Putting the Pieces Together:
State Nonpoint Source Enforceable Mechanisms in Context

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PUTTING THE PIECES TOGETHER:
STATE NONPOINT SOURCE ENFORCEABLE MECHANISMS IN CONTEXT

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Table of Acronyms

GENERAL/ FEDERAL	DEFINITION
319	Nonpoint source grant program under Clean Water Act
BMP	Best Management Practices
CAFO	Concentrated Animal Feeding Operations
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSO	Combined sewer overflow
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
FIP	Forestry Incentive Program
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NGO	Non-Governmental Organization
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	USDA Natural Resources Conservation Service
SIP	Stewardship Incentive Program for forestry
TMDL	Total Maximum Daily Load
US EPA/ EPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USGS	United States Geologic Survey
WHIP	Wildlife Habitat Incentives Program
WQIP	Water Quality Incentive Program
WRP	Wetland Reserve Program

STATE OF GEORGIA	DEFINITION
DCA	Georgia Department of Community Affairs
DNR	Georgia Department of Natural Resources
EPD	Georgia Environmental Protection Division
GFC	Georgia Forestry Commission
LAS	Land Application Systems
RC&D	Resource Conservation and Development Program
SWCC	Georgia Soil and Water Conservation Commission
SWCD	Soil and Water Conservation District

STATE OF MAINE	DEFINITION
CEO	Code Enforcement Officer
DAFRR	Department of Agriculture, Food, and Rural Resources
DEP	Maine Department of Environmental Protection
DMR	Maine Department of Marine Resources
DOT	Maine Department of Transportation
FAME	Finance Authority of Maine
L&WRC	Land and Water Resources Council
LEA	Lakes Environmental Association
LMF	Land for Maine's Future
LURC	Land Use Regulation Commission
MFS	Maine Forest Service
NRPA	Natural Resources Protection Act
PWD	Portland Water District
SPO	State Planning Office
SWCD	Soil and Water Conservation District
VLMP	Volunteer Lake Monitoring Program

STATE OF MARYLAND	DEFINITION
DNR	Maryland Department of Natural Resources
MACS	Maryland Agricultural Water Quality Cost Share Program
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
SRF	Water Quality State Revolving Fund

STATE OF OHIO	DEFINITION
DNR	Ohio Department of Natural Resources
HB 88	Ohio's cost share program, created by House Bill 88.
OEPA	Ohio Environmental Protection Agency
SWCD	Soil and Water Conservation District

STATE OF OREGON	DEFINITION
BPA	Bonneville Power Administration
DLCD	Department of Land Conservation and Development
GWEB	Governor's Watershed Enforcement Board
IMST	Independent Multidisciplinary Scientific Team
LAC	Local Advisory Committee
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
DEQ	Oregon Department of Environmental Quality
OWEB	Oregon Watershed Enforcement Board
SB 1010	Agricultural Water Quality Act, created by Senate Bill 1010
SWCD	Soil and Water Conservation District
WQMP	Agricultural Water Quality Management Plan

STATE OF TEXAS	DEFINITION
503	Texas cost share incentive program created by Senate Bill 503
DOPA	Dairy Outreach Program Area
EAPP	Edwards Aquifier Protection Program
ETJ	Extraterritorial Jurisdiction
NOV	Notice of Violation
PAP	Pollution Abatement Plan
RIO	Regionally Initiated Order
SWCD	Soil and Water Conservation District
TNRCC	Texas Natural Resources Conservation Commission
TPDES	Texas Pollutant Discharge Elimination System
TSSWCB	Texas Soil and Water Conservation Board

STATE OF VIRGINIA	DEFINITION
AMTA	Agricultural Market Transition Act
CBLAD	Chesapeake Bay Local Assistance Department
CBPA	Chesapeake Bay Preservation Area
CFO	Conservation Farm Option
DCR	Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
SWCB	Virginia Soil and Water Conservation Board
SWCD	Soil and Water Conservation District
VDACS	Virginia Department of Agriculture and Consumer Services

STATE OF WISCONSIN	DEFINITIONS
DATCP	Department of Agriculture, Trade and Consumer Protection
DILHR	Department of Industry, Labor, and Human Relations
DNR	Wisconsin Department of Natural Resources
LCC	County Land Conservation Commission
NOD	Notice of Discharge
AFO	Animal Feeding Operation
DLC	County Department of Land Conservation
UDC	Uniform Dwelling Code

Introduction

Pollution of our nation's waters is a continuing problem despite nearly thirty years of regulatory attention and funding. The largest remaining obstacle is "nonpoint source" water pollution. The federal Clean Water Act's National Pollutant Discharge Elimination System (NPDES) permit program regulates discharges of pollutants from "point sources," which include wastewater discharges from pipes, outlets, and other discrete conveyances, and stormwater discharges from industrial facilities, municipal sewer systems, and construction sites of five acres or more (one acre or more under recent regulations). But the NPDES program does not address nonpoint source water pollution from farms, forests, and other lands. Runoff from these lands carries sediment, nutrients, bacteria, metals, pesticides, organic compounds and other forms of pollution into the nation's rivers, lakes, estuaries, and wetlands.

The primary federal and state responses have been to provide financial and technical assistance and to encourage voluntary actions. Traditional nonpoint control methods include planning, technical assistance, promotion of voluntary best management practices (BMPs), funding of cost-share mechanisms, and public funding of stream buffers. But these assistance-oriented approaches have not succeeded in preventing pollution of the nation's rivers and streams.

Paying landowners not to pollute, providing free technical advice, and relying on voluntary adherence to BMPs has proven to be an incomplete strategy in many cases. Gradually, states are turning to enforceable mechanisms – including discharge prohibitions, direct enforcement of water quality standards, pollution abatement orders, required operating practices, nuisance and misdemeanor prosecutions, and civil and administrative penalties – to supplement other approaches. While enforceable mechanisms are not the primary instrument used to address nonpoint source pollution in any state, they are increasingly used to complement the other mechanisms.

This study examines representative experiences in eight states. It is intended to assess how enforceable mechanisms are used in practice. The study builds on several prior studies by the Environmental Law Institute (ELI) and available at www.eli.org. In 1997, ELI published a detailed analysis of enforceable state laws that were being used, or could be used, to address nonpoint source pollution. That report, *Enforceable State Mechanisms for the Control of Nonpoint Source Water Pollution*, identified the types of enforceable mechanisms available to the states and described their legal advantages and limitations. In late 1998, ELI published a companion state-by-state compendium of the enforceable laws – *Almanac of Enforceable State Laws to Control Nonpoint Source Water Pollution*. In 1999, ELI also published a related look at state programs affecting livestock operations, including those that can assist in making water pollution controls more effective – *Locating Livestock: How Water Pollution Control Efforts Can Use Information from State Regulatory Programs.*

The need for states to take further action to control nonpoint sources has been prompted by highly visible fish kills, endangered species listing of salmon runs in the Northwest, unacceptable fecal coliform levels in drinking water supplies, manure spills, nutrient pollution of major estuaries and lakes, and pollution effects on beaches and waterfronts. Concerns from point source dischargers that other polluters share some pollution prevention obligations are beginning to have some effect. Federal laws are also helping to drive the trend. Under section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA), over half the states are developing and beginning to

implement enforceable mechanisms in their coastal zones in order to remain eligible for continued grant funding. And all states will need to develop Total Maximum Daily Loads (TMDLs) to clean up their impaired waters identified under section 303(d) of the Clean Water Act. As they do so, many will need to use enforceable mechanisms to achieve more effective control over the nonpoint source discharges that comprise a significant source of the impairments.

The current challenges are deciding how to integrate enforceable mechanisms into the broad menu of assistance-oriented approaches, determining when enforcement is appropriate, and structuring a system that can act effectively when enforcement is invoked.

Methodology

This study uses a case study method to look at application of the tools identified in the *Almanac of Enforceable State Laws*. ELI examined the operation of nonpoint source control programs in the context of specific watersheds – including programs operated by state, local, and federal environmental, agriculture, forestry, natural resources, soil and water conservation, and land use agencies. The study:

- examines how these programs work, and what tools they use to achieve results;
- identifies how and where the enforceable mechanisms interact with the cost-share, voluntary, and technical assistance methods that comprise the primary approaches in these watersheds; and
- describes tools that can be adopted or adapted for use in other states.

The case studies include all of the pieces of the puzzle that now constitute nonpoint source controls in each watershed -- ranging from federal agricultural funding, to EPA funding, to state environmental programs, forestry programs, and agriculture programs, to local government programs, and soil and water conservation district programs.

We selected eight states for study: Georgia, Maine, Maryland, Ohio, Oregon, Texas, Virginia, and Wisconsin. Neither a cross section nor a collection of leading programs, the states were selected primarily to study particular enforceable mechanisms identified in the prior studies. A watershed approach was used to assess the operation of state nonpoint source programs. In several states we included more than one watershed in the study in order to examine different tools or different pollution problems. Although states were selected in order to study particular mechanisms, the research examined all of the enforceable and assistance-oriented policy tools relevant to the watersheds studied.

Georgia was selected because of its apparent authority to regulate nonpoint pollution sources under the state's water pollution law, and because of its river corridor protection law imposing enforceable obligations on local jurisdictions. Maine was selected to examine its array of land use laws relevant to nonpoint source pollution. Maryland was selected because of its new mandatory nutrient management planning law and its enforcement programs addressing discharges from agriculture, development, and forest harvest sites. Ohio was selected because of its authority to issue state-level nonpoint source abatement orders to farming and forest operations. Oregon offered the opportunity to examine integration of land use and watershed planning, an agricultural abatement

order linked to watershed planning, and a comprehensive forest practices act. Texas was selected in order to examine its programs authorizing local regulatory controls, and specifically special controls in the Edwards Aquifer area. Virginia's forest and agriculture nonpoint source abatement orders were the basis for its selection. Wisconsin was selected because of its integration of enforceable, technical assistance, and cost share mechanisms through the state's long-standing priority watershed program.

This study focuses on program delivery and implementation rather than on water quality outcomes. One of the incidental findings – worthy of its own future analysis – is how little monitoring data exist to assess the effect of any nonpoint source programs on water quality. Indeed, even where water quality data exist for a particular place and time – demonstrating nutrient impairment, for example – there is rarely comparable data from an earlier and later time that can show trends. Thus, program effectiveness is expressed in this study in terms of compliance with standards, norms, or BMPs, that are believed to protect water quality.

ELI conducted the research by collecting and examining laws, regulations, manuals, policies, and reports, and by conducting numerous interviews. Draft chapters were prepared and circulated for comment, then revised.

Each state chapter begins with a brief summary. This is followed by descriptions of the watershed(s) studied, the enforceable mechanisms available, and the assistance-oriented nonpoint source programs available in the watershed. Each chapter then discusses how these various tools and resources have been applied – or not applied – in the study watersheds. A brief conclusion to each chapter highlights issues, impediments, and opportunities resulting from each state's approach.

Putting the Pieces Together: Nonpoint Source Enforceable Mechanisms in Context

The eight case studies offer lessons for state and federal officials, policy makers, and others interested in improving nonpoint source pollution programs. Among these are the following:

1. ***Enforcement is already a small part of the strategic mix to control nonpoint sources***.

Each state, even though leading with other strategies, has recourse to enforcement tools for some nonpoint source problems. Some results simply cannot be accomplished by other means. For example, enforceable standards are widely used in addressing land clearing and grading activities not subject to NPDES stormwater permitting. States have found that waiting until after pollution occurs to take action, or relying wholly on voluntary standards, is an ineffective strategy. Similarly, for timber harvesting – where the land disturbance is temporary and the logger often is not readily available for post-harvest correction of problems – standards and enforceable mechanisms can be used to prevent pollution problems. Enforcement plays a critical role in agricultural pollution control as well. For agricultural animal operations falling below the numerical thresholds for NPDES permitting as concentrated animal feeding operations (CAFOs), many states have found that regulation and enforcement is needed to promote construction of necessary facilities and adherence

to management plans. This is the case both because control costs may be fairly high for such operations (thus inhibiting voluntary compliance even where cost shares are available), and because the impacts that occur are significant as most livestock operations are sited near water. Finally, for all forms of nonpoint source pollution, there is always some set of actors that will not respond to other means (not even 100 percent funding). For these actors, enforcement is an essential back-stop to other strategies.

2. ***Enforcement authority can be 1) linked to operating requirements or standards, and 2) integrated with a watershed plan.***

Enforceable nonpoint source mechanisms fall generally into two categories. One category provides an after-the-fact remedy. This category includes sanctions associated with violating a general prohibition on the discharge of pollution to the waters of the state, enforceable water quality standards, and authority to order the abatement of a nonpoint activity. The other category prescribes enforceable operating standards intended to prevent nonpoint pollution. Such mechanisms include construction requirements for the containment of manures, requirements for the filing of forest harvest plans, prohibitions on certain activities within 50 feet of streams, site erosion control requirements, and many other measures.

The study states have both of these types. State mechanisms that provide only an after-the-fact remedy without significant influence on operating approaches or inspection and monitoring appear to be less effective. For example, Ohio is able to invoke its nonpoint source abatement order authority only after pollution occurs. Virginia recently amended its formerly complaint-driven silvicultural nonpoint abatement order law in order to gain greater information and accountability from operations prior to any discharge occuring. In contrast, Maryland's agricultural enforcement programs are linked to on-farm water quality management planning and to nutrient management planning. Oregon links enforcement of agricultural practices to water quality management planning.

Some states link all of their nonpoint source efforts to watershed assessment and planning. This improves accountability for outcomes, while it enhances delivery of cost share and technical assistance. It also ties enforcement more closely to water quality objectives. Of the eight study states, Wisconsin and Oregon have the most detailed and comprehensive watershed planning associated with their nonpoint source controls. Maine is increasing its reliance on this kind of approach. While EPA's § 319 nonpoint source grant program has recently required watershed assessments in order for states to share in the additional funding available under that

program, a number of states have used this approach for some time – applying it to other cost-shares, technical assistance, and enforceable mechanisms.

3. ***Cost-share mechanisms continue to play a substantial role, particularly for agricultural sources***.

All of the states use cost-share and technical assistance as a primary approach to nonpoint source water pollution controls on agricultural lands. Federal funds often provide the bulk of cost-shares, but several of the study states – including Wisconsin, Maryland, and Virginia – have made significant state-funded cost-shares available. Several states have also enacted property and income tax breaks to encourage agricultural planning and installation of pollution control practices. Cost shares can play an important role in assuring compliance with regulatory programs. For example, Maryland has supported its new mandatory nutrient planning law's implementation with additional loan and cost-share funding. Wisconsin integrates costs shares with enforcement by linking eligibility for some cost shares to an operator's prompt response to an enforceable mechanism – such as the notice of discharge for animal operations. Ohio takes the opposite approach by prohibiting the issuance of an enforcement order that requires installation of a cost sharable practice unless cost share funding is actually provided.

Integration of technical assistance and cost share with enforcement has been difficult in some respects. Many agriculturally-oriented agencies do not want to be associated with enforcement. The case studies show that even states with the most fully developed enforceable mechanisms generally seek to assure that in addressing agriculture and forestry, the enforcement function is assigned to a separate entity from the cost-share and technical assistance function.

4. ***Geographically-targeted enforceable protections are significant features of state nonpoint programs***.

Although many state programs emphasize BMPs and rely on "no discharge of pollution" or abatement order provisions to address violations wherever they may occur, there is a clear trend toward geographically focused protections. For example, Georgia's unique river corridor protection program is intended to focus particular regulatory attention on these areas. Maine's Natural Resources Protection Act and Mandatory Shoreland Zoning Act provide special protections for areas vulnerable to nonpoint source pollution. So do the Chesapeake Bay protection acts of Maryland and Virginia, and the Edwards Aquifer protection program in Texas. Wisconsin's use of a priority watershed program – and designation of critical sites within these watersheds – reflects another way to focus both cost share and regulatory efforts.

5. ***Enforcement procedures are more effective when simple to use and prompt in their effect***.

Because in the nonpoint source universe enforcement generally comes only after all other approaches have failed, it is important that the enforceable mechanisms be straightforward and effective as early as possible. The track record of the states in this area is mixed. Ohio's abatement orders often restart the negotiations that led to the request for enforcement by the soil and water conservation district. Wisconsin's state-level agricultural pollution abatement orders also can result in a long waiting period. Prompt approaches include measures that can be locally taken. This can

include enforcement by county and local officials and enforcement by other state officials using local magistrates (as with Ohio's wildlife officers). Local governments play a significant role in nonpoint source regulation in a number of states – primarily in the field of erosion and sediment control from nonagricultural activities, but also including agriculture and silviculture in several states.

Local programs seem to require a great deal of state support, funding, and technical assistance, but when fully staffed seem to offer some advantages in effectiveness and visibility. Maryland, Wisconsin, and Maine have integrated nonpoint concerns into a vast array of laws, many of which involve local government. Georgia has some interesting locally-enforceable mechanisms, including the river corridor protection law, but its implementation experience is too recent to assess the effectiveness of this program generally. Texas's Edwards Aquifer program provides another example of a targeted regulatory regime with local enforcement that seems to operate well.

Enforceable Mechanisms Are Here To Stay

States are adopting enforceable mechanisms to supplement more traditional approaches. The case studies show that states often take some time to adopt and then use these mechanisms, but that once in use the enforceable mechanisms are supplemented or strengthened.

Maryland and Wisconsin appear to have the most fully integrated systems of nonpoint source controls. Both combine substantial cost-share funding with the realistic option to use enforceable mechanisms. Of the two, Wisconsin seems to have devoted greater effort to planning and targeting, Maryland to the development of an array of enforceable programs.

Nonpoint source enforcement is not a great unknown. Nor is it a mere spectre of the much debated TMDL process. The experiences of the states examined in this study offer substantial guidance about ways to structure enforcement, to develop programs, and to integrate traditional approaches with enforcement.

Nonpoint source pollution is perhaps our biggest water quality problem, and it remains one of our greatest problems of environmental governance. It will continue to be a problem until we address nonpoint source pollution with the same seriousness with which we addressed industrial and sewage discharges beginning in 1972. The solution will require a shared state and national commitment to solve the problem – demonstrated by:

- accountability for results in improving water quality,
- adequate state and federal funding, and
- enforcement.

Many of the pieces of this puzzle are already on the table. Some states have even assembled parts of the picture. It is time to finish the job.

Georgia Case Study

Summary

This study examines the mechanisms used to manage and control nonpoint source pollution in the Coosa River watershed in northwestern Georgia.[1] The study specifically examines the relationship between enforcement approaches and voluntary, technical assistance, and cost share approaches as used in the watershed. Georgia primarily uses voluntary and technical assistance programs that emphasize best management practices for nonpoint source pollution management – especially in agriculture and forestry. Although the need to maintain certain water quality standards can be used to enforce against agricultural and forestry nonpoint source runoff, in practice this enforcement mechanism seldom is used. Georgia does have an innovative mechanism for requiring localities to include environmental criteria in their comprehensive plans and local ordinances, including river corridor protection criteria. Georgia also requires localities to implement erosion and sedimentation control requirements on land development activities, and especially localities in high growth areas are developing innovative enforcement programs to manage this type of nonpoint source pollution. The state is strengthening its permitting programs for stormwater, concentrated animal feeding operations, and land application systems.

The Coosa River Watershed

The Coosa watershed in the northwest corner of Georgia is a mixture of rural and rapidly suburbanizing lands. Its streams are impacted by runoff from farms, forestry operations, and small surface mining sites. However, the southern counties of the region and the areas around municipalities are seeing an increase in subdivision development. Such development is leading to increased erosion and sedimentation runoff from construction, as well as urban runoff and sewer overflow problems. In general, the Coosa watershed is still fairly pristine, however threats exist from a variety of nonpoint sources and certain stream segments are impaired. Impaired streams in the Coosa watershed are primarily impacted by nonpoint source and urban runoff, fecal coliform being the most common contaminant.[2]

Named among the ten most endangered rivers in the United States in 1999, by the conservation group American Rivers, the Coosa River Basin in Georgia and Alabama flows through many wild and natural areas and supports a wide range of biodiversity.[3] The Coosa watershed, encompassing approximately 4,700 square miles, includes most of the counties in the Northwest corner of Georgia.[4] Several major rivers run through the watershed, including the Conasauga River, the Coosawattee River, the Oostanaula River, the Etowah River, and the Coosa River.[5]

The Coosa region is a priority watershed for agricultural nonpoint source management. Approximately 6 of its rivers and streams exhibit water quality impairments due to agricultural nonpoint source pollution, while 16 have a high potential of water quality problems.[6] Most of the farms in the region are still small family farms, but there is a recent increase in concentrated animal feeding operations. The watershed includes 2.4 million acres of forested land of which 11% is owned

by the forestry industry while the rest are held by landowners. Nonpoint source pollution from forestry accounts for a relatively small percentage of the overall water quality impairment. Major pollution risks involve sediment from roads and skid trails, soil disturbance during site preparation, and streamside cutting.

Georgia Environmental Protection Division (EPD) studies have concluded that, statewide, sediment is the most severe pollutant from nonpoint sources.[7] The proximity to suburban Atlanta affects both water quality and water quantity in the Coosa watershed. Increased construction from new housing developments contributes to sedimentation in the southeastern localities of the watershed.

Finally, surface mining is a $1.7 billion industry in Georgia. Mining in Georgia is concentrated primarily in stone, clays, and other construction and industrial materials. The Coosa watershed has a mixture of surface mining operations, some of which require NPDES permits, such as quarries, and some of which require surface mining permits, such as pit operations and borrow pits for clay, fill dirt, gravel, etc. Almost every county in the watershed has some type of surface mining.[8] There are approximately 24 quarries, 18 borrow pits, 12 dredgers, and 10 pits (primarily for clay) permitted in the region.

Enforceable Mechanisms

Of the Georgia nonpoint source enforceable mechanisms, the following were reviewed because of their relevance to the Coosa watershed.

! ***Water quality standards***. The Georgia Water Quality Control Act requires that the water quality standards for Georgia not be violated and provides civil and criminal enforcement sanctions for water quality violations.[9] As implemented, it does not establish a permitting process for nonpoint discharges, although the Act apparently would allow EPD to do so.[10] The Act is used primarily in forestry and agricultural nonpoint source discharge cases where there is a serious violation of water quality standards and the agency responsible for best management practices (BMP) implementation and technical assistance cannot secure compliance or implementation of BMPs. In these cases, the responsible agency may turn the case over to Georgia Department of Natural Resources' Environmental Protection Division (EPD) for enforcement.

! ***Land disturbance permitting***. The state Erosion and Sedimentation Act establishes a permitting process for land-disturbing activities such as clearing, grading, excavating, or filling of land.[11] To receive a permit, an applicant must submit an erosion and sediment control plan that outlines specific BMPs for implementation. This Act also directs local governments to enact erosion and sedimentation ordinances for review by the EPD. Once an ordinance has been found consistent with state law, EPD grants the local government authority to issue and enforce permits for land-disturbing activities. In areas where a local government has not been certified, the EPD is responsible for permitting, inspection, and enforcement under the Act. However, in much

of the state, local governments have adopted erosion and sedimentation ordinances and have been given the authority to issue and enforce permits for land-disturbing activities.[12]

! ***Surface mining permitting***. The Georgia Surface Mining Act requires a permit from EPD for surface mining operations.[13] The Act applies to surface mining activities statewide. Surface mining is defined as any activity or process for the removal of minerals, ores, or other solid matter.[14] Tunnels, shafts, and dimension stone quarries are not considered to be surface mining. Minerals include sand, clay, stone, gravel, phosphate, and other rocks and ore of commercial value found in natural deposits on or in the earth. The Act covers dredging of sand as well as other surface mining activities. EPD has the authority to enforce violations of the permit, including water quality and discharge violations.[15]

! ***Land application systems permitting***. Under the Water Quality Control Act, Georgia requires a general permit for all land application systems (LAS), including agricultural systems for spreading animal waste, municipal systems for spreading treated wastewater, and industrial systems for spreading treated wastewater.[16] A general permit can be issued for all facilities within a specific geographic area or to a specific category of LAS facilities. EPD may also require specific facilities to obtain an individual LAS permit. LAS permits are no-discharge permits and refer back to the accepted best management practices for land application of animal waste, human waste, or industrial waste, including a requirement for a treatment, storage, operation, and management plan that is incorporated by reference into the permit.

! ***River corridor protection***. Under state law, protection of river corridors and other critical natural resources is to be accomplished through comprehensive planning at the local level. Localities in Georgia are required to develop comprehensive plans if they wish to receive and maintain the status of "qualified local government" in order to participate in certain state financial assistance programs.[17] These plans must contain the minimum environmental criteria set out by EPD to protect large rivers from the impacts of human activities on land immediately adjacent to the river.[18] Each local government with a protected river in its jurisdiction is directed to adopt a river corridor protection plan which meets minimum planning standards established by the Department of Natural Resources.[19] Further, the river corridor protection standards must be incorporated into a local ordinance.

! ***Total Maximum Daily Loads***. Under section 303(d) of the Clean Water Act states must list impaired waters and provide that information to USEPA. Further, states must develop total maximum daily loads for certain pollutants for the impaired waters identified in the section 303(d) report. The state must then ensure that the TMDLs are met by point and nonpoint sources alike. In Georgia, a 1997 consent decree after litigation initiated in part in the Coosa watershed by the Coosa River Basin Initiative, started the TMDL identification and implementation process in the state. The draft Georgia 2000 list of waters under section 303(d) was submitted March 2, 2000 to USEPA.[20]

Assistance-Oriented Nonpoint Source Programs

This section describes a number of the technical assistance, cost-share and voluntary programs that address nonpoint source water pollution in the Coosa watershed. It is not an exhaustive list, but provides a brief description of programs that have influenced activities and water quality in the watershed.

! ***Agricultural Incentives to Protect Sensitive Lands***. Incentive programs offer a combination of rent payments and cost-share assistance covering 50-100 percent of the expense of the specific conservation practices or restoration activities. Incentives to shift agricultural production from sensitive lands and to restore them to more natural conditions mainly are provided through four federal programs, the Conservation Reserve Enhancement Program, the Wetlands Reserve Program, the Environmental Quality Incentives Program (EQIP), and Section 319 financing under the federal Clean Water Act. In the Coosa watershed, EQIP and Section 319 funding are the two most common programs used to manage nonpoint source pollution. The Wetlands Reserve Program and the Conservation Reserve Program are less commonly used, partly because eligible land is not as abundant as in other parts of Georgia and partly due to rising land values making landowners reluctant to enter into long term conservation agreements.

! ***Forestry Best Management Practices***. Forestry is subject to the Georgia Water Quality Control Act, but exempt from erosion and sedimentation control permit programs, provided that best management practices are used. Education and training focus on proper installation and maintenance of BMPs to minimize or eliminate nonpoint source pollution from forestry activities.

! ***Watershed Assessments***. Georgia has a relatively recent policy that any locality asking for an environmental permit from the state that facilitates growth and development, such as a wastewater permit or a water withdrawal permit must conduct a watershed assessment before receiving the permit.[21] There are 30 assessments currently taking place around Georgia.

! ***Adopt-A-Stream and Citizen Monitoring***. Georgia Adopt-A-Stream is a volunteer network of citizens and local governments that monitor water quality and conduct water body enhancement activities. Volunteers in the Georgia Adopt-A-Stream program and in other citizen programs monitor and record water quality providing valuable information to help citizens, the state, and localities understand both point and nonpoint pollution discharge sources, types, and quantities.

Discussion and Analysis

River Corridor Protection and Local Comprehensive Planning

Georgia establishes corridors along selected rivers as critical natural resource areas. The Conasauga, Oostanaula, Etowah and Coosa Rivers of the Coosa watershed are all state-designated protected river corridors. State law requires the Department of Natural Resources to develop minimum standards for the "protection of the natural resources, environment, and vital areas of the state, including, but not limited to, the protection of mountains, the protection of river corridors, the protection of watersheds of streams and reservoirs which are to be used for public water supply, for

the protection of the purity of ground water, and for the protection of wetlands, which minimum standards and procedures shall be used by local governments in developing" comprehensive plans.[22]

The minimum standards for watershed protection include buffer areas along streams and reservoirs, land development densities, and land use activities.[23] Standards for protection of river corridors include natural vegetative buffer areas for a distance of 100 feet on both sides as measured from river banks.[24] Septic tanks and septic tank drainfields for non-single family residential developments are expressly prohibited within the 100-foot buffer. In addition, areas for receiving, storing, or disposing hazardous waste or hazardous materials, as well as solid waste landfills are prohibited within the buffer. Construction of single family dwellings with a two acre minimum lot size which comply with local zoning is exempt from the river corridor protection requirements.[25] The statute gives local government the authority to exempt agriculture and silviculture consistent with BMPs from river corridor protection plans, but it does not require that agriculture and forestry be exempt.[26] The regulations, in contrast, treat agriculture and forestry as acceptable uses provided they do not impair the long term functions of the protected river or the river corridor.[27] It is not clear how EPD, DCA, and localities have dealt with this inconsistency.

In addition, at the discretion of local governments, mining and quarrying activities may also be exempted from river corridor protection requirements, according to both the statute and the regulations.[28] Finally, local governments may exempt wildlife and fisheries management activities and wastewater treatment.

In 1990, when comprehensive plans were first required, the Georgia Department of Community Affairs (DCA) asked local governments to address how they would handle river protection both in the comprehensive plan and in a 5-year short-term work-plan. DCA required that local governments also develop ordinances, but did not yet enforce this requirement.

As most governments complete their first 5-year short term review, DCA is requiring ordinances for all of the environmental criteria under the Comprehensive Planning Act. Localities that do not pass ordinances according to the time schedule set out by DCA will loose their qualified local government status until the ordinances and other planning requirements are in place. A loss of the qualified local government status means that a locality is no longer eligible for state environmental permits, state grants, and state loans.

All but four of the localities in the Coosa River Watershed contain river corridors for which ordinances must be developed.[29] Cherokee, Floyd, Gordon, and Forsyth Counties and the City of Rome recently have adopted river corridor protection ordinances. The other localities that require the ordinances have due dates in the year 2000 or beyond. All local governments in the Coosa River Watershed have had qualified local government status. Recently the qualified local government status for a few localities in the Coosa watershed was put on hold pending review of river corridor and wetlands protection ordinances that were submitted after their deadline had passed.

The river corridor ordinances typically follow the model ordinance developed by EPD, with a few exceptions. For example, the City of Rome widened the required buffer for tributaries specifically identified in the ordinance to 40 feet.[30] Localities tend to combine enforcement of the river corridor protection ordinances with erosion and sediment control inspections for new construction. For example, in the City of Rome when a developer asks for a zoning verification prior to receiving a building permit, he or she also receives verification of the buffer requirements. The Building Inspector must enforce the buffer during the inspection process. To date, no enforcement actions have taken place in this area under this ordinance in Rome.

Construction Activities: Erosion and Sedimentation Control

Certain activities under the Erosion and Sedimentation Act are unconditionally exempt from permitting requirements; these include: surface mining, granite quarrying, home gardening and landscaping, *agricultural and forestry operations*, and any other project carried out under the technical supervision of the Natural Resources Conservation Service. Other activities are partially exempt, meaning they do not need to obtain a permit prior to land disturbance, but BMPs must be followed. Such activities include: construction of single-family residences, construction or maintenance of roads by state or local governments, and land-disturbing activities conducted by public utilities.

Under state law, activities on sites of one and one-tenth acres or less are exempt from both permitting and BMP requirements unless such activities occur within 200 feet of lakes or perennial streams, in which case landowners must prevent sediment from moving beyond the property boundaries. Local governments with delegated authority for erosion and sediment control can, however, elect not to exempt activities on small sites from permitting or BMP requirements.

Local governments, with oversight by the EPD and the area Soil and Water Conservation District (SWCD) are primarily responsible for implementing the Erosion and Sedimentation Act. The Erosion and Sedimentation Control Act directs local governments to enact erosion and sedimentation ordinances. These ordinances are reviewed by EPD and, if consistent with state law, the local government is granted the authority to issue permits for land-disturbing activities. In much of the state, local governments have adopted erosion and sedimentation ordinances and have been given the authority to issue and enforce permits for land-disturbing activities.[31]

The state Soil and Water Conservation Commission (SWCC) has instituted program oversight to help municipalities to implement the erosion and sediment control requirements. In cases where a locality consistently does not implement the program, the SWCC can ask EPD to take back the issuing authority. This has happened or been threatened in several cases in the Coosa River Basin Watershed – as is described in the description of the revised Cherokee County program below.

Reports of suspected violations of the Erosion and Sedimentation Control Act are made to the body that issued the permit. Except in localities with strong inspection programs, the complaints typically come from citizens. In cases with a local issuing authority, if the violation continues, the complaint is then referred to the SWCC. The SWCC typically will write a letter to the issuing authority asking it to solve the violation. In the Coosa watershed region (Region 1), the SWCC received over 1000 complaints in 1999. Approximately half were successfully handled with a phone call or a letter to put the locality on notice. Of the remaining complaints, approximately 1 in 4 needed

a site visit from the SWCD before they were remedied. Approximately 10% are ongoing problems that need stricter enforcement measures. If the situation remains unresolved after the appropriate SWCD has exhausted site visits, letters, and action by the locality, the complaint is then referred to EPD for enforcement.

Enforcement, by EPD or the issuing authorities, consists of administrative orders, injunctions, and civil penalties. Civil penalties for non-certified counties and municipalities are authorized up to $2,500 per day. Permit revocation, suspension, modification, and bond forfeiture constitute additional enforcement sanctions.

In addition to erosion and sediment control, Georgia also has a NPDES permit program regulating discharge of stormwater from construction activities. As of 1997, the program was undergoing judicial review and implementation had been halted pending the results of that review. According to a February 2000 settlement of cases challenging the stormwater NPDES permit system, EPD will issue new stormwater permits for construction sites of 5 acres or more sometime in summer 2000.[32]

Erosion and Sediment Control in Cherokee County -- As a metro-Atlanta locality, Cherokee County is one of the fastest growing areas in the nation. The constant development and construction poses an enormous erosion and sediment control challenge to the county. In 1997, Cherokee County was put on warning by the EPD that if it did not do a better job as an issuing authority under the Erosion and Sediment Control Act, the program would be taken away and assumed by EPD. At the time, Cherokee County had an erosion and sediment control ordinance based on the model ordinance prepared for localities by the SWCC. However, there was very little implementation of the ordinance. Cherokee County hired new inspectors and developed a teamwork approach to enforcement of the erosion and sediment control provisions, that included housing all erosion and sediment control permitting in a single department. With the backing of elected officials, they restarted their program with a zero tolerance policy for non-compliance.

Currently, in Cherokee County, developers submit a plan in order to be granted a permit to clear, allowing trees to be cut and erosion control devices to be put in place.[33] The area is then inspected, after which the developer can receive a land disturbance permit. Once the projects start, inspectors drop by regularly, as much as several times a week, depending on the nature of the project. To build a house, the builder must apply for an erosion control permit in order to cut trees and install the erosion control devices. Once the site is inspected, the builder can receive the erosion control permit. Only with the erosion control permit can the builder receive a building permit from the Building Inspections Department.

Cherokee County counts on cooperation with its County Marshall and Magistrate to implement the zero tolerance enforcement policy. Inspectors can and regularly do issue stop work orders in the field as soon as they spot a violation. These stop work orders last until the violation is fixed, sometimes a day, sometimes a week or longer. One recent stop work order lasted a year. If inspectors find a problem that is actively impacting a waterway, they ask the County Marshall to issue a field citation. The developer must then go in front of the County Magistrate. Under this zero tolerance policy, compliance rates in the county are rising.

Agricultural Pollution

Education, technical assistance, and financial incentives are the primary mechanisms used to prevent agricultural nonpoint source pollution. Agricultural programs emphasize the use of best management practices (BMPs) to minimize or eliminate erosion, sedimentation, and runoff of other pollutants. Georgia has developed recommended BMPs for a wide range of agricultural activities. The Georgia Soil and Water Conservation Commission (SWCC), in conjunction with the 40 Soil and Water Conservation Districts (SWCD) and with other cooperating agencies, such as the U.S. Natural Resources Conservation Service (NRCS), conducts a statewide education and technical assistance program to promote the adoption of BMPs.

Agricultural operations fall under the Georgia Water Quality Control Act which sets water quality standards that may not be violated by agricultural runoff. Enforcement actions are rarely if ever brought for nonpoint source pollution from activities that do not need any type of permit. Only land application systems and concentrated feeding operations need permits in Georgia under the Water Quality Control Act regulations.

All agricultural operations are exempt from the Erosion and Sedimentation Control Act, and may be exempt from the River Corridor Protection Act provided the activities are consistent with BMPs.

In general, the SWCC and the NRCS believe that enforcement techniques do not work well with farmers, finding that family farms respond best to assistance, voluntary programs and training. However, the growing number of concentrated animal feeding operations (CAFOs) and other large scale hog and chicken farms is causing the state agencies to think about permitting and enforcement techniques for these types of farming operations.

Concentrated Animal Feeding Operations (CAFOs) – The DNR Board recently promulgated rules on permits for swine feeding operations with over 300 animal units.[34] New rules covering dairy and poultry are expected in late 2000. The rules allow no discharge from the swine feeding operations into surface waters of the state. By October 31, 2001, the owner or operator of an existing swine operation is required to submit a comprehensive nutrient management plan to EPD. The owner or operator of a new operation must have the plan in place before receiving the permit. Any failure to comply with any condition of the regulations will be deemed a violation of the Water Quality Control Act and may be punishable in accordance with the penalties provided for in the Act.

Prior to these rules, EPD had a memorandum of understanding (MOU) with the NRCS and the SWCC about best management practices for land application systems (LAS) on concentrated animal feeding operations. The MOU was first developed in 1981 and revised in 1991. Under the MOU, EPD issued new large CAFOs (over 1000 animal units for swine, dairy, and poultry) with land application system permits. There were only 13 permitted CAFOs statewide. The MOU is still in place for those facilities not covered by the new regulations (dairy and poultry), although its implementation is currently on hold pending new regulations that are expected later in 2000 concerning dairy and poultry. The SWCC has seen an increased interest among CAFOs in improving their pollution prevention systems: the SWCC reports an increase in calls from CAFOs requesting assistance with best management practices since the new regulations were proposed.

Agricultural land application systems require permits. Violations by farmers are handled by SWCC in the first instance to try to bring the system into compliance. If there is a fish kill or public health hazard associated with the violation then EPD will consider enforcement actions. EPD issues approximately 2 - 3 consent orders a year concerning agricultural land application system violations. A review of the EPD published enforcement orders found that no EPD enforcement orders had been proposed or finalized between 1998 and early 2000 in any of the localities of the Coosa watershed for violations of agricultural LAS permits.

Resource Conservation and Development Program (RC&D) – Most of the Coosa watershed is covered by the Resource Conservation and Development Program of USDA. Jurisdictions have banded together to form "Council Areas" that then identify the most important resource issues, set priorities, develop projects, and look for funding. Funding under Section 319 of the federal Clean Water Act is commonly used in the RC&D program and the projects carried out are often water quality demonstration projects. Water quality demonstration projects are a common component of the education and technical assistance program. Assistance with implementation of total resource management systems or of specific BMPs is provided in identified priority project areas. Assistance can include, for example, funding to agricultural producers for water related BMPs. These demonstration projects are implemented through cost-sharing programs with a combination of federal funds and state, local, and producer matching funds. The Coosa watershed is divided into three Council areas that would impact the basin. The Chestatee - Chattahoochee RC&D program covers the area around Lake Lanier and the Upper Coosa watershed. The Limestone Valley RC&D progra covers most of the Northwest to the Alabama line. The Rolling Hills RC&D program picks up west of the metro-Atlanta area.

Environmental Quality Incentives Program (EQIP) Priority Areas – The federal EQIP program focuses on priority areas where agricultural improvements will help meet water quality objectives and where financial assistance is available from state or local governments. EQIP will offer five to 10-year contracts providing incentive payments and cost-sharing for selected conservation practices, including grassed waterways, filter strips, buffer strips, and others. The SWCC encourages fencing out of streams to keep animals from watering directly in streams by providing financial assistance to build alternative watering locations. The Coosa watershed includes two EQIP priority areas: Armuchee Creek in Floyd, Walker and Chatooga Counties and the Conasauga River. Under EQIP a local workgroup sets conservation priorities for the area that are funded in part through EQIP and in part through other programs such as Section 319 funding. The types of practices that are typically priorities in the Coosa watershed concern livestock waste, alternative water supplies, and grazing practices.

Forestry Water Quality Programs

In 1978, EPD designated the Georgia Forestry Commission (GFC) as the lead agency in coordinating the forest water quality portion of the overall state program.[35] The Forestry Nonpoint Source Pollution Technical Task Force developed recommendations that forestry activities be carried out in accordance with voluntary best management practices.[36]

Because soil characteristics and slope vary greatly across the state, BMPs have been tailored to each of Georgia's four regions. The Coosa watershed falls in both the Piedmont and the Mountains

regions. Individual BMPs have been developed for eight groups of forestry activities: streamside management zones, stream crossings, access roads and their construction, timber harvesting, site preparation, reforestation, forest protection (prescribed burning, fire lines, and chemical fire retardants), and chemical treatments. BMPs include recommended activities as well as practices to be avoided. The Georgia Forestry Commission issued revised BMPs for commercial forestry, specifying new widths for streamside management zones, a refined list of streamside scheduled recommended activities within those zones, and other BMPs in January 1999.[37]

Since 1991, the GFC has carried out BMP compliance surveys in each river basin. The surveys identify any problems with implementation of best management practices. The compliance surveys function as a compliance audit. The GFC acts on findings of non-compliance by notifying the landowner and working with them to bring the forestry operation into compliance. In the Coosa River Basin, the 1992 compliance survey found that most of the forestry operations were in compliance. For example, in the Coosawattee River Basin where 3 sites involving 260 acres of forestry operations were evaluated, 72% of road miles, 96% of harvested acres, and 98% of prepared sites were in compliance. In the Etowah River Basin where 10 sites involving 1161 acres of forestry operations were evaluated, 89% of road miles, 95% of harvested acres, 69% of prepared sites, and 100% of regenerated areas were in compliance. GFC carries out the compliance surveys every two years.

In addition to helping the GFC identify problems, the compliance survey is used to target educational needs in the forestry community. GFC has carried out 3 or 4 workshops since 1995 in the Coosa River Basin. In general they have found that sites on U.S. Forest Service land are almost always in compliance, industrial forestry operations are generally in compliance, while private landowners are less often in compliance. For example, in the Etowah River Basin, as discussed above, on private lands compliance for roads was 72% while on forest industry lands, compliance for roads was 93%.

Complaints about actual or potential water quality impacts from commercial forestry activities first are referred to the GFC. Complaints from citizens are common, particularly in the counties with growing populations where landowners are living closer to forestry operations than in prior years. After notifying the forest owner, the GFC district coordinator makes a field inspection to determine if BMPs were followed, if there is a potential for water quality problems and who was responsible for the activity (*e.g.*, site preparation or timber harvesting). If problems exist, the GFC will work with the responsible parties until the problem is corrected or until it

determines that the issue cannot be resolved. GFC estimates that it has a 90% success rate in obtaining compliance through working with the responsible parties.

In situations where the GFC cannot gain satisfactory compliance, the case is turned over to EPD for action under the Georgia Water Quality Control Act.[38] For example, in Lumpkin County, a case was turned over to EPD for enforcement where the developer was trying to use the forestry exemption from the Erosion and Sedimentation Control Act to cut timber without a permit in order to sell the land for development. Under the Georgia Water Quality Control Act, if during logging the water quality standards in streams are exceeded and best management practices are not in place, EPD may bring enforcement actions. EPD actions include issuing a warning to the responsible party or landowner, undertaking water quality investigations to document nonpoint source impacts, referring the complaint to USEPA or initiating enforcement action as provided by the Georgia Water Quality Control Act. Typically, enforcement action will be taken by EPD where there is a demonstrable violation of water quality standards and the responsible party has a history of causing chronic water quality problems. There have been a few cases, including in the Coosa River Basin, where EPD assessed civil penalties.

Surface Mining Runoff Control

There is some surface mining in the Coosa River Basin Watershed, primarily stone or granite quarries and extraction of fill materials. An application for a surface mining permit must be accompanied by a mining land use plan consistent with the land use in the area of the mine. The plan also must specify activities for control of erosion and sedimentation and disposal of refuse, as well as provisions for reclamation of the affected land. The mine operator is responsible for completion of the plan. In addition to the land use plan, surface mining operators must file a surety bond with EPD for land reclamation activities. EPD surface mining permits incorporate best management practices for protecting water quality. Site operation, objectives of the land use plan, and estimated cost factors for completion of the mining land use plan are subject to review and evaluation by EPD at least every five years. Following the review, bonding amounts will be adjusted as needed to ensure adequate funding for site reclamation.

In practice, EPD Land Protection Branch will take actions under both the Surface Mining Act and the Water Quality Control Act to enforce permits and to remedy violations of water quality standards. The Branch typically uses the Surface Mining Act with its lesser fines of $1,000 per violation and $500 for each day of violation thereafter for minor or one-time violations,[39] and uses the Water Quality Control Act with its higher penalties for major or continuing violations. EPD enforcement typically starts with one to two notices of violation, a consent order if the problem is not fixed, and an administrative order if the violation is severe or if the consent order does not achieve compliance. EPD can also request penalty hearings connected to the administrative order.[40]

New Water Quality Enforcement Policy

As of 1998, EPD has become more vigilant about bringing enforcement actions in the case of violations of the Water Quality Control Act for certain areas, including the Coosa River watershed.[41] These enforcement actions are primarily brought in urban areas against violations of NPDES permits and sanitary sewer overflows. In practice, the Georgia Water Quality Control Act is rarely used to enforce against nonpoint source pollution. According to the published EPD enforcement orders, as of 1998, only two enforcement orders were brought in the Coosa watershed for nonpoint source violations of the Water Quality Control Act. These were both in Forsyth County and included an unauthorized discharge from a hog farm in September 1998 and an unpermitted land disturbing activity violation by a developer in January 1999.[42] The bulk of the enforcement orders in the Coosa watershed were for violations of NPDES permits and for sewer system overflows. There was one enforcement order concerning violation of a LAS permit.

In late 1997, the Georgia Department of Natural Resources (DNR) Board in reaction to several high profile water quality problems in high growth areas, asked EPD to identify areas of the state where the water systems were under stress. At the time there were a significant number of sanitary sewer overflows due to high growth in the metro-Atlanta region straining the existing sewer systems. EPD identified the Coosa River Basin, the Chattahochee River Basin, the Tallapoosa River Basin, and the 14 county metro-Atlanta region. The DNR Board asked EPD to come up with a strategy for addressing and resolving the water quality problems in these areas. Based on EPD's report, the DNR Board issued a resolution that any violation of the Georgia Water Quality Control Act, especially in the metro-Atlanta region, would be addressed by immediate enforcement action.[43] Although this theoretically covers both point and nonpoint source violations, it is primarily intended to address permit violations (NPDES, LAS, pretreatment, and CSOs) and sanitary sewer overflows. The resolution is silent about enforcement of violations of water quality standards. In addition, inspection and surveillance is required to be increased in the designated areas. This "zero tolerance" policy is also seen as an added incentives for localities and others to invest in compliance.

Total Maximum Daily Loads (TMDLs)

As the process for determining TMDLs continues in Georgia, ensuring compliance with pollutant load allocations on the part of nonpoint sources on impaired waters will most likely require that some type of enforceable mechanism be implemented. However, the TMDL process in Georgia has not yet reached a stage where TMDLs are being enforced. Under the current implementation schedule, the EPD will provide public notice of TMDLs for the Coosa watershed by June 30, 2003.[44]

Watershed Assessments

Under a new Georgia policy, any locality asking for an environmental permit from the state that facilitates growth and development, such as a wastewater permit or a water withdrawal permit must conduct a watershed assessment before receiving the permit.[45] There are 30 assessments currently taking place around Georgia, creating an additional pool of information about nonpoint sources of water pollution.

Under the watershed assessment guidelines, the permit applicant must identify the point and nonpoint sources of water pollution, carry out predictive modeling and land use scenarios based on future growth, and propose solutions to address current and future water quality problems.[46] The watershed assessment must be carried out for the entire service area covered by the local authority. The assessment includes the gathering of existing information about a watershed and its point and nonpoint pollution sources. This information is then used to evaluate current and predicted future water quality problems and to recommend short and long term solutions, including a list of corrective actions. The local government can use this information to develop a watershed protection plan, parts of which will be incorporated into an NPDES discharge permit or other enforceable program.

In the Coosa watershed, the Regional Development Councils, the City of Rome, various other localities, and EPD have undertaken a regional watershed assessment. The City of Rome initiated this approach when they were considering applying for a wastewater treatment facility expansion permit. Although they will only apply for the permit in another 2 or 3 years, the City decided to initiate a watershed assessment that would meet the watershed assessment policy and go beyond it by undertaking an assessment of a much larger area than required in the policy. The hope is that a regional assessment will avoid each wastewater and drinking water service area conducting small assessments in an uncoordinated fashion and that the assessment will provide the localities with new information concerning sources, types, and quantities of point and nonpoint source pollution.

Georgia Adopt-A-Stream and Citizen Water Monitoring

At the state-level, the Georgia Adopt-A-Stream program is coordinated through the Environmental Protection Division's Non-Point Source Program, which provides technical advice and information. In addition, there are five Regional Training Centers located at colleges and universities throughout the state. Currently, there are 225 Adopt-A-Stream groups in Georgia, with two in the Coosa Basin (City of Rome and Conasauga). In addition, through the Coosa River Basin Initiative and Alabama Waterwatch, citizens get test kits and monitor water quality on a monthly basis. This data is sent to Alabama Waterwatch which compiles the information for the whole Basin. Currently USEPA accepts Alabama Waterwatch data and Georgia EPD accepts Adopt-A-Stream data, but the two programs are coordinating their protocols and training practices in the hope that all the monitoring data will be accepted by both EPA and EPD.

Conclusions

Georgia has a variety of nonpoint source control programs operating in the Coosa watershed, including cost-share, technical assistance, voluntary, and enforceable programs. The

Coosa watershed reflects many of the trends and nonpoint source pollution programs found throughout Georgia.

The Coosa watershed shows that local erosion and sedimentation control programs such as the Cherokee County program can make a difference in water quality through a zero tolerance enforcement policy, adequate staff and funding, consolidation of the program in one office, and cooperation with local law enforcement agencies. The Coosa watershed also shows that the state requirement that local governments incorporate environmental criteria, such as river corridor protection criteria into their comprehensive plans and local ordinances strengthens local protection of these resources.

At the same time, the review of the Coosa watershed shows that while Georgia has worked to have best management practices in place for management of nonpoint source pollution from agricultural and forestry operations, it is very difficult to bring enforcement actions in these areas. The only enforcement "hook" is the Water Quality Control Act. Although fish kills and overt violations of water quality standards could be used in theory to enforce against nonpoint source pollution from agriculture and forestry operations, in practice, EPD has recorded only one enforcement order between 1998 and early 2000 for the Coosa watershed for agriculture and none for forestry operations. In addition, with very different agencies responsible for technical assistance and enforcement, coordination of these efforts can be very difficult.

The use of enforceable mechanisms has increased slightly over the past, although the primary nonpoint source control mechanisms are still technical assistance, cost-share and voluntary programs. In most cases, regulatory programs seemed understaffed with few financial resources at their disposal. Technical assistance programs are well-established for farmers and foresters, although those programs also seemed understaffed. Cost-share programs rely almost exclusively on federal funds, with few apparent state financial assistance programs.

Georgia seems to divide the traditional areas of nonpoint source pollution management, such as family farms and forestry operations, from newer sources, such as land development and concentrated animal feeding operations. In the traditional areas of nonpoint source pollution management, the state and the localities depend almost exclusively on traditional nonpoint source management mechanisms, such as best management practices and one-on-one resolution of compliance problems for family farms and forestry operations. When dealing with newer sources, such as erosion and runoff from sprawling development, sanitary sewer overflows, and concentrated animal feeding operations, permitting and the use of enforceable mechanisms are becoming more common. The state government also is pushing localities to protect their local water resources, using the carrot of maintaining "qualified local government" status to encourage the development of environmental ordinances, such as river corridor protection ordinances or threatening to assume authority for local programs such as erosion and sedimentation control.

The Georgia programs maintain a sharp distinction between entities providing assistance in coming into compliance (the soil and water conservation districts and the forestry commision), and enforcers (the EPD and the localities). This leads to complexity in coordination. It is understandable that the organizations with technical assistance as their primary function have a harder time referring their constituents to EPD or the localities for enforcement actions. Enforcement has been more likely where the entity providing technical assistance is also the enforcer, such as erosion and

sedimentation control from land development, although even here state oversight has been important.

Endnotes

1. In addition to the sources cited, the following individuals were interviewed by telephone or in person: Todd Bethune, Environmental Specialist, NW Regional Environmental Protection Division Office; Rick Brooks, Planning and Environmental Management Division, Georgia Department of Community Affairs; David Bullard, Municipal Permitting Unit, Environmental Protection Division; Jeff Cown, Land Protection Branch, Environmental Protection Division, Mike Creason, Permitting Unit, Environmental Protection Division; Jim Dixon, Assistant City Manager, City of Rome; Kevin Farrell, Unit Coordinator, Watershed Planning and Monitoring Program, Environmental Protection Division; Beth Fraser, TMDL Community Program, Georgia Legal Watch; Frank Green, State Water Quality Coordinator, Georgia Forestry Commission; Larry Hedges, Chief, Nonpoint Source Pollution Unit, Environmental Protection Division, Department of Natural Resources; David Howerin, Planning Director, Coosa Valley Regional Development Center; Suzanne Hutchinson, County Attorney, Gordon County; Richard King, Resource Specialist, Georgia Soil and Water Conservation Commission; Mitch Lawson, Intern, Coosa River Basin Initiative; Martha Little, Director of Planning, City of Rome, Rome Floyd County Planning Commission; Meredith Mason, County Engineer, Cherokee County; Richard Oliver, Natural Resources Conservation Service; Lee Ross, Director, Water Department, City of Rome; Heather Seckman, Basin Coordinator, Coosa River Basin Initiative, Jim Sommerville, Compliance and Enforcement Unit, Environmental Protection Division; Pamela B. Traylor, District Conservationist, Natural Resources Conservation Service, United States Department of Agriculture; and Bill White, Program Manager, Rural Water Resources, Georgia Soil and Water Conservation Commission.
2. Georgia Rivers and Streams Partially Supporting Designated Uses and Not Supporting Designated Uses, Section 303(d) of the Clean Water Act report, February 29, 2000.
3. American Rivers, 1999.
4. Based on the cumulative area for the Etowah, Coosawattee, Upper Coosa, and Oostanaula Rivers.
5. The localities in the Coosa Watershed include Bartow, Chatooga, Cherokee, Cobb, Dade, Dawson, Fannin, Floyd, Forsyth, Fulton, Gilmer, Gordon, Lumpkin, Murray, Paulding, Pickens, Polk, Walker, and Whitfield counties and the City of Rome.
6. *Nonpoint Source Management in Georgia: An Update of the Georgia Nonpoint Source Management Program*, Georgia Environmental Protection Division, April 1998.
7. *Nonpoint Source Management in Georgia: An Update of the Georgia Nonpoint Source Management Program*, Georgia Environmental Protection Division, April 1998.
8. Only Dawson and Dade Counties do not have any permitting surface mining operations.
9. Georgia Water Quality Control Act, O.C.G.A. 12-5-29 [Makes it unlawful to discharge excessive pollutants (sediments, nutrients, pesticides, animal wastes, etc.) into waters of the State in amounts harmful to public health, safety, or welfare, or to animals, birds, or aquatic life or the physical destruction of stream habitats.]
10. Georgia has a provision at O.C.G.A. 12-5-30(b) that requires a permit for anyone seeking to "erect or modify facilities or commence or alter an operation of any type which will result in the discharge of pollutants from a *nonpoint source* into the waters of the state, which will render or is likely to render such waters harmful to the public health, safe, or welfare, or harmful or substantially less useful for domestic, municipal, industrial, agricultural, recreational, or other lawful uses, or for animals, birds, or aquatic life." But the regulations limit this provision. They require only "written approval" and use of BMPs under the circumstances described in the statute, but do not require a permit unless the Director of the Environmental Protection Division (EPD) "has issued one to the

same person for a point source discharge." Ga. Comp. R. & Regs. 391-3-6-.06(3). This provision is not used to regulate nonpoint source dischargers.

11. Erosion and Sedimentation Act of 1975, O.C.G.A. 12-7-1 *et seq*. (as amended through 1995).
12. *Environmental Management Requirements for Stream and River Corridors in Georgia,* University of Georgia, 1997.
13. Georgia Surface Mining Act of 1968, O.C.G.A. 12-4-70, 12-4-75.
14. Georgia Surface Mining Act of 1968, O.C.G.A. 12-4-72.
15. Georgia Surface Mining Act of 1968, O.C.G.A. 12-4-75.
16. Rules for General Permit Land Application System Requirements, Chapter 391-3-6-.19, (Rules of Georgia Department of Natural Resources, Environmental Protection Division).
17. Georgia Comprehensive Planning Act of 1989, O.C.G.A. 50-8-1 *et seq*.
18. Rules for Environmental Planning Criteria, Chapter 391-3-16-04 [Criteria for River Corridor Protection], (Rules of Georgia Department of Natural Resources Environmental Protection Division).
19. Environmental Criteria Promulgation, O.C.G.A. 12-2-8, Georgia Comprehensive Planning Act of 1989, O.C.G.A. 50-8-7.1, 50-8-7.2, Rules for Environmental Planning Criteria Chapter 391-3-16-.04 [Criteria for River Corridor Protection] (Rules of Georgia Department of Natural Resources Environmental Protection Division).
20. Georgia Department of Natural Resources letter of March 2, 2000 to Ms. Beverly Banister, Water Management Division, USEPA.
21. *Planning for Domestic Wastewater Systems*, Georgia Department of Natural Resources, Environmental Protection Division (February 1999).
22. O.C.G.A. 12-2-8(b).
23. O.C.G.A. 12-2-8(d)-(f).
24. O.C.G.A. 12-2-8(g)(1)(A).
25. O.C.G.A. 12-2-8(g)(1)(A).
26. O.C.G.A. 12-2-8(g)(2)(D), "Local governments *may* exempt from the planning process: (...) (D) Specific forestry and agricultural activities from buffer and set-back criteria in accordance with the following conditions..." [emphasis added].
27. Rules for Environmental Planning Criteria, Chapter 391-3-16-.04(4)(f) [Criteria for River Corridor Protection] (Rules of Georgia Department of Natural Resources Environmental Protection Division, 1998), "River Corridor Protection Plans, developed by local governments, *shall provide the following acceptable uses* of river corridors (...) 1. Timber production and harvesting (...) 6. Agricultural production and management (...)" [emphasis added].
28. O.C.G.A. 12-2-8(g)(2)(B).
29. According to Georgia Department of Community Affairs records, there are no protected river corridors in Dade, Paulding, Polk, and Walker Counties.
30. Code of the City of Rome, Section 23-67 Environmental Protection Requirements.
31. *Environmental Management Requirements for Stream and River Corridors in Georgia,* University of Georgia, 1997.
32. Department of Natural Resources, Environmental Protection Division, Permit No. GAR 100000 *for settlement purposes only*, February 7, 2000.
33. Cherokee County Soil Erosion and Sedimentation Control Ordinance (amended 1995).
34. Rules for Swine Feeding Operation Permit Requirements, Chapter 391-3-6-.20 (Rules of Georgia Department of Natural Resources Environmental Protection Division).
35. O.C.G.A. 12-6-2.

36. Green, Frank, *Georgia Forestry Commission's Forest Water Quality Program* (Georgia Forestry Commission).
37. *Georgia's Best Management Practices for Forestry*, Georgia Forestry Commission, January 1999.
38. Georgia Water Quality Control Act, O.C.G.A. 12-5-29 [Makes it unlawful to discharge excessive pollutants (sediments, nutrients, pesticides, animal wastes, etc.) into waters of the State in amounts harmful to public health, safety, or welfare, or to animals, birds, or aquatic life or the physical destruction of stream habitats.]
39. Georgia Surface Mining Act, O.C.G.A. 12-4-83.
40. Georgia Surface Mining Act, O.C.G.A. 12-4-83(b).
41. Permitting, Compliance and Enforcement Program Enforcement Management Strategy for the Sensitive/High Growth Areas in the Chattahoochee River Basin, Coosa River Basin, Tallapoosa River Basin and the Metro Atlanta Area.
42. EPD Enforcement Orders: http://dnrnet.dnr.state.ga.us. (As of March 20, 2000).
43. Georgia Department of Natural Resources Resolution, January 26, 1998.
44. Georgia Department of Natural Resources letter of March 2, 2000 to Ms. Beverly Banister, Water Management Division, USEPA.
45. *Planning for Domestic Wastewater Systems*, Georgia Department of Natural Resources, Environmental Protection Division (February 1999).
46. Environmental Protection Division Guidelines for Watershed Assessments for Domestic Water Systems, Rev. 2/24/99.

Maine Case Study

Summary

In controlling nonpoint source pollution Maine relies on a combination of enforceable mechanisms and technical and financial assistance programs.[1] The Maine Department of Environmental Protection (DEP) is the lead agency for both enforceable and voluntary nonpoint source pollution control mechanisms. Although Maine gives priority to educational and technical assistance efforts in promoting compliance, it does have authority under several statutes to institute formal enforcement proceedings. Under the Natural Resources Protection Act, the Mandatory Shoreland Zoning Act, the Site Location of Development Law, the Stormwater Management Law, the Erosion and Sedimentation Control Law and a general discharge prohibition under the Protection and Improvement of Waters Act, DEP has enforceable authority to address a wide range of nonpoint source problems, including those resulting from development, forestry, and agricultural activities. In enforcing these laws, DEP officials follow a policy of progressive compliance, attempting first to educate, then obtain voluntary compliance, then pursuing administrative consent orders, filing a civil case in district court and ultimately referring the case to the Attorney General's Office. Most cases are resolved early in the progressive compliance process without advancing to more formal enforcement measures.

One of the unique aspects of Maine's nonpoint source efforts is the important role played by municipalities in setting, promoting compliance with, and enforcing nonpoint source laws. Under the Mandatory Shoreland Zoning Act, municipalities are required to adopt a local ordinance consistent with and no less stringent than the state standards. The Growth Management Law allows municipalities to adopt growth management programs, which may include drafting local ordinances to implement the program. Several communities have, for example, drafted their own phosphorous control ordinances. The Subdivision Law also requires that communities consider nonpoint source pollution prevention in reviewing subdivisions for approval and when adopting any subdivision regulations. Local code enforcement officers (CEOs) certified by the state and appointed by the local planning board implement and enforce these ordinances, with the state retaining oversight authority.

Maine has created a number of innovative institutional mechanisms that support the development and implementation of enforceable authorities as well as traditional forms of technical and financial assistance. For instance, municipalities may form watershed districts to protect and restore water quality. Watershed districts are authorized to undertake research, develop and implement plans, and implement municipal ordinances that protect water quality.[2] To date, only one watershed district has been formed under these provisions. Another mechanism the state has recently created to strengthen its enforcement presence is the position of lakes enforcement and compliance officer. This official is responsible for pro-actively seeking out potential nonpoint source violations in targeted watersheds. The targeted watersheds include priority lakes and other local water bodies. If a violation is found, the officer follows the same progressive compliance strategy as other DEP officials. Another unique institutional mechanism that supports enforcement in Maine is the Rule 80k certification program that trains and authorizes local code enforcement officers and

DEP staff who are not lawyers to bring cases in district court. By reducing the backlog of cases to be processed by the Attorney General that must be heard in district court, this mechanism has increased the likelihood of enforcement in the eyes of the regulated community.

Maine also has several sectoral laws that provide additional enforceable mechanisms to address nonpoint source pollution. The recently amended Forestry Practices Act now requires separation areas for clearcuts, and harvest plans must describe actions that will be taken to protect riparian zones and minimize erosion into water bodies. Statewide timber harvesting standards for riparian areas are currently being proposed which would transfer authority to Maine Forest Service (MFS) from DEP and the Land Use Regulation Commission.[3] The Department of Agriculture, Food, and Rural Resources (DAFRR) also has a number of enforceable tools under the Right to Farm Law, the Cull Potato Law and the Action Against Improper Manure Handling. DAFRR consider its authority to revoke protection against enforcement of local nuisance laws under the Right to Farm Law one of its most effective enforcement tools. The Right-to-Farm law protects farmers from enforcement of these laws if they are in compliance with best management practices; when this protection is revoked the farmer may be subject to enforcement under nuisance provisions.

In addition to the wide array of enforceable mechanisms, Maine has a number of non-enforceable mechanisms to address nonpoint source pollution, including cost sharing, technical assistance, and land conservation programs. DEP administers the state's Nonpoint Source Program, which coordinates the nonpoint source activities of all state agencies, designates priority rivers and lakes, and funds grants for nonpoint source and watershed mangement projects. The funding for grants under the program comes from the federal 319 program and a state bond initiative. Grants for nonpoint source projects are also available through other federal programs, primarily EQIP.

Local lake and river associations play a role in nonpoint source programs in Maine. These associations address the concerns of a specific waterbody. In the Sebago Lake watershed, the Lakes Environmental Association (LEA) is one of few regional lake associations in the state that is working on more than one lake. Generally the associations conduct outreach on BMPs and will refer landowners to technical assistance and cost share programs such as the Soil and Water Conservation Districts (SWCD). Representatives of the groups may on occassion also accompany DEP and local CEOs on enforcement activities.

Sebago Lake Watershed

In order to obtain a better understanding of the role of the enforceable mechanisms in Maine's overall strategy to address nonpoint source pollution, and particularly the coordination and interplay between enforcement and voluntary efforts, this report examined these issues in the context of the Sebago Lake watershed. This watershed was selected because a diversity of

governmental and non-governmental actors are involved in nonpoint source control in the area using a wide range of tools.

The Sebago Lake watershed is the largest of five subwatersheds that make up the Casco Bay Watershed, occupying 640 square miles of the 985 square miles of the Casco Bay watershed. It is also the primary source of water used by the Portland Water District. The Portland Water District is a quasi-municipality that provides water and wastewater services to Portland and surrounding communities.[4] Sebago Lake covers approximately 100 square miles and supplies one-third of the state's water. The water from Sebago Lake is piped to 180,000 consumers in the greater Portland area. The watershed is considered pristine; water quality is high enough that the district received a waiver from drinking water filtration requirements. The lake is one of the state's priority lakes for nonpoint source efforts due to the potential for high population growth in the area, use for water supply, outstanding clarity of the lake, high use of the lake, and outstanding fishery resources.[5]

Approximately 10 percent of the state's population lives in the watershed. The lakes are used for recreation and are the site of many seasonal cottages. Land in the watershed is 90 percent forested. Until spring 1999, a pulp and paper mill operated in the area and most of the pulp that was harvested in the watershed was used at the mill. It is unclear whether this harvesting will continue now that the pulp mill closed, but there continues to be lumber harvesting for board. Agricultural operations are scattered throughout the watershed.

The Sebago Lake watershed falls within the organized portion of the state. In the unorganized portion of the state the Land Use Regulation Commission (LURC) regulates many of the sources of nonpoint source pollution.

Enforceable Mechanisms

The following section provides an introduction to the enforceable mechanisms studied in detail in this report. The mechanisms were selected from the universe of mechanisms described in the *Almanac*[6] because of their relevance to the Sebago Lake watershed, their importance to the Maine program, or their innovative nature.

! ***Protection and Improvement of Waters Act***. Maine's Protection and Improvement of Waters Act prohibits any person from directly or indirectly discharging or causing to be discharged any pollutant without first obtaining a license.[7] This prohibition (§413) includes nonpoint source discharges. The term "discharge" encompasses "any spilling, leaking, pumping, pouring, emptying, dumping, disposing or other addition of any pollutant to water of the State." The term "pollutant" is broadly defined and includes "rock, sand, dirt and industrial, municipal, domestic, commercial or agricultural wastes of any kind." Erosion from agricultural activities may be exempt if an erosion and sedimentation control plan or conservation plan has been certified for the land and the agricultural activities are in compliance with the plan or federal and state funds are not available for implementation.

Whenever there is a soil discharge, DEP usually cites this authority in addition to the other statutory violations cited. Although there have been some instances of this provision being relied upon to negotiate consent agreements or to take a violator to court, this prohibition normally serves as a threat to bring a violator into compliance.

! ***Mandatory Shoreland Zoning Act***. The Mandatory Shoreland Zoning Act[8] protects areas within 250 feet of the normal highwater line of any great pond, river or saltwater body, within 250 feet of a coastal wetland or the upland edge of a freshwater wetland, and within 75 feet of the highwater line of a stream if the stream is the outward stream of a great pond or below the confluence of two perennial streams shown on a USGS topographic map. The law requires setbacks, limits on timber harvesting, and vegetation buffers between buildings and shorelands.[9] Municipalities are required to adopt a local ordinance consistent with and no less stringent than the state standards. Alternatively, the state may impose these requirements. A local CEO and the local planning board are responsible for implementing and enforcing the ordinance. If the town fails to act, the state may enforce against the town and/or the violator.[10] To encourage municipal enforcement, which can be expensive, there is a state fund to reimburse towns for their enforcement costs, which is currently unfunded.

! ***Natural Resources Protection Act***. The Natural Resources Protection Act (NRPA) prohibits certain development activities without a permit if the activity will take place in, on, or over any protected natural resource or will result in material or soil being washed into coastal and freshwater bodies and wetlands.[11] Examples of activities that may be regulated by NRPA include construction and renovation projects, culvert construction, and wetland fill. Permit standards address erosion and sedimentation control, protection of wildlife habitat, and water quality. Routine projects may qualify for a "permit by rule" with standard setback and erosion control requirements. Eighty-five percent of all NRPA development permits are issued under permit-by-rule provisions. Permit-by-rule standards have been developed for 13 activities. Activities affecting wetlands or intended to alter wetlands require more detailed individual permits. Various activities, including farming activities and forest management, are exempt from permitting requirements provided other regulatory requirements are met. NRPA is normally enforced by DEP, but DEP may delegate enforcement authority to qualified municipal CEOs as well.

NRPA is administered by the DEP Bureau of Land and Water Quality, Division of Land Resource Regulation. The Division has staff in all four regional offices. In most of the offices, all of the staff do compliance inspections; only the enforcement staff, however, resolve violations.

! ***Site Location of Development Law***. The Site Location of Development Law regulates large scale development by requiring a permit from DEP prior to construction, operation, sale or lease.[12] There are two permit triggers: 1) development creating more than three acres of impervious cover (buildings or building parts dating prior to 1975 are exempt from the permitting requirement); and 2) development of a residential subdivision involving more than 30 acres or 15 lots.[13] Development in the unorganized areas of the state subject to the jurisdiction of the Maine Land Use Regulation Commission is exempt from regulation under this law as are developments protected under certain other regulatory programs.

! ***Stormwater Management Law***. The 1996 Stormwater Management Law requires a permit in two situations. In watersheds designated as "most at risk," a permit is required if there will be 20,000 square feet of new impervious area or five acres of open, disturbed area. In watersheds "not at risk," a permit is required if there is one acre of new impervious area or five acres of disturbed area.[14] Stormwater standards address both water quality and water quantity. Water quality standards include standards for phosphorous and suspended solids, and apply only in watersheds considered at risk. The law does not apply within the unorganized areas of the state. Certain forest management and farming activities, as well as single family home construction and federally-permitted industrial facilities are exempt from the law. Department of Transportation (DOT) construction projects are exempt if they are constructed pursuant to the stormwater quality and quantity standards set forth in the Memorandum of Agreement between DOT and DEP.

! ***Erosion and Sedimentation Control Law***. Pursuant to this law unreasonable erosion of soil and sedimentation from construction activities beyond the project site or into a protected natural resource must be prevented.[15] Activities in the unorganized portion of the state as well as certain forestry management and agricultural activities are exempt from this requirement.

This law was enacted in 1996 and became effective July 1, 1997. No civil or criminal enforcement of these provision was allowed prior to July 1, 1998 if a good faith effort to comply was demonstrated. In a 1998 report to the state legislature, DEP recommended that the Erosion and Sedimentation Control Law be made retroactive so it would apply to chronic, historical erosion control problems. The legislature acted on DEP's recommendation to require any person who owns property that is subject to erosion as a result of filling, displacing, or exposing soil prior to July 1, 1997 to take measures to prevent unreasonable erosion of soil or sediment into a protected natural resource. This requirement applies as of July 1, 2005 to property in watersheds most at risk and as of July 1, 2010 to other property.[16]

! ***Comprehensive Planning and Land Use Regulation Act, and Subdivision Law.*** The Comprehensive Planning and Land Use Regulation Act (also known as the Growth Management Law) allows municipalities to adopt local growth management programs. These include comprehensive plans and implementation programs.[17] The towns also have home rule authority to take these actions.[18] Although towns are not required to develop a plan or implement a program, there are financial incentives (discussed below) to do so. The majority of the nearly 500 cities and towns in Maine have a comprehensive plan, although not all of the plans have been implemented.

The Subdivision Law provides another legal framework for towns to implement growth management plans. Towns must consider several criteria relating to nonpoint source pollution control when reviewing a subdivision for approval and when adopting any subdivision regulations. The proposed subdivision must not result in undue water or air pollution.[19] If the proposed subdivision is within the watershed of any pond or lake or within 250 feet of any wetland, great pond or river, it must not adversely affect the quality of that body of water or unreasonably affect the shoreline of that body of water.[20] Also, the long-term cumulative effects of the proposed subdivision must not unreasonably increase a great pond's phosphorous concentration during the construction phase and life of the proposed subdivision.[21] The State Planning Office (SPO) provides model ordinances and guidelines for subdivision ordinances and grants for developing them. Most towns currently have subdivision ordinances on the books.

The local CEO conducts all enforcement of the Growth Management Law and Subdivision Law. SPO trains and certifies code officers on administering and enforcing the Mandatory Shoreland Zoning Act, the Growth Management Law and the Subdivision Law. They also provide training on the Stormwater Management Law.

! ***Forest Practices Act.*** During 1999 changes were made to the Forest Practices Act and rules that provide for enforcement activities related to non-point source pollution. Under the old version of the law, the Commissioner of Forestry was authorized to promulgate rules establishing forest practices for clearcuts and forest harvests to ensure adequate regeneration, and set performance standards for clearcuts including standards to minimize soil erosion and protect water quality.[22] Management plans conforming to these standards were required for clear-cuts of 50 acres more. Landowners were required to give notice of harvesting operations. None of these requirements or the initial regulations implementing them provided a significant opportunity for formal enforcement. The requirement that the landowner provide notice prior to commencing operations was simply a notice requirement, not a permitting requirement which could be reviewed**.** The initial regulations for the management plans did not have substantive performance standards linked to nonpoint source pollution or water quality. The clearcut standards were not developed to address nonpoint source pollution. Under the old law, harvest plans were not reviewed in advance or kept on file.

Under the new harvest plan[23] requirements for clearcuts greater than 20 acres, there are 13 minimum elements required, including an assessment of the soil erosion potential of the harvest area and a description of the actions that will be taken to protect riparian zones and minimize erosion into water bodies.[24] For clearcuts of 20 - 75 acres, the plans must be developed and made available for inspection. For clearcuts over 75 acres, the plans must be reviewed and approved. The Forest Policy and Management Division Field Team Leaders or their field staff will review the plans for sufficiency.

Although not specifically aimed at addressing nonpoint source pollution, Maine's Forest Practices Act also requires that there be a separation zone between clearcut areas if the harvesting activities result in a clearcut larger than five acres. In this case, regeneration standards must be met as well.[25]

! ***Agricultural Requirements (Right to Farm Law, Cull Potato Law, Manure Law***). The Right to Farm Law provides protection against nuisance suits if a farmer complies with BMPs. However, the Commissioner of the Department of Agriculture, Food, and Rural Resources (DAFRR) is required to investigate all complaints involving farms. If the source of the problem is found to be a nuisance caused by failure to use BMPs, the Commissioner shall determine the changes needed in the farm to comply with BMPs and prescribe site-specific BMPs for the operation.[26]

The Cull Potato Law prohibits cull potato piles between June 10 and October 1 each year and requires immediate and proper disposal of any cull potatoes generated during that time period.[27] The rules establish standards for disposal during the prohibited periods by various methods. Violations of this law may be identified during inspections or through complaints made from farmers or DEP to DAFRR.

In 1998 the legislature enacted a Action Against Improper Manure Handling Law (or the Manure Law) which requires farms with more than 50 animal units or that receive 100 or more tons of manure a year to implement a certified nutrient management plan.[28] New farms with more than 300 animal units must hold a livestock operations permit issued by DAFFR. Beginning December 1, 1999, manure spreading is prohibited between December 1 and March 15. Failure to develop or implement a nutrient management plan or to comply with a permit are offenses punishable by civil forfeiture of up to $1,000 plus $250 per day; winter spreading of manure is punishable by civil forfeiture of up to $1,000 for every day that spreading occurs.

Assistance-Oriented Nonpoint Source Programs

Nonpoint Source Program

In 1991 Maine created its Nonpoint Source Program.[29] The Maine Department of Environmental Protection (DEP) is the lead agency for the program. DEP is charged with cooperating with DAFFR, Department of Conservation (Maine Forest Service), Department of Transportation, Department of Human Services (Division of Health Engineering), Department of Marine Resources, and the State Planning Office to ensure a coordinated approach to nonpoint source pollution control for agriculture, forestry, transportation, and development. DEP also coordinates with other state, federal and local governmental agencies, non-governmental organizations, and citizens.

The program promotes the use of “best management practice guidelines” (BMPs) to address nonpoint source pollution. Four state agencies (DAFFR, Maine Forest Service, Transportation and DEP) are charged with developing and implementing best management practice guidelines to prevent water pollution from nine types of activities: agriculture, forestry, development, resource extraction, transportation facilities and support, chemical use and storage, solid waste disposal, marine industries, and hydrologic modification.

In 1997 the comprehensive watershed protection program was established.[30] The Maine Land & Water Resources Council (L&WRC) works with other state agencies to develop and implement nonpoint source strategies, conduct scientific research and water quality surveys, implement regulatory and nonregulatory approaches, coordinate with other governmental and non-governmental organizations, and establish priorities for directing resources. DEP and the State Planning Office (SPO) co-chair the Maine Watershed Management Committee which implements this program. The committee developed the “Nonpoint Source Priority Watershed List” to be used by federal, state and local authorities in directing resources. Under Maine’s nonpoint source grant program, projects that aim to protect or restore waters on the priority

watershed list are given priority. Other state and federal agencies also direct discretionary resources towards activities to improve waters on the list.

The Division of Watershed Management administers the nonpoint source program and relies on voluntary cooperation. They help prepare nonpoint source watershed surveys, identify specific nonpoint problems of concern and develop voluntary projects to address these problems.

Nonpoint Source Grants Program/319 Funding

Maine's Nonpoint Source Grants Program, administered by DEP, provides financial assistance to help public entities, including state agencies, Soil and Water Conservation Districts (SWCDs), regional planning councils, watershed districts, municipalities and nonprofit organizations, conduct projects to reduce or prevent nonpoint source pollution.[31] Maine solicits proposals for projects annually. Four types of projects may be submitted for consideration: a watershed survey project; a nonpoint source implementation project; development of a watershed management plan; or implementation of a watershed management plan. Priority is given to projects that benefit nonpoint source priority watersheds. DEP program staff serve as technical advisors to the projects. In 1999, 30 project were funded. There are currently over 100 active projects, including several in the Sebago Lake watershed.

The Nonpoint Source Grants Program is financially supported by the state bond funds for planning or implementing a "watershed management plan" and U.S. Environmental Protection Agency 319 funds.[32] In 1999, $500,000 of state bond funds went to the Nonpoint Source Grants Program. Approximately 50 percent of the 319 funds received by the State since 1992 have been used for Nonpoint Source Program Grants.

Nonpoint Source Training and Resource Center

The Nonpoint Source Training and Resource Center managed by DEP provides publications, videos and training on stormwater management and erosion control, and coordinates the Voluntary Contractor Certification Program, which provides education and certification to contractors engaged in earth moving activities.[33] Certification entitles the contractor to reduce the mandatory waiting period for permit-by-rule projects. Certification may be revoked in the event of a formal enforcement action against the contractor. The Center also serves as a clearinghouse for nonpoint source and BMP information.

Volunteer Lake Monitoring Program

Maine supports one of the nation's oldest and largest citizen-based environmental monitoring program, known as the Volunteer Lake Monitoring Program (VLMP). VLMP is an independent non-profit corporation with close links to DEP. Volunteer efforts provide a substantial amount of data on lake water quality. In 1999, volunteers made 4,450 visits to 400 lake basins in Maine to monitor for clarity through Secchi disk readings and in some cases to measure for dissolved oxygen. To ensure that volunteer data is of high quality, DEP has developed quality assurance standards for volunteers, and all volunteers must be certified at least every two years (every year for those

monitoring dissolved oxygen). The data gathered by volunteers is used by Main state agencies, including DEP, Department of Conservation, and SPO, as well as lake associations and educational institutions. The data is used by DEP specifically for its phosphorous review programs, to determine the lakes at risk for the stormwater protection program, and identifying priority watersheds. The program is supported by 319 funding.

USDA/NRCS/SWCD Programs

Soil and Water Conservation Districts are the primary providers of nonpoint source related technical training programs sponsored by USDA, DEP, DAFRR, and MFS. Resource specialists conduct watershed and BMP demonstration projects which include technical assistance, education and outreach, BMP installation and demonstration, and workshops for targeted audiences. NRCS and the SWCDs provide cost share assistance for BMPs through the EQIP program. The Nonpoint Source Priority Watershed List is part of the criteria for EQIP cost-share funds for landowners adopting conservation measures to benefit water resources. Maine receives approximately $1 to $2 million in EQIP funding annually to provide cost-shares to landowners, and funding is primarily used for animal waste management and erosion control purposes.

Land for Maine's Future

The Land for Maine's Future (LMF) program seeks to acquire lands of state significance which "make a substantial and lasting contribution towards assuring all of Maine citizens, present and future, the traditional Maine heritage of public access to Maine's land and water resources or continued quality and availability of natural resources important to the interests and continued heritage of Maine people."[34] The program is primarily funded through a $35 million state bond authorized by voter referendum in 1987.[35] A LMF affinity credit card which features two local natural scenes has provided approximated $40,000 in revenue for the program from royalties to date. In addition to these sources, the program receives some Farm Bill funding for acquiring farm development rights and money from the Land and Water Conservation Fund and Forest Legacy Program when it is available. The Land and Water Conservation Fund provides funding to federal, state, and local governments for acquisition of private lands for conservation and recreation purposes. The Forest Legacy Program supports acquisition of conservation easements on forest lands by state and federal governments.

To select land for acquisition, the program uses a scoring system to ensure that the purchase will provide protection of undeveloped land and preservation of ecological integrity of riparian, wetland, coastal, and other systems. The program will only purchase natural, unbuilt lands. The LMF Board receives proposals for acquisitions which are ranked by a subcommittee of the board according to scoring criteria. The criteria address the prevention of deterioration of natural resource systems. The top ten percent are then considered by the full Board, which considers criteria like geographic distribution and other more intangible qualities. The top choices are appraised, and the designated negotiator deals with the seller. Once the seller has agreed to the appraisal value, the acquisition is subject to a public vote by the Board.

The program requires that agricultural land be managed under a conservation plan that meets

NRCS standards for erosion control and nutrient management. Management plans are also required for non-agricultural lands that receive access-improvement funds for trail development, parking lot construction, and boat launch facilities (or other public access features). The managing agency can receive up to five percent of the appraisal value in access improvement funds. The program is not regulatory so must rely on the managing agencies to ensure that the properties are maintained in a way that will not cause damage to ecosystems.

One site enrolled in the LMF program is located in the case study watershed. On Sebago Lake, the Department of Conservation holds an easement on a 35 acre tract of lakefront land.[36] The land has 980 feet of high quality sand beach and 35 acres of white pine and hardwood forests. It was identified as one of the eight outstanding beaches in Maine's organized towns in an inventory prepared for the Maine Critical Areas Program. The town of Raymond manages the property as a park with a day-use area for swimming and picnicking.

State Revolving Loan Fund

Maine also offers nutrient management loans which can be used for building storage and handling facilities for manure and milk room wastes, including equipment that is used solely for this purpose. The loans are available through the Finance Authority of Maine (FAME) and have an effective interest rate of 2% for up to 20 years.[37] The program offers low interest loans of up to $350,000 for installation of manure storage facilities to assist facilities in complying with the Nutrient Management Law and other DAFRR rules. CAFOs may not be eligible for loans under this program.

Forestry Programs

For forestry stewardship and best management practices, funding is available from the Stewardship Incentive Program (SIP) and Forestry Incentive Program (FIP). SIP funding comes from the US Forest Service, and is provided to landowners with forest management needs through the Maine Forest Service. The funding can be used to develop recreational trails or improve wildlife habitat. FIP funding through USDA Natural Resources Conservation Service has not been as significant. However, a large ice storm in 1998 devastated area forests and special "Ice Tree money" was available to repair and improve forests. Some EQIP money is used for erosion controls on forest harvests.

The state of Maine also has a tree growth program which provides a tax break for forest land under a management plan. The elements of the management plan vary based on the goals for the land (*i.e.*, preservation v. timber harvest) but usually address erosion concerns and identify state sensitive areas, including shoreland zones.[38]

Watershed Districts

Municipalities are authorized to form watershed districts "to protect, restore and maintain the natural functions and values," of wetlands, rivers, great ponds, bays, and estuaries.[39] A watershed

district is authorized to conduct research on water quality in the district; implement natural resource protection, management, and restoration plans; work with municipal officials and state agencies to encourage enforcement or enactment of ordinances or laws that will improve or protect water quality in the district; and enter into agreements with municipalities to administer municipal land use ordinances.[40] The Cobbossee Watershed District is the only district in the state formed under these provisions.

Discussion and Analysis

This section discusses the implementation and enforcement of the mechanisms described above and describes the relationship between these mechanisms and traditional cost-share and technical assistance programs. Examples drawn from the Sebago Lake watershed are provided when appropriate; however, innovative statewide enforcement practices are also described. Maine's land use and development provisions are discussed first, with a focus on DEP and local CEO roles in enforcement and technical assistance. Regulation and technical assistance for forestry and agriculture are discussed more briefly.

Land Use and Development

Many of Maine's mechanisms to control nonpoint source pollution are directed at land use activities, both during and subsequent to development. Many laws specifically target development activities, for instance the Site Location of Development Law and NRPA, the Erosion and Sedimentation Control Law, the Stormwater Management Law, the Mandatory Shoreland Zoning Act, and local subdivision and growth control regulations. These laws employ permit mechanisms, BMPs, performance standards, and critical area protection provisions. Additionally, the Protection and Improvement of Waters Act does not specifically address development but serves more generally as a backup to protect water quality through general discharge prohibitions. These laws apply not only to construction activities, but also to activities conducted by landowners on their properties. For instance, in some areas of Maine landowners commonly violate shoreland zoning provisions by removing trees within 75 feet of the shoreline to create a view of the lake. Another common landowner violation of land use laws occurs when landowners add sand to their lake front beaches. In addition to ensuring compliance with the array of related laws, both DEP and the local CEOs, the principal enforcement entities, provide technical assistance to landowners in complying with these laws. In the Sebago Lake watershed, laws regulating land development and use are the most commonly invoked of the laws regulating nonpoint source pollution due to the limited extent of agricultural and forestry operations in the area.

DEP Role Generally

As the lead agency in Maine for nonpoint source pollution concerns, DEP plays a major role in enforcement of related laws, primarily in the area of land use and development. The Water Resource Regulation Division and Land Resource Regulation Division of DEP have primary enforcement responsibility for the Protection and Improvement of Waters Act, Site Location of Development Law, Stormwater Management Act, Erosion and Sedimentation Control Law, and NRPA.

The Water Resource Regulation Division of DEP is primarily responsible for enforcement of point source pollution violations, but a small part of the enforcement efforts relate to nonpoint source pollution. Nonpoint source enforcement is generally triggered by complaints from citizens or lake associations. The four regional DEP offices handle the complaints. When a complaint is received in the regional office the department first determines if the complaint has merit. Next DEP will conduct a site investigation, although the timing of the inspection is based on the severity of the problem. For example, DEP will respond immediately to a severe violation. If there is not a potentially severe impact, DEP may schedule the inspection with other trips to the area or after priority complaints are addressed.

If a problem is documented DEP discusses the necessary corrective action with the property owner. DEP sometimes accompanies representatives of voluntary programs to visit a site. DEP's presence provides a glimpse of the threat of enforcement if violators do not voluntarily comply. DEP staff report that they usually have only to write a letter to the violator to obtain compliance. For severe violations or uncooperative violators, DEP will propose an administrative settlement. DEP must clear the proposed settlement with the Attorney General's office before presenting it to the violator. The Board of Environmental Protection gives final approval to all settlements.

DEP staff also have the authority to go to District Court. Most people will settle after these cases are filed. The last option is to refer the case to the Attorney General's office who will file an enforcement action in Superior Court. Cases referred usually involve developers and medium sized commercial operations, not homeowners. Follow-up inspections are done as needed.

Another example of DEP's enforcement approach is that of the Land Resources Regulation Division's enforcement activities under NRPA. DEP's first priority when a *permit* violation is discovered is to request the violator to correct the problem. If the problem is not corrected, DEP will send the permit holder a notice of violation. For significant violations (even in some cases where the party is being cooperative), there are three enforcement mechanisms that DEP can use. DEP can file a civil case in District Court (only a few have been filed); it can refer the case to the Attorney General's office (only a few have been referred); or it can enter into an administrative consent agreement, the most common mechanism used. Most violations are resolved voluntarily, and if there have been no prior problems, usually no penalty is imposed. Voluntarily resolved cases are recorded to track repeat violations. In addition to enforcing this law, DEP will refer people to other programs for technical assistance if there are complicated requirements.

DEP will coordinate its efforts with the Department of Marine Resources (DMR). DMR monitors shellfish for pollution and can close shellfish beds. It conducts shoreland surveys and gives DEP information on pollution sources. However, DMR generally calls the local plumbing inspector

before calling DEP in response to a problem believed to originate from overboard discharge systems. The departments conduct joint sanitary surveys to identify malfunctioning septic systems. In one situation in Vinalhaven, an island where there is no sewage treatment plant, DEP and DMR discovered numerous illegal discharges. DEP and DMR looked at the entire watershed for each cove including houses on and behind the shore. In bringing these illegal discharges under control they were able to open a substantial acreage for shellfish harvesting.

In response to a recommendation of the Great Ponds Task Force, the Maine legislature recently created a new full-time position for enforcement and compliance on lakes. The initial goal for the enforcement position was to boost compliance with state and local laws by improving CEO capacity. This position is currently held by an individual based in the Southern Maine Regional Office. He focuses his attention exclusively on a few ponds and watersheds that are identified in coordination with the Division of Watershed Management. The selection process first involves identifying several priority watersheds to be covered. Several "non-priority list" great ponds within the geographical area of the identified priority watersheds are also selected for attention. DEP hopes to be proactive at these lakes to prevent them from becoming a priority watershed. As described above, there are other field and enforcement officials in the office that have primary responsibility for responding to citizen complaints and answering compliance questions.

The lakes enforcement and compliance official goes out on his own initiative, not only in response to complaints, to patrol by boat, car and foot looking for violations of land use laws including NRPA, the Site Location of Development law, the Erosion and Sedimentation Control Law, and the Stormwater Management Law. The focus on a few lakes allows local people to see an increase in DEP presence. This situation is in contrast to traditional enforcement work which has almost exclusively responded to complaints. The large geographical scope of problems and limited resources have prevented DEP from using the proactive inspection and enforcement strategy of the lakes official statewide. The official also devotes considerable time to education and outreach, advising government officials and the public on how to use BMPs He works very closely with CEOs, serving as a liaison between towns and DEP shoreland zoning staff. He focuses on small towns where limited resources may prevent the CEO from being aware of the latest information from DEP. In these towns, the CEO may work only part time or may lack expertise on specific issues.

Sometimes requirements under NRPA, the Site Location of Development Law, and the Mandatory Shoreland Zoning Act prohibitions overlap. The officer will address problems jointly with the CEO in this case since the CEO has responsibility for enforcing some of these laws. Both will agree on the action a violator should take and the deadline for compliance, and will jointly notify violator of the violation.

DEP provides financial support to local projects through its Nonpoint Source Program. DEP has funded these types of projects in the Sebago Lake watershed through the Nonpoint Source Program and 319 funds. In 1999, the Portland Water District received approximately $100,000 in 319 and state matching funds to encourage the use of BMPs with demonstration projects in subwatersheds around Sebago Lake. Certain DEP units also provide technical and engineering assistance in dealing with nonpoint source pollution concerns from land development and land use activities. DEP also provides funding to small communities to build individual septic or small cluster septics where there is no municipal treatment.[41]

The Portland Water District falls within the jurisdiction of the Southern Region of DEP. In this area, DEP actively enforces NRPA, the Site Location of Development Law, and the Protection and Improvement of Waters Act. The Erosion and Sedimentation Control Law may be used if water is directly affected. NRPA and the Protection and Improvement of Waters Act address erosion and sediment control concerns as well. DEP also inspects for compliance with the stormwater program.

In the entire Southern Region last year, 234 complaints were received and 224 complaints resolved. Not all of these complaints were related to nonpoint source problems. Fifteen were resolved through formal penalties, one through a judicial proceeding, and 106 cases were resolved voluntarily. In 98 cases no violation was identified. Four cases were referred to other agencies. One case involving a minor discharge from a gravel pit was referred to the Attorney General's office, mostly because of ownership issues of the site and not because of the nature of the violation.

DEP regional offices inspect facilities permitted under NRPA. Of the facilities permitted under "permit by rule" in the Southern Region in 1998, 40 percent were inspected in 1999. "Permit by rule" facilities are only inspected for two years after permit issuance, usually after construction to ensure that the site is stabilized. Sites issued individual permits under NRPA and under the Site Location of Development are also inspected by the licensing staff. One hundred percent were inspected in 1999. The licensing staff will refer violations to enforcement staff.

The Southern Region works with other agencies, including the SWCDs, local CEOs, the LEA, and the Portland Water District.[42] DEP receives complaints from LEA and makes site visits with them. Generally, other agencies do not refer complaints to DEP.

Local Code Enforcement

Local code enforcement officers are employed by municipalities to enforce the Mandatory Shoreland Zoning Act; the Growth Management Act; and plumbing, subsurface waste water and building standard codes.[43] Municipalities may also employ plumbing inspectors to inspect plumbing and other construction projects.[44] Plumbing inspectors approve permits for interior plumbing and subsurface waste disposal; some towns may task a CEO with these duties.[45] All CEOs and plumbing inspectors must be certified by the State Planning Office in their areas of responsibility.[46] Separate certifications are required for areas such as planning, plumbing, electrical, shoreland and 80k enforcement functions. In some cases, certification is required for subspecialities (*e.g.*, indoor and outdoor plumbing). Recertification is required every five years.

Septic tank problems are a nonpoint source concern that DEP has regulated since the 1970s. Today, DEP serves as a backstop to local enforcement efforts and in response to a problem, DEP will generally call the town plumbing inspector or code enforcement officer. The municipally-appointed plumbing inspectors have the authority to act more immediately than DEP in response to plumbing or septic problems if there is a direct discharge that can be observed. If the plumbing inspector doesn't have the political support or isn't aggressive enough, DEP may act directly.

Local CEOs may be trained and certified to bring enforcement actions in district court. The District Court sets aside one day a month for hearing these cases. Maine officials describe this provision as a "velvet hammer" in promoting compliance. In the past people thought they could stall cases in the court system because cases might take years to be scheduled. Because the district court sets aside a day to hear these cases, it is more likely that a case against a violator will be heard quickly. Since violators are aware that their cases may be heard quickly under these provisions, they are more likely to cooperate at an earlier point in the compliance process.

In the Sebago Lake watershed, the local code enforcement officers conduct enforcement activities although most nonpoint source-related violations are resolved without resorting to formal enforcement. In one town, the local CEO has not had to go beyond informing a violator of a problem in order to achieve compliance. Property owners around the lakes generally want to protect their investments by keeping the lake clean. The local code enforcement officers from five towns (Casco, Raymond, Bridgton, Naples and Harrison) coordinate with LEA and the Portland Water District to coordinate strategies and exchange information. Information concerning violations is commonly received from neighbors who are acutely aware of the restrictions on development and other activities. This reduces the need to conduct inspections to monitor for compliance. When a complaint is received, the local CEO will check to see if there is a permit on file for the activity and will investigate the complaint initially by phone. If needed, a site investigation will also be conducted.

The local CEOs also rely heavily on education as an important tool for promoting compliance. The target audience for their outreach is broad; for instance, the CEOs conduct road shows for real estate brokers so brokers can educate new owners about nonpoint source regulations. CEOs often advise the public on restrictions and prohibited activities under the Mandatory Shoreland Zoning Act and NRPA.

The local CEOs will on occasion work jointly or turn a case over to the state to handle enforcement and work cooperatively with them. One major case in the late 1980s involved a subdivision with a 72 unit complex which ultimately was shut down. The subdivision was built on a wet, low property back from the shore. The engineering calculations and construction techniques for stormwater retention during floods and storms did not work correctly, and while the project was under construction the dams broke and a large sediment plume went into the water. LEA joined the CEO and state against the developer. The local CEO issued a stop work order which gave the state and LEA time to bring other orders and actions. The developer eventually ended the project.

Growth Management Law Implementation

Local CEOs are responsible for enforcing municipal ordinances adopted pursuant to the Comprehensive Planning and Land Use Act (or the Growth Management Law). For 13 years, SPO through the Growth Management Program has provided grants to towns to develop and implement comprehensive local growth management plans as well as technical assistance. When a town requests a grant, it agrees to develop the plan in accordance with the state goals and guidelines outlined in the Growth Management Law. SPO has seven staff who work with towns on developing comprehensive plans. Several guidelines for the comprehensive plans address nonpoint source pollution. One guideline directs that plans should "Protect, maintain and, when warranted, improve the water quality of each water body . . . and ensure that the water quality will be protected from long-term and cumulative increases in phosphorous from development in great pond watersheds."[47] SPO grants for implementing the plan include funding for drafting a phosphorus control ordinance. SPO and the eleven regional planning councils provide technical assistance to draft the ordinances. DEP also provides technical assistance in developing ordinances. For example, DEP developed a phosphorus control manual in the early years of the program that serves as a specific guide for drafting phosphorus control ordinances as well as local implementation of the Site Location of Development Law and Stormwater Management Law.

The financial incentive for implementing the plan is that "certified programs" get preference for certain state funding programs including Land for Maine's Future, community development block grants and other community development programs. SPO reviews plans to determine if they are consistent with the Growth Management Law. Other state agencies review the plans in the certification process. SPO also certifies town growth management programs based on a review of the plans and the implementation strategies. Implementation strategies include ordinance drafting and plans for capital improvements like sewer and fire protection. "Certified programs" become eligible for preferential funding, but SPO also encourages funding preference for aspects of certified plans.

Shoreland Zoning Implementation

DEP provides an oversight role in local enforcement of shoreland zoning laws. Three DEP staff members provide technical assistance to municipalities and help them enforce the Shoreland Zoning Program (one in Bangor and two in Augusta). DEP staff review local ordinances and make recommendations to the Commissioner of DEP who is responsible for approving all ordinances and amendments. The staff conduct general oversight of enforcement by municipalities. If towns continually fail to enforce their shoreland zoning ordinance, the state can take action against the town. In the last 13 years, however, only three towns have been taken to court. DEP attempts to resolve problems with towns before resorting to prosecution.

Some towns have gone beyond the minimum state standards in their local ordinances. For example, some have developed legislation on control of phosphorus in their local shoreland zoning ordinance or in separate legislation (*i.e.*, China, Manchester). Some towns have greater setbacks than required by the state (greater than 100 ft. v. 75 ft.). However, misunderstandings in measurement of the high water line have caused a problem in the application of the more stringent standards in at least one case. Another modification to the state standards implemented by towns in the Sebago Lake watershed is setting minimum lake frontage standards for high density development to prevent funnel lots and clustered housing on the shore. Most towns adopt the state minimum standards in

their ordinances.

The federal Coastal Zone Management Program provides substantial funding for the staff and day-to-day operation of DEP's Shoreland Zoning Program. There has been no funding to date from agricultural programs or 319 grants.

There are some concerns about the ability of local municipalities to administer the program, particularly in the area of enforcement. Specific concerns include: the capacity of local administration, the influence of local politics and limited resources. Also, some municipalities do not have a local CEO or only have one that works part-time or is uncertified. Towns are concerned, on the other hand, about the lack of state funding to cover a CEO's time spent in state training programs as well as the possibility of having to pay for training courses in the future.

Portland Water District

The Portland Water District also plays a significant role in controlling nonpoint source pollution both through enforcement and voluntary programs. The PWD has authority to inspect all septic systems within 200 feet of the high water mark of Sebago Lake pursuant to the private and special law adopted in 1912. This law requires that notice in writing be provided to PWD prior to any construction in this lakeside zone.[48] The notification must include the method for disposing of waste and drainage, which may then be inspected by the trustees of PWD. The law also provides for the state board of health to make orders or regulations to protect Sebago Lake or any of its tributaries. Today PWD inspectors patrol only Sebago Lake. PWD may require the implementation of erosion control measures. The town CEOs who enforce this requirement under NRPA depend on PWD to identify problems around Sebago Lake. If people do not comply with their recommendations, the PWD refers the matter to the local CEO for formal enforcement, and then to DEP.

There is a 3,000 foot no trespassing zone around the two water intakes in Lake Sebago. No body contact with the water is allowed within two miles of the intakes. One PWD inspector stays at the boat launch area to enforce the no body contact rule by ensuring that boats are launched by people wearing boots. There is another inspector who patrols the area by boat to ensure there is no swimming, sailboarding, or jet skiing. Only boats with more than seven inches of freeboard are allowed in this zone.

In wintertime, the District has on staff a source protection coordinator, an inspector, an educator and two Americorps volunteers. In summertime, they add five positions, including two inspectors who provide information to property owners and look for failing septic systems.

As the water supplier, the Portland Water District also conducts outreach to homeowners and others on ways they can maintain good water quality in the watershed. In addition to inspection and enforcment activities, PWD conducts outreach activities at schools and camps, helping to identify problems and the BMPs to solve them. They will make small grants to schools and camps for low cost BMP projects such as building paths to the lake and planting vegetation. The District has received a Section 319 grant to work at Kettle Cove, a residential area with nonpoint source erosion problems. Work under this grant is directed at nonpoint source problems from camp roads. The District conducted a watershed survey to identify problems, and installed BMPs. They

monitored the condition of the cove before the project began and will monitor after implementation of the BMPs.

Lakes Environmental Association

The Lakes Environmental Association (LEA) assists with compliance and technical assistance activities in the area of the Portland Water District. The Lakes Environmental Association is a nongovernmental regional lake association. LEA works on 37 lakes. Its direct service area includes the towns of Bridgton, Naples, Harrison, Denmark, and Sweden, as well as the rim of Sebago Lake. Indirectly, LEA works throughout the Portland region. The organization is 60 percent member-supported, and members include local residents and businesses. Additional funding comes from federal grants, endowment, the Portland Water District, and miscellaneous grants. LEA conducts educational programs in schools and the community and conducts water quality monitoring in all 37 lakes.

Six years ago LEA developed the Clean Lake Check Up program, which has since been adopted by the Portland Water District. The program involves visiting properties to provide an analysis of what the landowner can do to reduce pollutants entering the lake. Sometimes the visit will be at the request of the local CEO or through a referral from DEP; most visits are at the request of the landowner. Sometimes the visit will identify serious concerns and the code officer will also work with the landowner. LEA conducts 30 to 40 of these check ups annually. LEA also assists with full NRPA permitting or permitting-by-rule.

LEA formerly appeared before town planning boards and provided comments on applications for subdivision. For the past five or ten years, developers have been consulting with LEA during the planning stage so that LEA has input while the application is developed and no longer needs to provide comments in front of the boards. LEA has also drafted some local ordinances, either on request or on its own initiative. LEA drafted a phosphorous control amendment to the townwide zoning ordinance for the town of Sweden. Using DEP's phosphorous control manual, LEA developed a matrix which requires a buffer with a variable width based on the land area disturbed during development. LEA is considering developing a phosphorous standard for the Highland Lake watershed based on triggers dependent on water quality.

LEA has received two 319 grants. One grant three years ago provided funding for 19 demonstration sites in the Highland Lake watershed in conjunction with the SWCD and DEP. LEA also conducted a survey of the watershed during a heavy rain and identified the "Big Nine" spots with the worst stormwater problems. The office uses a GIS Hotspots model to predict where problems may be found. PWD has adopted the Hotspots model as well as the Clean Lake Check Up program for its own use. The two organizations work together and try to leverage their resources. For instance, LEA works with the Portland Water District on the Crooked River Initiative. The Crooked River is a major tributary to Sebago Lake. Long Lake and the Crooked

River come together at the locks to provide 80 percent of the flow to Sebago Lake. The initiative develops conservation easements on land near the river.

Forestry

Under forest harvest regulations, landowners are required to give notice to the Maine Forest Service (MFS) before beginning activities. Statewide, 5,000 - 7,000 notifications of harvest are received annually. MFS conducts regular inspections of forest harvest sites. Each ranger is assigned a unit. When a notice of intent to harvest is sent to the state, the information is sent to the unit officer. Inspections are based on priorities, such as operations in a salmon area, or an area where there is a sensitive feature (*e.g.* an eagle's nest) or where there have been past violations. MFS responds immediately to any complaints. MFS randomly selects sites for in-depth BMP monitoring to ensure that BMPs are properly applied. There are approximately 75 unit managers statewide. There is no state financial assistance for the preparation of harvest plans. Large landowners usually have foresters on staff and small landowners (under 100 acres) are exempt from the requirements. There are only nine field staff at MFS who have training to help in the preparation of harvest plans. Full forest management plans are still voluntary.

MFS has developed voluntary Best Management Practices for reducing erosion and sedimentation.[49] Since discharges are generally prohibited, the BMPs focus on eliminating "discharge" through site appropriate measures. There are two vehicles to disseminate information and provide training on BMPs. The nine field foresters conduct training with the certified logging professional program (a private course). Another mechanism is the Sustainable Forestry Initiative, an industry program in which MFS personnel serve as trainers. MFS disseminates information on BMPs by speaking at NRCS and SWCD workshops. MFS also conducts some landowner and logging site visits.

MFS has a Memorandum of Agreement (MOA) with DEP to coordinate enforcement. The MOA allows MFS field staff to identify and investigate water quality violations and to work out a solution; if no solution is achieved, they are required to turn the case over to DEP or the local code enforcement officer. In most cases, if a water quality violation is found, an enforcement action would be brought under the water quality laws rather than the clearcut laws and regulations. There has been some initial enforcement activity under forest harvest plan provisions. In one case the operator did not leave an adequate separation zone between the clear cuts and the plan did not reflect on-the-ground practice. This represented a violation of the Forest Practices Act. The violator received a letter of warning and then corrected the problem. Since a letter of warning was sent, a further violation would be treated as a second violation for penalty purposes. Violation of these provisions results in a civil penalty.[50]

DEP and LURC also have regulations addressing nonpoint source pollution from forestry activities and are currently considered the primary agencies for dealing with these problems. In order to harmonize the regulations in the organized and unorganized areas of Maine, statewide timber harvesting standards for riparian areas have been proposed.[51] They are based on current LURC and DEP shoreland zoning rules. These standards would be administered and enforced by MFS. Forestry activities in riparian zones would be exempt from regulation under LURC, the NRPA and Shoreland Zoning statutes if conducted in accordance with the new statewide standards.

There is little forest harvest activity in the Sebago Lake watershed. Forestry activities are monitored by PWD by air twice a year to make sure buffers and BMPs are maintained.

Agriculture

Agricultural Compliance Officer

There is one Agricultural Compliance Officer for the entire state of Maine who works on compliance and enforcement activities for the Right to Farm Law, the Cull Potato Law, and the Manure Law. Enforcement activity under the "Right to Farm Law" is completely complaint driven; the state does not conduct regular inspections to identify compliance problems. About 75 percent of the complaints are made to DAFRR and 25 percent to DEP; all complaints are then forwarded to the Agricultural Compliance Officer. Once received, the officer investigates the site. If there is a problem, the officer recommends changes or BMPs to address the problem. Normally, the farmer has 30 days to begin making the changes. Other agencies may be brought in to identify and design appropriate BMPs. The Agricultural Compliance Officer will also visit the complaining party to explain the problem, and what changes have been recommended, although in some cases there are no changes recommended because the activity does not violate the law.

Regular follow-up inspections are conducted by the Agricultural Compliance Officer after the recommendations are given. If the requested changes have not been made, the complaint will be referred to DEP if it involves a water quality violation or to the Attorney General's office if it involves a nuisance. For example, in the case of a manure pile too close to a stream, the case would be referred to DEP to test the stream for a water quality violation. If a violation were found, the Agricultural Compliance Officer would work with DEP to develop the case. To date, no court cases have resulted from nuisance complaints referred to the Attorney General's office; most cases have been resolved with a letter from the Attorney General's office to the violator.

Another enforcement option is to revoke protection of the Right to Farm Law. Ordinarily if a farmer complies with BMPs, the farmer cannot be sued for creating a nuisance. Potential revocation of this protection has proven to be the most effective enforcement tool.

Violations of the Cull Potato Law are identified during inspections by the Agricultural Compliance Officer as well as through complaints from the public. When a violations is identified, the Agricultural Compliance Officer first tries to solve the problem voluntarily. If immediate action is not taken in a reasonable period (12 hours to 10 days depending on problem), the case is turned over to the Attorney General's office. Only the Attorney General can obtain fines. The Agricultural Compliance Officer also has the authority to have the state hire a contractor to remove the problem and then recuperate costs through the Attorney General's office. Under this law, there has been only one case where fines have been sought by the

Attorney General. Only a few cases have gone to the Attorney General's office and most are resolved early in the process.

The Agricultural Compliance Officer usually handles between 100 -150 complaints a year. During calendar year 1998, 99 complaints were received (three related to noise problems, 21 for water quality problems, and 75 related to insect, odor, carcass and potato cull pile problems). Of these cases, the majority (92) were resolved by voluntary compliance. Three were resolved by MOUs between the department heads and the violator. One case was referred to the Attorney General's Office. In another case involving a farmer who refused to move a manure pile in a ditch, the Agricultural Compliance Officer pulled the protection of the Right to Farm Law, allowing the town to proceed with enforcement. Two cases are still active, with the officer working on developing BMPs.

The Agricultural Compliance Officer relies on NRCS and the SWCD to provide assistance in identifying and designing appropriate BMPs. He also uses the Extension Service at the University of Maine and occasionally a hydrogeologist from DEP and the state soil scientist. A farmer may apply for EQIP money to fund the implementation of BMPs. Section 319 funding is available for projects that will protect salmon habitat.

The Agricultural Compliance Officer also enforces the new Manure Law. Legal mechanisms in existence prior to the adoption of this law were ineffective in dealing with nonpoint source pollution from manure handling because it was difficult to identify a water quality violation during the spring melt. Enforcement of this law begins in the winter of 2000. It is not expected to play a major role in the Sebago Lake watershed, but in other areas of the state this law may generate some enforcement actions. Generally, the local CEO will refer people to other government agencies for help.

In the Sebago Lake watershed, there are scattered agricultural operations and these laws are infrequently invoked. The statewide Agricultural Compliance officer has not handled many problems in the Sebago Lake watershed. DEP is involved with some agricultural problems in the area. In most cases, DEP will only become involved if the Agricultural Compliance Officer determines that there is a water quality problem and that the farmer is not willing to implement BMPs. In one example near Waterford a pig farmer was expanding his herd and had runoff problems. The pigs were in the wetland near a stream. Because the farmer cooperated with DEP and SWCD the state did not resort to formal enforcement. If the violator had not cooperated, DEP reports that it would have initiated a formal enforcement action even if the violation was not severe.

Soil and Water Conservation Districts/NRCS

Although Soil and Water Conservation Districts and NRCS are primarily agricultural agencies, in areas of Maine the staff will provide technical assistance to anyone with erosion problems, regardless of the source. Lake associations often refer people to NRCS and the local SWCD for assistance with non-agriculturally related problems, such as camp roads. DEP and DAFRR will also refer people to NRCS. Most often, DEP refers farmers to the SWCD if they are eligible for cost-share or technical assistance. The SWCD may suggest that a farmer contact DEP for technical assistance, but will not inform DEP if they suspect a farmer is violating a law. The local SWCD and NRCS staff distance themselves from enforcement efforts generally. NRCS notifies

landowners if they observe a situation where the landowner may need to obtain a permit, and ensures that any plans they develop abide by the regulations. In the course of planning, if any activity is proposed that might cause a violation of state law, NRCS will suggest that the landowner check with the town to ensure the activity is in compliance with the law. In cases where it is clear that a permit is needed, NRCS will tell the landowner to get a permit. NRCS will not normally notify the town that an activity that might violate local ordinances is ongoing.

No state funding is currently provided for cost share assistance. The state does provide low-interest loans for manure storage equipment through the state's financing entity.

There have been significant nonpoint efforts by NRCS and the SWCDs in the Sebago Lake watershed since the early 1990s. In 1991 the Casco Bay Regional Water Quality project was funded by NRCS to support management practices for nonpoint source treatment in the watershed. This program was related to the Casco Bay Estuary Project, a ten year program involving a five year planning period and five year implementation period. The current focus is on-the-ground implementation of nonpoint management practices. As part of the project several area SWCDs developed a comprehensive land use inventory for the Casco Bay watershed. The watershed received an EQIP grant in 1996. EQIP is the primary program used for land treatment activities in the watershed. There are currently eight EQIP contracts in the Portland Water District. The most requested practice is waste management systems, but EQIP can also fund erosion controls, agricultural chemical handling facilities, and riparian and stream bank protection. Early in the 1990's the Portland Water District organization worked with NRCS on a 319 project to protect drinking water quality through reduction in nonpoint source pollution. NRCS was involved in bringing together various organizations to combat erosion problems at the intake pipes for the water supply system, and coordinated the installation of 1000 feet of erosion controls.

Conclusions

A variety of enforceable mechanisms to control nonpoint source pollution are available to state and local officials in Maine. Because of limited forestry and agricultural operations in the Sebago Lake watershed, enforceable mechanisms are more often used to control pollution from land development or land use activities than from agricultural sources. Statewide, the preponderance of enforceable mechanisms also address nonpoint source pollution from development, although the use of enforceable mechanisms is growing in the agricultural and forestry areas. In the watershed and throughout the state, Maine uses a variety of tools to address nonpoint source pollution from land use and development activities, including planning and zoning provisions, permit-based schemes requiring control of sedimentation, critical area protection, and prohibitions on discharges of sediment to water during construction activities.

Most often, formal enforcement provisions serve as threats or deterrents. DEP, as well as local CEOs enforcing municipal ordinances, follows a progressive compliance policy that seeks voluntary cooperation prior to the use of penalties or more formal enforcement approaches. Voluntary program staff tend to draw a distinction between their roles and the role of enforcement staff. DEP enforcement staff report that they rarely have to develop a consent agreement to bring landowners into compliance; a letter informing the landowner of the violation is generally a sufficient incentive to elicit compliance. Local CEOs may also bring a case in District Court under special

procedures or enforce laws using standard enforcement procedures. However, they report that they generally do not need to resort to these procedures to obtain compliance. Even though the District Court enforcement procedure provides CEOs with the opportunity and basic skills to bring a case in court, some hesitate to go up against a formally trained lawyer. Nevertheless, by increasing the likelihood of enforcement, the procedure serves as a "velvet hammer" for obtaining compliance.

Some attribute the ease with which compliance may be obtained to the ethics of state residents. SPO conducted a survey of Maine home buyers which showed a strong ethic for resource protection. In the Sebago Lake watershed, lakeside residents are very aware of the restrictions on activity near the lakes and report violations to municipal and state enforcers.

However, some associated with enforcement activity in Maine report that the limited number of cases referred to formal enforcement proceedings reflects DEP's preference for voluntary measures to respond to problems. Others state that limited formal enforcement is the result of insufficient enforcement staff and reduced attention to violations. Some report witnessing substantial violations with minimal or no DEP enforcement. Where laws are enforced by municipalities with DEP oversight (*e.g.* shoreland zoning), limited DEP enforcement activity of other laws sends a mixed message to the towns regarding the need to rigorously prosecute violations of the laws. In particular, people note that the compliance situation is worse in rural areas of the state in terms of both DEP and CEO enforcement. It was noted that a visit from DEP enforcement staff makes a difference in these areas by demonstrating that DEP cares about compliance with the law.

Towns in Maine may enact more stringent ordinances than state laws require. In the Portland Water District, towns have worked with the Lakes Environmental Association to develop phosphorous control ordinances that are not required by state law. The ability of towns to enact a variety of more stringent laws provides for the possibility of enhanced water quality protection.

However, the effectiveness of the municipal law often depends more on the quality of town administration and enforcement than the quality of the rules. The local code enforcement officer, often a part-time employee, bears heavy responsibility in the decentralized scheme. Limited town support for CEO enforcement or poor enforcement by the CEO may create a weak link in nonpoint source pollution control process. Training and certification programs for CEOs are considered by some to be crucial to the success of local efforts, and there is some concern that the state may decrease its support for these activities. For instance, the state does not always provide full funding for CEO training; the state pays for the course but not for the time the instructor spends at the course. There has recently been some discussion that the state will start charging for classes.

Many of Maine's sectoral laws addressing significant sources of nonpoint source pollution, such as the revised Forest Practices Act, Erosion and Sedimentation Control Law, and the Manure Law, have been recently enacted. Some enforcement activity has been initiated by the Maine Forest Service for violations of forest harvest laws. MFS may be increasing its enforcement role if statewide standards for forest harvesting are adopted. The state manure spreading law became effective this winter so it is difficult to assess the results of any enforcement. Some observers report that there has been significant earth moving activity without erosion and sedimentation controls as required by the recently enacted erosion and sedimentation control laws.

Maine state agencies leverage their limited resources by working together and adopting MOUs to eliminate duplication of efforts. For instance, MFS and DEP have an MOU to coordinate training and education, inspection and technical assistance, investigation of complaints, and both formal and informal enforcement. Inspections and corrective actions are the responsibility of MFS; DEP staff are responsible for issuing notices of violation or other less formal notification, as well as carrying out the formal enforcement process, if necessary. Through this collaboration DEP enlists the support of MFS rangers, who are present in the forests, in enforcement of DEP laws such as NRPA or Shoreland Zoning.

Maine nonpoint programs reflect a significant level of attention to nonpoint problems by a variety of actors. The effectiveness of these programs, particularly in regulation of lakeside activities, appears to be enhanced to varying degrees by the participation of local residents and lake associations. For example, in the Sebago Lake watershed, LEA serves as a link between the providers of technical assistance services and the enforcement entities. Although technical assistance staff rarely turn the attention of enforcement personnel to violators, enforcement personnel will refer violators to technical assistance programs. The high concentration of nonpoint source programs, both enforcement and voluntary, in DEP serves to coordinate at least some aspects of the enforcement and technical assistance processes.

Endnotes

1. In addition to the sources cited, the following individuals were interviewed by telephone: Rich Baker, DEP; Greg Bean, DEP; Carol Blaisi, Conservation Law Foundation; Phil Boissoneaux, Portland Water District; Roy Bouchard, DEP; Jim Cassida, DEP Central Region; Will Cook, DEP Southern Region; John Delvecchio, State Planning Office; Mark Desmeules, State Planning Office; Ron Faucher, Portland Water District; Bill Galbraith, Land Use Regulation Commission; Phil Garwood, DEP; Frank King, CEO, Bristol; Craig Leonard, Agriculture; Peter Lowell, Lakes Environmental Association; Norm Marcotte, DEP; Morton Moesswilde, Maine Forest Service; Bill Monagle, Cobbossee Watershed District; Wayne Monroe, Cumberland County Field Office, NRCS; Roger Ryder, Maine Forest Service; John Thompson, CEO, Naples; Mary Thompson, Warren County Field Office, NRCS; and Bill Yarmantino, NRCS.
2. 38 M.R.S.A §2001 et seq.
3. LURC currently regulates many activities creating nonpoint source pollution, including certain aspects of forestry operations.
4. http://www.pwd.org. February 23, 2000.
5. Maine DEP. Draft rev. 9/18/98: Nonpoint Source Priority List. http://janus.state.me.us/dep/blwq/docwatershed/prilist5.pdf. February 23, 2000.
6. *See* Environmental Law Institute, *Almanac of Enforceable State Laws to Control Nonpoint Source Water Pollution* (1998).
7. Me. Rev. Stat. Ann. Tit. 38 § 413 (West 1989 & Supp. 1997).
8. Me. Rev. Stat. Ann. tit. 38 § 435 et. seq.
9. Me. Rev. Stat. Ann. tit. 38 § 439-A.
10. Me. Rev. Stat. Ann. tit. 38 §443-A, §347-A *et. seq.*
11. Me. Rev. Stat. Ann. tit. 38 § 480-A *et. seq.*
12. Me. Rev. Stat. Ann. tit. 38, §483-A.
13. Me. Rev. Stat. Ann. tit. 38 §§482(2) and (5).
14. Me. Rev. Stat. Ann. tit. 38 §420-D.
15. Me. Rev. Stat. Ann. tit. 38 §420-C.
16. Me. Rev. Stat. Ann. tit. 38 §420-C.
17. Me. Rev. Stat. Ann. tit. 30-A §4311 *et seq.*
18. Me. Rev. Stat. Ann. tit. 30-A §2101 and Maine Constitution, Article VIII, Part Second.
19. Me. Rev. Stat. Ann. tit30-A § 4404 1.
20. Me. Rev. Stat. Ann. tit. 30-A § 4404 11.
21. Me. Rev. Stat. Ann. tit. 30-A § 4404 18.
22. Me. Rev. Stat. Ann. tit. 12 § 8869.
23. The term “harvest plan” replaced the term “management plan” in the new regulations. 04-058 MRC ch. 20, §2.A.27.
24. 04-058 MRC ch.20 Section 5.C.
25. Me. Rev. Stat. Ann. tit. 12 § 8869.
26. Me. Rev. Stat. Ann. tit. 17, § 2805.
27. Me. Rev. Stat. Ann. tit. 7 §1007-A.
28. Me. Rev. Stat. Ann. tit. 7 §§4201-4209.
29. Me. Rev. Stat. Ann. tit. 38 §410-H *et. seq.*
30. Me. Rev. Stat. Ann. tit. 5 §3331(7)
31. Maine Nonpoint Source Control Program: Program Upgrade and 15 year strategy (9/23/99). http://janus.state.me.us/dep/blwq/docwatershed/npsstrategy.pdf.

32. *Id.*
33. http://janus.state.me.us/dep/blwq/training/is-vccp.htm. February 29, 2000.
34. Me. Rev. Stat. Ann. tit. 5 §6200.
35. http://janus.state.me.us/spo/lmf/history.htm. February 29, 2000.
36. http://janus.state.me.us/spo/lmf/sebago.htm. February 29, 2000.
37. http://www.famemaine.com/biz/nutrient.htm. February 29, 2000.
38. Me. Rev. Stat. Ann. tit. 36 §571 *et. seq.*
39. Me. Rev. Stat. Ann. tit. 38 §2001.
40. Me. Rev. Stat. Ann. tit. 30 §2007.
41. DEP website.
42. The Portland Water District is a quasi-municipality providing water and wastewater services to 10 Greater Portland Communities.
43. Me. Rev. Stat. Ann. tit. 30-A §4451.
44. Me. Rev. Stat. Ann. tit. 30-A §4221.
45. Me. Rev. Stat. Ann. tit 30-A §4452.
46. Me. Rev. Stat. Ann. tit. 30-A §4451.
47. Me. Rev. Stat. Ann. tit. 30-A, § 4326 3. C.
48. Laws of Maine 1913, Private and Special. Ch. 157. "An Act to Prevent the Pollution of the Waters of Sebago Lake."
49. BMP Guide.
50. 04-058 Ch. 20. Sec. 3-E
51. Maine Department of Conservation, Maine Forest Service. *The Impact of Timber Harvesting on Nonpoint Source Pollution: Report to the 119th Maine Legislature Joint Standing Committee on Agriculture, Conservation and Forestry*. January 15, 1999. http://www.state.me.us/doc/mfs/h20.htm

Maryland Case Study

Summary

This study examines the relationship between enforceable mechanisms for the control of nonpoint source water pollution, and the voluntary, technical assistance, and cost share approaches used in a Maryland watershed, the Monocacy River watershed. Maryland uses a great many programs and planning mechanisms to address nonpoint source water pollution, and it provides substantial cost share funding from state sources as well as from federal programs. The state also has a full suite of enforceable mechanisms. In the agricultural sector these are used primarily to move producers into planning, cost share, and technical assistance programs and to provide a backup approach where these assistance-based mechanisms are not implemented by the discharger. Among the key enforceable mechanisms for agriculture are a back-up "no discharge" provision to deal with significant problems, a soil and sediment discharge provision with exemptions for agricultural operations operating under approved plans, and a mandatory enforceable nutrient planning program. For non-agricultural sources, including land development activities and forest harvests, Maryland relies on county enforcement of a state sediment control law. Maryland also has a forest conservation law, administered by the counties, which requires retention of forests and buffers in connection with development activities.

Monocacy River Watershed

The Monocacy River watershed is a subbasin of the Potomac River[1]. The 899 square mile watershed is mostly in Maryland, although part of the headwaters lies within Pennsylvania.[2] In Maryland, the watershed lies mostly within Frederick County and Carroll County, north of Washington, DC and northwest of Baltimore. The Monocacy was designated a state Scenic River in 1974.[3] It is part of the Upper Potomac watershed for purposes of Maryland's tributary strategy under the Chesapeake Bay Agreement, which is aimed at reducing nutrients entering the Bay. The watershed includes substantial agriculture, comprising about 3,500 farms within these two counties. Dairy and other livestock operations are significant. Both counties are also undergoing rapid suburban development.

The Monocacy watershed and its subwatersheds have been the focus of a number of targeted projects to address nonpoint source water pollution from agriculture, including sediment, nitrogen, and phosphorous, among other pollutants. The state's required assessment under § 303(d) of the federal Clean Water Act lists nutrients and suspended sediment as impairments from non-point and natural sources.[4] Maryland's Unified Watershed Assessment for 1998 classifies the Monocacy as both Category 1 (waters needing restoration) and Category 3 (waters needing protection).

Enforceable Mechanisms Studied

Of the Maryland nonpoint source enforceable mechanisms described in the *Almanac*,[5] the following were reviewed in detail because of their relevance in the Monocacy watershed.

! ***No discharge***. Maryland's water pollution control law contains a broad prohibition against discharges of any pollutant to the waters of the state. "Except as provided in this subtitle [regarding permits][6] and Subtitle 4 of Title 4 of this article [relating to soil and sediment discharges] and the rules and regulations adopted under those subtitles, a person may not discharge any pollutant into the waters of this State."[7] The term "discharge" is defined as "(1) The addition, introduction, leaking, spilling, or emitting of a pollutant into the waters of this State; or (2) The placing of a pollutant in a location where the pollutant is likely to pollute."[8] This broad prohibition is enforced by the Maryland Department of the Environment (MDE), which may use administrative orders, injunctions, and civil penalties of up to $10,000 per day (judicially) or $1,000 per day (administratively), or criminal prosecution.[9] The discharge prohibition is referred to by MDE generally as its Title 9 authority.

! ***Soil or sediment discharges***. Maryland also has a law prohibiting the discharge of soil or sediment into the waters of the state *except* as authorized under a discharge permit or when discharged from land managed under an agricultural soil conservation and water quality plan approved by the local soil conservation district. This provision, referred to as 4-413, provides that apart from these exceptions, "it is unlawful for any person to add, introduce, leak, spill, or otherwise emit soil or sediment into waters of the State or to place soil or sediment in a condition or location where it is likely to be washed into waters of the State by runoff of precipitation or by any other flowing waters."[10] MDE enforces the soil or sediment provisions by corrective action order[11] or injunction.[12] Civil penalties are authorized up to $25,000 per day (judicially) or $10,000 per day (administratively), and criminal sanctions up to $50,000 and/or one year imprisonment.[13] A person engaged in agricultural land management practices *without* an approved soil conservation and water quality plan is covered by the law, but is not liable for penalties if the person complies with MDE's corrective action order.[14] Conversely, if a person has an approved soil conservation and water quality plan, and violates that plan and a discharge of soil or sediment results, the MDE may enforce under its Title 9 authority described above.

! ***Maryland's Water Quality Improvement Act***. This law, passed in 1998, requires farmers that use commercial fertilizers to prepare nitrogen and phosphorous nutrient management plans by December 31, 2001 and to implement them by December 31, 2002.[15] Farmers that use manure or sewage sludges must similarly prepare a nitrogen management plan and implement it by the same dates. Farmers using manure or sludges must prepare phosphorous management plans by July 1, 2004, and implement them by July 1, 2005. The plans must be prepared by state-certified nutrient management consultants. The requirements apply to all agricultural operations with an annual income of at least $2,500, and livestock operations with 8 or more animal units.

Enforcement will be the responsibility of the Maryland Department of Agriculture (MDA). Farmers who fail to develop a plan may be fined up to $250; those who fail to implement a plan by the required dates will receive a warning for a first offense and an administrative penalty of up to $100 for each subsequent violation, not to exceed $2,000 per year.[16] Persons applying commercial fertilizer for hire to nonagricultural property of three or more acres or to state property

inconsistently with University of Maryland Cooperative Extension recommendations will be subject to a penalty of up to $1,000 for a first violation, and up to $2,000 for subsequent violations, but not to exceed a total of $10,000.[17]

! ***Grading and land clearing permits***. This enforceable permitting program for the control of non-agricultural sediment and erosion is administered by MDE or by county and municipal governments to which the program has been delegated. It applies to forestry activities as well as land clearing and development exceeding 5,000 square feet, but not to "agricultural land management practices, construction of agricultural structures, or, except in Calvert County, to construction of single-family residences or their accessory buildings that disturb an area of less than one-half acre and occur on lots of two acres or more."[18] "A grading or building permit may not be issued until the developer (1) submits a grading and sediment control plan approved by the appropriate soil conservation district, and (2) certifies that all land clearing, construction, and development will be done under the plan."[19] "A person may not begin or perform any construction unless the person: (i) Obtains an approved sediment control plan; (ii) Implements the measures contained in the approved sediment control plan; (iii) Conducts the construction as specified in the sequence of construction contained in the approved sediment control plan; (iv) Maintains the provisions of the approved sediment control plan; and (v) Implements any sediment control measures reasonably necessary to control sediment runoff."[20] Enforcement includes stop work orders, corrective action orders, and injunctions; administrative penalties of up to $1,000 per violation (not exceeding $20,000 for any action), judicial civil penalties of double the cost of installation and maintenance of erosion and sediment controls and permanent restoration of the land; and misdemeanor fines of up to $5,000 and/or one year imprisonment.[21]

! ***Forest conservation requirements***. The state also has an enforceable forest conservation program related to land development. "A unit of local government having planning and zoning authority shall develop a local forest conservation program, consistent with the intent, requirements and standards of this subtitle."[22] "Before the approval of the final subdivision plan, or the issuance of the grading or sediment control permit by the State or local authority, the applicant shall have an approved forest conservation plan."[23] The forest conservation subtitle applies "to any public or private subdivision plan or application for a grading or sediment control permit on areas 40,000 square feet or greater." It does not apply to construction of highways, to forest cutting in areas governed by the Chesapeake Bay Critical Area Protection Law (which have their own protective provisions), or to agricultural activity that does not result in a change in land use.[24] Enforcement includes a penalty of 30 cents per square foot of the area found to be in noncompliance,[25] plan revocation,[26] a stop work order by the state or local authority, injunctive relief, and civil penalty of up to $1,000 per day.[27]

These enforceable mechanisms are relevant to nonpoint sources in the Monocacy watershed. Their interaction with Maryland's various nonpoint source voluntary and technical assistance and cost share programs is discussed following the brief description of the latter programs in the watershed.

Maryland's *Chesapeake Bay Critical Areas Law* is not analyzed in this case study, despite its importance statewide to nonpoint source pollution control. It applies to activities within 1000 feet of the Chesapeake Bay and its tributaries influenced by the tide, a definition that does not include the Monocacy watershed. In general, the law limits the creation of impervious surface within the critical area, requires forest buffer retention, and requires that agricultural activities employ best management practices.[28]

Assistance-Oriented Nonpoint Source Programs

This section describes a number of the major programs that address nonpoint source water pollution in the Monocacy watershed. It is not an exhaustive list, but provides a brief description of programs that have influenced activities and water quality in the watershed.

Rural Clean Water Project - Double Pipe Creek Watershed

This project, in a subwatershed of the Monocacy in Carroll County, was funded under a U.S. Department of Agriculture nationwide pilot program in the 1980s to address agricultural water pollution concerns in small watersheds. The project ran from 1980 to 1990, and provided over $3.5 million in cost share assistance to farmers in the 120,000 acre Double Pipe Creek watershed. Dairy farmers were the main participants, although some beef operations and wheat farmers also participated. Each of the over 100 participating farms signed a contract, developed a conservation plan, and implemented best management practices (BMPs) The program provided up to $50,000 in cost share assistance per farmer, paying three-quarters of the cost for installation of BMPs. The contracts required farmers to return the cost share funds if BMPs were not maintained.

The Monocacy River Watershed Water Quality Demonstration Project

The Monocacy Project was funded by USDA from 1989-1998 as a project to "accelerate the widespread, voluntary adoption of land treatment and management practices that provide a cost effective means of reducing agrichemical and nutrient loadings to surface and ground water resources."[29] Primary staffing for the project was provided by Maryland Cooperative Extension, although funds were also allocated to the participating soil conservation districts. For much of the project, the emphasis was on encouraging adoption and implementation of voluntary nutrient management plans and integrated pest management in three subwatersheds of the Monocacy – the Piney/Alloway (in Carroll County), and the Linganore Creek and Israel Creek (in Frederick County).

Voluntary Nutrient Management Planning

The nutrient management program in Maryland has been a voluntary program until the recent enactment of the Water Quality Improvement Act, which makes it mandatory in future years. Carried out by Maryland Cooperative Extension, voluntary nutrient management plans achieved widespread adoption by farmers in the Monocacy watershed. Such nutrient planning has also been required in order to participate in federal or state cost share programs. Extension staff perform tests on the fields and develop a customized plan for the farm which specifies what levels and amounts of fertilizers and manures can be applied consistent with good agronomic practice.

In addition to nutrient plan services provided by Extension free of charge, farmers may also develop a nutrient management plan by consulting a state-certified nutrient management consultant, often an employee or consultant to a fertilizer company. Maryland developed the private nutrient consultant certification program in 1993, and has certified well over 450 consultants, of whom about 70-110 are actively preparing plans. Planners must take a state examination to achieve certification, and the Maryland Department of Agriculture (MDA) reviews a sample of plans from time to time to verify that certified private planners are correctly carrying out their function. Statewide, Extension staff have written 8700 nutrient management plans since 1989, and private consultants over 2600 plans since 1993. Over 1.1 million acres of Maryland farmland have been covered by nutrient management plans, including updates.[30]

Soil Conservation and Water Quality Plans

Soil conservation districts work with farmers to develop soil conservation and water quality plans. Soil conservation district staff develop plans for installation of BMPs, assist with design and cost estimates and applications for cost-share assistance, and provide assistance with installation of practices as well as advice on maintenance. Over half the farmers in the watershed have soil conservation and water quality plans in place. These plans are voluntary, but are required for participation in various cost share programs under federal and state laws. They also provide some protection against enforcement by MDE under section 4-413 of the state's water pollution control law. Provisions in the 1996 federal Farm Bill require farmers on highly erodible lands to adopt and implement soil and water conservation plans in order to receive federal benefits. These Farm Bill provisions have increased the planning workload in the Monocacy watershed.

Property Tax Credit for Conservation Plan and Nutrient Management Plan

Maryland has enacted legislation authorizing counties to offer up to a 50 percent tax credit against property taxes due on agricultural land that is subject to and compliant with a current soil conservation and water quality plan approved by the county soil conservation district, and a nutrient management plan (where eligible).[31] Neither Frederick nor Carroll County has adopted this credit.

Maryland Agricultural Water Quality Cost Share Program (MACS)

The MACS program was created by the Maryland General Assembly in 1984 as part of the Chesapeake Bay Agricultural Initiative. It provides funding for most of Maryland's agricultural water quality programs, including funding for BMPs under various programs. MACS now provides cost-share assistance for the installation of 29 different agricultural BMPs. The amount of assistance available varies for each management practice, but funding is available up to 87.5% of the total cost.[32] MAC cost-share has a lifetime limit per farm while under the same ownership of $75,000, scheduled to increase to $100,000. USDA Farm Services Agency funds may be combined with MACS funds to maximize cost share assistance.

Soil conservation districts provide the farmer with assistance in selecting the appropriate management practices and developing cost estimates used in applying for cost share money. MACS funding is substantial. Statewide, MACS has funded about 12,000 projects with over $48 million in assistance over its 15 year history. Annual funding in recent years has been over $4 million. However, fiscal year 1999 appropriations for MACS are in excess of $8.9 million (not including federal funds). In fiscal year 1998, MACS provided cost share assistance for 121 projects in Carroll County and 86 in Frederick County.[33] MACS usually only funds construction of practices, but not maintenance activities. However, at times funding is available for special practices, such as the cover crop program, which was made available in the Monocacy watershed for the first time in 1998. The cover crop program, which prevents erosion and retains nutrients that would otherwise be washed into the waterways, funds the planting of cover crops in the fall, and then kill-off of the crop in March.

Environmental Quality Incentives Program (EQIP)

EQIP is another of the federal Farm Bill programs. In Maryland, EQIP serves primarily as an additional source of funding beyond MACS cost shares. It provides up to $10,000 in cost share funding per farmer. Until 1998 EQIP money in Maryland was allocated in such a way that the western counties of Maryland all had to compete for funding in the same pool, but this has changed. Carroll and Frederick Soil Conservation Districts each received just under $100,000 in EQIP funds in 1998. Carroll's funds were targeted for use in the Little Pipe Creek watershed.

Conservation Reserve Enhancement Program (CREP)

This addition to the federal Conservation Reserve Program, available in Maryland, is targeted at areas that will provide water quality benefits. It pays farmers to take riparian lands, highly erodible lands, or wetlands out of production for up to 15 years, and provides incentive bonuses to install conservation practices such as forested or vegetative buffers, to retire highly erodible land within 1000 feet of a waterway, or restore wetlands.[34] Eligible lands include cropland that has been planted to an agricultural commodity for two of the last five years, or marginal pastureland suitable for use as a riparian forest buffer. In April 1999 the program, which operates throughout the state, had enrolled 563 acres in Carroll County and 890 acres in Frederick County, mostly in the Monocacy watershed.

CREP has been popular in the watershed. CREP is more attractive to landowners than to many of the active farmers in the watershed, many of whom rent much of the land on which they farm. CREP has also raised some concerns among farmers about making land unavailable for agriculture as well as concerns with having land out of production adjacent to productive land such that deer or Johnson grass might become a problem for the remaining land in production.

319 Program

The federal grant funds provided under Section 319 of the Clean Water Act for control of nonpoint source water pollution have been used for a variety of projects in the watershed, including a number of projects under the Monocacy Project. Statewide, Maryland usually has $1.4 million in 319 money each year, but will have $2.6 million in 1999 and 2000. These funds are in addition to the Chesapeake Bay implementation grant. In the Monocacy, § 319 funds have supported technical assistance for animal waste management practices and erosion controls, monitoring projects to determine the effectiveness of agricultural and forestry best management practices, development of water quality modeling programs, and homeowner education on residential best management practices.

Agricultural Land Preservation Program and Maryland Rural Legacy Program

Maryland's Agricultural Land Preservation Program is aimed at acquiring permanent easements on agricultural land to keep it in agriculture. Since 1985, a condition of the easements has been that the owner must develop a soil conservation and water quality plan, outlining best management practices to be installed and maintained on the property. The plan includes a schedule of implementation and is included as a condition in the easement. In 1998, Carroll County had preserved the most acreage in the state under this program, over 25,000 acres.

The Rural Legacy Program provides funding for 12 areas around the state. Carroll County recently received $2.5 million as part of this program, which will be used in the watershed to create an agricultural buffer around the town of New Windsor. The program will promote CREP, the Maryland Agricultural Land Preservation Program, and also provide for easements on non-agricultural lands such as environmentally sensitive lands and wooded property.

Discussion and Analysis

Agricultural Pollution Generally

The Maryland approach to agricultural sources of nonpoint source pollution is primarily through technical assistance, cost-share, and voluntary programs administered through the soil conservation districts. This is backed by enforcement by MDE for unlawful discharges that are not

remedied by farmers when they are put on notice and offered assistance by the soil conservation districts.

MDE's field office acts on agricultural nonpoint source pollution largely in response to citizen complaints, or staff may act on personal observation of a pollution problem. Complaints may be made directly to MDE at its field office or at headquarters. Citizens who complain to a soil conservation district may be referred to the MDE. Under MDE policy, citizen complaints are acted upon within three days. MDE's normal approach upon receipt of a complaint is to contact the local soil conservation district to determine whether the operation has a soil conservation and water quality plan or is working on one with the district. MDE also invites the soil conservation district to conduct a joint inspection of the operation. If there is an existing plan, the district staff will often go with MDE to visit the site. If not – as is more typical in complaint cases – the district usually declines the invitation. Both MDE and soil conservation district staff noted that the districts do not want to be associated by farmers in the first instance with enforcement-oriented activity, believing that this may make their provision of technical assistance and farmer acceptance of voluntary programs more difficult.

An MDE staff member visits the site and determines whether a discharge or potential discharge situation is occurring. The MDE staffer then produces a Field Investigative Report on a computer-generated form and leaves a copy with the farm operator. If there is a violation, the MDE staff member will advise the operator to contact the soil conservation district for assistance. Typically, the MDE will wait a few weeks and then contact the district to determine whether the farmer has sought assistance. If the farmer has not, the MDE visits the farm again. More serious situations may result in issuance of a Site Complaint, whose issuance requires approval from MDE management. (There are 4 regional compliance divisions in the state). The Site Complaint, while more serious in form, has no additional legal significance, however, unless it is accompanied by an order. An order can only be issued if pre-authorized by an assistant state attorney general advising the MDE.

If an observed violation is for soil and sediment under 4-413, the violator is directed to get a soil and water conservation plan from the soil conservation district. If the violator obtains a plan and thereafter does not violate it, then there is no sanction for the original violation. MDE did not identify any instances in the Monocacy watershed of an enforcement action arising after preparation of a plan under these circumstances. However, one Frederick County farmer outside the Monocacy watershed was advised to contact the soil conservation district to develop a plan and to implement it, after he mass-graded his fields and disturbed a stream. The district prepared the plan, but the farmer then failed to maintain the practices specified in the plan. Subsequent MDE enforcement activity resulted in a settlement in which the farmer took corrective action and paid a fine of $750.

The assistant attorney general responsible for advising MDE did not recall any sediment pollution cases prosecuted in court by the attorney general's office against agricultural operations. The approach of directing such violators into the planning process with soil conservation districts has apparently resolved all of the known violations short of formal enforcement.

Most agricultural water pollution in the state, as well as in the Monocacy watershed, involves manure discharges and/or animals in the stream. The MDE can take enforcement for these violations directly under the Title 9 "no discharge" prohibition, and is not required to offer the discharger an initial opportunity to correct the problem without penalty as under 4-413. Ordinarily, however, the MDE official uses a similar approach – advising the farmer to get in touch with the soil conservation district to develop and implement a plan to correct the problem. Carroll County Soil Conservation District officials note that one farm in the county is currently under a site complaint related to discharges of barnyard and dairy wash water to a wetland and stream. While this is a violation, the MDE has not pressed the enforcement action to a formal order (with administrative review, penalties, and other consequences) because the soil conservation district still needs to do the design work to support the remedy and the cost shares necessary to solve the problem. Thus, although provision of cost share money is not a legal prerequisite to enforcement action in Maryland, nevertheless, the MDE exercises its enforcement discretion in cases where the problem is expected to be solved. Frederick County Soil Conservation District officials note a similar case in which a tenant dairy farmer received a field inspection report from MDE advising him to contact the district to resolve a nonpoint source pollution problem and a related problem with a pipe discharging milking parlor waste water. The district perceives some difficulty in solving the problem in the near term as the operator is near retirement, the remedy will require substantial capital investment (including cost share) and the landowner may not want to invest in expensive engineered solutions; the current hope is to develop some sort of management plan. Each of these cases shows that enforcement is intended to serve what remains a largely technical assistance and cost-share oriented approach.

The Frederick County Soil Conservation District currently is working with ongoing projects involving 200-400 farmers; fewer than a dozen of these are relationships initiated by MDE referrals/complaints. Projects can take from 2-6 years to develop and implement. In Carroll County, the Soil Conservation District works with about 1000 farmers annually but fewer than ten of the projects are related to MDE involvement. The office tries to resolve problems within six months, but practices may take between 1 to 3 years to install. Cost share funds play a role in the adoption of practices. Federal funding is currently limited, but state MACS funding is by far the largest source of cost share money.

The soil conservation districts also noted that they do not use the specter of potential MDE enforcement as a "selling point" when seeking to promote the voluntary adoption of practices or participation in agricultural cost share programs – even for animal waste situations (where costs are much higher and enforcement consequences more likely). Their experience shows that a farmer has to have a strong desire to participate and to integrate the recommended practices and constructed facilities into the farm operation if they are to have any chance of long term maintenance or operation. Imposed solutions, in their view, often lack this level of commitment and fail after a few years. This also explains, in part, the districts' desire to be the provider of solutions in an enforcement context, rather than to appear as a co-enforcer (e.g., declining joint site visits with MDE in most instances).

Nutrient Planning and Water Quality Improvement Act Implementation

Maryland has received national attention for its Water Quality Improvement Act adopted in 1998 in response to the *Pfiesteria* problem in certain tributaries of the Chesapeake Bay. The Act imposed mandatory nutrient management planning requirements statewide. This mandatory program follows years of promotion of voluntary nutrient management planning.

However, the new law's approach does not simply make mandatory what was previously voluntary. The law makes substantive changes in the required content of plans, thus requiring new plans and plans that address animal operations more holistically. The law also raises issues of administration. In practice, the law divides responsibility for nutrient management planning and regulation among at least four entities – the Maryland Department of Agriculture, Maryland Cooperative Extension, the local soil conservation districts, and the Maryland Department of the Environment.

Historically, nutrient management planning was the responsibility of Maryland Cooperative Extension, while soil conservation and water quality planning was the responsibility of the soil conservation districts. As described previously, soil conservation districts provide broad planning services for farmers and serve as the gateway for cost-shares and other programs. Within the soil conservation and water quality plans, the districts schedule specific "practices" to meet the needs identified. Nutrient management is one of the component "practices" of the soil conservation and water quality plan, but the nutrient management plan was prepared by Extension (or a private certified consultant) rather than by the district staff.

Soil conservation and water quality plans also contained a "waste management system" practice. The district prepares a waste management plan, which addresses management of animal waste and runoff in the area of the barn and barnyard, but does not address the application of such materials to fields (which is the subject of nutrient management planning). A farmer with a waste management plan must also have a nutrient management plan because it is a component practice of the overall soil conservation and water quality plan.

Alternatively, a farmer could have Extension or a certified private consultant prepare a stand-alone nutrient management plan, without engaging with the soil conservation district in preparation of a soil conservation and water quality plan.

The new Water Quality Improvement Act requires *mandatory* preparation of nutrient management plans. But these plans take in elements that were previously not part of nutrient management planning in Maryland. The plans required by the new law require consideration of rates of runoff and pollution from the land, and measures for management and containment of manures. But the previous nutrient management plans prepared by Extension only determined agronomically appropriate rates of application of manures and fertilizers on the land; they did not address runoff rates or manure storage and management issues. Moreover, the handling and storage of "excess" manure not applied to the fields must also be addressed under the mandatory program, a change from the prior system where this was an issue handled only in the waste management plan prepared by the soil conservation district. Thus, the new mandatory plans involve features not part of the voluntary plans. Some soil conservation district staff are concerned that Extension nutrient planners

will not be equipped to handle the new demands of the mandatory program – either because of lack of experience with waste management practices, or unfamiliarity with farm conservation and water quality issues on a holistic basis. Others are confident that the gap can be closed and needs addressed cooperatively. The Maryland Department of Agriculture expects Extension nutrient planners to become familiar with these requirements, and/or to refer the farmer to soil conservation district staff for detailed planning and construction of waste management structural practices. Under any scenario, soil conservation districts will need to work more closely with Extension by providing soil loss and runoff data to aid in the development of the new nutrient management plans and by assuring that the waste management element has been prepared.

The new program is likely to mean that a substantial number of animal operations in the Monocacy watershed will need to upgrade their existing waste management system plans in order to come into full compliance. Soil conservation district staff estimate that up to eighty percent of existing dairy farms in Frederick County are likely to need new or revised waste management plans in conjunction with the new nutrient management plans. In anticipation of these costs, the state recently announced a new loan program to help cover the portion of farmers' expenses not covered by the 87.5 % cost shares available under MACS. This Maryland Agricultural/Nonpoint Source Loan Program uses Water Quality State Revolving Fund (SRF) monies administered by the MDE to make low interest loans. The farmer works with the soil conservation district to develop the necessary practices; the district certifies the need to prevent nonpoint source pollution, and the farmer then seeks a loan from a commercial bank. If the application is approved by the bank, the bank applies to the MDE for a "linked deposit" of SRF monies. The bank disburses the loan.[35]

Cost shares are also available to assist with the planning. The MACS program is providing up to a 50 percent cost share (limited to $3 per acre) for the preparation of nutrient management plans by certified private nutrient consultants.[36] Extension nutrient planners will continue to provide their planning services free of charge.

Enforcement of the new law will be the responsibility of the Maryland Department of Agriculture (MDA), rather than MDE. The soil conservation districts, Cooperative Extension staff, and private nutrient planners will also not have enforcement responsibilities under the Water Quality Improvement Act. The MDA has hired six inspectors statewide in anticipation of implementing the enforcement program. In addition, in anticipation of increased planning and cost share workloads in the soil conservation districts, the state has funded 15 new positions last year and will add 33 this year statewide. Four of these will be in Frederick, five in Carroll. (The net increase in district staffs will be somewhat smaller, owing to downsizing in recent years. For example, the Carroll County Soil Conservation District's five new staff will represent a net gain of two because of three previous unfilled positions).

Although MDA will be responsible for enforcement of the Water Quality Improvement Act, MDE will retain the ability to use its Title 9 authority where there is an unlawful discharge of pollutants. Because MDE has a history as an enforcement agency, and because the penalties are so much higher under its Title 9 authority than under the Water Quality Improvement Act administered by MDA, there is great concern among the agricultural community about sharing of information among the agencies. Under existing practice, a nutrient management plan is kept by the farmer and the preparer. The soil conservation and water quality plan (with its waste management component) is kept by the farmer and the district. Under the new program, MDA will receive only a summary of

the new nutrient management plan, not a copy of the plan itself. In 1999, the Maryland legislature amended existing law to provide that information from soil conservation and water quality plans could be shared with MDE "for enforcement under 4-413" (soil or sediment) and further providing that the MDA can share information with MDE "to support the development of a compliance or enforcement case for purposes of addressing *an existing water quality problem*" (viz. Title 9) but only pursuant to procedures to be established between the two departments and the state soil conservation committee.[37] These authorizations and limitations were the subject of substantial negotiations in the legislature. MDE and MDA are currently "negotiating" over how their respective enforcement duties will be carried out under the Water Quality Improvement Act.

Soil conservation districts and Extension staff also have concern with being associated with an "enforceable" program. They suggest that MDA will need to take the heat of doing inspection and enforcement if the two assistance-oriented organizations are to be effective in gaining cooperation of farmers in developing and implementing the plans.

The new enforceable program clearly represents a step forward in water quality protection. It will undoubtedly improve both nutrient and waste management planning for those Monocacy watershed farms that already have plans, and will bring in those farms that do not. However, the program is highly dependent on the provision of sufficient staff and the investment of substantial cost share funds, and its division of functions may complicate implementation.

Land Development Regulation

Nonpoint source pollution from land development activities is addressed by a number of regulatory laws. Here, the approach is not voluntary, but mandatory.

State law requires a sediment control plan for land disturbances over 5,000 square feet other than agriculture. The plan must be reviewed and approved by the soil conservation district before the county may issue grading permits. Frederick and Carroll Counties have taken delegation of the sediment control program. The City of Frederick has not, so MDE enforces the district-approved sediment control plans within the city limits.

Land disturbances over 20,000 square feet in Carroll County (or 15,000 square feet in Frederick county) require a full sediment control and grading permit. The county receives a copy of the plan at the same time as the soil conservation district, but will not issue a permit until the plan has been approved by the district. In Frederick City, the MDE receives a copy of the approved plan. Land disturbances between 5,000 and 20,000/15,000 square feet are subject to minor permits with standard conditions for sediment control. Sediment control plans for minor permits are not individually reviewed by the soil conservation district.

Bonds are required to assure compliance with the plan for disturbances greater than 20,000 square feet. Carroll County requires dedication of a 100 foot water resource protection easement along streams. Frederick County does not, but under its zoning ordinance simply prohibits or limits developments within variously defined "floodplain" widths, and within 50 feet of unmapped intermittent streams. Frederick County also has an inconsistently enforced provision in its zoning laws requiring that intermittent streams be protected with native vegetation/grasses.

County inspectors (or MDE in the city of Frederick) enforce the sediment control law. County inspectors ordinarily visit sites biweekly and also after precipitation events. If the county inspector identifies a violation, the inspector issues a field report identifying the violation and specifying the number of days to correct it. If the violation is not corrected in this time period, the inspector may issue a notice of violation or site complaint, again specifying a time for compliance. Failure to comply may lead to a stop work order. If a violation is significant, such as actual discharge of sediment offsite, a stop work order may be issued on the first inspection. In Carroll County in 1998, 3,204 inspections were performed, resulting in 19 stop work orders and 7 notices of violation. In each case these were resolved without assessment of a fine or commencement of a court case.[38] In Frederick County there were 13 stop work orders and 49 notices of violation issued between July 1998 and July 1999. There were also 3 citations issued with fines totaling $750 in the same period. MDE inspectors do not observe the identical inspection frequency, but prioritize the workload based on anticipated potential for pollution; MDE enforcement is typically by administrative civil penalty.

The Maryland Forest Conservation Law also has requirements that apply to development that affects 40,000 square feet or more of land. The state law sets forth standards which are implemented through county ordinances, which must be at least as stringent as the state law. These ordinances provide that the developer must conduct a forest stand delineation which is reviewed by the county, and then must submit a forest conservation plan. The plan must provide for forest retention and reforestation, and in certain cases for afforestation of previously non-forested areas. Developments in agricultural and resource areas or zoned for medium residential density that have less than 20% of the net tract area in forest cover must be afforested up to 20%; and commercial or industrial properties and high density residential areas with less than 15% must afforest up to 15%. In order to assure that forested areas remain in forest to some extent, areas that are deforested by the development activity must be reforested. Reforestation is required at a ratio of 1:1 (one acre reforested for each acre deforested) in Carroll County; and on a sliding scale (from 1/4:1 to 2:1) in Frederick County. The sliding scale in Frederick County, which follows the state law model, depends on a number of factors. If the forest cover removed by the development activity results in a residual forest area above a specified numerical threshold, reforestation is required only at the 1/4:1 ratio (with a 1 for 1 credit for each acre retained above the threshold). If the amount of forest cover removed results in a residual forest cover below the threshold, reforestation at the ratio of 1/4:1 is required for acres deforested down to the threshold and at 2:1 for acres deforested below the threshold.

In both counties, the developer must post a bond to assure performance of the forest conservation plan. In Carroll County the bond is $5,000 per acre to be forested; in Frederick it is

either $0.10 per square foot or, for larger sites, an amount equal to the market rate for the required forest plantings plus a 15% contingency.

Forested or reforested land covered by the forest conservation plan must be placed under easement conveyed to the county. The easement requires that the land remain permanently in forest. In Carroll County developers may use offsite forest mitigation banking; the county does not allow "fee in lieu" mitigation. Frederick County allows offsite banking as well; the county ordinance makes agricultural streams the number one priority for off-site reforestation or forest banking. Such "banks" are subject to the same review, bonding, and easement requirements as for approval of onsite forest conservation activities.

The Carroll County Forest Conservation Ordinance requires creation and retention of a 50 ft. forest stream buffer. (County subdivision ordinances require 100 feet, and the Forest Conservation Ordinance may soon be changed to require 100 feet. The county normally seeks a 100 foot forest buffer despite the current 50 foot provision in the ordinance). Frederick County forest stream buffers under the ordinance are 50 feet or floodplains.

Forest conservation enforcement in Carroll County includes conducting an initial inspection to ensure that the planting has taken place as specified in the plan, then following up after 12 months. At that time, if 75% of the trees planted have survived, the developer receives 50% of the bond back. The final inspection is after 26 months. If 75% of the originally planted trees still survive, the developer receives the remaining 50% of the bond. A similar approach is used in Frederick County.

Frederick County depends on citizen complaints to identify individual landowners who may be conducting activities that are subject to the Forest Conservation Act without filing the appropriate plans. This generally only happens with private landholders since the review process for development ensures that commercial developers follow the requirements. There have been 2 or 3 violations in the county that the landowner rectified.

Forest Harvest Operations

Forest harvesting operations disturbing more than 5,000 square feet are also subject to enforceable mechanisms under the grading and clearing law. Like land development operations, these harvest operations prepare a sediment control plan for soil conservation district review and approval, and must obtain a permit from the county. As noted, operations disturbing between 5,000 and 15,000/20,000 square feet will obtain the standard (or minor) grading permit; larger operations need major permits. While bonds are required for major grading permits involving development, they are not required in either Frederick or Carroll County for forest harvests.

The MDE and the Department of Natural Resources (DNR) have established a "compliance agreement for the standard erosion and sediment control plan for forest harvest operations." This provides the requirements including Best Management Practices (BMPs) and stream buffers needed for sedimentation control.[39] For harvests affecting streams, the approved sediment control plan is required to include a forest stream buffer management plan for the "streamside management zone." The buffers are a minimum of 50 feet at zero percent grade, with an additional 4 feet of width for every percent above zero. The plan must provide for the post-harvest basal area within the buffer

being at least 60 percent of the pre-harvest basal area. No landings are allowed in the buffer, and haul roads in the buffer are allowed only if preexisting and stable, or if they merely cross the buffer laterally. Research in the Monocacy watershed funded by 319 money has shown that use of best management practices for forest harvests avoids significant impacts to water quality.

Enforcement is by the county sediment control inspectors. Stop work orders and related enforcement on logging operations occurs in both counties. The last civil citation for a grading violation in Carroll County that resulted in a fine was about 7-8 years ago, involving a timber harvest that occurred without the required plan and approval. It was cited because the harvest involved stream crossings and wetlands.

Maryland has a separate state law authorizing regulation of some forest harvest practices on private lands.[40] The law requires notice to the local district forestry board (in each Maryland County) for commercial harvests affecting more than three acres of forest land, and is implemented mostly in the Chesapeake Bay critical area.[41] However, in Frederick County, the county government has adopted zoning ordinance provisions that require the board to review timber harvests occurring in the county's "conservation areas." This provides an additional level of scrutiny to assure the retention of stream buffers.

Conclusions

Maryland has many programs operating in the Monocacy watershed, including cost-share, technical assistance, voluntary, and enforceable programs. The substantial impression left by review of these efforts is their sheer magnitude - in dollars, staffing, and duration. With respect to agricultural sources of nonpoint pollution, Maryland's approach centers on the delivery of services by the soil conservation districts, but enforcement is the responsibility of the MDE. With respect to the new mandatory nutrient management program, responsibilities will be divided further, with MDA having initial enforcement responsibility, backed by MDE enforcement if water pollution occurs. Thus, the enforcement tools are plainly intended to be used to support traditional planning, cost share, and technical assistance approaches.

Many of the technical assistance and voluntary programs in the watershed have come and gone, often with substantial participation rates and results, but with little formal coordination at the state level. Although Maryland does have all of its waters divided into basins under its tributary strategy, the multi-stakeholder tributary teams seem to be chiefly engaged in public outreach and promotion of water pollution control and prevention techniques rather than in watershed goal-setting or development of projects. Similarly, unified watershed assessment has provided a means for the state to target its 319 money, but the 319 funding (while substantial) is small in comparison with the MACs and USDA funding that has come to the state and into the watershed.

For land development and nonpoint source pollution from forest harvests, enforceable mechanisms adopted by the counties under state legislation are the central approaches in Maryland. These seem to be working in coordinated fashion. Indeed, the centering of approval and enforcement in county governments appears to assure better understanding of requirements and controls over activities. The involvement of the soil conservation districts in review and approval of plans also helps to assure coordination of agriculture and non-agriculture expertise in the watershed.

The Maryland programs maintain a sharp distinction between entities providing assistance in coming into compliance (the soil conservation districts and the cost-share programs they serve as gateways), and enforcers (the MDE, county governments, and now the MDA). While this can lead to complexity in coordination, it also apparently alleviates concerns of land holders who can then seek compliance assistance from familiar entities without concerns over a potential conflicting role as enforcers.

Endnotes

1. In addition to the sources cited, the following individuals were interviewed by telephone or in person: Donna Baker, Carroll County Forester, Maryland Forest Service; Elizabeth Bonar-Bouton, 319 Coordinator, Maryland Department of Natural Resources; Patty Burdette, Nutrient Management Planner, Frederick County Extension Service; Dawn Early, District Manager, Frederick County Soil Conservation District; Mike Kay, Frederick County Forester, Maryland Forest Service; Carole Larsen, Environmental Planner, Frederick County; Louise Lawrence, Maryland Department of Agriculture; Bill Limpert, District Manager, Water Management Administration, Maryland Department of Environment; Vicky Luther, Division of Landscape and Forest Conservation, Carroll County Department of Planning and Development; Dave Lyons, Chief, Water Management Administration Enforcement Division, Maryland Department of Environment; Rick Masser, Environment Preservation Agency Manager, Frederick County Department of Public Works; Tom Miller, Agronomist, Maryland Extension Service; Steve Nelson, Division of Water Resource Management, Carroll County Department of Planning and Development; Ed Null, District Manager, Carroll County Soil Conservation District; Steve O'Phillips, Frederick County Development Review Office; Phil Panel, Frederick County Forester, Maryland Forest Service; Bill Powell, Agricultural Preservation Planner, Carroll County; Maggie Rhodes, USDA-NRCS District Conservationist, Carroll County; Ed Sanders, Administrator for Conservation Grants, Maryland Department of Agriculture; Mark Siebert, District Conservationist, Frederick County Soil Conservation District; Gail Smith, Sediment Control Inspector, Bureau of Development Review, Carroll County Department of Planning and Development; Bryan Snyder, Sediment Control Planner, Carroll County Soil Conservation District; Rosewin Sweeney, Assistant Attorney General, Maryland Department of Environment; Doug Valentine, USDA-NRCS Soil Conservationist, Carroll County; and Lauren Wenzel, Tributary Team Program Coordinator, Maryland Department of Natural Resources.
2. Monocacy Project, Fiscal Year 1997 Annual Report, Exec. Summ.
3. *See* Alliance for the Chesapeake Bay, The Monocacy River, Factsheet.
4. "Maryland Clean Water Action Plan, Final 1998 Report on Unified Watershed Assessment, Watershed Prioritization and Plans for Restoration Action Strategies." December 31, 1998; and http://www.epa.gov/iwi/303d/02070009_303d.html, November 19, 1999.
5. *See* Environmental Law Institute, *Almanac of Enforceable State Laws to Control Nonpoint Source Water Pollution* (1998).
6. Maryland law does authorize the MDE to require dischargers, potentially including nonpoint source dischargers, to obtain permits as "other activity" under some circumstances if an "operation could cause or increase the discharge of pollutants into the waters of this State." Md. Code Ann., Envir. §§ 9-323(a)(3), (b). This authority has not been used to require permits for nonpoint sources, but has been used to require permits for spray irrigators.
7. Md. Code Ann., Envir. § 9-322.
8. Md. Code Ann., Envir. § 9-101(b).
9. Md. Code Ann., Envir. §§ 9-334, 9-335, 9-338, 9-339, 9-342, 9-343.
10. Md. Code Ann., Envir. § 4-413(a).
11. Md. Code Ann., Envir. § 4-412(a), § 4-415.
12. Md. Code Ann., Envir. §§ 4-405, 4-415, 4-416.
13. Md. Code Ann., Envir. § 4-417.
14. Md. Code Ann., Envir. § 4-413(b).
15. Md. Code Ann., Agriculture, § 8-801 et seq.
16. Md. Code Ann., Agriculture, § 8-803.1.

17. Md. Code Ann., Agriculture, § 8-803.4.
18. Md. Code Ann., Envir. § 4-102. Section 4-105(a)(1)(i) includes "otherwise disturbing land for any purpose" within the definition of "construction" subject to the law.
19. Md. Code Ann., Envir. section 4-103(a).
20. Md. Code Ann., Envir. § 4-105(a)(3).
21. Md. Code Ann., Envir. §§ 4-103, 4-110, 4-113, 4-116.
22. Md. Code Ann., Nat. Res. § 5-1603(a)(1).
23. Md. Code Ann., Nat. Res., § 5-1608(b).
24. Md. Code Ann., Nat. Res., § 5-1602.
25. Md. Code Ann., Nat. Res., § 5-1608(c).
26. Md. Code Ann., Nat. Res., § 5-1612(b).
27. Md. Code Ann., Nat. Res., § 5-1612(c), (d).
28. Md. Code Ann., Nat. Res., § 8-1801 et seq.
29. Monocacy Project, Annual Reports.
30. Maryland Department of Agriculture, 1998 Agricultural Nutrient Management Annual Report.
31. Md. Code Ann., Tax - Prop., § 9-226.
32. Md. Code Ann., Agriculture §§ 8-701 et seq.
33. Maryland Agricultural Water Quality Cost-Share Program, 1998 Annual Report: Conservation Efforts in Progress.
34. New Benefits: Your Farm and the Maryland Conservation Reserve Enhancement Program.
35. Maryland Department of Agriculture, Agricultural/Nonpoint Source (NPS) Loan Program Fact Sheet.
36. Maryland Department of Agriculture, Cost-Share Assistance for Nutrient Management Plans.
37. HB 706 (1999), amending Md. Code Ann., Agriculture, § 8-306.
38. Application for Renewal of Delegation of Erosion and Sediment Control Enforcement Authority - 1998 (Carroll County).
39. Best Management Practices for Forest Harvests (www.dnr.state.md.us/Forests/Landplanning/bmp.html).
40. Md. Code Ann., Nat. Res. § 5-601 et seq.
41. Md. Code Ann., Nat. Res. § 5-608; see § 8-1808(c) (requiring that all harvesting of timber in the critical area be in accordance with plans approved by the district forestry board.)

Ohio Case Study

Summary

In addressing nonpoint source water pollution from agriculture and silviculture, Ohio relies primarily on its 88 county soil and water conservation districts.[1] While these districts chiefly use voluntary measures and technical assistance, they have the power to require filing of operations and management plans to *abate* agricultural or silvicultural pollution. If plans are not prepared or carried out to abate ongoing pollution, enforcement can be requested from the chief of the Department of Natural Resources' Soil and Water Conservation Division to ensure that the necessary measures are put in place. These administrative "chief's orders" are enforceable, and can also lead to judicial enforcement. Ohio's law requires the state to provide cost share funds as a condition for the validity of chief's orders that require the installation of any practices eligible for cost-shares. Enforcement-driven cost shares rise to the top of the list for state eligibility. Fairly limited funding, capped at $15,000, is available for such enforcement-based cost shares, however. Very few chief's orders are requested by the districts or issued by the DNR, and use of this mechanism takes significant time. Ohio's state wildlife officers can also address nonpoint source pollution, seeking misdemeanor fines, court orders, and restitution for nonpoint source pollution that results in fish kills. They also may seek enforcement when litter and other materials are found in streams.

Ohio EPA plays a limited role in enforcement in the nonpoint context. The state's general water pollution law administered by OEPA does not cover agricultural, silvicultural, or non-agricultural nonpoint pollution otherwise subject to DNR or county authority. OEPA's involvement occurs primarily when a discharge can be defined as a point source or when a water pollution situation is not covered by these other laws.

Watersheds

Two rural watersheds (in eastern and western Ohio) were examined in order to assess the use of enforceable mechanisms, and their relationship to cost-share and technical assistance approaches to nonpoint source discharges.

Stillwater River Watershed

The Stillwater River Watershed in western Ohio drains an area of 673 square miles. Comprising most of the land area of Darke County and flowing southeastward through western Miami County and northwestern Montgomery County, the Stillwater watershed is a part of the Great Miami River drainage basin. The Stillwater River flows into the Great Miami River at Dayton. The Stillwater River and Greenville Creek (its tributary) were designated State Scenic Rivers by the Ohio legislature in 1975. The watershed is predominantly agricultural; and the largest town in the watershed is Greenville, with a population of 12,850.[2]

The headwaters of the watershed, and 70 percent of its total area, lie in Darke County, on the Indiana border. Of the 400,000 acres in Darke County, approximately 325,000 acres are agricultural. The county is one of the most agriculturally productive in the state, regularly ranking among the top three counties for production of corn, soybeans, and wheat. In addition to crop production, almost two-thirds of agricultural revenue in 1997 was derived from livestock farms. The county has over 200,000 animal units and approximately 10 million animals, more than any other county in the Miami Valley region. While the number of livestock operations has decreased steadily since the 1940s, the number of animals has increased. Poultry and hog numbers have increased, while beef and dairy cattle have declined in number. Chickens now comprise almost half of the total number of animal units, and more than 90 percent of the animals.[3] Most of the stream miles in the watershed are classified as warmwater habitat or exceptional warmwater habitat for water quality purposes. However, almost 60 percent of the stream miles assessed in 1996 were not attaining or were only partially attaining water quality use standards. Causes of impairment included livestock pastures/feedlots, row-crop agriculture, and on-lot wastewater systems, as well as some industrial and municipal point sources.[4]

Belmont County

Belmont County lies in eastern Ohio, and is bordered on the east by the Ohio River. Its terrain is rugged and steep. The major stream systems, running from west to east into the Ohio River, are associated with McMahon Creek and Captina Creek. Most of the streams are designated warmwater habitat.[5] Primary land uses in Belmont County include forestry, agriculture, and mining. The county is the second highest in the state for annual soil losses, and contains the fourth largest amount of highly erodible soil and the third highest number of total stream miles. Forty percent of the county is forested. Forest harvests are increasing in the county as the demand for high quality hardwood increases. Most forest land is privately owned, and logging operations are generally arranged through contracts between logging companies and landowners. Approximately 45 percent of the county is agricultural land, with slightly more land devoted to pastures than cropland. More than half of the cropland is enrolled in cost-shares for conservation practices. Water quality impairments are primarily nonpoint in origin.

Enforceable Mechanisms Studied

“Chief’s Orders” for Agriculture and Silviculture

Ohio law directs Ohio DNR's Division of Soil and Water Conservation, with the approval of the Soil and Water Conservation Commission, to adopt rules establishing "technically feasible and economically reasonable standards to achieve a level of management and conservation practices in farming or silvicultural operations that will *abate* wind or water erosion of the soil or *abate* the degradation of the waters of the state by animal waste or by soil sediment including substances attached thereto."[6] The key concept is that these standards come into play where abatement of pollution is needed; absent pollution, operators are not subject to any of these standards except on a voluntary basis.

This law does not “restrict the excrement of domestic or farm animals defecated on land

outside a concentrated animal feeding operation or runoff therefrom into the waters of the state."[7] The definitions are important. "Concentrated animal feeding operation" is not defined by numerical animal unit thresholds as under the federal Clean Water Act. Instead, the term is defined as including "animal feedlot and animal waste management facilities and land application areas for managing and disposal of animal waste."[8] An "animal feedlot" is defined as a feeding or holding area "where grass or other suitable vegetative cover is not maintained," while an "animal waste management facility" means "any area or facilities used for the collection, storage, handling or treatment of animal waste."[9] Thus, the law provides authority for the DNR to set standards to address manure spreading, handling, collection, and application practices, and other forms of animal waste such as wash waters; but it does not address animal waste excreted in pastures.

DNR regulations provide that to abate pollution from animal waste collection, storage, or treatment facilities, the operator shall "design, construct, operate, and maintain" such facilities to prevent discharge, and must follow the standards in the "Field Office Technical Guide."[10] The operator must prevent seepage from animal waste management facilities, and "if pollution of waters of the state occurs from an existing facility, corrective measures shall be taken."[11] Pollution from land application of animal waste, flooding, waste waters, and related activities must be prevented.[12]

DNR sediment regulations under this law also require control of sheet and rill erosion, wind erosion, and concentrated channel erosion.[13] Farmers "responsible for agricultural pollution" must apply and maintain "Field Office Technical Guide" measures and install practices in accordance with an approved operation and management plan.[14] Soil and water conservation districts are required to review and approve "operations and management plans."[15] Such plans must "contain implementation schedules and operational procedures for a level of management and pollution abatement practices which will abate the degradation of the waters of the state by animal waste and by soil sediment including attached pollutants."[16] The sediment regulations further provide that there shall be no earth disturbing practices (including tillage) immediately adjacent to waters of the state "except for those practices constructed or implemented in accordance with generally accepted agricultural, silvicultural and engineering practices."[17] The sediment regulations also require silviculture operators to apply Best Management Practices, and provide that such operators "may" file operations and management plans with soil and water conservation districts.[18]

The Division of Soil and Water Conservation is required to "establish procedures for...enforcement of rules for agricultural pollution abatement."[19] The procedures rely on the abatement measures administered by Ohio's 88 soil and water conservation districts (one in each county),[20] but are backed by authority for the chief of the Division at the state level to issue enforcement orders.

Typically, citizen complaints about agricultural or silvicultural pollution are investigated by the conservation district. After the district invites the violator to comply, provides any assistance, and gives a voluntary period to correct the problem,[21] the district may refer the matter to the Division of Soil and Water Conservation for a "chief's order."[22] State law created the chief's

order for animal waste pollution in 1978. In 1991, “chief’s order” authority was extended to include pollution from discharges of sediment.

After conducting an adjudicatory hearing, the Division chief may order an agricultural or silvicultural operation to comply with the standards, and operate in accordance with an operation and maintenance plan.[23] However, the chief *may not* issue an order that requires the recipient to implement an agricultural pollution abatement practice eligible for cost sharing unless public funds are actually made available to cover not less than 75 percent of the required cost (not exceeding $15,000/person/yr).[24] Cost shares are available only to owners and operators that develop and have approved by the soil and water conservation district a current operation and management plan for their *entire* operation.[25]

Chief’s orders are appealable to the court of common pleas.[26] The orders are also judicially enforceable.[27] Violation of an order is a misdemeanor punishable by imprisonment up to 6 months, fine of up to $1,000 per day, and restitution.[28] Also the state may recover any expenditures it made from the "agricultural pollution abatement fund" to protect public health.[29] In addition, the Division may seek a court order against a discharger at any time if the violation "causes pollution of the waters of the state and constitutes a danger to public health."[30] For discharges of animal waste that cause pollution of the waters of the state and require immediate action to protect the public health, the chief may issue an emergency order effective immediately, and the Division may enter on the lands to abate the problem if the person responsible does not comply.[31]

Land Clearing and Development Erosion and Sediment Programs

State law also empowers the Division of Soil and Water Conservation, subject to approval of the Ohio Soil and Water Conservation Commission, to adopt rules for "technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will *abate* wind or water erosion of the soil or *abate* the degradation of the waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed for *nonfarm* commercial, industrial, residential, or other nonfarm purposes."[32] Municipalities and counties may develop their own programs. The Division “may recommend” criteria and procedures for “approval of urban sediment pollution abatement plans and issuance of permits” prior to the disturbance of five or more acres. Although areas less than five acres do not need plans or permits, they are not exempt from the “other [substantive] provisions of this chapter and rules adopted under them.”[33] Areas of any size require use of conservation practices including sediment trapping, stabilization of denuded areas, and stream crossing work; and no dumping of material is authorized into waters or in such proximity that material may slough, slip, or erode into the waters unless specifically authorized.[34] Developments of five or more acres must develop an "erosion and sediment control plan" which must be approved by the state or local approving agency, and must institute stormwater controls.[35]

The soil and water conservation districts and the Division do not have enforcement responsibilities under this program, and "chief's orders" are not available. Instead, local municipal or county ordinances provide the enforcement.

Concurrent with these responsibilities, the Ohio EPA has permitting and enforcement responsibility for the federal Clean Water Act industrial and urban Phase I stormwater program, which applies to land development activities including land clearing for development in excess of five acres. Enforcement is by the municipalities or counties, or the Ohio EPA. The Ohio EPA has also entered into agreements with 17 soil and water conservation districts (not including the counties comprising the watersheds examined in this case study). These mostly urban counties do local education on erosion control at construction sites, review notices of intent to construct, and some conduct inspections.

Other Nonpoint Source Authority

Apart from the above provisions, enforceable mechanisms for nonpoint sources are limited in Ohio.

Enforcement by Ohio EPA under the state's *water pollution law* does not apply to most nonpoint sources.[36] The state water pollution law states that "No person shall cause pollution or place or cause to be placed any sewage, industrial waste, or other wastes in a location where they cause pollution of any waters of the state, and any such action is hereby declared to be a public nuisance"[37] But the law expressly exempts from this prohibition "[a]pplication of materials to land for agricultural purposes or runoff of such materials from such application or pollution by animal waste or soil sediment including attached substances, resulting from farming, silvicultural, or earthmoving activities regulated by Chapter 307 or 1515 of the Revised Code."[38] The referenced laws are those discussed above under which Ohio counties regulate earthmoving associated with development, and under which Ohio's soil and water conservation districts and DNR address agricultural discharges of sediment and animal waste. The general prohibition also exempts excrement of domestic and farm animals and runoff therefrom.[39]

Only when an animal operation has a controlled, direct discharge of wastewater or has 1,000 animal units or more, is it required to have a discharge permit or "permit to install" issued by the Ohio EPA .[40] Similarly, only where earthmoving falls under the federal stormwater permitting program or is unregulated by county ordinances does it fall within the Ohio EPA's enforcement purview. Where the prohibition does apply, enforcement includes administrative orders, injunctions, and civil penalties of up to $10,000 per day.[41]

Ohio also has several *nuisance-type misdemeanor* provisions that can be used to address some kinds of water pollution that may include nonpoint sources. For example, "No person shall....corrupt or render unwholesome or impure, a watercourse, stream, or water."[42] This is a third degree misdemeanor, with a penalty of no more than 60 days and/or $500; the court may also impose restitution for any property damage.[43] Similarly, "No person, regardless of intent, shall deposit litter or cause litter to be deposited...in or on waters of the state."[44] "Litter" means "garbage, trash, waste, rubbish, ashes, cans, bottles, wire, paper, cartons, boxes, automobile parts, furniture, glass, or anything else of an unsightly or unsanitary nature."[45] This is also a third degree misdemeanor. And

the court may, in lieu of or in addition to any penalty, require such person to "remove litter from any public or private property, or in or on waters of the state.[46] These misdemeanor provisions are enforceable by any sheriff, police officer, constable, wildlife officer, conservancy district officer or any other law enforcement officer.[47]

Ohio's *wildlife law* contains a similar provision: "No person shall place or dispose of in any manner, any garbage, waste, peelings of vegetables or fruits, rubbish, ashes, cans, bottles, wire, paper, cartons, boxes, parts of automobiles, wagons, furniture, glass, oil, or anything else of an unsightly or unsanitary nature...in any ditch stream, river, lake, pond, or other water course...or upon the bank thereof where the same is liable to be washed into the water either by ordinary flow or floods."[48] However, this provision does not apply to substances placed in accordance with a permit under the water pollution control provision referenced above "or exempted by such section." Thus it exempts runoff of waste or sediment from agriculture, silviculture, and earthmoving where otherwise regulated, and exempts animal manure generally. The wildlife law prohibition is enforced in local courts as a misdemeanor by wildlife officers or local law enforcement officials.[49] The first offense is punishable by no more than 60 days and/or $500 fine; subsequent offenses by no more than 6 months and/or $1,000 fine.[50] The court may also impose restitution for all or part of any property damage.

Assistance-Oriented Nonpoint Source Programs

This section describes the primary assistance-oriented state, federal, and local programs used in Darke and Belmont Counties to address nonpoint source pollution.

The Stillwater River Watershed Protection Project

The Stillwater River Watershed Project is a locally initiated watershed project. Working with numerous local partners, the project is administered through the Darke and Miami County Soil and Water Conservation Districts. The project's mission is "to protect and enhance the ground and surface water resource base through voluntary land use practices that are both practical and economical."[51] The project began in the late 1980's but received its first formal funding in the form of a Section 319 grant in 1993. Additional funding from the project has originated in many of the programs described in this section. The project has received over $1.5 million from U.S. EPA 319 funding, from state cost share (HB 88) funding, and from the USDA water quality incentive program (WQIP). In addition, reduced interest loans totaling about $1 million have been issued in the watershed under the Linked Deposit Program.[52] Each of these programs is described in more detail below. The $2.5 million in funding expended or loaned for cost share and incentive practices funded work by 216 landowners, many of whom received funding from multiple sources.[53]

The project continues to use a series of inventories to assess the potential for addressing nonpoint source pollution from a variety of sources. Each of 28 subwatersheds in the Stillwater was evaluated on the number of stream miles, the size of the subwatershed, the percent of the subwatershed that is Highly Erodible Land, the number of animal units, the tons of manure produced per acre per year, and the number of on-site septic systems. On the basis of these evaluations, each subwatershed was ranked to identify the areas with the most likely pollution

potential. The project then targets funding to the highest ranked areas.[54] One-third of the project's funding (including loans through the Linked Deposit program) has been targeted at the number-one ranked subwatershed, Swamp Creek.[55] Practices funded include no-till, manure holding structures, erosion control, filter strips, and demonstrations of innovative best management practices. Participation in most programs requires that farmers develop an operation and management plan for livestock facilities, and a conservation plan for all cropland. The Darke and Miami County SWCDs develop these plans with funding from their general allocations.

The project is overseen by a 15 member Joint Board of Supervisors, who hire staff to work on the project out of the Darke County SWCD office. The Board is assisted by a full-time project coordinator hired with 319 funding.

Ohio Cost Share Program ("HB 88")

Ohio's cost share program, commonly referred to as "HB 88," provides funding to individual landowners to implement practices to abate nonpoint source pollution from agricultural and silvicultural activities. The program is administered by DNR's Division of Soil and Water Conservation and provides cost-sharing up to 75 percent of the cost of a practice, with a limit of $15,000 per year. The general assembly allocated $1.3 million in 1999 for this program. Locally, the program is administered by the soil and water conservation districts. Funds are allocated first to resolving complaints, in accordance with Ohio's agricultural pollution abatement laws that require cost share assistance to be provided for the installation of management practices to resolve complaints. An individual requesting cost share assistance must have a soil and water conservation plan in order to receive funding, as well as an operation and management plan if the funding is to be used for an animal waste management facility. DNR also provides small grants to soil and water conservation districts through this program for watershed projects; this source of funding is reserved to provide the required local match for EPA's 319 funding.[56]

In the Stillwater River watershed, HB 88 funding of $50,000 was provided in 1994-96 to help 20 farmers with no-till practices, manure holding structures, soil testing, and manure testing. A second grant of $15,000 was recently issued under the nonpoint source grant program for nonpoint source pollution prevention practices in the watershed.[57]

In Belmont County, HB 88 funding has been used primarily for animal waste management. The county has provided between $30,000 and $40,000 to farmers for animal waste management systems. The program does not generally provide cost-share assistance for the installation of silviculture BMPs, regarding these practices as a cost of doing business.

Water Pollution Control Fund Linked Deposit Program

Ohio's Linked Deposit program, administered by Ohio EPA, is a mechanism for the state to provide loans for water pollution abatement activities through commercial lending institutions at below market interest rates. The program was created in 1993, and has since provided $3.5 million in loans to farmers in six participating Ohio watersheds, including the Stillwater, but not including any in Belmont County. Each participating watershed is required to develop (or amend) a watershed management plan, identifying the pollution sources in the watershed, the proposed solutions to pollution problems, the areas which will be prioritized for assistance, the sources of funding, and a schedule for implementing the plan. The plans are generally developed collaboratively by local water quality and agricultural agencies, and must be approved by Ohio EPA.

Individual landowners work with the soil and water conservation district to develop their applications for loans through this program. Each landowner must develop a soil and water conservation plan, and the landowner must present a Certificate of Qualification issued by the district to the local participating bank in order to receive a loan. The bank evaluates the candidate using its own lending criteria. If the bank chooses to issue a loan, Ohio EPA and the Ohio Water Development Authority then deposit funds equal to the face value of the loan through a certificate of deposit with a term equal to the term of the loan. The bank issues the certificate of deposit at a reduced interest rate, and is required to pass along the interest savings to the landowner in the form of a reduced loan interest rate. The bank services the loan according to its normal procedures.[58]

The Stillwater River Watershed has participated in the program since 1995, and has generated about $1 million in approved loans. A total of $5.4 million in loan authority has been approved for this watershed to finance a variety of pollution control practices, including livestock waste handling systems, manure handling equipment, no-till planters and drills, conservation tillage equipment, and erosion and runoff control practices.[59]

Streambanking

Ohio's Streambanking program is funded by bonds issued under the state's Natureworks bond program. It is intended to establish and conserve forested stream buffers. DNR provides grants to soil and water conservation districts working in cooperation with local park districts or nonprofit land trusts for the purchase of easements or fee-title interests in land. In order to participate, the district and its partners must develop a Riparian Area Protection Plan that includes an inventory of areas in need of improvement or protection, identification of tools to protect areas, and short and long term goals for the watershed. The district must hold the easements or fee ownerships acquired under this program for at least 15 years, and monitor easements annually.[60]

The Miami County soil and water conservation district spearheaded the Streambanking effort in the Stillwater River Watershed, in partnership with the Miami County Park District. The program has purchased seven easements since 1995, protecting 104 acres. Of the acreage enrolled, 84 acres were forested and 20 were cropland. Two of the acquisitions were fee-simple purchases of potential development sites, near or adjoining parcels owned by DNR. These parcels totaled almost 7 acres. The remaining 97 acres are easements on privately owned lands. The total cost of all easements has been close to $150,000.

Belmont County does not participate in the Streambanking program because of the county's topography. The narrow stream gullies make stream buffers a lower priority for most landowners, and cropping rarely extends near streams.

Natureworks Watershed Management Program

A state program funded by the same bond issue as the Streambanking program, the Watershed Management program provides up to $250,000 to watershed projects for cost sharing management practices. By supplementing on-going federal cost share programs, the program provides anywhere from 50 to 100 percent of the cost for materials and installation of water quality improvement practices. Funded practices include stream fencing for livestock exclusion, riparian buffers, streambank stabilization, stream habitat restoration, and animal waste practices. All practices funded under this program must be maintained a minimum of 15 years.[61] The Stillwater Watershed Project has received $250,000 from this program. Funding has been used to install erosion control measures, construct animal waste storage facilities, and improve wetlands and wildlife habitat.[62]

Ohio's 319 Program

Ohio EPA administers the state's 319 program, federal nonpoint source funding available from U.S. EPA under the Clean Water Act. Ohio has received around $3 million annually in 319 money, but received $6 million with the incremental federal funding available in 1999. The federal program requires a 40 percent state match for all funds granted.

The Stillwater River Watershed Project has received three grants through the 319 program totaling approximately $550,000 since 1993. The initial grant, received in 1993, constituted the first funding for the project, and provided funds to test innovative management practices, help purchase manure handling equipment, construct streambank stabilize measures, and hire a project coordinator. Further grants have similarly provided funding for BMP installation and a project coordinator.[63]

Belmont County and 3 adjacent counties receive 319 funding for a project on their Stillwater Creek watershed (unrelated to the Miami-Darke County Stillwater River watershed) which crosses four counties. The grant of $209,000 provides funding for tree planting on reclaimed strip mines, pasture management practices, and livestock watering systems.

USDA Environmental Quality Incentive Program

The Water Quality Incentive Program (WQIP) was replaced by the Environmental Quality Incentive Program (EQIP) in the 1996 Farm Bill. These cost share programs are designed to reduce agricultural nonpoint source pollution problems in small watersheds. The Stillwater Watershed Project received over $500,000 in two grants over a six year period from this program. The funding was directed to projects in two subwatersheds for no-till practices, well-testing, and ICM plans.

Belmont County has also received some funding from EQIP. In 1999, Belmont County also received $300,000 in emergency funding from USDA and state sources due to drought conditions. The funding was provided for livestock watering systems and the purchase of hay.

USDA Conservation Reserve Program

The Conservation Reserve Program (CRP) is administered by the USDA Farm Services Agency. Under CRP, agricultural landowners can apply to enroll their highly erodible and environmentally sensitive lands. In return, landowners must enter into 10-15-year contracts with USDA, under which they agree to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, native grasses, wildlife plantings, trees, filterstrips, or riparian buffers.[64] Landowners participating in CRP can receive up to 50 percent of the costs of establishing the approved practices. Landowners may also be reimbursed for up to 25 percent of the cost of restoring wetlands.[65] There are 4100 acres in Darke County enrolled in CRP.

Forestry Practices Information

Ohio does not have a specific cost-share program for forest harvest operations. Belmont County addresses forestry issues through information and outreach to loggers and landowners. The soil and water conservation district has held two outreach programs for landowners on forestry requirements and BMPs. One hundred and twenty two landowners attended these workshops. The soil and water conservation district created a timber packet for landowners with information on best management practices (BMPs), a sample contract, a list of certified loggers, and a sample O&M plan that it will send upon request. There is a full time forester on staff in the district, but requests for assistance exceed availability. Generally, the requests for assistance are from private landowners who are interested in improving or created forested areas on their land. Ohio recognizes a voluntary program for certification of loggers. To become certified, loggers must attend a one day training course on BMPs and pass an exam. However, there is no requirement that loggers become certified or that landowners use certified loggers. The soil and water conservation district has held a logger certification training course.

Discussion and Analysis

Agriculture and Silviculture

Chief's orders play a minor role in Ohio's agriculture and silviculture nonpoint source controls. Traditional cost-share, education, and technical assistance mechanisms are the heart of the program.

DNR's Soil and Water Conservation Division surveys the state's 88 soil and water conservation districts every 3 years to determine how they are responding to complaints. Statewide statistics compiled by the Division in 1997 show that urban stormwater was the leading source of formal and informal complaints, followed by construction runoff, animal waste, rural flooding, and silviculture impacts. The districts receive only about 200 complaints per year statewide from the public about agriculture and silviculture pollution. Of the *formal* pollution complaints received by the districts concerning agriculture and forestry statewide in 1996, 121 concerned animal waste, 23 cropland erosion, and 44 silviculture erosion. Of the formal complaints fielded by the districts concerning agriculture or silviculture, only about 2-5 each year lead to district requests for chief's orders, and even fewer of these result in the issuance of chief's orders.

The Belmont County soil and water conservation district has requested issuance of chief's orders with respect to sediment pollution from logging operations. In 1998, the district requested 3 chief's orders, 2 of which were for logging-related pollution. In both of the logging cases, operators had damaged the areas logged and left the sites. The district contacted the operators numerous times regarding the violations, and sent certified letters as required by law. When the operators did not respond to the district, it forwarded the complaints to the chief. Although orders were drafted, they were not yet issued when the operators agreed (at the encouragement of the local forestry association) to install required practices, including mulch, seeding, and waterbars. The administrative and chief's order request process took between twelve to fifteen months, and the on-site remedy occurred long after the completion of the logging operations.

Because of concern with the timeliness and effectiveness of chief's orders in encouraging operators to avoid pollution (since it is an after-the-fact abatement mechanism rather than a provision for sound logging practices), the Belmont County soil and water conservation district's board of supervisors passed a motion seeking to have the county require a permit for logging in order to gain closer control over logging practices. Such a permit would have required logger adherence to BMPs and following an operations and maintenance plan as a condition of being allowed to operate in the county. (Ohio's agricultural pollution abatement law provides that forestry operators "may" file an operations and maintenance plan with the soil and water conservation district.[66] The districts therefore accept these plans only if volunteered; they cannot require them). The county permit system proposed by the district board was opposed by DNR and by the logging industry, and is no longer under active discussion. DNR increased its education and informational outreach for loggers; and formal complaints related to pollution caused by silvicutural activities decreased in Belmont County. The district reports that it received no complaints related to silviculture in 1999.

The Darke County soil and water conservation district has had among the highest number of citizen complaints about animal operations. Most of these have related to odors rather than to water

pollution. This district has never requested a chief's order. Pollution related complaints have all been resolved informally, frequently including the provision of cost-share money as part of the remedy. The existence of the Stillwater River Watershed Protection Project has, in effect, provided a well-funded infrastructure for technical assistance and cost shares that has forestalled the use of enforcement tools.

Financial assistance for producers needing to address livestock pollution problems statewide in Ohio has come from a variety of sources: 38 percent received state funds, 38 percent received USDA program funds, 14 percent required no assistance, 6 percent received § 319 funds, 3 percent received NatureWorks funds, and 1 percent received other funding assistance.[67] Soil and water conservation districts identified the primary practices needed to correct livestock pollution as storage facililities, facility management, runoff control, and nutrient utilization practices. Statewide statistics show that about 2/3 of the agricultural cost share funds administered by the Division of Soil and Water Conservation in recent years have been allocated to addressing complaints (about $647,000 in fiscal year 1998, for example).[68] Requiring cost-shares as a condition for enforcement has been criticized as "paying the polluter."

Ohio has had only 3 chief's orders that couldn't be resolved at the Division level in the last 10 years and that had to be forwarded to the Attorney General for enforcement in court. Referrals to the Attorney General are a last resort for the Division, both because the process is perceived to be time-consuming and because the Attorney General bills the Division for time spent on Division matters. Two of the three cases referred for judicial enforcement subsequently settled, while the third did not but is still expected to settle (culminating a 4-5 year process since the original complaint).

The Ohio system is geared to voluntary compliance at every step, so it is not a speedy process. Both state and local officials noted that the process is unwieldy and slow, and enforcement comes into effect only in the most prolonged of cases. The soil and water conservation districts wish the enforcement process were quicker after they request a chief's order, largely because they seldom refer any cases for chief's orders until they have themselves exhausted every opportunity for informal resolution.

The DNR's Division of Wildlife plays a role in nonpoint source enforcement when there is a fish kill directly attributable to activities on the land. There is a wildlife officer in each county. For a first offense, Wildlife generally refers the situation to the soil and water conservation district if less than $50 in fish are involved in the kill. If a claim of more than $50 is involved, then the Division of Wildlife seeks restitution from the discharger itself – sending a bill for fish and for investigative costs, and offering settlement. If there is no settlement, then the Division seeks a criminal fine and payment of restitution. For repeated offenses, the Division of Wildlife proceeds criminally. Under the stream litter and nuisance provisions, the potential sanctions are up to $500 and/or 60 days in jail (fine up to $3,000 if a corporate violator). Soil and water conservation district staff report that wildlife officers are hesitant to enforce against agricultural or silvicultural pollution because there is some uncertainty as to whether natural substances such as sediment (or tree tops) would be considered stream litter by local judges.

Urban Stormwater/Nonfarm Program

The Division of Soil and Water Conservation developed standards for urban runoff, but has

no enforcement authority in this area. Ohio EPA has authority to issue enforcement orders. Ohio EPA has Memoranda of Understanding (MOUs) with 17 soil and water conservation districts on stormwater. These mostly urban counties do local education on erosion control at construction sites, and review notices of intent to construct. Some also conduct inspections. Local governments also have regulatory and enforcement authority.

Conclusions

Ohio DNR's chief's orders present a unique state-based mechanism to address agricultural or silvicultural nonpoint source pollution when soil and water conservation districts cannot resolve matters voluntarily. However, the process depends heavily on voluntary and cost-share programs, requires provision of cost-shares where cost-sharable practices are needed, and takes a great deal of time. The wildlife officer enforcement option is useful in the case of fish kills traceable to particular activities and has been used. Ohio EPA has little enforcement authority with respect to nonpoint source water pollution.

ENDNOTES

1. In addition to the documentary sources cited, the following individuals were interviewed by telephone in connection with this case study: Larry Antosch, Ohio EPA; Jim Bennett, District Conservationist, Darke County SWCD; Tammie Brown, Division of Soil and Water Conservation, DNR; David Hanselmann, Assistant Chief, Division of Soil and Water, DNR; Gail Hesse, 319 Coordinator, Ohio EPA; Karen McAlister, District Conservationist, Miami County SWCD; Bob Monserrat, Division of Environmental and Financial Assistance, Ohio EPA; Bob Phelps, Ohio EPA; Beverly Riddle, Program Assistant, Belmont County SWCD; Dan Schneider, Division of Wildlife, Law Enforcement, DNR; Len Snedeker, District Manager, Belmont County SWCD; Jerry Wager, Division of Soil and Water Conservation, DNR. Comments were also provided by George Kleevic, Belmont County SWCD.
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4. *The 1996 Ohio Water Resource Inventory (305b Report).* See http://chagrin.epa.state.oh.us/watershed/attain/use57.htm.
5. *Ibid.* See http://chagrin.epa.state.oh.us/watershed/attain/use07.htm.
6. Ohio Rev. Stat. § 1511.02(E)(1).
7. Ohio Rev. Stat. § 1511.02.
8. Ohio Admin. Code § 1501:15-5-01(B)(13).
9. Ohio Admin. Code § 1501:15-5-01(B)(4), (6).
10. Ohio Admin. Code § 1501:15-5-02.
11. Ohio Admin. Code § 1501:15-5-03.
12. Ohio Admin. Code §§ 1501:15-5-04 to -07.
13. Ohio Admin. Code §§ 1501:15-5-08, -09, -10.
14. Ohio Admin. Code § 1501:15-5-08.
15. Ohio Admin. Code § 1501:15-5-15.
16. Ohio Admin. Code § 1501:15-5-01(B)(26).
17. Ohio Admin. Code § 1501:15-5-11.
18. Ohio Admin. Code § 1501:15-5-12.
19. Ohio Rev. Stat. § 1511.02(E)(4).
20. Ohio Rev. Stat. §§ 1515.08(L),(R),(S),(T) provide for soil and water conservation districts to agree to carry out the program under Chapter 1511.
21. Ohio Admin. Code § 1501:15-5-15.
22. Ohio Rev. Stat. § 1511.02(G); Ohio Admin. Code § 1501:15-5-16.
23. Ohio Rev. Stat. § 1511.02(G).
24. Ohio Rev. Stat. § 1511.02(H); Ohio Admin. Code § 1501:15-5-13.
25. Ohio Admin. Code § 1501:15-5-13(A)(2)(e).
26. Ohio Rev. Stat. § 1511.08.
27. Ohio Rev. Stat. § 1511.07(B).
28. Ohio Rev. Stat. § 1511.99; Ohio Admin. Code § 1501:15-5-16(A)(2).
29. Ohio Rev. Stat. § 1511.071.
30. Ohio Rev. Stat. § 1511.07(A)(2).

31. Ohio Rev. Stat. § 1511.02(A)(3).
32. Ohio Rev. Stat. § 1511.02(E)(2).
33. Ohio Rev. Stat. § 1511.02(E)(3).
34. Ohio Admin. Code § 1501:15-1-04.
35. Ohio Admin. Code § 1501:15-1-03, § 1501:15-1-05.
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37. Ohio Rev. Stat. § 6111.04.
38. Ohio Rev. Stat. § 6111.04(C).
39. Ohio Rev. Stat. § 6111.04(D).
40. See Environmental Law Institute, Locating Livestock: How Water Pollution Control Efforts Can Use Information From State Regulatory Programs (June 1999), at p. 149.
41. Ohio Rev. Stat. §§ 6111.06, 6111.07, 6111.08.
42. Ohio Rev. Stat. § 3767.13(C).
43. Ohio Rev. Stat. §§ 3767.13, 2929.21(E).
44. Ohio Rev. Stat. § 3767.32(A).
45. Ohio Rev. Stat. § 3767.32(D).
46. Ohio Rev. Stat. § 3767.99(C); § 2929.21(E).
47. Ohio Rev. Stat. § 3767.32(E).
48. Ohio Rev. Stat. § 1531.29.
49. Ohio Rev. Stat. § 1531.131.
50. Ohio Rev. Stat. § 1531.99; see § 2929.21.
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54. Miami Valley Regional Planning Commission. *Stillwater River Watershed Protection Project, Darke and Miami Counties*. September 1995 (Revised).
55. "Over $1,500,000 Raised for the Stillwater Watershed Project." *Stillwater Watershed Project Newsletter*. Issue 15, November 1998.
56. See Ohio EPA. *A Guide to Developing Local Watershed Action Plans in Ohio*. June 1997.
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64. U.S. Department of Agriculture. January 1997. "U.S. Department of Agriculture's Natural Resources Programs: Financial, Technical and Educational Assistance for Landowners." Fact sheet. U.S. Department of Agriculture: Washington, DC

65. U.S. Department of Agriculture. February 1997. "Conservation Reserve Program." Fact sheet. U.S. Department of Agriculture: Washington, DC.
66. Ohio Admin. Code § 1501:15-5-12.
67. Division of Soil and Water Conservation, ODNR, 1997 Ohio Conservation Partnership Pollution Abatement Needs Survey (August 1997).
68. Memorandum, Lawrence G. Vance, Chief, DSWC, June 26, 1997.

Oregon Case Study

Summary

This study surveys enforceable legal mechanisms for nonpoint source pollution control in Oregon, together with a variety of voluntary and assistance-oriented approaches, as illustrated by practice in two watersheds, the Tualatin River Basin and the Grande Ronde River Basin.[1] The three mechanisms studied include: (1) watershed-level management planning under SB 1010, Oregon's Agricultural Water Quality Act; (2) enforceable best management practices under the Oregon Forest Practices Act and its accompanying rules; and (3) implementation of water-related planning goals through Oregon's statewide comprehensive land-use planning law, which is unique in the nation.

Each of these mechanisms has become a key element of Oregon's attempts to meet not only state water-quality goals and federal TMDL requirements, but also the habitat concerns raised by recent Endangered Species Act listings of several salmonid species. In this context, there has been much discussion in each of the affected sectors as to whether the existing state-law mechanisms can be made adequate to implement federal mandates, or whether more stringent regulation will be needed in the future. In agriculture, debate centers on current policy approaches that favor stakeholder participation and voluntary compliance versus expanded use of SB 1010's relatively untested enforcement and penalty sections; in forestry, where water quality provisions have been enforced for some time, on the adequacy of existing management practices for ensuring continued protection of salmon habitat; and in the urban sector, on the application of generally-worded statewide planning goals to local water quality issues, and their translation into enforceable local ordinances.

Coupled with both new and ongoing programs to encourage voluntary control of nonpoint sources, these enforceable legal mechanisms also are at the core of overarching initiatives by the Governor's Office and the Oregon Department of Environmental Quality to integrate water-related issues statewide. A common aspect of both the voluntary and enforceable mechanisms is their emphasis on planning and management at the watershed level. The two watersheds studied served as models for the approaches now being undertaken, and highlight the path that is being followed in other watersheds throughout the state.

Tualatin and Grande Ronde Watersheds

! The *Tualatin River Basin,* just southwest of the Portland metropolitan area, is about 80 miles long and a tributary of the Willamette River. Its drainage basin is approximately 43 miles long and 29 miles wide, and covers an area of 712 square miles.[2] Over half of the watershed is forested, one-third is agricultural, and fifteen percent (70,000 acres) is urban,[3] including the Portland metropolitan area communities of Tigard, Beaverton, and Hillsboro as well as the cities of Tualatin, Sherwood, and Forest Grove.[4] It is one of the fastest-growing areas in the state, with forecasts of 400,000 additional people living in the Metro region (which includes the Tualatin Basin) over the next twenty years.[5] The river is the major source of drinking and irrigation water in its valley, but the

Oregon DEQ has designated it and its tributaries as "Water Quality Limited."[6] "Tualatin" derives from an Indian word meaning "slow and lazy" – an accurate description of the river's meandering course. For this reason, shading and temperature issues are prominent in the basin, alongside more traditional concerns about discharges and runoff.

The Tualatin basin was chosen for study because it combines agricultural, forest, and urban issues, and thus is affected by each of the enforceable mechanisms examined. In addition, due to a long history of litigation over water quality issues, the basin was among the first to fully develop and adopt various federal and state programs for water quality management and nonpoint source pollution control. It has the oldest TMDL in the state, and also was the first to adopt an agricultural water quality management plan under Oregon law. The basin's early adoption of these mechanisms means that they have recently become eligible for active enforcement action, including enforcement against nonpoint sources.

! The study also briefly examined the *Grande Ronde River Basin* in Northeastern Oregon. This basin, which is centered on the city of La Grande, encompasses the Blue Mountain region, covers more than 5,000 square miles, and includes 280 streams and rivers that contain 2,900 miles of fisheries.[7] Land ownership in the basin is approximately 65% public land and 35% private land.[8] In Eastern Oregon, nonpoint source issues are concentrated in the agricultural sector, and center on ranching, grazing, and irrigation practices and their effect on water quality and stream temperature. A chief concern is the declining population of Snake River spring chinook salmon, which is listed under the Endangered Species Act.[9] The basin was chosen for study because it is frequently cited as an example of a strong voluntary effort -- the Grande Ronde Model Watershed Program, described in detail below -- that predated and provided a solid foundation for more recent planning and regulatory mechanisms in the agricultural sector.

Enforceable Mechanisms Studied

Of the Oregon nonpoint source enforceable mechanisms described in the *Almanac*,[10] the following were reviewed in detail because of their particular relevance to ongoing statewide efforts to control nonpoint source pollution, as illustrated by the Tualatin and Grande Ronde watersheds.

! ***Agricultural Water Quality Act (SB 1010)***. This 1993 law, still commonly referred to by its bill number, authorized the Oregon Department of Agriculture (ODA) to designate areas to be governed by a water quality management plan and to adopt rules that require landowners in the affected area to perform those actions necessary to carry out the plan.[11] In general, once a plan is implemented, all activities, including pesticide use, irrigation, and grazing, within the affected area of the plan must be conducted "in full compliance with the plan and rules implementing the plan and with all rules and standards of the [Environmental Quality Commission] relating to water pollution control…."[12]

In 1995, SB 1010 was supplemented and strengthened by SB 502, which required ODA to develop and implement programs and rules "that directly regulate farming practices that are for the purpose of protecting water quality" and that are applicable both to exclusive farm use zones under the state planning law and to other lands where agricultural practices are taking place.[13] ODA has interpreted this mandate as giving it exclusive authority to regulate agricultural activities that affect water quality.[14] The water quality management plans themselves are developed through a public process in individual watersheds, with priority given to impaired watersheds listed under § 303(d) of the Clean Water Act. ODA has enacted administrative rules to ensure consistency and uniformity in the planning process throughout the state.[15]

ODA is authorized to determine compliance with the management plans through entry and inspection, but must give a notice of violation and an opportunity for compliance prior to assessing a civil penalty. Penalties can be up to $2,500 for the first violation and up to $10,000 for a second violation.[16] In addition, violations of the plans and/or administrative rules are subject to all remedies and sanctions available to the Oregon Department of Environmental Quality (DEQ) or Environmental Quality Commission.[17]

! ***Oregon Forest Practices Act***. Under the Oregon Forest Practices Act, the Oregon Board of Forestry must establish best management practices (BMPs) "to insure that to the maximum extent practicable nonpoint source discharges of pollutants resulting from forest operations on forestlands do not impair the achievement and maintenance of water quality standards."[18] Forest operators are required to comply with these BMPs, unless they can demonstrate that alternative practices will yield better results.[19] If forest operators are in good-faith compliance with the BMPs, then their operations are given a safe harbor from enforcement, and considered not to be in violation of any water quality standards.[20] BMPs can be subjected to review pursuant to a petition alleging that existing forestry operations conducted in accordance with them are nonetheless contributing to violations of water quality standards. Upon receiving such a petition, the Forestry Board must either revise the BMPs within two years or dismiss the petition;[21] if it fails to issue revisions or dismiss the petition within the specified time, then water quality standards may be enforced directly against forest operators.[22]

Aside from requiring BMPs, the Act also contains specific requirements governing forestry operations. Forest operators must give written notice of all operations to the State Forester, and interested parties may subscribe to receive notification of all proposed operations. Similarly, when operators give notice of chemical applications, the State Forester must notify persons within 10 miles of the application, if those persons have requested such notice and hold downstream surface water rights.[23] The Board of Forestry also has authority to require a written plan for operations conducted within 100 feet of a stream used by fish or for domestic use, or within 300 feet of an area that contains threatened or endangered species, sensitive bird nesting or roosting sites, or significant wetlands.[24]

The State Forester enforces all of these requirements through inspection, citations, and issuance and service of administrative orders, such as cease and desist or reparation orders.[25] No penalties may be imposed unless a citation is issued.[26] The Act provides for general criminal and civil penalties,[27] including potential civil sanctions of up to $5,000 per violation.[28]

! ***Statewide comprehensive land-use planning.*** Oregon has a comprehensive statewide land-use planning law that in part provides for the protection in local comprehensive plans of a variety of environmentally sensitive areas, including flood plains, estuarine areas, wetlands, lakes, coastal areas, and wilderness and scenic areas.[29] The Department of Land Conservation and Development (DLCD) also has authority to designate "areas of critical state concern" as part of the planning process.[30]

The law is implemented through a series of statewide planning goals, including goals that can be applied to cover nonpoint sources. These goals must be complied with in the development of city and county land use plans and implementing regulations, which govern community growth and development. Of particular relevance are Goal 5, which relates to natural resource protection; Goal 6, which covers the quality of air, water, and land resources; Goal 7, which protects floodplains and other areas subject to natural disasters and hazards; and Goals 3 and 4, which govern agricultural lands and forest lands, respectively. The plans were submitted to DLCD for initial review and "acknowledgment"; once acknowledged by the Department, the plan, rather than the goals, is the controlling legal authority. However, the plans also are subject to periodic review, especially as the planning goals change and evolve.

Local governments then enforce these requirements through their police power. In the "areas of critical state concern," the Commission, as well as the county governing bodies, has investigative and hearing authority for alleged violations, and injunctive relief also is available;[31] however, the Commission has not yet exercised its authority to designate these areas. Remedies for noncompliance of a local plan with the statewide goals include withholding state grant money to local governments, as well as legal and equitable remedies.[32]

These three enforceable mechanisms were chosen for their relevance to nonpoint sources in the Tualatin, Grande Ronde, and other key watersheds not examined in this study. The interaction among these state-level enforceable mechanisms, between these mechanisms and federal pollution control law, and between these mechanisms and Oregon's voluntary, technical assistance, and cost-share nonpoint source pollution programs is complex. Statewide coordination of many of these programs is occurring under the "Oregon Plan," a recent initiative sponsored by the Governor's Office. The Oregon Plan and several of the new and traditional assistance-oriented mechanisms for nonpoint source control are discussed in the next section.

Voluntary and Assistance-Oriented Nonpoint Source Programs

The Oregon Plan for Salmon and Watersheds / Watershed Councils

The Oregon Plan for Salmon and Watersheds is the umbrella for a number of related activities aimed at improving water quality, including nonpoint source control. Developed and administered by the Governor's Office in 1997 in response to declining fish populations and proposed listings of salmonids under the Endangered Species Act (ESA), and affirmed by executive order in 1999, the Oregon Plan establishes three main priorities: (1) achievement of water quality standards through federal and state law and technical assistance through the "Healthy Streams Partnership"; (2) restoration of native fish populations; and (3) watershed assessment and restoration, largely through encouraging and funding the creation of local watershed councils in each basin. The

Oregon Plan's emphasis on basin-level improvements is meant to represent a "place-based" approach to meeting water quality goals.

Central to the Oregon Plan is the distinction between watershed restoration activities, which seek to undo past harm, and planning and regulatory mechanisms that address ongoing pollution. Restoration activities are the primary focus of the watershed councils, and are coordinated at the state level through the Oregon Watershed Enhancement Board (OWEB, formerly the Governor's Watershed Enhancement Board or GWEB). Since July 1997, OWEB has awarded almost 568 grants totalling $39 million to assist with implementation of watershed restoration projects. OWEB's work has included not only grants and other support to the watershed councils, but also projects such as the development of a watershed assessment manual for the councils' use. The Board also has played a role in facilitating coordination among state agencies on water policy.

The watershed council concept emerged from the "Watershed Health Program," a two-year trial program that appropriated ten million dollars between 1993 and 1995 to help create watershed councils in each of two trial basins -- the South Coast and the Grande Ronde -- and worked to integrate state-funded programs and Section 319 efforts in those basins. When this program ended, the remaining activities were incorporated into GWEB. With new funding through the Oregon Plan, 90 watershed councils have now been established statewide. DEQ works with and participates on the watershed councils, largely through training on data collection and sampling, and the other state natural resource agencies also play a major role.

The Oregon Plan also incorporates the Healthy Streams Partnership, a 1997 initiative to forestall additional regulation by developing a series of agreed-upon principles for integrating Clean Water Act and TMDL requirements with aquatic systems preservation and fish habitat needs. The Partnership consists of a stakeholder process supported by the state's commitment to carry out certain regulatory objectives, such as SB 1010 implementation and TMDL development, and to increase agency staffing. The goals of the Partnership include investing in state water resources under existing legal authorities; developing TMDLs for all 92 sub-basins; and developing a stakeholder focus that emphasizes collaborative processes.

In 1997, a total of $30 million was appropriated for implementation of the various aspects of the Oregon Plan, $20 million of which was earmarked for cost-share grants through OWEB. Sources of these funds included timber tax revenue ($13 million), a surcharge on salmon fishing licenses ($1 million), contributions from the concrete industry ($1 million), and monies from the state's general fund ($5 million). In 1998, a ballot initiative passed a constitutional amendment that dedicates 15% of state lottery funds to ongoing support of these initiatives. The amendment is in place for fifteen years, and is expected to yield $30-40 million every two years. These allocations allowed the creation at both the Oregon Department of Environmental Quality and the Oregon Department of Agriculture of 19 new staff positions specifically devoted to water quality issues and to working with the watershed councils.

While the political, financial, and human resources invested in the Oregon Plan have been substantial, some NGO representatives charged that the Governor's Office "significantly oversells the role and efficacy of watershed councils" as a primary solution, favoring them over regulatory approaches. According to these critics, the council process is slow, taking years to draft a restoration workplan for the Tualatin Basin, much less to address regulatory issues. Further, they claimed, the

emphasis on involvement of all stakeholders circumvents development of regulatory approaches where they are needed. However, even these NGO sources acknowledged that watershed councils are critical for promoting communication and coordination within a basin, and have served that purpose very well.

The Tualatin River Watershed Council was formed in 1993. The Unified Sewerage Agency, which serves the urban areas of Washington County, was a major force behind initiating the watershed council, even before the Oregon Plan was in place. The Council's stated purposes are to: "increase local input in management of watershed resources; initiate resolution of problems and issues within the watershed; identify problems and issues of importance to local citizens, groups, and users of the watershed; diminish and eliminate further degradation of the watershed and its resources through better management practices; increase the viability, diversity, and health of the watershed; undertake a proactive approach in management of the watershed; [and to] create and implement a watershed action plan encompassing, but not limited to, current and potential problems and issues, potential solutions, restoration/enhancement measures, and monitoring programs within the Tualatin River Watershed."[33]

Like other watershed councils throughout the state, the Tualatin River Watershed Council is not itself an enforcement agency, instead making recommendations to policymakers.[34] It consists of twenty members who represent key interests in the watershed (citizens, agriculture, business and industry, environmental groups, forestry, education, local governments, chambers of commerce, and water and sewer providers), and attempts to reach its decisions by consensus.[35] In 1996, the Council was officially recognized by the Washington County Board of Commissioners, applied for and received an operating grant from the GWEB, and hired a full-time coordinator.[36] In January 1999, the Council adopted the Tualatin River Watershed Action Plan -- "a long-term vision on how to improve water quality, improve fish and wildlife habitat, minimize soil erosion, minimize flooding, and increase recreational opportunities within the Tualatin River Watershed" that strives to integrate existing plans and efforts within the watershed.[37]

The Council views the Action Plan as a technical review that helps set its priorities and define in concrete terms the necessary conditions for ensuring the health of the Tualatin watershed. In addition to this core work, the Council responds to immediate challenges, such as watershed health emergencies and new issues, as they arise. The members interviewed felt that the effort is working well so far, although some noted that the possibility of stricter ESA mandates could present a challenge for the cooperative process. Council representatives have been effective in dealing with their constituencies on smaller problems -- for example, a 1996 flood that caused mudslides on forest land -- but the Council hasn't yet tackled anything as controversial or as comprehensive as the ESA.

Model Watershed Program

The Grande Ronde Model Watershed Program was established in 1992, one of three such programs created in Oregon, Idaho and Washington by the Northwest Power Planning Council. In the Grande Ronde, the Union County and Wallowa County Commissions had foreseen the imminent ESA listing of spring chinook salmon and "determined that a grass-roots, locally-based effort working to coordinate existing local, state and federal programs could effectively maintain, enhance, and restore [the] watershed."[38] The Grande Ronde Program was one of the original models for watershed councils statewide, and continues to act as the watershed council for the Grande Ronde basin. It works closely with the local (Union County and Wallowa County) Soil and Water Conservation Districts, which help implement some of the Program's initiatives.

The Program received initial funding from the Bonneville Power Administration (BPA) and the Bureau of Reclamation, followed by five million dollars from the Watershed Health Program. The BPA has continued to provide funding for administration of the Program, as much as 65-70% of its annual budget. The Program also receives funds or in-kind support from the Bureau of Reclamation, Oregon Watershed Enhancement Board, Natural Resource Conservation Service, and the Union County and Wallowa County SWCDs.

The restoration projects have included small modifications with immediate results, such as upgrading irrigation diversions to allow fish passage; channel restoration, which already has led to significant temperature reduction; and projects, such as fencing and livestock exclusion, vegetation and shading, that are expected to have longer-term results. About 100 projects were undertaken in 1994-95. Since then, between thirty and forty additional projects have been proposed each year, approximately thirty of which get funded -- a total of 260 to date. Funding decisions are made by the Program's Board with the assistance of a technical committee, composed of ten representatives from relevant agencies, that reviews all project proposals and recommends funding priorities to the Board. In addition, OWEB has its own process for reviewing and funding restoration projects, and last year at least fifteen or twenty of these were in the Grande Ronde basin.

The Program maintains a database that keeps track of all restoration projects dating back ten years, and serves as a clearinghouse for that data. Each funded project over a certain size has a monitoring component that requires monitoring for five years, and this data also is made available. In addition, there is a basin-wide water quality monitoring program that is administered through the Union County SWCD, and established to coordinate the activities of the many agencies that were conducting monitoring. The monitoring program's goal is to gather baseline data on temperature, nutrients, sedimentation, and so forth, and to track long-term changes in water quality.

Federal Farm Bill Programs

The various U.S. Department of Agriculture programs for nonpoint source pollution control are administered through the Oregon offices of the Natural Resource Conservation Service, which is headquartered in Portland. The Service's mandate is to provide landowners and local Soil and Water Conservation Districts with technical assistance for carrying out USDA programs. In addition to its regular activities, as part of the Oregon Plan the Service has signed an MOU with the Governor's Office, the EPA Region X office, and NMFS to assist with consultation on ESA issues affecting

private lands. NRCS has around 30 field offices in Oregon and 135 staff positions, of which at least two-thirds are in the field.

The Oregon Department of Agriculture coordinates with NRCS to leverage the available funding. The two agencies have formed the "Conservation Partnership," a consortium of agency representatives from ODA, NRCS, the local SWCDs, and the Oregon Association of SWCDs, which meets monthly or bi-monthly to work through issues of common interest. In practice, most implementation activity occurs through the local Soil and Water Conservation Districts, where the real integration happens -- the SWCDs are the direct recipients of both USDA/NRCS and ODA funds.

In 1999, USDA programs active in Oregon included: the Environmental Quality Incentives Program (EQIP), which was described as "the heart and soul" of the Farm Bill programs, with $3.9 million allocated for cost-share assistance in FY 99; the Wetland Reserve Program (WRP), with $1.5 million allocated; the Wildlife Habitat Incentives Program (WHIP), largely focused on threatened and endangered species issues, which had $0.5 million allocated for FY 99 but is unfunded for FY 2000; and the P.L. 556 small watershed program, which has provided "a few million dollars" in targeted planning assistance to address local-level concerns such as watershed plan development and implementation.

Program funding is targeted primarily at identified priority areas within the state. Since Oregon organizes its efforts on a watershed basis, the NRCS has followed suit, creating basin workgroups and local workgoups within the basins that are composed of representatives from NRCS, the local SWCDs and other relevant parties. These workgroups identify resource issues needing attention, set priorities, and make funding recommendations to the State Technical Committee. This approach has been fairly successful; thus far, the greatest limiting factor has not been funding per se, but rather the low availability of technical assistance to implement activities once they are funded.

Recent (FY 98) priority areas for EQIP funding have included the John Day/Umatilla Basin ($742,000), Snake River Basin ($492,000), North Coast Basin ($442,500), Deschutes/Hood Basin ($709,500), Southwest Basin ($481,000), Lower Willamette Basin ($537,000), Central Coast/Upper Willamette Basin ($328,000), and the High Desert Basin ($384,000). However, the Service attempts to fund at least the top priority project in every basin, in order to maintain its presence across the state. In these and other projects statewide, there is a current focus on three issues: salmon habitat, promotion of healthy watersheds, and the Mid-Columbia Plateau.

The NRCS also has a history of providing technical assistance and funding to the Tualatin Basin, dating back to the 1980s. The Tualatin was designated as a "hydrologic unit area," an experimental ground for watershed modeling and testing theories. In addition, the Service has worked on the social aspects of agricultural issues in the basin, including sponsoring focus groups to get the local communities involved and to help them recognize water quality problems.

In addition to the programs described above, Oregon has developed a program under the USDA's Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP). Approved in late 1998, the Oregon CREP will be funded at approximately $250 million dollars over 15 years, with 80% coming from the federal government. The program, which is designed to assist in restoration of habitat for salmon and trout listed under the ESA, will restore

freshwater riparian habitat along 4,000 miles of streams throughout the state. Agricultural landowners are eligible to enter into 10- to 15-year contracts to plant long-term vegetative cover and exclude livestock in exchange for cost-share and technical assistance. Program goals include: reducing temperature to natural ambient conditions; reducing sediment and nutrient pollution from agricultural lands adjacent to streams by more than 50 percent; stabilizing stream banks along critical salmon and trout streams; and restoring stream hydraulic and geomorphic conditions. The state will conduct monitoring throughout the project to evaluate and record progress in achieving these goals.

Section 319 Program

According to the Oregon DEQ, "grant funds available through Section 319 of the Water Quality Act of 1987 are a critical element in turning Oregon's NPS control program into water quality protection realities in watersheds throughout the state."[39] Section 319 funding totalled $8.7 million dollars between 1991 and 1998, with a budget of $1.35 million in both 1997 and 1998.[40] According to DEQ, funding originally tended toward a large number of smaller projects, peaking in 1994 when EPA approved 32 projects averaging $44,400 each. Starting in 1995, this trend was reversed, "emphasizing fewer, bigger, and longer projects in order to address needs for whole watershed enhancement, to sustain this effort over enough time to effect significant improvements, and to avoid the growing administrative burden on DEQ resulting from having 50 to 60 projects active simultaneously."[41]

The Department has worked to prioritize and apply its Section 319 funding in the basins where TMDLs are needed, because there is more knowledge about water quality concerns in those basins and therefore a greater degree of certainty that money spent will be used directly to meet or achieve water quality standards. In channelling Section 319 funding, DEQ works closely with the local watershed councils. Similarly, Section 319 funds also have provided some support for the local advisory councils and development of water quality management plans under SB 1010, and have been applied to water-quality-related revisions of the Oregon Forest Practices Act.

In the Tualatin Basin, the Section 319 program has funded projects designed to "increase local involvement and stewardship in nonpoint source pollution control projects and contribute to environmental education and water quality monitoring."[42] These include the Dairy-McKay Hydrologic Unit Area Project, which studies the link between agricultural BMPs and water quality; and the Student Watershed Research Project, which encourages middle- and high-school students to monitor water quality data throughout the Tualatin and add it to a regional watershed database.[43]

Discussion and Analysis

Agricultural Water Quality Management Plans (WQMPs)

In 1993, the Oregon Legislature passed Senate Bill 1010 (SB 1010), which directs the Oregon Department of Agriculture to work with the state's agricultural community on non-point source water pollution control. Under the legislation, ODA is authorized to develop and implement watershed-based water quality management plans (WQMPs) that identify measures landowners can use to prevent and control water pollution. ODA must initiate the planning process once water

quality concerns have been identified in a watershed and a management plan becomes required by any state or federal law. In practice, EPA's Section 303(d) list of water-quality-impaired watersheds is the strongest driver for watershed planning.

Combined with Senate Bill 502, which further called upon ODA to develop and implement programs and rules that regulate farming practices for the purpose of water-quality protection, this legislation gives ODA exclusive responsibility for regulating agricultural practices that affect water quality. The Department's authority extends to any land being used for agricultural purposes, regardless of its designation under the state land-use planning law or local zoning laws. Although the Department prefers to emphasize technical assistance and other non-regulatory approaches for nonpoint source control, SB 1010 provides enforcement authority when voluntary measures prove insufficient for ensuring compliance with the WQMPs and rules.

ODA has established a four-year time frame for WQMP development in impaired basins. In parallel, the Oregon DEQ has established a ten-year time frame for its issuance of Clean Water Act TMDLs that will cover many of the same basins and apply to many of the same non-point sources. As a result, the WQMPs already in place have in part served as "early action plans," which contain enforceable conditions intended to minimize nonpoint pollution, even before specific TMDL numbers have been calculated and allocated among the various point and nonpoint sources within the basin. ODA acknowledges that its four-year timetable is ambitious, but notes that it has roughly been able to adhere to this schedule, allowing for some initial delays in starting up the process. While only a few final plans are in place at the time of this study, many more are in draft form, and a number of final plans will be issued over the next six months to one year.

To ensure consistency and uniformity in plans throughout the state, ODA has adopted rules governing the process for plan development and enforcement.[44] Although ODA retains the ultimate decision-making authority, these rules call for public consultation with ad hoc local advisory committees (LACs) composed of various stakeholder representatives from the basin. Local advisory committees are distinct from the watershed councils promoted under the Oregon Plan, but there is considerable overlap between the two, and it is generally felt that inclusion of watershed council members on the local advisory committees helps to promote coherence and collaboration.

As developed through this stakeholder process, the WQMPs establish both general goals for the basin (for example, reduction of sediment loading) and performance standards designed to encourage or discourage certain activities consistent with these goals. In crafting the plans and their accompanying rules, ODA's goal is to leave flexibility for landowners to achieve performance standards through the practices they deem most appropriate for their operations. These can include adoption of specific BMPs. After being developed by the LAC and reviewed by ODA, the rules are issued through a formal rulemaking process, and thus go through an additional round of notice and comment before becoming final. They then are given to the appropriate local management agency -- usually the county soil and water conservation district or districts -- for implementation. In many cases, a year or more may elapse from the time a local advisory council is appointed until the rulemaking process is finalized.

The Tualatin River Basin is noteworthy for having adopted Oregon's first agricutural water quality management plan, in April 1996; it also has the state's first TMDLs, for phosphorus and ammonia, which were issued in 1988 and approved by EPA in the early 1990s. Significantly, there is a

history of controversy and litigation that played a role in attaining these milestones, including citizen suits that established the TMDL process and subsequent lawsuits to enforce TMDLs. In effect, the existing nonpoint source control measures in the basin stemmed from point source concerns during the 1980's, when local environmental groups went to court over pollution from thirty municipal wastewater treatment facilities. In 1986, the Northwest Environmental Defense Center filed a lawsuit against Oregon DEQ and U.S. EPA for failing to set effluent discharge limits within 180 days, as required by the federal Clean Water Act -- the first successful suit in the nation to require enforcement of the total maximum daily load provision of the Act.[45]

This case was resolved in part by a consent decree that divided the area into forest, agriculture, and urban districts, assigning load allocations for each, and assigning responsibility for meeting the allocations to different local management agencies. For forestry, the designated agency is the Oregon Department of Forestry; for agriculture, the Oregon Department of Agriculture, which can delegate its authority to the local Soil and Water Conservation Districts; for urban, the Unified Sewerage Agency (a regional agency that covers twelve cities), Clackamas, Multnomah, and Washington Counties, and the cities of Portland, Lake Oswego, and West Linn. In short, the consent decree mandated a cooperative, cross-sectoral planning process well before the enactment of SB 1010.

Indeed, the substance of what became SB 1010 was pioneered by the Washington County Soil and Water Conservation District, which helped implement the judge's decision for the agricultural sector. The SWCD developed an approach through a public procedure that involved all stakeholders and attempted to foster agreement on the importance of water quality protection. This approach was directly incorporated into the legislation, and paved the way for further development of the Tualatin WQMP after the legislation was enacted in 1993.

Once SB 1010 was passed, a local advisory committee was formed to develop a draft plan and rules for the Tualatin basin and submit them to ODA. Participants included a number of local farmers, representatives of environmental groups, and various local government agencies. The committee also employed a 15-person technical committee composed of volunteer experts from the NRCS, university extension services, and several state government agencies. Operating through discussion, negotiation, and consensus, the advisory committee spent nearly a year working with ODA to draft the water quality management plan and the proposed implementing rules. Once the plan was drafted, ODA drafted administrative rules, which were subject to notice and comment before being finalized in April 1996.

Opinions were mixed on the level and efficacy of stakeholder involvement in the Tualatin planning process. In general, regulators argue that the composition of the local advisory council is critical to its efficacy; for the rules to carry weight with the landowners, they need to be put forth by credible representatives of the different user groups. Similarly, most participants from the agricultural community appear to feel that the combination of stakeholder representation on the local advisory committee and expert assistance from the technical advisory committee were instrumental in making the process work in the Tualatin. More recently, however, the process has provoked resistance from farmers in other basins.[46]

Further, some representatives of local conservation groups view the heavy emphasis on stakeholder input and consensus as an obstacle to the development of effective, enforceable plans. These sources cited the extensive outreach effort required to raise awareness of the importance of

wetland and riparian areas in the first place, and to convince farmers that their practices can have negative impacts on these resources. They further argued that even after the agricultural community had been brought to the table, it exhibited an exclusive preference for voluntary, education-based approaches over regulatory mechanisms, and a “total opposition” to considering any new taxes or fees to cover the cost of implementing even these measures.

The resulting Tualatin WQMP essentially constitutes a basin-wide resource assessment, which identifies performance standards required of all landowners, other resource concerns, endangered species issues, current farming practices and fertilizer use. Its primary objective is to address water quality violations, issues raised by other laws such as the Endangered Species Act, and fish and wildlife concerns as they affect water quality. The Washington County SWCD implements the plan by prescribing best management practices that address erosion control, temperature, and so forth. There was a grace period of two years for public notice and education about the rules and the consequences of violating them, in accordance with SB 1020, a companion bill that requires that the public be adequately informed about the new rules before they become the object of proactive enforcement.

In the Grande Ronde River Basin, the SB 1010 WQMP recently was completed. There, the local advisory committee included a number of local ranchers and farmers, the county extension services, Union County government, the Department of Public Works, and Union County and Wallowa County SWCDs, and produced a plan that has now been enacted into regulations.

On a roughly parallel track, the TMDL process for the Grande Ronde basin is nearing completion for parameters of temperature, nutrients, dissolved oxygen, pH, and sediment -- most of these resulting from nonpoint source discharges. For this reason, the Grande Ronde TMDLs drew upon and incorporated much of the information generated during the SB 1010 process, even though the TMDL process includes sectors besides agriculture. Stakeholders represented on the TMDL planning committee included the SWCDs, Union County, the La Grande city government, transit and public works agencies, the forestry sector, and private companies such as

Boise Cascade. The committee was divided into subcommittees that dealt with specific sources such as agriculture, forestry, urban runoff, etc.

Relationship Between WQMPs and the TMDL Process

The situation in the Grande Ronde basin illustrates the complex interrelationship between the SB 1010 WQMP process and the ongoing development of TMDLs under the federal Clean Water Act. Oregon DEQ is currently more than two years into its ten-year schedule to complete all TMDLs statewide. A lot of the work to date has been driven by Clean Water Act citizen suits, decisions, and settlements, as well as ongoing concerns about ESA salmon species listings that have brought habitat issues such as sedimentation and temperature to the forefront. (Indeed, as this study was being drafted, the Sierra Club announced that it was filing suit to compel DEQ to finish TMDLs for all Oregon waters within 180 days.)

The Department has adopted a sub-basin approach, noting that there is incomplete information on water quality in many areas and that it therefore makes most sense to focus more widely rather than on isolated stream segments. By covering an entire sub-basin, both point and nonpoint source concerns can be identified, and point source control and nonpoint source control can be more tightly integrated.

For these reasons, and because of the broader coordination goals under the Oregon Plan, DEQ has decided to include implementation plans as part of its TMDL load allocations. These plans are the point at which the various enforceable elements of state law (SB 1010, the Forest Practices Act, and the statewide planning law) intersect with one another and with the federal TMDL process. DEQ has entered into separate memoranda of agreement with ODA and the Oregon Department of Forestry (ODF), specifying each agency's role in the TMDL process, and has issued guidance on the elements necessary in an SB 1010 plan if it also is to serve as a TMDL for nonpoint sources.[47] In addition, the Governor's Office has been working through the Healthy Streams Partnership to better integrate WQMPs and other state efforts into the TMDL process.

Statewide, there has been some debate over the appropriate timing for development of an SB 1010 plan vis-á-vis TMDL development for the same basin. As noted, ODA is currently on a four-year timetable for completion of all WQMPs, and although the agency is uncertain whether it will meet this goal, it is likely that most plans will be in place before all the TMDLs are completed. As one regulator explained, this discrepancy results in a "chicken-and-egg" problem: it is difficult to craft a definitive SB 1010 plan without knowing load allocations for the agricultural sector, but it is also difficult to calculate and implement realistic load allocations without mechanisms such as the SB 1010 rules and performance standards in place. As a result, some sources thought ODA should postpone WQMP development until TMDLs have been developed, in order to generate plans that are directly driven by numerical standards; others believe it is appropriate for 1010 plan development to get underway before TMDLs are issued.

Most regulators found merit in the early stakeholder involvement afforded by the SB 1010 planning process, arguing that it provides a valuable opportunity to get the agricultural community into the mindset of revising its practices. ODA in particular contends that the lead time is important for introducing new ideas and for facilitating a climate of good stewardship in advance of federal

mandates. By issuing plans on a shorter timetable, ODA seeks to set initial performance standards for landowners, and to add elements to these plans as needed to meet the TMDL allocations. The Department claims that it is attempting to reach a middle ground of "goal-oriented" measures rather than purely prescriptive practices. It acknowledges that it has yet to fully convince EPA that its approach will work, but argues that it resonates better with its constituents than prescriptive measures would. In short, ODA doesn't want debate about numerical endpoints to stall the possibility of immediate progress, and it hopes to avoid resistance to a second round of potentially more stringent planning and regulation by anticipating and educating parties about it through the current planning process.

Nevertheless, there remains some concern within the agricultural community about the interaction of the SB 1010 process, the TMDL process, and the perennial specter of Endangered Species Act requirements. According to one source, some farmers wonder why they're doing so much work now if the federal government is simply going to come along and add another layer of regulation. Landowners feel that they can live with what they know now, even if it requires some additional work, but "they're scared to death about what's coming down the pike." One reaction is that DEQ and EPA will need to interact better with people in the field to consider the efficacy of the requirements and the process used, rather than just assign load allocations: "The people writing the [TMDL] rules need to sit down with real live people."

In the Tualatin Basin, TMDL concerns are already being incorporated into the second round of the SB 1010 process, which has reconvened the local advisory committee to review and amend the existing WQMP. Interviewees felt that this was an appropriate juncture for using the local advisory committee process to integrate the two programs, though they expressed some concern about the time required to get new members of the advisory committee up to speed. In the Grande Ronde Basin, the TMDL process used a lot of information generated during the just-completed SB 1010 process, and the TMDL implementation plan specifically identifies the WQMP as a mechanism for meeting load allocations. Interviewees there felt that early development of the WQMP had offered localities a stronger voice in TMDL development and let farmers "get a jumpstart" on updating their practices.

Enforceability of WQMPs

By design, WQMPs tend to embody a "graduated suite" of enforceable mechanisms that grow progressively more severe if violations are not corrected. To begin with, the plans typically allow for a phase-in period of at least two years, during which time notice of the requirements is given, but they are not proactively enforced. During this period and subsequently, the local SWCD is at the front line of compliance efforts. The SWCDs work with landowners to correct any problems, and will give the landowner a certain amount of time to come into compliance. If this approach does not work, the SWCD can correspond with landowners and notify them of the availability of technical assistance, and will continue to work with the landowner to reach agreement on a resolution of the problem. If this effort fails, the District then may turn the case over to ODA for enforcement. In the Tualatin, SWCD officials have resolved more than 300 cases through voluntary compliance since the rules became final in 1996.[48]

Similarly, ODA's policy is that enforcement action "is pursued only when reasonable

attempts at voluntary solutions have failed."[49] The Department may initiate an investigation when it receives a written complaint of a violation of WQMP implementing rules, or its staff is referred to or directly observes conditions that violate the rules.[50] If noncompliance is verified, the agency can employ its own spectrum of enforcement actions, including issuance of a warning, issuance of a citation with an order to correct the violation, and generation of a compliance plan with prescribed measures and dates for implementing them and correcting the violation. If a landowner does not comply with these mechanisms, the Department may assess civil penalties of $50 to $2,500 for a first violation and $100 to $10,000 for repeat violations, based on the history of violations and the gravity of the violation's impacts on human health and the environment. Abatement actions also are available.

Given its long history, the Tualatin WQMP was the first plan in the state to become ripe for enforcement action starting in early 1998. Since the plan became enforceable, the Washington County SWCD has received at least sixty complaints requiring investigation, only three of which it referred to ODA. The referrals resulted in the Department issuing one notice of noncompliance and several "water quality advisory letters" warning of potential problems. Ultimately, however, each of these situations was remedied without resorting to penalties.

The Washington County SWCD expressed some initial frustration with the ODA's handling of the enforcement referrals, noting that in each case, the SWCD had established a long history of attempting to work with the landowner prior to the referral, and was more than ready for enforcement to begin. Instead, in the SWCD's view, ODA occasionally had a tendency to retrace the SWCD's steps in attempting to persuade the landowner to make improvements, rather than bringing regulatory mechanisms immediately to bear.

The Washington County SWCD also noted the complementary nature of enforceable and voluntary mechanisms, and the significant amount of voluntary action that is taken in the shadow of a credible enforcement threat. Once a few notices had been issued, the SWCD experienced an influx of other people interested in adopting voluntary measures and taking advantage of technical assistance programs. In one month alone, 35 people came forward wanting to write a voluntary management plan for their land, which created a backlog because the SWCD lacked sufficient staff to accommodate everyone at once. While this situation is atypical, the SWCD believes that interest in voluntary actions will continue to ebb and flow with enforcement, and that the next high-profile enforcement action will cause a similar influx of volunteers.

In sum, the Washington County SWCD believes that enforcement is needed to deal with the small percentage ("three to five percent") of people who are genuine bad actors. In the District's experience, problem cases tend to stem from absentee landowners or new residents who have just moved to the area. In contrast, they view long-time landowners and small commercial farmers as generally more sympathetic to the concept of good stewardship, and able to be convinced to work within the emerging planning and regulatory processes.

Similar attitudes toward enforcement were noted in the Grande Ronde Basin, though the grace period means that there has not yet been a test of enforceability of the new WQMP. There, voluntary actions by the agricultural sector have been spurred by enforcement action taken by the DEQ on water quality, the Oregon Water Resources Department on water quantity -- water rights being a major issue in arid Eastern Oregon -- and the Division of State Lands on fill and removal

permits. The threat of what might happen in the future, particularly with respect to water rights, has been a big motivator for restoration and other voluntary activities: “people would rather take the initiative now.”

In general, it was felt that attitudes in the Grande Ronde area have improved substantially over recent years, with more people talking about water quality. The large proportion (65-70%) of federal land holdings in the area have simplified the process, as the U.S. Forest Service and Bureau of Land Management have been cooperative. For private landowners, the SWCDs are the focal point, as the majority of their work is on private agricultural or ranch land. Perhaps the most important factor is the local land ethic –- most private landowners are individuals and families, not companies, so they care about aesthetics as well as property values. As in the Tualatin, the locals believe that the only genuine bad actors tend to be recent arrivals or absentee landowners.

Forest Operations

Enacted in 1971 and significantly revised in 1986 and 1991, the Oregon Forest Practices Act[51] is administered by the Oregon Department of Forestry. The Act applies on any non-federal land where a commercial forest operation is being carried out, regardless of how the land is zoned and even inside urban growth boundaries. However, the Act is primarily targeted at ongoing harvest operations, and is not ideally suited for addressing one-time operations such as clearing an urban lot and selling off the timber. For this reason, local governments also have the ability to develop forest ordinances within urban growth boundaries, in which case ODF usually defers to their authority.

Under the Act, the Oregon Board of Foresty has adopted forest practice rules containing best management practices for forestry.[52] The BMPs serve as a safe harbor from the state water quality law and other pollution control statutes; if operators comply with the BMPs, they are also deemed to be in compliance with pollution control laws.[53] In recent years, the Act, rules, and BMPs have increasingly focused on water quality issues. In September 1994, the rules were specifically amended to increase streamside protection -- according to the Department, “the most comprehensive riparian protection rules ever enacted on non-federal land in Oregon.”[54] The new rules focused on maintaining trees and vegetation along streams, developing woody debris to create stream structure for fish habitat, and maintaining adequate fish passage along the length of a stream.[55] Among other requirements, they mandate that all fish-bearing streams have a riparian management area of between 50 and 100 feet, including a twenty-foot no-harvest buffer zone on either side.[56]

The Act requires forest operators to notify ODF of pending operations, and the Department receives 18,000-20,000 such notifications annually. There are 54 Forest Practices Foresters who review notifications and written plans, prioritize oversight based on potential risks to natural resources, and issue approvals. A number of operations are then chosen for inspection. ODF is currently in the process of doing a statistical analysis of compliance rates.

Based on the notifications and inspections, ODF issues 200-400 citations per year, some for procedural violations (e.g., failure to notify or to obtain an approval), and others for actual damage to forest resources. For the past 10 years, ODF has focused its efforts on civil penalty mechanisms; while criminal penalties are available, it has proven difficult to get criminal courts to pay attention to water violations as opposed to violent crimes. In assessing civil penalties, ODF uses a formula to

ensure consistency. The formula is spelled out in the administrative rules, and takes into account such factors as the level of damage to natural resources and the operator's previous history of violations. The Department has found this procedure to be an effective deterrent, but slow -- any citation can be appealed and receive a full administrative hearing, and 20-30% of violators elect to go this route. As a result, there is a backlog in assessing and collecting penalties, and the agency is constantly lacking adequate staff and budget resources.

ODF maintains a civil penalties database that is capable of generating statistics on penalties issued and breaking out substantive violations from purely procedural violations. According to that database, in 1997 there were 41 cases of penalties assessed for violations of water-quality-related rules, including one instance of criminal penalties for illegal instream operation of machinery. Civil penalties assessed totalled nearly $41,000, for an average of approximately $1,000 per violation, and the highest penalty assessed for a single violation was $3,400. Assessed penalties frequently were reduced, suspended, or mitigated due to new facts or subsequent cooperation by the violator.

The Department cited one significant case in Clatsop County in Northwestern Oregon as crucial to its enforcement efforts. There, an operator with a history of violations was cited $30,000 in civil penalties for multiple violations. As a result of this case, ODF received new legal authority to bar forest operators with outstanding penalties or non-compliant conditions from conducting forest operations altogether, a useful gain: "We have stretched out the continuum of enforcement tools we have available to us."

Given the well-established enforcement structure, most current attention has centered not on enforceability of the existing forest practice rules, but on their adequacy for protecting water quality. In addition to the Forest Practice Act's own provisions for periodic review of the BMPs, the Oregon Plan has been a major driver for various other review mechanisms. In 1997, as part of a memorandum of agreement between the State and the National Marine Fisheries Service that was intended to forestall ESA listing of coho salmon, the Governor agreed to set up a forestry advisory committee to assess current practices. The committee was established, but its work came to a halt in mid-1998, when a federal court ruled that NMFS was required to make the listing.

In January 1999, the Governor's Executive Order 99-01 reaffirming the Oregon Plan spelled out additional requirements for salmon habitat protection. It required the Board of Forestry to reappoint a Forest Practices Advisory Committee to finish the task of considering the adequacy of regulatory and non-regulatory forestry practices, and to provide the Board with policy recommendations, including possible changes in regulations. There has been some carry-over in membership from the original forestry advisory committee, though the current Committee is not as narrowly focused on ESA issues. The Committee's recommendations are expected in 2000.

In parallel, the state legislature has established an "Independent Multidisciplinary Science Team" (IMST) that is charged with looking at all aspects of the salmon issue in Oregon and making recommendations through a series of reports. In September 1999, the IMST issued its assessment of the forest practice rules, concluding that "the current rules for riparian protection, large wood management, sedimentation, and fish passage are not adequate to [p]reserve depressed stocks of wild salmonids."[57] While the IMST report makes several recommendations for improvements within the existing policy framework, it also argues for more sweeping changes, such as incorporation of the Oregon Plan and Executive Order 99-01 into the Oregon Forest Practices Act and/or the Board of

Forstry's policies and adoption of a "landscape-scale approach" that goes beyond site-specific measures to consider cumulative watershed impacts.[58] These recommendations were presented to the Forestry Practices Advisory Committee; ODF believes that the IMST's findings largely parallel recommendations that are already on the table in the Advisory Committee's deliberations.

Relationship Between Oregon Forest Practices Act and the TMDL Process

Beyond the safe harbor provision of the Act, any potential overlap between ODF and DEQ jurisdiction (especially in developing TMDLs) is handled by a memorandum of understanding between the two agencies, which determines what kind of action will be taken in certain kinds of situations. In basins where the two agencies agree that water quality impairment is not attributable to forestry, the existing forest practice rules are deemed to be the compliance mechanism for forest lands, and ODF generally does not participate in the TMDL or WQMP process. In basins where a legacy of forest practices has contributed to water quality impairment but the agencies agree that the current BMPs are adequate for ongoing protection, the forest practice rules are deemed to be the compliance mechanism, and ODF will participate in the planning process "as necessary." In basins where the agencies disagree about whether the current BMPs are adequate, the forest practice rules serve as the interim compliance mechanism, but ODF must design a specific monitoring program as part of the basin plan; if the monitoring indicates that changes are needed, the agencies then will work together to develop further watershed-specific rules. Likewise, if both agencies agree that current BMPs are inadequate for a basin, they also must collaborate on watershed-specific rules.[59]

Similarly, coordination between ODF and other agencies such as ODA varies depending on the basin in question. For the most part, ODF and ODA operate independently from one another, each agency having its own MOU with DEQ. To the extent that the TMDL process is shaped by specific landscapes, DEQ tends to work with each agency independently. The Governor's Office has been encouraging ODA, ODF, and DEQ to coordinate their efforts, and the agencies have met at the policy level several times in the past year. The agencies acknowledge the need to cultivate closer relations in the future, particularly in basins characterized by mixed forest and agricultural practices, such as construction of dual-use roads or grazing on forest land.

More generally, where nonpoint source pollution is concerned, there is a certain amount of finger-pointing between the forestry and agricultural sectors, on the part of both the agencies and the regulated community. The forestry industry cites its history of scrutiny and regulation under the Forest Practices Act, and argues that, whatever reforms may still be needed, it should not bear the brunt of the blame for the salmon crisis. Some regulators agree, noting that forestry has presented an easy target for regulation because it has a smaller constituency of readily identifiable operators, as opposed to agriculture, which has multiple constituencies that are more reluctant to acknowledge their role in nonpoint source pollution. Even environmental NGOs, long-time critics of Oregon's forest industry, conceded that some progress has been made through the Forest Practices Act, and lamented that comparable headway has not yet been made with agriculture.

Responses from agriculture sources sometimes appear to confirm this assessment: in the Grande Ronde, a heavily agricultural basin, a survey conducted by the Union County SWCD showed that "most residents consider watershed health as an issue concerning logging and forestry....and many did not link their own actions to watershed health problems."[60] However, regulators argued

that in fairness, the agriculture sector has had ten to fifteen fewer years than the forestry sector to think about nonpoint issues, and pointed to the progress currently being made under SB 1010. They believe it is important for the agricultural community to adopt responsibility for controlling its own pollution, and lauded the steady, if "incrementalist," approach being taken by ODA to bring its own constituency on board. Further, they pointed out that some of the same oversight mechanisms used in the forestry sector, such as a statewide advisory committee, may soon be applied to agriculture; the IMST is planning to do a comparable analysis of the relationship between agricultural practices and the goals of the Oregon Plan.

Statewide Comprehensive Land-Use Planning

Oregon's statewide comprehensive land-use planning program supports nonpoint source pollution control by providing a framework in which local jurisdictions can implement enforceable mechanisms related to development and specifically targeted at nonpoint sources. Passed in 1973, the law requires municipal, county, and regional governments to develop local land-use plans and to comply with 19 statewide planning goals. Plans are updated on an ongoing basis through a process known as "periodic review."

According to DLCD officials, the statewide planning process provides authority to enact local ordinances governing land uses that affect watershed functions and aquatic habitat under several of the existing statewide goals. These include Goal 5 (natural resource protection, including riparian and wetlands resources), Goal 6 (protection of air, water, and land resources), and Goal 7 (natural hazards and floodplain protection). Some also argued that similar results could be achieved through the creative application of Goal 11 (public facilities, including stormwater control), Goal 14 (urbanization and "smart growth"), Goal 15 (the Willamette River Greenway), Goal 16 (estuarine resources), and Goal 17 (coastal shorelands). Only some of the planning goals have been implemented through administrative rules.

Goal 5 covers "natural resources" in their broadest sense; provisions under this goal that are relevant to nonpoint source pollution include protection of riparian areas and wetlands. Goal 5 has been codified in rules that require local jurisdictions to adopt programs that comply with the goal when they revise their comprehensive plans.[61] Goal 5 requires localities to inventory certain specified natural resources to determine their "significance" and to protect significant resources. Importantly, the riparian rule provides a safe harbor whereby communities can opt out of the inventory requirement simply by designating a 50-foot protective buffer zone along all streams as "significant."

The purpose of *Goal 6* is "[t]o maintain and improve the quality of the air, water, and land resources of the state." This goal does not have administrative rules, and in practice typically results in the inclusion in local plans of a statement that all land-use decisions will comply with federal and state environmental laws. However, DLCD officials point out that little attention has been paid to the goal since it was adopted in 1974-75, when point sources were perceived as the major cause of water pollution. For this reason, they believe that the potential for Goal 6 to be applied to nonpoint sources has not been fully analyzed. For example, the goal states that discharges may not exceed the carrying capacity of receiving water bodies, and a recent decision of the Land Use Board of Appeals applied this provision to prevent a local government from amending its plan to allow future development near an impaired water body.[62] Since that decision was not limited to point sources, it

could easily extend to planning decisions that affect nonpoint sources.

However, the planning law's interaction with major categories of nonpoint source pollution is unclear. While *Goal 3* and *Goal 4* aim at the conservation of agricultural lands and forest lands, respectively, they do not expressly allow for land-use regulation for the purpose of protecting water quality within areas designated for those uses. Indeed, there is a statutory provision that gives the forest practice rules precedence over land-use rules, and SB 1010 similarly appears to preempt jurisdiction over agricultural practices. DLCD feels the TMDL process ultimately will become the superstructure for integrating these concerns, including the land-use planning goals, but notes that this coordination hasn't yet happened.

Similarly, Department sources believe that there is room for more thorough integration of local land-use planning into the basin-level initiatives taking place under the Oregon Plan and the watershed councils. They expressed admiration for the work of the watershed councils, but note that they are focused on restoration and are careful to avoid regulatory responsibility. The intersection between watershed planning and local comprehensive planning is ill-defined, and there could be more interaction between the two. In part, this is for political reasons -- local officials are not yet paying sufficient attention to the Oregon Plan, except for a forward-looking few who already have some sense of what the ESA mandates may soon require. Until local planners get authority and resources from local administrations and city councils, they will be unable to address these issues in a comprehensive fashion.

In an attempt to raise awareness and to provide regulatory tools at the local level, DLCD presently is drafting a model water quality code for small cities (population 10,000 or less). Essentially a technical assistance document rather than an enforceable mechanism, the model code contains detailed provisions that cities could voluntarily adopt, enact and enforce locally. The Department hopes that growing concern over TMDL load allocations and ESA liability will be the drivers for the code's adoption, and it includes model load allocations on a sliding scale. The draft is expected to be completed in early 2000.

The Tualatin Basin is an excellent example of land-use planning being employed to address water quality issues. There, the combination of a history of water pollution issues, some uniquely powerful regional government agencies, and the political sensibilities of the Portland metropolitan area has resulted in a number of ongoing planning and regulatory efforts. Both state and local government officials, as well as NGOs within the basin, cited these as relevant to nonpoint source control and an essential component of addressing ESA and TMDL concerns.

The metropolitan Portland area has a regional planning organization known as "Metro" that handles comprehensive land-use planning for the entire region, which covers three counties and 24 cities and includes part of the Tualatin Basin.[63] More than a simple council of governments, Metro is the only directly-elected regional government in the country; it was created by referendum and governs directly in its region. By law, once Metro adopts a policy at the regional level, its constituent local governments must amend their comprehensive land-use plans to comply. While Metro has the legal authority to compel localities' compliance, enforcement more typically is through fiscal measures, such as withholding regional transportation funding from the non-complying jurisdiction.

In 1993-94, Metro began work on "Region 2040," a growth concept for the Portland metropolitan region, predicated on holding the urban growth boundary steady and protecting the natural resources within it. In short, Metro projected growth trends and needs, removed 16,000 acres from the "buildable lands" category within the growth boundary, and concluded that there was no need to move the boundary (though it recently has been extended by 5,000 acres, amid much controversy). The original 16,000 acres removed included all floodplains, wetlands, stream corridors, and slopes above 25% grade. In addition to this regulatory move, Metro inaugurated an "Urban Green Spaces Program" to acquire streamside habitat land, a non-regulatory, acquisition-based approach.

More recently, Metro adopted Title 3, a set of regulations on floodplain and water quality management in urban riparian areas that is designed to implement statewide planning Goals 6 and 7. Title 3 has three main focuses: it mandates region-wide erosion controls for all new developments, regardless of size; requires every local government to adopt vegetative corridors for stream segments within their jurisdiction; and improves management of the 100-year floodplain. The regulations include a model local ordinance that has already been adopted and become enforceable in many of Metro's constituent communities; the formal deadline for compliance was December 1999.

Both regulators and NGOs agreed that the next large challenge for the urban portion of the Tualatin Basin will be control of stormwater discharges and the reduction of impervious surfaces. In dealing with stormwater issues, Metro can draw upon the Unified Sewerage Agency (USA), a regional service district that covers the urban areas of Washington County, as well as portions of Multnomah and Clackamas Counties and the City of Portland. USA was formed about 30 years ago to deal with the sanitary waste problem in the watershed, and its initial mandate was limited to sanitary waste.

In the late 1980s, following the TMDL suit filed by the Northwest Environmental Defense Center, USA was given authority to deal with stormwater, and it now holds the Municipal Separate Storm Sewer System (MS4) permit for twelve cities. Stormwater is handled primarily via intergovernmental agreements among these cities, which have agreed to have USA set minimum standards (for example, erosion control and buffer widths) for surface water quality control, and to take responsibility for implementing the standards. USA retains a degree of oversight capability

because the cities are required to obtain USA's consent before issuing any new site permit for connection to sewage and stormwater systems.

In addition, through its Surface Water Management Program, USA also has its own regulatory authority. For example, the Agency handles erosion control permits for construction sites up to five acres, and also has an erosion control program that goes down to the single family home. Under the latter program, there is a two-tier enforcement structure. The first step is to notify violators of any problem and to request correction within 24 hours; the next step is to stop work until the situation is corrected. The hook for compliance is the requirement that USA sign off on building permits, although problems arise with developers who modify plans after USA signs off. The Agency is currently trying to identify enforceable mechanisms to control this type of situation.

Metro has asked USA to assist with implementation of Goal 6 water quality standards through Title 3; cities also have asked USA to help them meet the requirements, since Title 3 is modeled in part on USA's model municipal ordinance package that requires certain buffer widths. According to the Agency, it is willing to help, but concerned about trying to simultaneously manage water quality and land use. Its primary responsibility under the MS4 permit is water quality control. In protecting water quality through land use, however, the agency risks falling subject to takings claims, and has therefore been reluctant to make any final decisions on land use.

Some local NGOs were critical of the USA's role in managing stormwater discharges, claiming that the MS4 permit fails to incorporate specific load allocations, instead referencing only BMPs, and that the effect of USA's role has been to shield the individual municipalities from Clean Water Act liability. At the time of this study, Tualatin Riverkeepers and Northwest Environmental Defense Center had filed a notice of intent to sue EPA and Oregon DEQ to correct this situation.

Conclusions

Oregon has a broad array of both assistance-oriented and enforceable mechanisms aimed at improving watershed health and reducing nonpoint source pollution. The steadily growing concern over TMDL requirements and ESA listings of salmonid species has led to increased attention being paid to these issues. It also has led to the need to integrate the State's numerous water quality programs. The main initiative for habitat restoration, the Oregon Plan, relies primarily on cost-share and technical assistance and voluntary activities through local watershed councils. The main regulatory effort, development of TMDLs with enforceable implementation plans at the watershed level, builds upon and attempts to coordinate existing state-law processes for the agricultural, forestry, and urban sectors, among others. In turn, these state mechanisms may need to be ratcheted up to meet potentially stringent federal standards, given the current preference for encouraging voluntary compliance with SB 1010, the criticisms of the adequacy of the current forest practice rules, and the difficulty of ensuring local compliance with statewide planning goals.

There is ample evidence of the efficacy of deploying voluntary and cost-share programs alongside enforceable mechanisms. However, there may also be some tension between the two, or at least the danger of sending mixed signals, particularly if both are administered by the same agency. In this regard, the example set by ODA will be crucial, as it continues to evolve from its historical role of provider of technical assistance to that of implementer and ultimate enforcer of the SB 1010 plans.

The SWCDs appear well-situated to continue to provide technical assistance and cooperative oversight of voluntary activities, in addition to serving as ODA's early warning system for enforcement issues. However, they also indicated a need for more decisive action once an enforcement referral to the Department is made. Oregon's brief experience thus far suggests that while stakeholder participation and voluntary compliance are worthy goals, they must be backed by a credible threat of enforcement against genuine bad actors. It remains an open question whether ODA will be able to overcome the political resistance from its own constituency and be successful, first, in meeting its ambitious timetable for development of the WQMPs; and second, in enforcing their provisions once they are established.

Other questions relate to the integration of the WQMPs, forest practice rules, and land-use planning into the TMDL process. As discussed, Oregon DEQ has devised agreements with both ODA and ODF that govern its relationship with each of those agencies. But equally important is the relationship between ODA and ODF, especially in watersheds that have both farming and forest uses, and the two agencies expressed a desire to cooperate more closely with one another in such watersheds. But each department inevitably reflects its constituency, and finger-pointing between the agriculture and forest sectors could come to hinder their cooperation on planning and regulatory goals. Ultimately, the task of coordination could fall to the Governor's Office, which is attempting to encourage dialogue among all state agencies.

Less well-defined is the actual or potential connection between WQMPs and TMDL implementation on the one hand, and state and local land-use planning on the other. There is significant overlap between the objectives of the water-quality statutes and the planning law, though they are administered in very different ways. Since both WQMPs and TMDLs are being developed through separate planning-oriented processes at the basin level, it may make sense to explore more direct integration of local land-use planning into watershed planning.

Indeed, a key advantage of Oregon's statutory framework and current policy decisions is that all the major legal mechanisms -- the TMDL process, agricultural water quality management plans, forest practice rules, and land-use planning -- are not only being authorized and coordinated at the state level, but also are targeted at, and delegated down to, the watershed or local levels. This thorough adoption of a basin-by-basin approach, which is also reflected in the voluntary activities under the Oregon Plan, provides a sound hydrological basis for water quality improvements, and facilitates coordination among the relevant agencies and regulated communities. Equally important, it allows for meaningful stakeholder participation and decision-making at the local level.

ENDNOTES

1. In addition to the sources cited, the following individuals were interviewed by telephone: Jeff Allen, Executive Director, Oregon Environmental Council; Ann Beier, State Floodplain Program Manager, Oregon Department of Land Conservation and Development; Ken Bierly, Program Manager, Oregon Watershed Enhancement Board; Rosemary Furfey, National Marine Fisheries Service; Don Greiner, Director of Field Operations, Natural Resources Conservation Service; Stephanie Hallock, Office of the Governor; Mike Houck, Audubon Society, Portland; John Jackson, Planning Director, Unified Sewerage Agency; Lyle Kuchenbecker, Executive Director, Grande Ronde Model Watershed Program; Sue Marshall, Public Policy Director, Tualatin Riverkeepers; John McDonald, Chair, Washington County Soil and Water Conservation District; Sandy Middleton, Civil Penalty Specialist, Forest Practices Program, Oregon Department of Forestry; David Morman, Policy Unit Manager, Forest Practices Program, Oregon Department of Forestry; Dick Pedersen, Manager, Standards and Assessments Section, Water Quality Division, Oregon Department of Environmental Quality; Amanda Punton, Coastal Specialist, Oregon Department of Land Conservation and Development; Jeffrey Weber, Salmon Plan Coordinator, Oregon Department of Land Conservation and Development; Bill White, Program Officer, Natural Resources Conservation Service; Mike Wolf, Water Quality Program Manager, Natural Resources Division, Oregon Department of Agriculture; and Lorna Youngs, Oregon Department of Agriculture.
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3. Tualatin River Watershed Council, "Tualatin River Watershed Facts," <<http://www.upa.pdx.edu/CWSP/WATSHED/tualatin/tual.htm>>.
4. See Tualatin River Watershed map at <<http://www.trwc.org/map.gif>>.
5. Tualatin River Watershed Council, "Council History and Purpose," <<http://www.trwc.org/council.html>>.
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8. Id.
9. Union County Soil and Water Conservation District, Grande Ronde River Basin Study, <<http://www.oregontrail.net/~uswcd/basin.htm>>.
10. *See* Environmental Law Institute, Almanac of Enforceable State Laws to Control Nonpoint Source Water Pollution (1998), 221-24.
11. Or. Rev. Stat. §§ 568.909, 568.912.
12. Or. Rev. Stat. § 568.930.
13. Or. Rev. Stat. § 561.191.
14. Oregon Department of Agriculture, "Management Program, Agricultural Water Quality Management Act (Senate Bill 1010)," <<http://oda.state.or.us/Natural_Resources/sb1010.htm>>.
15. See Or. Admin. R. § 603.95.
16. Or. Rev. Stat. §§ 568.915, 568.918 & 568.933.
17. Or. Rev. Stat. § 568.930.
18. Or. Rev. Stat. § 527.765(1).
19. Or. Admin. R. 629-24-102.
20. Or. Rev. Stat. § 527.770.

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Texas Case Study

Summary

In addressing nonpoint source water pollution from agriculture, Texas relies primarily on the Texas Soil and Water Conservation Board (TSSWCB) which administers the water quality management plan certification program cooperatively with the Soil and Water Conservation Districts.[1] Any facility that is not required to obtain a permit from the Texas Natural Resources Conservation Commission (TNRCC) may develop a certified water quality management plan. The plans are voluntary, although if water pollution is occurring, the TSSWCB may request that the discharger obtain a plan. In most cases, operators will obtain a plan rather than risk regulation or enforcement by TNRCC. Facilities that have a plan may be eligible for cost-share assistance, capped at $10,000 over the lifetime of the operation. These funds are available to a limited degree across the state, but most are specifically targeted at priority watersheds identified by TSSWCB. Failure to comply with the plan may result in repayment of any cost-share assistance and animal feeding operations may be required to obtain a permit from TNRCC. The TSSWCB investigates violations of the plan and any law or rule relating to agricultural pollution in cooperation with the local Soil and Water Conservation District and, if necessary, develops a corrective action plan. If the violator fails to take corrective action the complaint is referred to TNRCC for enforcement. Although authorized by law Texas has yet to develop a certified water quality management program for silvicultural activities.

Development and earth-moving activities are regulated in the Edwards Aquifer region of the state primarily through the Edwards Aquifer Protection Program (EAPP). Any construction-related or post-construction activity that has the potential for polluting the Edwards Aquifer *and hydrologically connected surface streams* may not proceed until the required plans, including a water pollution abatement plan (PAP) have been approved by TNRCC. The PAP must describe temporary and permanent best management practices for preventing pollution of surface water, groundwater, and stormwater. TNRCC reviews and approves the EAPP permits and conducts enforcement.

Development activities may also be regulated on the local level through programs authorized by various state laws that allow a municipality to protect for watersheds, to develop a water pollution control and abatement program, and to enter into cooperative agreements with TNRCC to inspect public waters to determine whether water quality meets state water quality standards and to check compliance with permitting requirements. Austin, for example, has enacted several ordinances over the years regulating development through permit mechanisms, starting with an ordinance regulating development activity near creeks in the Lake Austin and Lake Travis areas and then moving to a comprehensive watershed ordinance for the entire city. A particular stringent ordinance was passed for the Barton Springs watershed. Austin also has a stormwater program and an Emergency Spills and Pollution Complaint Response Project. The City carries out inspections and formal enforcement and also provides technical assistance and outreach activities to implement these programs.

Watersheds

One urban (Edwards Aquifer) and one rural (North Bosque River) watershed in Texas were examined in order to assess the use of enforceable mechanisms and their relationship to cost share and technical assistance approaches.

Edwards Aquifer

The Edwards Aquifer is one of the most valuable water resources in the central Texas area. This aquifer provides water for municipal, industrial, and agricultural uses, and serves as the principal source of water for a number of cities, including San Antonio and Austin. In 1975, the San Antonio portion of the Edwards Aquifer was the first in the country to be designated a Sole Source Aquifer by EPA under the Safe Drinking Water Act, and the Austin portion received the same designation in 1988. The designation is reserved for aquifers that provide 50 percent or more of the drinking water for an area where there are no reasonable alternative drinking water sources.[2]

The aquifer lies in an underground layer of porous limestone that is 400 to 600 feet thick. The aquifer runs in an arch from an area west of San Antonio to north of Austin. The aquifer can be divided into three parts: the contributing zone, or drainage area; the recharge zone; and the artesian area. The contributing zone is found in Texas Hill Country and is about 4400 square miles. The area receives about 30 inches of rainfall per year which drains through streams and the water table into the Edward Aquifer in the recharge zone. The recharge zone is an area where highly faulted and fractured Edwards limestones outcrop at the land surface, allowing large quantities of water to flow into the aquifer. About 85 percent of recharge occurs when rivers and creeks cross the recharge zone. The artesian zone, unlike the recharge zone, is confined between two impermeable rock formations. Artesian wells and natural springs exist where water can be pushed through wells or faults to the surface.[3] The aquifer is unusual due to its rapid acceptance of recharging waters, large yields in springs and wells, and relatively rapid groundwater movement.[4]

The area over the Edwards Aquifer has been subject to increasing development in recent years. Since 1970 the population of the greater Austin area has approximately tripled. The increased urban development has resulted in increased water quality problems due to urban runoff from streets, industries, and lawns.[5]

Barton Springs is the main discharge point for the Barton Springs segment of the Edwards Aquifer. Ninety percent of all water that discharges from this segment of the aquifer emerges at Barton Springs. Water discharged at Barton Springs has been channeled and dammed since the early twentieth century to form a naturally fed pool known as Barton Springs Pool. Recently the spring, pool, and ancillary springs were identified as the only surface habitat of the Barton Springs salamander, which was listed under the Endangered Species Act in 1977. The majority of pollutants that enter the Barton Springs segment of the Edwards Aquifer must exit the aquifer through salamander habitat. The primary threats to the Barton Springs salamander are

degradation of the quality and quantity of water that feeds Barton Springs due to urban expansion over the Barton Springs watershed.[6]

North Bosque River

The North Bosque river flows 97 miles through north-central Texas. The river runs through Erath County, Hamilton County, Bosque County and McLennan County where it joins the Middle and South Bosque Rivers and flows into Lake Waco on the edge of the city of Waco. The terrain is generally flat with a clay and sandy loam soil. The watershed is in one of the primary dairy producing areas in Texas. Erath County alone contains over 200 dairies, and the Upper North Bosque watershed has over 38,000 cows[7]. The watershed has been targeted by the state for TMDL development before April 2000, and the Texas Institute for Applied Environmental Research at Tarleton State University has conducted modeling activities and convened stakeholder committees as part of the TMDL development process. Representatives of local governments, the Soil and Water Conservation Districts, and local dairy farmers are among the members of the stakeholder committee that will determine the TMDL. The primary sources of impairment in the watershed are nonpoint sources which have lead to high fecal coliform and nutrient levels in the watershed[8]. Manure spreading from the growing number of dairies may be one of the major causes of the water quality problems in this watershed.

Enforceable Mechanisms

Of the Texas nonpoint source enforceable mechanisms described in the *Almanac*,[9] the following were reviewed in detail because of their relevance in the Edwards Aquifer or North Bosque River Watershed.

! ***General discharge prohibition.*** The state Water Code provides that, except as authorized, no person may "discharge sewage, municipal waste, recreational waste, agricultural waste, or industrial waste into or adjacent to any water in the state," discharge other waste which in itself or in conjunction with any other discharge or activity causes pollution of any water of the state, or commit any other act which causes pollution of any water of the state[10]. Exempted from this prohibition are: discharges authorized by permit, discharges in compliance with a certified water quality management plan as provided under the state agriculture code (discussed in greater detail below), and activities under the jurisdiction of the Parks and Wildlife Department, the General Land Office (coastal management) or the Railroad Commission of Texas. The Texas Natural Resources Conservation Commission (TNRCC) enforces these provisions.

Enforcement of the water code, or any other rule, permit, or order issued pursuant to it, is through administrative penalties up to $10,000 per day, civil penalties of between $50 and $10,000, and injunctions.[11] TNRCC uses these provisions to enforce against violations of both agricultural and development related permits.

! ***Water quality management plan certification program***. The state Soil and Water Conservation Board is the lead agency for the abatement of agricultural and silvicultural nonpoint source pollution.[12] The Board is required to plan, implement and manage programs and practices for

abating such pollution, and other state agencies with responsibilities in this area must coordinate their actions with the Board. In areas identified as having agricultural nonpoint source water quality problems (or in coastal zone areas), the Board is required to establish a water quality management plan certification program. The program is administered through the soil and water conservation districts. Participating farmers develop individual water quality management plans for agricultural lands, including animal feeding operations not otherwise permitted under the NPDES program. The state board adopts rules for these plans in compliance with state water quality standards.[13]

All complaints concerning a violation of a water quality management plan or a violation of a law or rule relating to agricultural or silvicultural nonpoint source pollution are referred to the state Board. The Board investigates the complaint in cooperation with the local Soil and Water Conservation District and, if necessary, develops a corrective action plan. If the violator refuses to take corrective action, the Board refers the complaint to TNRCC.

! ***Animal feeding operations***. Texas was delegated authority to issue federal NPDES permits to CAFOs in September 1998. All facilities confining more than 1000 animal units (700 mature dairy cattle) for at least a 45 day period annually must obtain a TPDES permit.[14] However, smaller facilities in the Dairy Outreach Program Area, which includes Erath, Bosque, Hamilton, Comanche, Johnson, Hopkins, Wood and Rains counties, must also obtain a TPDES permit if they confine more than 300 animal units (or 200 mature dairy cattle) for the same time period[15]. A facility which qualifies for and obtains a certified water quality management plan as described above is not considered a CAFO and is not subject to permit requirements unless it is referred to TNRCC for enforcement purposes.[16] The TPDES permit requires the operator to develop a pollution prevention plan that addresses water and air pollution as well as the land application of wastes and wastewater.[17]

! ***Edwards Aquifer Protection Rules***. Development activities over the Edwards Aquifer, one of the largest sources of drinking water for Austin and San Antonio, are regulated under the Edwards Aquifer protection program. The authority for this program is found in the Water Code, which states that "discharges of pollutants, disposal of wastes, or other activities subject to regulation by state agencies be conducted in a manner that will maintain present uses and not impair potential uses of groundwater."[18] The Edwards Aquifer protection rules govern activities in the recharge and contributing zones of the aquifer. The rules require that developers obtain a letter of approval before beginning construction activity and require that developers implement both temporary and permanent BMPs during and after construction.

! ***Protection of Streams and Watershed by Home-Rule Municipality***. Texas's local government code includes provisions allowing a home-rule municipality to prohibit the pollution of streams, drains, and tributaries that "may constitute the source of the water supply of any municipality," including the power to police the water bodies.[19] The law more broadly states that a home-rule municipality may provide protection for and police any watersheds. A municipality may exercise both provisions inside or outside the municipality's boundaries.[20] The city water pollution control program embodied in the city of Austin's Land Development Code,

described in detail in the Discussion and Analysis section, is based on the authority granted to home-rule municipalities in the local government code.

! ***City Water Pollution Control and Abatement Program***. A city may establish a water pollution control and abatement program. If the watershed water quality assessment reports or other assessments identify water pollution attributable to non-permitted sources in a city that has a population of 10,000 or more, TNRCC, after providing the city an opportunity to correct the problem and after a public hearing, may require the city to establish a water pollution control and abatement program.[21] A city's water pollution control and abatement program includes the entire city and may include areas within its extraterritorial jurisdiction. The law lists a number of program components, including "the development and execution of reasonable and realistic plans for controlling and abating pollution or potential pollution resulting from generalized discharges of waste which are not traceable to a specific source, such as storm sewer discharges and urban runoff from rainwater."[22] The water pollution control and abatement program must be submitted to TNRCC for review and approval.[23] The City of Austin also uses the authority provided under this law to establish its city water pollution control program, described in detail below, and submitted the programs developed under these provisions to TNRCC for review following approval by the City Board.

! ***Local government authority***. State law provides local governments with the authority to inspect public water to determine whether water quality meets state water quality standards, unpermitted discharges to water are occurring, and permitted discharges are in compliance with permit requirements.[24] TNRCC may, by cooperative agreement, assign any powers or functions normally held by TNRCC to a local government if necessary for the local government to perform water quality management, inspection, and enforcement functions.[25] Local governments have the same power as TNRCC to enter public and private property within their territorial jurisdiction to inspect and investigate water quality concerns. The results of any inspection made by local government must given to TNRCC if requested.[26] The City of Austin administers municipal storm sewer discharge pollution prevention programs and emergency spills and pollution complaint response programs under the authority of these provisions.

! ***City of Austin Water Pollution Control Program***. The City of Austin established its water pollution control program under the authority of Local Government Code 401.002 and Water Code 26.177. The law states that municipalities with a population over 10,000 "may" develop a water pollution control and abatement program through municipal ordinance. Development activities are regulated throughout the city and its extraterritorial jurisdiction (ETJ) area as described in the Land Development Code, volume two of the city's ordinances. Generally, developers must implement erosion and water quality controls and protect critical environmental features on property during and following development.[27] The Comprehensive Watershed Ordinance, passed in 1986, was the first ordinance to regulate development throughout Austin and the ETJ. This ordinances established critical water quality zones, mandatory setbacks, and impervious cover restrictions. In 1992 the city adopted one of the more stringent provisions in the Land Development Code, the citizen-initiated Save Our Springs Initiative, which also limits impervious cover in developments, increases the distance permitted between development and water bodies, and eliminates increased loading of suspended solids, phosphorous, nitrogen, and other contaminants.[28] These regulations apply to the Barton Creek, Barton Springs, and Barton Springs aquifer area. Unlike other ordinances, there are no variances or exemptions permitted from these standards.

A provision of state law requires that permits for development be evaluated only on the basis of the regulations in effect at the time that the original permit was first approved[29]. Under this law, preliminary plans including subdivision plats, site plans, and other development permits on land covered by a preliminary subdivision permit are considered to be a single permit. This may allow certain development activities in the City of Austin to be "grandfathered" under older provisions of the land development code.

Assistance-Oriented Nonpoint Source Programs

Senate Bill 503 Cost Share and Technical Assistance

The Texas State Soil and Water Conservation Board (TSSWCB or Board) administers the 503 program, the state's cost share incentive program established as part of Senate Bill 503. Funds from the incentive program are available to a limited degree across the state, but most are specifically targeted at priority watersheds identified by the Board. Priority watersheds are based on lists developed by the state under Clean Water Act Section 319(a), and include primarily watersheds impacted by agricultural activities. The North Bosque is included among the priority areas. Each priority watershed is allocated funding annually by TSSWCB. Funding for cost share assistance is provided through the Soil and Water Conservation District (SWCD) offices in the priority watersheds. In addition to funding provided to the priority watersheds, funds are set aside for the purpose of addressing animal feedlot operations in any watershed in the state.

To be eligible for cost share assistance, an individual must develop a certified water quality management plan with the assistance of the local SWCD and TSSWCB's regional staff. For animal feedlot operations, any facility not required to obtain a TNRCC permit is eligible to develop a water quality management plan. All other agricultural operations may also develop a plan on a voluntary basis. Plans are approved by NRCS field office staff and agreed to by the SWCD. To receive cost share assistance for a specific practice, the practice must be included in the certified plan. The TSSWCB regional office responsible for the North Bosque has approved approximately 500 plans since the 503 program went into effect in 1994.

Local SWCD's have some latitude in administering the cost share program. State law sets the maximum portion of a project's cost that can be funded by cost share at 75 percent,[30] but the SWCD may set a lower rate. The SWCD also determines which practices it will fund through the 503 program.[31] The lifetime limit for cost share is $10,000 per operation throughout the state, although this does not fund 75 percent of the cost of most waste management systems for animal feedlot operations. In priority watersheds, requests for cost share assistance can be approved by SWCDs without referral to TSSWCB. In other areas of the state, operators of animal feeding operations must submit requests to the Board who will award funding on a first come, first served basis.

EQIP

EQIP is the most active of the Farm Bill programs in both the North Bosque river watershed and the Edwards Aquifer. The state has received over $10 million a year in funding for the past three years. The NRCS State Technical Committee selects priority areas around the state from proposals from regional NRCS staff and other agencies. In 1999, 25 priority areas received funding while 25 percent of the state's total allocation was reserved for applicants outside of the priority areas. The North Bosque and Edwards Aquifer are the state's top two priority regions for EQIP. The Edwards Aquifer region has been a priority area for four years. Most contracts are in Medina and Uvalde counties, and focus on water quantity issues such as improving the efficiency of irrigation. The Bosque River region has been a priority area for three years, and contracts are primarily focused on water quality concerns. Funding has been used for waste management systems and nutrient management planning for cropland. In all areas of the state, funding is limited by law to 75 percent of the cost of the practice with a maximum of $50,000 for a five year contract. Grants are evaluated in each priority area for cost-effectiveness, and about 20 percent of applications are funded each year. Applications originating outside priority areas are evaluated against other non-priority area applications statewide, but are grouped into four resource concerns so that problems that may be more costly to address, such as animal waste management, are evaluated against similar proposals.

319 in Texas

TSSWCB's 319 program for agricultural and silvicultural nonpoint source pollution targets its funding to priority areas identified on the state 303(d) list of impaired waters. Efforts under this program are intended to complement the state's TMDL development process. The program receives approximately $2.3 million in funding annually. By Memorandum of Understanding,[32] TNRCC and TSSWCB have divided responsibility for implementing the provisions of the EPA Clean Water Act 319 programs. TNRCC is responsible for programs relating to non-agricultural nonpoint source pollution, while TSSWCB is responsible for managing programs addressing agricultural and silvicultural nonpoint source pollution.

Discussion and Analysis

Agricultural Pollution Generally

The TSSWCB and the TNRCC have entered into a memorandum of understanding that governs the procedure for coordinating jurisdictional authority, program responsibility and procedural mechanisms for nonpoint source pollution programs.

The 503 program allows any facility that is not required to obtain a permit from TNRCC to participate in the program and develop a certified water quality management plan. (See discussion below on when a facility is required to have a permit). The certified plans contain all of the elements that would be required under a TNRCC TPDES permit. They encompass the whole operating unit and all natural resources. For example, even if the landowner comes in only for assistance on animal waste management practices, the plan will also address other problems, such as erosion, that are present on the property. There are approximately 3,000 plans for nonpoint source sites around the

state, including small animal feeding lots.

The North Bosque River watershed is under jurisdiction of the regional office of the Board in Dublin. This office covers a number of major dairy areas in Central Texas, including Erath, Commanche, Bosque, Hamilton and Johnson counties. Since 1995, this office has prepared certified water quality management plans. In Erath County the majority of dairies are permitted because of their large size. Although the number of dairies in the area has dropped by 50 percent in the last 4 years (from 212 to 151), the dairy production of the region has remained the same.

The TSSWCB is responsible for investigating complaints and monitoring compliance of all animal feeding operations with a certified water quality management plan or other Board rules. The Board is also responsible for maintaining an electronic database to track and document the proceedings of the plans and corrective actions. If the Board receives a complaint and determines that TNRCC has jurisdiction over the facility (see discussion below), it must refer the case to TNRCC within five working days of the investigation. The Board also automatically refers to TNRCC any complaint involving "an immediate impact to aquatic life"[33] or any complaint involving a documented violation of a plan that requires immediate action because it is affecting human health and safety or will cause serious impact on the environment.

The first step taken by the Board in the case of a complaint is to check whether a facility has a plan and if so, whether the facility is complying with the plan. If a compliance problem exists, a "violation letter" will be sent, citing the facility as in violation of Section 26.121 of the Texas Water Code. The letter will direct the violator either to obtain a plan or to implement a corrective action plan. Corrective actions could include steps necessary to implement the plan or other steps necessary to come into compliance. A facility without a plan may not necessarily be required to obtain a plan; the corrective action may be limited to those steps necessary to come into compliance. Although compliance with the plan technically exempts a party from enforcement of the "no discharge" prohibition, it is unlikely that an agricultural operation would be in compliance with the plan in the event of a discharge causing a public health or wildlife hazard.

In the event that the facility is not under a plan, the operator is given 45 days to apply for one and have the plan approved at a monthly meeting of the Board. The Board follows up after 45 days to see if the operator has applied for the plan. Once the plan is approved, the operator must present evidence of an effort to begin implementation of the plan within 90 days. This allows time for the agencies providing technical assistance, the SWCD and NRCS, to work with the individual. If the violator does not obtain a plan or come into compliance with the existing plan within the time frame established by the Board and the SWCD, the plan will be nullified and the case will be referred to TNRCC for enforcement.

In one example of a complaint handled by the Board, a small hog feeding operation (150 hogs) allowed waste to go into a ditch and then flow into a water source. A letter was sent by the Board requiring the violator to apply for a plan in 45 days and implement the plan. Since the Board meets every 30 days, the violator was basically being given two opportunities to get a plan. The violator did not prepare a plan and the case was referred to TNRCC for enforcement. Usually the TSSWCB does not hear back from TNRCC about cases unless TNRCC determines that the violator is now fully willing to remedy the problem and that a certified water quality management plan would be the appropriate next course of action.

There is one TSSWCB staff person statewide in charge of investigating complaints. The regional TSSWCB offices do not investigate complaints. However, the regional offices conduct status reviews of plan implementation (described below). From the start of FY94 to date, the Board has received 127 complaints, mostly involving animal feeding operations. There have been no complaints received concerning silviculture operations. Fifty-one of those complaints involved dairy operations. The majority (92) of these complaints have been referred by other agencies, while the remainder (35) came from the general public. Most of the complaints under Board jurisdiction relate to problems in suburban areas. Thirty-eight cases were resolved by requiring a water quality management plan, twenty required other corrective action and ten were referred to TNRCC for action. Of these ten referrals, two cases involved operations of permitted facilities or facilities that should have been permitted so TNRCC jurisdiction was automatic. The other eight were referred because they had failed to comply with the water quality management plan program.

Each year ten percent of the certified water quality management plans get a status review. These are conducted by the regional TSSWCB offices. When a status review of a certified plan reveals that the implementation of the plan is not on schedule, TSSWCB works with the operator to correct the problem. The inspector will generally notify the operator of any problems identified. If the problem threatens public health, it will be treated as a priority and the inspector will return to the site to ensure that it is addressed quickly. More often, the problems are less severe such as the operator being unable to meet the implementation schedule. In this case, the regional TSSWCB staff and the SWCD will amend the schedule in the plan and follow up to ensure that the plan is implemented according to the new schedule.

If the operator continually fails to implement the plan on schedule, TSSWCB will eventually void the contract, requiring repayment of cost shares or the return of any equipment purchased, and the plan will be canceled. In the DOPA, TNRCC is aware of all the dairies and the status of any plans. As soon as a plan is cancelled TNRCC can regulate the facility, which may include putting the facility on its inspection list and requiring the facility to obtain a permit. However, given the cost share limit of $10,000, there are very few actions by the Attorney General to retrieve the contract funds. The funds are usually retrieved on the local level without court action.

In the North Bosque River watershed TSSWCB has conducted three 319 program projects, working closely with TNRCC. The projects have studied innovative best management practices to control phosphorous and assessed the contributions of various sources of nonpoint source pollution to the watershed.

Although authorized by law, TSSWCB has yet to develop a water quality management certification program for silvicultural operations. Nonpoint source pollution problems in this area are addressed through voluntary best management practices.

TNRCC Role

TNRCC takes the lead in regulating and enforcing management of livestock and poultry waste from concentrated animal feeding operations. CAFOs over a certain size are required to obtain a permit from TNRCC. For example, dairy operations with 700 or more mature dairy cattle are required to obtain a permit. In the dairy outreach program areas (Erath, Bosque, Hamilton, Comanche, Johnson, Hopkins, Woods and Rains), permits are required for for facilities with at least 200 hundred mature dairy cattle. TNRCC also has general discretion to require an animal feeding operation of any size to acquire a permit in certain cases where water quality is threatened.

Enforcement actions against animal feeding operations are primarily handled by the 16 regional TNRCC offices. Each office has one staff person to handle enforcement. The regional offices may refer cases to the main office by a Regionally Initiated Order (RIO). Examples of cases that may be referred include those with recalcitrant, repeat or egregious violators.

When a TNRCC regional office receives a complaint, an inspector will be sent to investigate. The Stephenville TNRCC office (which handles the North Bosque River watershed) receives most complaints directly and usually responds within a few hours. TNRCC also conducts regular inspections of animal feeding operations under its jurisdiction. All facilities with more than 200 dairy cattle in the dairy outreach program are inspected annually. Facilities that have had their water quality management plan cancelled will also be put on TNRCC's inspection list. During the period September 1, 1998 to August 31, 1999, the TNRCC Stephenville office conducted 265 scheduled compliance inspections and 66 complaint inspections, issued 123 notices of violation and referred 23 cases for enforcement.

If a minor violation is found, the inspector can issue a written notice of violation (NOV). The notice will include a deadline for correcting the problem. If the violator corrects the problem within the specified time, the enforcement proceeding ends. A verbal NOV may be issued if (i) no emissions or discharges occurred, (ii) no documented oral notice or NOV was issued to the operator in the last year, and (iii) the violation can be and is corrected within 14 days.

More serious violations are subject to formal enforcement proceedings. Two types of orders are used depending on the severity of the violation: "1660 orders" and "findings orders." The former are issued for less serious violations. "1660 orders" are no-contest orders that allow for a deferral or reduction of the penalty if the violator complies with the order. "Findings orders" including findings of fact and conclusions of law. Each time a findings order is issued, the penalty increases.

In one recent case involving a permitted animal feeding operation in the North Bosque watershed, TNRCC received a complaint that the facility was discharging onto a neighbor's property. Only a month earlier, TNRCC had issued an order to the same facility for an unauthorized discharge. The facility had five prior NOVs on record. TNRCC is now developing an order for the facility. TNRCC is also considering referral of the case to the Attorney General's office. This office has the authority to institute a civil action or seek a temporary injunction against the violator. Enforcement through the AG's office also opens the possibility for imposing jail time for future violations.

In another case a small dairy operation was given a "1660" order for a first-time discharge violation. The order required the facility to get a Subchapter B permit and to pay a fine of $3,125. When the facility committed a second discharge violation, a findings order with a stiffer penalty of $4,875 was issued.

Land Development Requirements

Nonpoint source pollution from development activities in the Edwards Aquifer region is primarily addressed through a number of regulations at the state and local level that use permitting requirements to impose development restrictions and require the use of best management practices. These regulatory programs are then backed by enforcement mechanisms and technical assistance.

Development activities in various portions of the Edwards Aquifer have been regulated since 1970 when the Texas Water Quality Board issued a board order designed to protect the quality of water entering the Edwards Aquifer recharge zone.[34] Recently the rules were extended to cover the contributing zone to the recharge area. Collectively, the regulations and associated approvals and programs are referred to as the Edwards Aquifer Protection Program (EAPP).

The Edwards Aquifer regulations prohibit any person from commencing any construction-related or post-construction activity that has the potential for polluting the Edwards Aquifer *and hydrologically connected surface streams* until the required plans, including a water pollution abatement plan, have been approved by TNRCC.[35] Specific plans are also required for the rehabilitation or construction of sewage collection systems, underground storage tank systems, and aboveground storage tank systems. Activities exempt from this approval process include agricultural activities (other than feedlots/concentrated animal feeding operations regulated under Chapter 321), oil and gas operations, routine maintenance, and construction of a single family residence on a lot no larger than five acres. The Edwards Aquifer Protection Rules also prohibit new feedlot/concentrated animal feeding operations regulated under Chapter 321 on the recharge zone.[36]

The program requirements and their implementation in the contributing zone are similar to those of the recharge zone. The primary difference is in the activities that are regulated; only activities disturbing more than five acres are included. The plans required are very similar to the Phase I storm water plans required by EPA for construction sites and in some cases TNRCC has allowed the submission of the storm water pollution plan in lieu of the water pollution abatement plan. The BMPs required for post-construction activity are the same as those required in the recharge zone, and inspections are handled in the same way.

The information that must be submitted in the water pollution abatement plan includes the

site location, a geologic assessment, a description of the proposed activities, the expected volume and characteristics of wastewater to be produced, any activities or processes which may be a potential source of contamination, and temporary and permanent best management practices for preventing pollution of surface water, groundwater and stormwater.[37]

The plan is submitted to the appropriate TNRCC regional office (in either Austin or San Antonio) where the staff review the plan for administrative completeness. Staff conduct a site inspection to verify that the information submitted in the plan is accurate and perform a technical review of the proposed permanent and temporary BMPs**.** Most of the time the plan requires little modification before the approval is issued.

TNRCC's Austin and San Antonio Regional Offices provide both formal and informal technical assistance to promote compliance with the requirements of the Edwards Aquifer Protection Program. Informal assistance is the predominant mechanism for providing technical assistance to the engineering, consulting, and development community that is subject to the land development requirements. The Austin regional office receives over 3000 telephone inquiries each year seeking assistance with the requirements of the program. Inspectors rotate through telephone duty where they respond to these calls. The San Antonio regional office reports similarly that it relies on telephone contacts to provide the majority of the technical assistance. The San Antonio office will also contact site owners to let them know about the requirements of the program. The Austin regional office will more formally hold workshops for various associations to discuss the requirements of the program; a recent workshop involved the Highway Contractors Association. TNRCC provides two guidance documents on the requirements of the program, and TNRCC's small business assistance program is assessing ways to assist small businesses in complying with the program.

Once the application meets the requirements, TNRCC issues an approval letter. The approval letter may contain special conditions for approval. Some examples of special conditions are plugging of abandoned wells or installing mitigation practices such as buffers around a sensitive feature (a zone of easy infiltration to the aquifer). The applicant must also provide written notice of the intent to commence construction to the appropriate regional office no later than 48 hours in advance.[38] At this time, it will be determined if the applicant is eligible for an extension of an approved plan. If any sensitive feature is discovered during construction, all regulated activities must cease until the methods proposed to protect the sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality have been reviewed and approved. When the approval letter has been issued and construction has begun, TNRCC does a follow up inspection during and after construction to ensure that BMPs are being implemented and maintained. The staff reviews from 20 to 30 percent of existing projects.

Over the lifetime of the program there have been 2,500 plans created for development projects. The Austin and San Antonio offices receive about 500 to 600 plans each year.

The letter of approval and a notation that the property is located over the aquifer are recorded in the deed for the parcel.[39] The requirement to maintain the BMPs on the site runs with land. The plans are good as approved for two years in the recharge zone and five years in the contributing zone. Projects in the recharge zone must be 10% completed within the first two years and 50% completed within the first 10 years.

Developers who are not in compliance with their plans are identified randomly by TNRCC staff through the inspection process. Most enforcement of EAPP is carried out by TNRCC regional staff in Austin and San Antonio. When an inspector identifies a site that is not maintaining BMPs as required by their approval letter, or not employing the proper controls, the inspector issues a notice of violation (NOV). The NOV has a due date for compliance. If the developer misses the due date, the inspector can initiate formal enforcement.

Sites that are identified as not having a letter of approval are immediately subject to formal enforcement. TNRCC issues an administrative order. The maximum penalty they can issue under Texas water quality laws is $10,000 per violation per day, but this penalty is reduced by a number of specific factors. The average penalty assessed against a site that is operating without a letter of approval is $2,000. The penalty provisions also call for a 20 percent deferral if this is a first time violation.

Through the third quarter of this year, the Austin regional office (Williamson, Travis, and Hays Counties) monitored 76 sites for compliance by conducting a follow-up inspection. Of those, 20 were issued an NOV, and four were referred to formal enforcement. The four sites referred to formal enforcement may have been operating without an approval letter or violating their plan in other ways.

The most common violations are the failure to submit a water pollution abatement plan or to get approval in advance of construction. One recent case brought by the Austin regional office involved a violator who had failed to identify and notify the regional office of a sensitive feature, in this case, a cave. The original complaint was made to the City of Austin who referred the case to TNRCC which sent out its inspectors. The penalty imposed was $2,000 in accordance with the penalty policy. The violator received a 20 percent deferral and was allowed to conduct a supplemental environmental project (providing kits to test water to the school system for use in fifth grade science classes). There are usually no hearings in connection with EAPP cases because the proposed agreements are usually based on standard policies, but a hearing can be held if the violator is unhappy with the proposed agreement.

The general discharge prohibition under the state water code is rarely used as the basis for enforcement actions involving land development activities in the recharge and contributing zones if the Edwards Aquifer, although it may be used for other types of problems such as a spill. From an enforcement perspective it is difficult to prove a violation of the general discharge prohibition because TNRCC must provide evidence that a discharge actually occurred. This involves having an inspector on the site at the time of the discharge in order to document the event by taking upstream and downstream photographs and samples. Enforcement of violations under the EAPP, such as the failure to implement or maintain BMPs during construction or failure to obtain prior approval before construction, are much easier to prove.

Although the law allows a local authority to be certified to review, approve and enforce Edwards Aquifer Protection plans,[40] no counties or other local entities have been delegated authority to implement their own program and TNRCC administers the EAPP. Even if a local entity were to assume program responsibilities, the EAPP fees would continue to be paid to the Commission to assure continued proper oversight and enforcement. Plans are distributed to appropriate municipalities and groundwater districts for comments. The City of Austin often provides

comments.

The TNRCC's Austin regional office receives 319 funding for basic programmatic funding as well as funding to pass through to other local groups conducting research on the Edwards Aquifer. The regional office has received its own 319 grant since 1992. The most recent grant was a three year grant for $100,000 per year. The grant funds two positions for review and enforcement of the Edwards Aquifer Protection Program. One of the other organizations funded through 319 is the Barton Springs Edwards Aquifer Conservation District which conducts studies monitoring the effects of BMPs.

Local Initiatives

Development activities in the Edwards Aquifer may also be restricted by city or municipal laws. State law authorizes cities to establish a water pollution control and abatement program.[41] This program may include areas within a city's extraterritorial jurisdiction if necessary to achieve the objectives for the area within its territorial jurisdiction. In addition, if certain reports, assessments or studies identify a water pollution problem from non-permitted sources, the Commission may require a city that has a population of 10,000 or more to establish this type of program. However, the city in question must first be given an opportunity to correct the problem and a public hearing must be held.

The City of Austin, for example, has enacted several ordinances over the years regulating of nonpoint source pollution created by development activities. The first city ordinance, the Lakes and Creeks Ordinance, was passed in the 1970's. This ordinance regulated development activity near creeks in the Lake Austin and Lake Travis areas in the western part of Austin. Since then, a number of ordinances have been passed regulating development activities in various watersheds. In 1986 the Comprehensive Watershed Ordinance encompassing the entire City of Austin was passed. For the first time, the eastern part of the city was regulated. The ordinance also covered a five mile extraterritorial area. In September 1992 the City adopted the Save our Springs Ordinance for the Barton Creek and Barton Springs Watershed.

The resulting program requires erosion control for site development, restricts impervious surfaces, and requires water quality control measures to be implemented following construction. The program applies to development throughout the city and into a five mile extraterritorial jurisdiction (ETJ) are outside city limits. However, in the ETJ the city's ordinances require only water quality protection measures, not zoning or other land use controls. The requirements applicable to a given area depend on its location; activities in certain watersheds are more stringently regulated. Overall, the city's requirements are as stringent or more stringent than the requirements of the Edwards Aquifer Protection Program.

The Save our Springs ordinance sets out special requirements for development of lands in watersheds which contribute to Barton Springs.[42] Impervious cover for all such development is limited to a maximum of 15 percent in the entire recharge zone, 20 percent in the contributing zone within the Barton Creek watershed and 25 percent in the remainder of the contributing zone. Runoff is to be managed so that no increases occur in the average annual loadings of total suspended solids, total phosphorus, total nitrogen, chemical oxygen demand, biochemical oxygen demand, total lead,

cadmium, fecal coliform, fecal streptococci, volatile organic compounds, total organic carbon, pesticides, and herbicides from the site. Impervious cover is to be reduced if needed to assure compliance with these pollutant load restrictions. These requirements are not subject to the regular exemptions, special exceptions, waiver or variances allowed generally under the Land Development Code.

Austin requires a site development permit for all non-single family home construction activity. The Development Review and Inspection Office issues the permit after compliance with the water quality control requirements is verified. In the case of single family home construction, a permit is required for infrastructure development. A building permit, but not a site development permit, is required when the actual home is constructed, and this application is reviewed to ensure compliance with impervious cover limitations and other environmental requirements. Financial assurance is required for each permitted site to cover the costs of maintaining erosion controls or revegetation is the site is abandoned.

Austin has eleven full-time inspectors in the Watershed Protection Department. The frequency of inspections varies. A very large and active site may be visited by inspectors two or three times a month. Inspectors are assigned to a specific area of the city which enables them to identify more easily unpermitted development.

The most common violation is failure to maintain erosion controls.[43] When a violation is identified, it is classified as either a routine or priority violation. Routine violations include failure to maintain or repair erosion controls, or tracking of soils in minor roads. In the case of a routine violation, a verbal warning is given and the violator is allowed 24 hours to remedy the violation. If the violation is not addressed within 24 hours, the inspector will issue a written notice. If the violation is not addressed in the time frame specified in the written notice, the inspector will issue a stop work order, known as a red tag. This requires construction to stop, and also stops all other city inspections that are required for approval.

A red tag is the first step in a priority violation. Priority violations include any activity without a permit or activity that has begun without a pre-construction meeting with Watershed Protection Department staff. Other priority violations are construction that has gone outside the specified limits of construction, any offsite discharge in the Barton Springs zone (even if the construction has been grandfathered under an earlier ordinance) or any violation in a critical water quality zone or involving a critical environmental feature. After the issuance of a stop work order (red tag), the city may file a Class C Misdemeanor in municipal court. The maximum fine is $2,000 per day, with each day counted as a separate violation. The city may offer a deferred disposition when violations are identified. In this scenario, a judge will lay out a schedule for compliance and will require the developer to post bond with this court. A deferred disposition is only considered when construction is on-going.

During the period from October 1, 1998 to September 30, 1999, the Environmental Review and Inspection Division of the Watershed Protection Department issued a total of 111 red tags for violations of the Land Development Code. During the same period, 71 Class C misdemeanor complaints were filed in Municipal Court against 14 developers/owners. The number of complaints filed against each person ranged from two to twelve, depending on several factors, including the severity of the violation, failure to respond to the stop work order, and willingness of the defendant

to come into compliance.

Certain development activities may not be subject to these requirements because of grandfathering provisions passed by the state and later by the City of Austin itself. The state legislature passed the grandfathering provisions in direct response to Austin's water quality protection initiatives. The first state law was passed in 1987, one year after the City passed its Comprehensive Watershed Ordinance. The legislature was responding to what it perceived as aggressive regulation by the City that took away land use rights, particularly in regard to impervious surfaces and water quality controls. The first legislative bill simply stated that the regulations in effect on the filing date of a project would apply to *all* subsequent applications.[44] This provision was somewhat general and difficult for the city to implement. Because it was general, the city read the provision as stringently as possible and looked for ways to reject projects from being grandfathered. Much litigation occurred over this provision between 1987 and 1995, with cases decided both in favor of the state and the city.

In 1995, the legislature continued to be alarmed by changes in the Land Development Code and passed SB 1704, which more clearly stated the legislature's intent.[45] Austin enacted guidelines on the grandfathering process in an effort to limit the impact of the new law. These guidelines were much disputed, but considered workable by both the city and the legislature. In September 1997, SB 1704 was inadvertently repealed. The legislature wanted to call a special session to reenact the provisions, but the city suggested instead that they develop a municipal law to address these concerns. The legislature agreed to this suggestion and Austin passed the Interim Development Order. The provisions were very complicated albeit attempting to be fair, but the order upset many people, including the legislature which passed HB 1704 in May 1999, reenacting the provisions of the 1995 statute (SB 1704). Instead of developing formal guidelines, the city has responded by handling each case individually and relying on litigation to enforce its stricter interpretation of this statute. A committee addresses each case and will not decide whether it can be grandfathered unless a member of the law department is present and agrees. Usually several attorneys participate in the decision. Generally, the lawyers will assess how likely they would be to prevail in a suit, and that determines whether the project will be grandfathered or rejected.

Some of the more specific elements that are considered in reviewing the applications are changes in land use and active permits. The city will divide the land use of applications into five categories: single family/duplex; multi-family; office; commercial; industrial; and civic. If the land use of the project has changed since the first permit was approved, the project is considered new and is not grandfathered. Each project must receive a series of permits. The first generally is the subdivision permit, which is based on zoning and may cover a very large area. After this permit is issued, the applicant must have an application for a final plat for a least a portion of the subdivision reviewed and approved within 2 years. If this is done, the subdivision permit remains active; if not, the permit expires. If the first permit has expired, the project is not grandfathered. If the first permit has not expired, the project may be grandfathered; however it is often the case that the proposed land use has changed over time and this too makes the project ineligible for grandfathering.

Local Voluntary Programs

Austin has its own storm sewer discharge pollution prevention program which is an

inspection and permitting program that is different from the federal stormwater program. The federal storm water program inspectors are in Dallas and rarely inspect Austin facilities. The City's program is carried out by going to businesses likely to pollute such as auto dealers, detailing businesses, dry cleaners, fuel storage operations, and others that have historical problems with pollution. These facilities are inspected, permitted and required to implement BMPs that have been developed for various sectors. Stormwater Discharge Permits are issued annually for the period January 1 to December 31 and renewal notifications are sent in December of each year.[46] The program tries to obtain compliance without formal believes it is successful with this approach. When contamination is found, staff often provide guidance to owners of small businesses on remediation and assist in the cleanup. If necessary, the City will take people to court to get the actual clean up done.

The City of Austin also has a voluntary program called Clean Water Partners which is primarily an educational program. The City sought partners to implement a checklist of more stringent standards than those in the permit checklist. Those who came into compliance with the standards were given banners, stickers, and public recognition. The City targeted specific geographic areas and types of businesses with a history of problems. The worst offenders chose not to participate. The City also created a "how to" notebook for businesses.

Austin also has an Emergency Spills and Pollution Complaint Response Project which responds to complaints and is on call 24 hours, 7 days a week[47]. The program also provides technical assistance and outreach to the public and other City departments. They try to respond to priority calls in 15 to 30 minutes. Their job is to coordinate cleanup among agencies and to keep the spill out of waterways and identify the responsible party. The responsible party will have to pay for the cleanup. The city is allowed to go after the responsible party under state law; Ch. 26 of the State Water Code gives municipalities authority to enforce state law.

Conclusion

In the North Bosque River watershed efforts to address non-point source pollution from agricultural operations rely heavily on the voluntary water quality management certification program. The primary incentives for participation in this program are limited cost share assistance as well as exemption from regulation under the TPDES in certain cases. In the event of a serious discharge to surface water, TSSWCB might revoke cost share funds, and TNRCC enforcement authority, including enforcement and penalties, might be exercised as well. The thrust of efforts to resolve complaints encourages participation in the voluntary program. The lower threshold of animals required for the TPDES program in the Dairy Outreach Program Area brings a substantial number of operations under the more structured enforcement policies of TNRCC.

Texas's efforts to regulate land development activity over the Edwards Aquifer have resulted in significant TNRCC enforcement activities. The EAPP, unlike the general discharge prohibititions of the Texas Water Code, does not require inspectors to prove that a discharge occurred, but instead requires the use of best management practices which are intended to prevent nonpoint source pollution. TNRCC inspectors are unable to inspect every site regulated under this program to identify an illegal discharge, but have the legal tools to ensure that erosion and other pollution controls are implemented and maintained.

Some believe that the EAPP is a good first step at regulating land development, but would prefer a more stringent approach. The City of Austin, under state authority but of its own initiative, has implemented a series of regulations that are often more stringent that the EAPP in regulating land development. Some provisions, like the Save Our Springs ordinance in the Barton Springs zone, were passed as a result of citizen initiatives. In spite of the popular support behind the land development regulations and the legislative authority to establish a water pollution control program, Austin has been challenged by the state legislature as the stringency and scope of its regulations increase. The legislature has passed a series of laws that limit the power of Austin's regulations by requiring the city to regulate development under the regulations in effect at the time the initial permit for development was issued, often turning the regulatory clock back many years to much weaker provisions. The city has turned to the courts in an attempt to validate its interpretations of grandfathering provisions, but the state laws continue to provide developers an opportunity to evade the more stringent laws, and require the city to expend resources battling the state. The City of Austin appears to determined to protect water quality, not only through its Land Development Code, but also through its stormwater and emergency spill programs which make use of non-enforcement measures such as outreach to reduce pollution.

ENDNOTE

1. In addition to the sources cited, the following individuals were interviewed by telephone: Mary Ambrose, Texas Natural Resources Conservation Commission; Bobby Cauldwell, Texas Natural Resource Conservation Commission; Laurie Eaves; Texas Natural Resource Conservation Commission; David Faller, Texas Natural Resource Conservation Commission; Steve Jones, Texas State Oil and Water Conservation Board; Gary Keith, Texas Institute for Applied Environmental Research; Mary Kelly, Texas Center for Policy Studies; Ken Kramer, Sierra Club, Lone Star Chapter; James Moore, Texas State Soil and Water Conservation Board; Duncan Muir, City of Austin Watershed Protection Department; Lee Munz, Texas State Soil and Water Conservation Board; Carol Piza, Texas Natural Resource Conservation Commisison; Patty Reeh, Texas Natural Resource Conservation Commission; Susan Scroggins, City of Austin Watershed Protection Department; Sherry Smith, Texas Natural Resource Conservation Commission; Sam Umberhagen, Texas State Soil and Water Conservation Board; and Darryl Williams, Texas Natural Resource Conservation Commission.
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10. Vernon's Texas Code Annotated Water Code 26.121(a).
11. VTCA Water Code 26.123, 26.122(a), 26.136.
12. VTCA Water Code 26.1311, VTCA Agriculture Code 201.026.
13. VTCA Agriculture Code 201.026.
14. 30 TAC § 321.32(9)(a).
15. 30 TAC § 321.32(9)(b) and (11).
16. 30 TAC § 321.33(d).
17. 30 TAC §§ 321.39 and 321.41.
18. VTCA Water Code 26.401.
19. VTCA Local Government Code 401.002(a).
20. VTCA Local Government Code 401.002(b) and (c).
21. VTCA Water Code 26.177(a).
22. VTCA Water Code 26.177(b).
23. VTCA Water Code 26.177(c).
24. VTCA Water Code 26.171 (1999).
25. VTCA Water Code 26.175 (1999).
26. VTCA Water Code 26.173 (1999).
27. City of Austin Land Development Code § 25-8.
28. City of Austin Land Development Code § 25-8-511 *et. seq*.
29. Texas House Bill 1704 (1999).
30. VTCA Agriculture Code 201.308.

31. VTCA Agriculture Code 201.305(b).
32. Memorandum of Understanding: Texas SSWCB and TNRCC, May 27, 1997.
33. *Id.*
34. U.S. EPA, "Section 319 Success Stories: Volume 11", EPA 841-R-97-001, October 1997.
35. 30 TAC § 213.4.
36. 30 TAC § 213.8.
37. 30 TAC § 213.5 (b).
38. 30 TAC § 213.5(f)
39. 30 TAC § 213.4(g).
40. 30 TAC § 213.4(a)(5).
41. VTCA Water Code 26.177.
42. City of Austin Land Development Code § 25-8-514.
43. City of Austin Land Development Code § 25-8-81.
44. Texas House Bill 4 (1987).
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46. Title IV, Ch 401 Austin City Code 1992, Subtitle D (Water Quality Control) Ch. 26, Texas Water Code, and 31 TAC Ch. 307-321, and VTCA Water Code 26.175 (1999). City of Austin, "Program Storm Sewer Discharge Facilities."
47. Title IV, Chapter 401 Austin City Code 1992, Texas Water, Ch 26, Title 2, Subtitle D, and City of Austin." Program 23, Emergency Spills and Pollution Complaint Response."

Virginia Case Study

Summary

This study examines the mechanisms used to manage and control nonpoint source pollution in the James River watershed. The James River starts in the Blue Ridge Mountains and continues through Virginia to the Chesapeake Bay.[1] The study specifically examines the relationship between enforcement approaches and voluntary, technical assistance, tax incentives, and cost share approaches as used in the watershed.

Virginia primarily uses incentive-based programs that emphasize best management practices for nonpoint source pollution management – especially in agriculture and forestry. The state has completed the development of a tributary nutrient and sediment reduction strategy and draft goals for the James River. The goals will, to a large extent, determine the future priorities for technical assistance, funding, and enforcement actions in the James River watershed. Virginia's enforcement of nonpoint source pollution violations largely is triggered by citizen complaints, although forestry recently has included an inspection and monitoring program. Identification of nonpoint source pollution typically first goes through a process of working with the landowner to correct the problems, with enforcement actions taken only where attempts to achieve compliance do not work. Virginia depends heavily on its localities for implementation and enforcement of urban runoff controls, such as erosion and sediment control during construction and other land-disturbing activities, as well as stormwater management of runoff from existing developments and urban areas. Combined with the fact that many areas in Virginia and in the James River watershed are undergoing heavy growth and development pressures, this means that erosion and sediment control and stormwater runoff continue to need attention under nonpoint source pollution management programs.

James River Watershed

Virginia has nine major river basins with an estimated 49,350 miles of rivers and streams and approximately 2,500 square miles of estuaries.[2] In general, fecal coliform bacteria exceedances are the leading cause of non or partial support of designated uses in rivers and streams. Agricultural practices appear to be one of the primary sources causing the loss of designated use support. Indications are present that agricultural and pasture land use results in much of the fecal coliform bacteria and nutrient contamination in Virginia's waters. However, urban runoff, as well as municipal and industrial discharges, are also significant contributing sources.

Forested land covers approximately 55.6% of Virginia's landscape.[3] More than 400,000 private forest landowners own 77% of the commercial timberland, while the forest industry owns 10% and the remaining 13% is owned by federal, state, and local government. The second most prevalent land use in Virginia is agriculture, covering 25.9% of the state's total land area. Cropland accounts for 2,903 square miles, about 7.1% of the state's total area, pasture and hay production accounts for 6,845.3 square miles or about 16.8% of the state's land.

The James River Basin occupies the central portion of Virginia and drains 10,102 square

miles or approximately 25% of the Commonwealth's total land area.[4] It is Virginia's largest river basin and is made up of the Upper, Middle, and Lower James River Subbasins and the Appomattox River Subbasin.[5] The James originates along the Virginia/West Virginia border in the Allegheny Mountains, flows in a southeasterly direction to Hampton Roads where it enters the Chesapeake Bay, a total of 450 miles. The James constitutes 10% of the waters flowing to the Chesapeake Bay. Most of the James is forested, with about 25% in cropland and 9% urban.[6] The population along the James River is primarily concentrated in two metropolitan areas: Tidewater and the Richmond Metropolitan area with approximately one million people each. Most of the extensive urban development and industrial activity is concentrated in this lower portion of the James watershed in Richmond, Petersburg, Hopewell, and Hampton Roads. Two smaller, but growing, population centers are the Lynchburg and Charlottesville areas, each with over 100,000 inhabitants. In total, nearly one-third of Virginia's population live in the James watershed and use its waters. The James is stressed by a combination of pollutants, including sediments, nutrients, toxics, and bacteria. The James River watershed is primarily impacted by agricultural and urban nonpoint source pollution.[7]

Enforceable Mechanisms

Of the Virginia nonpoint source enforceable mechanisms, the following were reviewed because of their relevance to the James River watershed.

! ***Water quality standards***. Under the Virginia Water Pollution Control Law, it is unlawful to discharge wastes or other deleterious substances into or adjacent to the waters or to alter their state without a permit. Enforcement is by special order and can include injunctive relief and civil penalties of up to $25,000 per day.[8] In practice, enforcement actions in response to water quality standard violations are not common. Silviculture and agriculture have developed their own enforcement mechanisms.

! ***Agricultural Stewardship Plans***. Virginia's Agricultural Stewardship Act establishes a complaint-driven enforcement mechanism applicable to agricultural nonpoint source pollution. If, after receiving a complaint, the Commissioner of Agriculture finds pollution or a threat of pollution, he can require that the landowner submit an agricultural stewardship plan to the local soil and water conservation district.[9] Failure to implement an agricultural stewardship plan subjects the landowner or operator to corrective action that sets out a timetable for implementation. The corrective action order can be enforced by injunction, by entry and abatement (with cost recovery), and by assessment of a civil penalty of up to $5,000 per day.[10] The Commissioner also can issue an emergency corrective action if runoff from an agricultural activity is causing or is likely to cause imminent or substantial danger to public health, animals, fish and aquatic life, public water supply, or agricultural, recreational or industrial uses. An emergency order may direct cessation of all or part of the agricultural activity and require specific stewardship measures.

! ***Confined animal feeding operations***. Since 1994, animal waste from confined animal operations in excess of 300 animal units (hogs and cattle) has been managed primarily through a Virginia general pollution abatement permit.[11] These operations are required to meet a number of conditions that will assist in reducing nutrients from liquid animal waste and preventing runoff and ground water contamination. These conditions include requirements for an approved nutrient management plan and standards for waste unit operations. In 1999, the Virginia General Assembly

passed legislation which requires DEQ to develop regulations for the management of poultry waste.[12] The statute requires that growers with more than 200 animal units of poultry (about 20,000 chickens) implement nutrient management plans which limit land application of manure to crop nutrient needs and crop nutrient uptake.

! ***Virginia Chesapeake Bay Preservation Act***. The Virginia General Assembly enacted the Chesapeake Bay Preservation Act in 1988, establishing a cooperative program between state and local governments to reduce nonpoint source pollution.[13] Under the Chesapeake Bay Preservation Act, localities designate and map Chesapeake Bay Preservation Areas, implement specific performance criteria, adopt or amend a comprehensive plan to enhance water quality, and adopt development standards, as necessary to preserve water quality. The localities of Tidewater Virginia must incorporate general water quality protection measures into their comprehensive plans, zoning ordinances, and subdivision ordinances.[14] Localities in the region must establish Chesapeake Bay Preservation Areas, identifying lands that if improperly developed may result in water quality damage. The regulations on land use standards are intended to prevent a net increase in nonpoint source pollution from new development, achieve a 10% reduction in nonpoint source pollution from redevelopment, and achieve a 40% reduction in nonpoint source pollution from agricultural and silvicultural uses.[15] State regulations set out general performance criteria to minimize erosion, reduce land application of nutrients and pesticides, and maximize rainwater infiltration for Chesapeak Bay areas. The criteria become mandatory on the local program adoption date and are enforceable by localities. The local program stormwater management water quality criteria required of local developers is consistent with the state Stormwater Management Program implemented by DCR.

! ***Forestry BMPs and water quality enforcement***. The Virginia Department of Forestry has a system of inspection and enforcement for all timber harvesting. When actual or threatened water quality violations occur, the Department has authority to recommend corrective action, issue orders, stop harvesting, or initiate civil penalties.[16] As long as best management practices are not in place, the Virginia State Forester may issue a special order to an operator conducting business in a way that is likely to cause or is causing water pollution.[17] The order can include a stop-work order and corrective actions that must be implemented within a specific timetable. The State Forester can also issue emergency orders if there is an imminent and substantial endangerment of public health or the health of animals or fish, or if commercial or recreational activities are endangered.

! ***Land disturbance permitting***. Virginia's Erosion and Sediment Control Law sets forth the regulation of land disturbing activities including clearing, grading, excavating, transporting, and filling of land.[18] The Law also sets forth the establishment of a state erosion and sediment control program (state program) and local erosion and sediment control programs (local programs). The state program is administered by the Department of Conservation and Recreation (DCR) under the authority of the Virginia Soil and Water Conservation Board. Counties, cities, and towns currently administer local programs. Local programs (totaling 166 separate programs throughout the Commonwealth) exercise program authority over private and municipal projects. The DCR exercises program authority over all state agency projects. The Virginia Soil and Water Conservation Board is responsible for periodically evaluating the effectiveness of local program implementation to ensure consistency with the state program. Persons undertaking land disturbing activities cannot receive a building or any other permit unless they have an approved erosion and sediment control plan and certification that the plan will be implemented. Plan approval is granted by local program authorities

or the Department of Conservation and Recreation as appropriate. The appropriate program or plan approving authority is required to conduct periodic inspections of projects in accordance with the regulations. When violations are found, the inspector notifies the owner about needed corrections and when they must be made. If violations are not corrected on time, the locality (or DCR if applicable) is responsible for enforcement. The program authority can serve notice on the violator specifying a timetable for meeting the requirements of the plan. Localities can establish civil penalty schedules for violations, issue stop-work orders, apply corrective actions, or revoke the permit. The Erosion and Sediment Control Law does not apply to specifically identified agricultural or silvicultural operations. It also does not apply to activities under 10,000 square feet, unless the locality chooses to lower this threshold. For example, Chesapeake Bay Preservation Act areas have a threshold of under 2,500 square feet. Program authorities have authority to grant a variance for specific activities from the requirements of the law.

! ***Stormwater Management***. The Virginia Department of Environmental Quality (DEQ), Department of Conservation and Recreation (DCR), and the Chesapeake Bay Local Assistance Department (CBLAD) are coordinating related yet separate state programs that regulate the management of pollution carried by stormwater runoff, including an urban and industrial stormwater permit program under the federal Clean Water Act. The Virginia Stormwater Management Act and regulations enable local governments to establish management plans and adopt ordinances that require control and treatment of stormwater runoff to prevent flooding and contamination of local waterways.[19] Local programs must meet or exceed the minimum standards contained in regulations. Under the act, state agencies must employ management practices whether or not the locality in which a state facility is to be located has a program.

Assistance-Oriented Nonpoint Source Programs

This section describes a number of the technical assistance, cost-share, and voluntary programs that address nonpoint source water pollution in the James River watershed. It is not an exhaustive list, but provides a brief description of programs that have influenced activities and water quality in the watershed.

! ***Virginia Agricultural BMP Cost-Share Program***. The cost-share program is administered by DCR to improve water quality in the Commonwealth's streams, rivers, and the Chesapeake Bay. The program is funded with state and federal monies through local Soil and Water Conservation Districts. SWCDs encourage farmers and landowners to use BMPs to better control sediment, nutrient loss, and runoff of pollutants into Virginia's waters from excessive surface flow, erosion, leaching, and inadequate animal waste management. The objective of the program is to solve water quality problems by fixing the worst problems first. Thus, program participants are recruited by the District based upon those factors which most influence their land use impact upon water quality. The individual cost-share limit for all BMPs is $50,000.

! ***Virginia Agricultural Best Management Practices Tax Credit Program***. For years, the Virginia SWCB has promoted BMPs. The legislature two years ago added a statewide income tax credit program. This program provides an incentive to install agricultural BMPs in accordance with an approved conservation plan. Its goal is to reduce the amount of nonpoint source pollution entering the state's streams, rivers, and estuaries. For all taxable years beginning on and

after January 2, 1998, any individual or corporation engaged in agricultural production for market who has in place a soil conservation plan approved by the local SWCD shall be allowed a credit against the tax imposed by Virginia Code section 58.1-320 of an amount equaling twenty-five percent of the first $70,000 expended for agricultural BMPs by the individual. Agricultural BMP means a practice approved by the SWCB which will provide a significant improvement to water quality in the state's streams and rivers and the Chesapeake Bay, and is consistent with other state and federal programs that address agricultural nonpoint source pollution management. Any practice approved by the local SWCD Board shall be completed within the taxable year in which the credit is claimed. The credit shall be allowed only for expenditures made by the taxpayer from funds of his own. The amount of the credit shall not exceed $17,500 or the total amount of the tax imposed, whichever is less, in the year the project was completed, as certified by the Board. If the amount of the credit exceeds the taxpayer's liability for the taxable year, the excess may be carried over for credit against income taxes in the next five taxable years until the total amount of the tax credit has been taken.

! ***Virginia Nutrient and Pesticide Application Equipment Tax Credit***. This tax credit program encourages the purchase of improved and more precise nutrient and pesticide application equipment. It is managed by DCR and the SWCDs and is applicable statewide. The Virginia Nutrient and Pesticide Application Equipment Tax may be claimed for the year of purchase for equipment meeting state approved specifications. A 25% Virginia income tax credit may be applied to qualifying purchases of up to $15,000 resulting in a maximum credit of $3,750. The credit balance may be carried forward up to five years into the future if the credit amount exceeds the farmer's tax liability for the year of the purchase. Persons or corporations must be engaged in agricultural production for market to be eligible for the credit. In addition, a nutrient management plan must be developed for the farm and approved by the SWCD by the required filing date of the tax return. A letter from the SWCD indicating plan approval must be sent in with the tax return. The nutrient management plan should incorporate the use of the new equipment and meet DCR criteria for nutrient management plans.

! ***Conservation Reserve Enhancement Program (CREP)***. CREP is Virginia's largest cost-share program. Beginning in 2000, its five year total will exceed $91 million with 30,500 acres of riparian buffers, 4,500 acres of wetlands restoration, and 8,000 acres of riparian easements anticipated statewide. The federally-funded CREP program supports annual rental payments, cost-share for BMPs, and the ability to add on riparian easements if desired. The program also offers a sign-up incentive payment and a practice incentive payment. The cost-share ranges from 75% to 100% for eligible BMPs and approximately 25% comes from local SWCD funds.

! ***Conservation Reserve Program (CRP)***. The CRP is primarily for environmentally sensitive lands and for highly erodible lands. Under the CRP, the USDA's Farm Service Agency tries to sign up highly valuable environmental acreage, establish long-term resource conserving covers on eligible land, and to reduce erosion, runoff, and leaching. It is applicable in all counties in Virginia. Offers from landowners to enroll lands, placing them under conservation easements for a period of years, are accepted provided the acreage and producer meet certain eligibility requirements, including suitability of the land for riparian buffers, filter strips, grassed waterways, shelterbelts, salt tolerant vegetation, or shallow water areas for wildlife.

! ***Environmental Quality Incentive Program (EQIP)***. EQIP is managed by the Natural Resources Conservation Service (NRCS) and is applicable statewide to address priority

concerns and in special targeted priority areas. The program was established under the 1996 Farm Bill to provide a single voluntary conservation program for farmers and landowners to address significant natural resource needs. Approximately 65% of the EQIP funding in Virginia is directed towards "priority areas." These areas are selected by the State Technical Committee based on proposals submitted by the locally led conservation work group. The remaining 35% of the funds are directed toward statewide priority concerns of environmental needs. EQIP offers 5-10 year contracts to landowners and farmers to provide cost-share assistance or incentive payments to implement conservation practices. Eligibility is limited to persons who are engaged in livestock or agricultural production. Eligible land includes cropland, pasture, and other agricultural land in priority areas or if the land has a need that matches one of the statewide concerns.

! ***Conservation Farm Option (CFO).*** The Conservation Farm Option provides landowners and farmers the option of consolidating the different types of payments available under the Conservation Reserve Program, the Wetlands Reserve Program, and the Environmental Quality Incentives Program into a single annual payment. CFO provides an incentive for coordinated, long-term natural resource planning and gives farmers additional flexibility. CFO is managed by the Farm Service Agency and only owners and producers that have a farm with contract acres enrolled in production flexibility contracts established under the Agricultural Market Transition Act (AMTA) are eligible to participate.

! ***Forestry Incentive Program (FIP)***. FIP is a reforestation program managed by the Natural Resources Conservation Service and the Virginia Department of Forestry. It is applicable statewide. FIP is a voluntary cooperative program with landowners to encourage the development, management, and protection of non-industrial, private forest lands in the state. The program provides cost-sharing assistance to landowners for site preparation and tree planting.

Discussion and Analysis

Tributary Strategies

In Virginia, various state agencies, such as DEQ, DCR, and the Chesapeake Bay Local Assistance Department (CBLAD), work together to develop tributary strategies for river basins, such as the James, to ensure that reductions of nutrients, toxics, and sediments, are sufficient to improve water quality and restore the living resources of the Chesapeake Bay and its tributaries.[20] The *Initial James River Basin Tributary Nutrient and Sediment Reduction Strategy* was completed in July 1998 through a cooperative process among state and local government, agriculture, business, industry, citizens and others. The *Tributary Strategy: Goals for Nutrient and Sediment Reduction in the James River* was sent out for public comment in January 2000.

In 2000, over $20 million was appropriated for the biennium to the Virginia Water Quality Improvement Fund, which by law receives a portion of any budget surplus.[21] The Water Quality Improvement Fund supports point and nonpoint source nutrient and sediment reduction through grants to local governments, farmers and others and is the cornerstone of Virginia's Chesapeake Bay Tributary Strategy Program. The fund also provides grants to areas outside of the Chesapeake Bay watershed. Nonpoint source grants are administered by DCR. Since 1997, approximately 113 million has been appropriated to the Water Quality Improvement Fund. Most of this funding has gone to

point sources. In theory, cost-share funding is available for nonpoint source control projects that have been identified in the Initial James River Basin Tributary Strategy, and for other, innovative or cost-effective practices that will help achieve the goals of the Strategy. In practice, access to this funding has been limited, but may increase in the James River Basin when the tributary strategy goals are finalized, although the sufficiency of the amount of available funds to meet the pollution reduction needs is in question.[22] Virginia also applies other funds from Clean Water Act Section 319, Virginia's Chesapeake Bay Implementation Grant Program, and Coastal Zone Management Act Section 6217.

Agricultural Pollution

The Virginia Department of Agriculture and Consumer Services (VDACS) works with farmers and local Soil and Water Conservation Districts to resolve water quality problems reported to VDACS concerning nutrients, sediment and toxins from agricultural activities. Incentives and cost-share programs are the main avenue for nonpoint source pollution management. Enforcement against agricultural nonpoint source pollution is bifurcated. The first prong is regulatory, such as permits for CAFOs. The second prong of Virginia's system addresses agricultural runoff and ground water pollution from CAFOs that are too small for the DEQ permit system, as well as runoff and ground water pollution from crop land and all other forms of agriculture. This second prong is complaint-driven and strives to achieve compliance before resorting to enforcement actions.

Incentive Programs – The primary vehicle for cost-share funding of point source and nonpoint source nutrient controls is the Virginia Water Quality Improvement Fund administered by DEQ and DCR. The Fund is managed as a grant fund for individual projects, identified through the River Basin Strategy. It is also managed as a fund for Soil and Water Conservation Districts to disburse through their normal process of agricultural best management practices and cost share programs.

Animal Feeding Operations – Currently, confined animal feeding operations (CAFOs) (except poultry operations) must obtain a permit. All permitted CAFOs are required to be designed and operated according to specific standards contained in the permit and are subject to inspection by DEQ. Violation of the permit requirements or failure to obtain a permit opens the owner or operator to enforcement by DEQ in the form of civil penalties, criminal charges, and/or injunctive or other equitable relief. Most of Virginia's regulated animal feeding operations are found outside of the James River watershed. However, DEQ has taken some enforcement actions based on violations of permits, primarily on dairy and hog farms. For example, in 1999, statewide, three enforcement actions were completed – one for a small dairy in Tidewater, one for a small dairy in West Central, and one for a larger hog farm. There have not yet been any enforcement actions again chicken farmers as the changes to the law are still too new.

Complaint-Driven Enforcement – Virginia's agricultural stewardship program gives the farmer an opportunity to correct a water quality problem voluntarily before any enforcement action is taken.[23] Under the program, VDACS receives complaints and contacts the local Soil and Water Conservation District for an initial investigation. After the complaint is investigated, VDACS reviews the findings and determines if the complaint is founded and requires further action under the Agricultural Stewardship Act. If so, the farmer is required to develop a plan to correct the problem

and then complete plan implementation within 18 months. The Agricultural Stewardship Act does not cover agricultural activities subject to water quality permits from the Department of Environmental Quality, forestry activities, or problems that do not involve agricultural products. Typical activities covered under the Act include nutrients from manure in feedlot runoff, sediment from erosion on crop fields, and toxins from pesticide runoff.

In practice, DEQ, in the course of its water quality monitoring or permit compliance inspections will identify potential water pollution problems under the Agricultural Stewardship Act and notify VDACS as a complainant. Since the complaint-driven process was established in April 1997, VDACS has received approximately 300 inquiries, 100 of which underwent the first step of the process to develop a corrective plan. Of those 100, in only one case was the plan not implemented within the 18 month time limit, causing VDACS to undertake an enforcement action which was still underway in May 2000. This enforcement case is in the James River Basin. In general, the enforcement process is triggered when there is a pollution problem and the landowner (1) does not develop a corrective plan; (2) plan is not being implemented 6 months later upon VDACS inspection; or (3) implementation of the plan is not completed within 18 months of plan approval.[24]

Forestry Water Quality Programs

Virginia has developed best management practices for water quality, such as streamside management zones, design guidance for roads, skid trails, and stream crossings, revegetation of bare soil areas, and wetlands protection.[25] Virginia complements its complaint-driven enforcement mechanism in forestry, with a system of Department of Forestry monitoring, inspection, and specific triggers for enforcement actions.

In order to ensure the monitoring and inspection, Virginia has developed a series of forms to facilitate enforcement of the Silvicultural Water Quality Law.[26] The harvest inspection form is for all private land harvesting operations and is usually filled out by the DOF inspector and then submitted to the Regional Office.[27] Department field personnel can inspect at any time, and in any case will inspect operations of landowners not meeting DOF requirements. If the harvesting inspection form shows that a violation of the Silvicultural Water Quality Law has taken place, the inspector must complete and issue a water quality law enforcement form.[28] In some cases, the inspection form may indicate a BMP deficiency problem that is not a water quality law violation. In these cases, the inspector will re-inspect the tract for BMP corrective action if requested by the owner/operator. Landowners who receive a law enforcement form are given specified periods of time for implementation of corrective measures in a “notice of required action.” These deadlines are mandatory. Ninety percent of problems are solved at the notice of required action stage. If the corrective action is not properly taken, the inspector prepares a law enforcement case summary and sets up an informal conference. DOF also can issue emergency special orders or stop-work orders if the silvicultural activity is causing an “imminent and substantial danger to the waters of the Commonwealth by introducing sediment deposition.” Landowners can request formal administrative hearings. After either the informal conference or the hearing, DOF issues a final order that can include civil penalties or civil charges. In determination of the civil penalty or charge amount, DOF considers the seriousness of the violation, the degree of negligence, the owner’s good faith, and any previous history of violation.

In practice, a weak link in the new enforcement procedures can be identifying logging jobs that do not self-report. The citizen organization Virginia Forest Watch has begun a new program in early 2000 to assist theVirginia Department of Forestry in identifying the location of logging jobs. Between February and April 2000, the watchdog program reported 30 jobs in 15 different counties across the state. According to Virginia Forest Watch, the first two jobs looked at by DOF resulted in the discovery of water quality violations and "notice of required action" was served on the loggers and the owners.

Land Development and Urban Runoff

Erosion and Sediment Control – DCR Soil and Water Division coordinates the erosion and sediment control program for the state. The Soil and Water Conservation Board has the authority to revoke a local program. However, in the case of revocation, the local Soil and Water Conservation District would be able to take over the program, and if they refuse to do so, the program then would fall under the jurisdiction of DCR**.** In practice, all localities in Virginia have retained control over their erosion and sediment control programs, knowing that lack of resources in the local Soil and Water Conservation Districts and in the DCR offices might cause their building permit fees to rise in order to provide the resources for running the program. However, program consistency with state law generally and in the James specifically is at approximately twenty-five percent. Erosion and sediment control has become a big problem for localities facing increased growth, although sedimentation remains a relatively small contribution to the James River overall.

Stormwater – Eight urban localities (Chesapeake, Norfolk, Newport News, Virginia Beach, Portsmouth, Chesterfield, and Henrico) in the James River basin and its adjacent Bay waters have been required to develop stormwater management programs under provisions of the federal Clean Water Act, administered by Virginia DEQ. Permits obtained by localities require them to implement and monitor programs that reduce the discharge of pollutants from municipal storm sewers to the maximum extent possible and to prohibit illicit discharges into stormwater systems. Other localities regulate stormwater runoff on a case-by-case basis through subdivision laws and other zoning regulations. Most stormwater enforcement actions are taken by localities administering the programs. DEQ has investigations underway, but no enforcement actions.

The Chesapeake Bay Preservation Act establishes requirements for stormwater management within Chesapeake Bay preservation areas in all Tidewater localities. Under this legislation, each local government enforces its own program, which has been patterned on a model developed by the Chesapeake Bay Local Assistance Board and Department. State resources for the implementation and enforcement of stormwater regulations are low, with only five stormwater engineers statewide who oversee state agency stormwater management practices as well as local stormwater management programs.

Conclusions

Virginia has a variety of nonpoint source control programs operating in the James River watershed, including cost-share, technical assistance, voluntary, and enforceable programs. The James River watershed reflects many of the trends and nonpoint source pollution programs found

throughout Virginia. The process of developing a tributary strategy for the James River has helped state and local government, as well as citizens and others identify priorities and set goals for reduction of nutrients and sediment from nonpoint source pollution. This process is helping the state government and local governments to determine priorities for technical assistance, cost-share funding, and enforcement actions.

The review shows that Virginia emphasizes best management practices for management of nonpoint source pollution from agricultural and forestry operations. The various regulatory agencies focus on bringing land owners into compliance, using enforcement actions as a final resort in cases of continued noncompliance. Coordination among agencies, such as VDACs and DEQ or DOF and DEQ, can facilitate identification of real and threatened harm to water quality in order to support compliance and enforcement actions. Compliance and enforcement for forestry operations is supplemented by a recently adopted monitoring and inspection process by DOF. The James River watershed experience shows both that local erosion and sedimentation control programs are very important to maintaining healthy rivers, and that a more resource-intensive mixture of technical assistance, training, priority-setting, and enforcement is needed to make the local and state programs in these areas more effective.

In general, the impression left by review of existing efforts is that the use of enforceable mechanisms has increased slightly over the past, although the primary nonpoint source control mechanisms are still technical assistance, cost-share, and voluntary programs. In most cases, regulatory programs seemed understaffed with few financial resources at their disposal. Nonpoint source controls have never been relatively well funded, although there was a significant level of funds this year for the first time. Historically nonpoint controls have been left to be accomplished voluntarily, with cost-share largely carrying out “demonstration” of practices, rather than broader-scale implementation.

Still, a significant level of agency interaction and cooperation in Virginia has enabled the Commonwealth to achieve certain improvements with the limited resources available. Voluntary conservation and stewardship have also played a role. The rapid pace of development, alongside continued agricultural and silvicultural activity, poses a challenge to state and local government agencies. These will require additional resources for strengthening implementation, compliance assurance, and enforcement in the future.

ENDNOTES

1. In addition to the sources cited, the following individuals were interviewed by telephone or in person: Jack Frye, Director Soil and Water Conservation Division, Virginia Department of Conservation and Recreation; Patti Jackson, James River Association; Kathleen O'Connell, Water Enforcement Program Manager, Department of Environmental Quality; Collin Powers, Virginia Chesapeake Bay Program, Department of Environmental Quality; and Sarah Pugh, Virginia Agriculture Commissioner's Office.
2. Virginia 305(b) Water Quality Assessment Report, Virginia Department of Environmental Quality, 1998.
3. Virginia 305(b) Water Quality Assessment Report, Virginia Department of Environmental Quality, 1998.
4. All or a portion of the following 39 counties and 14 cities lie within the basin: counties: Alleghany, Amherst, Bath, Nelson, Rockbridge, Augusta, Bedford, Botetourt, Campbell, Craig, Giles, Highland, Montgomery, Roanoke, Amelia, Buckingham, Chesterfield, Cumberland, Fluvanna, Goochland, Henrico, Powhatan, Albemarle, Appomattox, Prince Edward, Dinwiddie, Greene, Hanover, Louisa, Nottoway, Orange, Charles City, Isle of Wight, James City, Nansemond, New Kent, Prince George, Surry, and York; cities: Buena Vista, Clifton Forge, Covington, Lexington, Lynchburg, Charlottesville, Colonial Heights, Petersburg, Richmond, Hopewell, Norfolk, Newport News, Suffolk, and Williamsburg.
5. Major tributaries to the James River are Craig Creek, Maury River, Tye River, Rockfish River, Slate River, Rivanna River, Willis Creek, Appomattox River, Chickahominy River, Pagan River, Nansemond River, and the Elizabeth River.
6. *Initial James River Basin Tributary Nutrient and Sediment Reduction Strategy*, July 1, 1998, p. 24.
7. Virginia 303(d) TMDL Priority List, Virginia Department of Environmental Quality, 1996.
8. Water Pollution Control Law, Va. Code 62.1-44.5
9. Agricultural Stewardship Act, Va. Code 10.1-559.3
10. Agricultural Stewardship Act, Va. Code 10.1-559.5, 10.1-559.7
11. General Permits for Confined Animal Feeding Operations, Va. Code 62.1-44.17:1. Confined animal feeding operations that do not qualify for the general permits must obtain individual permits under either the Virginia Pollution Abatement (VPA) permit system or the Virginia Pollution Discharge Elimination System. See, Va. Code 62.1-44.5, 62.1-44.15.5, 62.1-44.17:1-1.
12. Poultry Waste Management, Va. Code 62.1-44.17:1.1
13. Chesapeake Bay Preservation Act, Va. Code 10.1-2100 *et seq*.
14. Chesapeake Bay Preservation Act, Va. Code 10.1-2100, 10.1-2109
15. Chesapeake Bay Program 9 VAC 10-20-110
16. Silvicultural Water Quality Law, Va. Code 10.1-1181
17. Silvicultural Water Quality Law, Va. Code 10.1-1181.2
18. Erosion and Sediment Control Act, Va. Code 10.1-560
19. Virginia Stormwater Management Regulations, 4 VAC 3-20
20. Virginia Chesapeake Bay Tributaries Strategies Law, Va. Code 2.1-51.12:1 *et seq*.
21. Chesapeake Bay Commission, *Legislative Update*, May 2000. See also, Chesapeake Bay Commission, *Annual Report 1999: Policy for the Bay*.
22. Demand for cost share funding currently exceeds the amount available, even in areas in which increased funds have been made available, and this demand is expected to increase.
23. Agricultural Stewardship Act, Va. Code 10.1-559.1

24. See amendments to the Agricultural Stewardship Act, HB 1307 Agricultural Stewardship Act, approved by Governor April 2000, effective July 1, 2000.
25. *Forestry Best Management Practices for Water Quality in Virginia: Technical Guide*, Virginia Department of Forestry, 1997.
26. Virginia Department of Forestry Harvest Procedures and Water Quality Law Enforcement Procedures, August 1998.
27. Harvest Inspection Form, Form 30.
28. Law Enforcement Form, Form 145.

Wisconsin Case Study

Summary

Unlike many other states, Wisconsin has for many years had a fully articulated program for nonpoint source water pollution control.[1] Thus, its enforceable mechanisms have long been linked with its cost share and technical assistance provisions. Wisconsin's nonpoint source pollution abatement program originated in 1978. Initially, the program administered grants to individual landowners and communities in both urban and rural watersheds to cover the cost of voluntary best management practices. To assist in targeting projects, as well as to meet federal and state requirements to identify waters in need of attention, the state developed a system known as the "priority watershed program." The Department of Natural Resources (DNR), with cooperation from the Department of Agriculture, Trade, and Consumer Protection (DATCP), ranked the watersheds. For each priority watershed, DNR, DATCP, and the local government developed a priority watershed plan to guide cost-share assistance and related activities. In 1993, the priority watershed program was amended to include a requirement that "critical sites" be identified in the planning process. A critical site is one that, due to the amount of pollution it generates and/or its location in the watershed, *must* be addressed in order for the plan to achieve its water quality objectives.

After nearly ten years of experience with the nonpoint source program, it became clear that enforceable mechanisms would be needed to assure the state's ability to assure the effectiveness of nonpoint source pollution controls. In 1987, DNR received authority to issue Nonpoint Source Abatement Orders. DNR can issue such orders whether or not the site is in a priority watershed, although more complex procedures apply when the site is agricultural.[2] Orders may be issued for all sources of nonpoint source pollution except animal waste, which has been regulated under a separate program since 1984. The "Notice of Discharge" system for animal waste nonpoint sources provides a way to obtain corrective action for these sites.[3]

In 1997, the Wisconsin legislature significantly changed the direction of the state's nonpoint source programs. Act 27 (the common name for the 1997 amendments) placed the priority watershed program, which is chiefly administered by DNR, into a long multi-year phase-out period. It also strengthened the role of DATCP in addressing agricultural nonpoint source pollution. The changes required the agencies to develop explicit performance standards for nonpoint sources. Further, Act 27 created new competitive funding programs available across the state rather than just in priority watersheds. In 1999, the legislature reinforced these changes by shifting more funding to DATCP to support agricultural nonpoint source control staff and cost share activities in all 72 of Wisconsin's counties.

Wisconsin's counties, and to some extent towns and cities, play a substantial role in the state's nonpoint programs. Funding and cost share assistance are provided by the state through the county Land Conservation Commissions (LCCs). Counties also adopt and administer land

and water resource management plans and enforceable ordinances which may address erosion, shoreline protection, animal waste and manure management, land use, and pollutant management practices.

Wisconsin's comprehensive nonpoint efforts reflect objectives of setting state standards and state priorities, while providing for local control and flexibility. The programs reflect as well the continued legislative experimentation with the role of DNR (which largely administers Chapter 281 of the Wisconsin Statutes) and DATCP (which administers Chapter 92). The legislature adjusts their relationship *each biennium* through budget legislation, which often includes substantive amendments. The recent changes reflect the legislature's judgment that more funding and attention should go to nonpriority counties and watersheds.

Watersheds

This study examines the use of state and local nonpoint source programs and authorities in watersheds in two parts of Wisconsin: La Crosse County (along the Mississippi River in western Wisconsin) and Brown County (in the Green Bay area in northeastern Wisconsin).

Both counties have developed local ordinances for the control of nonpoint source pollution, and both have been funded for priority watershed projects in the past. The watersheds – which have substantial agriculture and development activity – are described in greater detail in the "Discussion and Analysis" section.

Enforceable Mechanisms Studied

This study examines the following enforceable mechanisms:

! ***DNR Nonpoint Source Abatement Order***. These orders apply to all types of nonpoint source pollution except animal waste pollution, and may be issued by DNR if pollution is determined to be "significant." Significant nonpoint source pollution is defined as causing violation of a water quality standard, significantly impairing aquatic habitat or organisms, restricting navigation, deleterious to human health, or otherwise significantly impairing water quality.[4]

! ***Animal Waste Notice of Discharge.*** A complaint-driven process can result in a DNR determination that an animal waste pollution discharge is significant. If so, DNR issues a Notice of Discharge (NOD) which requires correction of the problem. If the NOD does not result in compliance, the DNR requires the operator to obtain a state NPDES permit which specifies all of the requirements to abate the discharge and come into compliance.[5]

! ***Local Ordinances***. Wisconsin law provides for many kinds of enforceable local ordinances that may be directed at nonpoint source water pollution. These include soil and water conservation and nonpoint source pollution abatement ordinances; shoreland ordinances; livestock operation and manure management ordinances; and zoning ordinances that address contruction erosion and stormwater runoff.[6]

Nonpoint Source Programs, Cost-Shares, Standards, and Enforcement

Responsible Agencies

Operating under Title 281, DNR's Bureau of Watershed Management has primary responsibility for administering Wisconsin's nonpoint source program, for standard setting, and for grant funding, particularly in priority watersheds.[7] DNR also has abatement order authority. DNR must consult with DATCP on elements of the nonpoint program that relate to agricultural standards and agricultural watersheds.

For its part, operating under Title 92, DATCP sets soil and water conservation policies and administers agricultural grant and planning programs.[8] The legislature recently gave DATCP greater responsibility for standard setting, and for local staffing and cost shares in addressing nonpoint source problems. DATCP interacts with county land conservation committees (LCCs), which are created by Wisconsin's county boards.[9]

The appointed Land and Water Conservation Board (Board) oversees both DNR's nonpoint source program and DATCP's soil and water conservation program, reviewing administrative rules and plans. The Board also approves the list of priority watersheds, which until recently served as the core of the Wisconsin nonpoint program.

Local government units, including cities, counties, villages, towns, metropolitan sewerage districts, town sanitary districts, public inland lake protection and rehabilitation districts, regional planning commissions, or drainage districts, also play a role in nonpoint source controls.[10] County and municipal governments are authorized to enact ordinances to address nonpoint source pollution, including the prohibition of land uses or management practices that cause erosion, sedimentation, nonpoint source water pollution, or storm water runoff.[11]

Priority Watershed Program

The priority watershed program has for two decades been the state's primary vehicle for targeting its cost sharing grants. The process of identifying priority watersheds was linked to Wisconsin's original areawide water quality management planning process.[12] DNR set water quality objectives for each priority watershed and established a committee (including farmers, public inland lake protection and rehabilitation districts, riparian landowners) for each watershed to advise DNR and DATCP.[13] DNR, in consultation with DATCP and the appropriate local

governmental unit, prepared the proposed priority watershed plan.[14] During the planning process, DNR:

- Conducted a water resource assessment
- Set water quality goals
- Analyzed alternative management practices
- Incorporated best management practices (BMPs) into the plan
- Determined whether a city, town, village or county must develop construction site erosion control ordinances or manure storage ordinances[15]

The implementation plan[16] prepared by the local government must contain:

- A list of BMPs that are most critical to achieving water quality objectives
- Designations of critical sites
- Priorities for implementation
- Requirement to review plan periodically
- Provisions for public notice and education[17]

Following two public meetings to receive comments, the county could approve, conditionally approve, or reject the priority watershed plan. Once the plan received county approval, its subsequent approval by the Board and by DNR would render the project eligible for funding.[18] DNR was required to provide cost share grants to governmental units and landowners for cost-effective best management practices.[19] The local government unit specified in its application for funding the percentage of the implementation costs that the grant would cover, but the grant could not exceed 70 percent of the cost of implementing the BMPs.[20]

Cost sharing grants could also be issued to governmental units or individual landowners in non-priority watersheds if projects were in conformance with areawide water quality management plans, but at least 70 percent of cost-sharing grants annually were required to be used in priority watersheds.[21]

The priority watershed program was amended in 1993 to include a requirement that "critical sites" be identified in the watershed planning process. A critical site is one that, due to the amount of pollution it generates and/or its location in the watershed, *must* participate and be addressed in order for the plan to achieve its water quality objectives. DNR was required to notify the owner or operator of a designation.[22] The owner or operator could request a review of the designation by the county land conservation committee and further appeal to the Board.[23] The owner or operator of a critical site must apply best management practices.[24] However, once the owner or operator has installed BMPs as provided in the plan, the site is no longer considered a critical site.[25]

The priority watershed program underwent significant changes beginning in 1997. There had been 60 priority watersheds designated – mostly in the southern and eastern part of the state. Legislative concern arose over the treatment of the northern counties. Accordingly, Act 27 required the Land and Water Resource Board to determine by mid-1998 whether or not to continue *existing* priority watershed projects, assuming no increases in the funding available to the program. Act 27 further provided that there would be *no new priority watersheds* designated after that time. DNR was required to submit to the Board a list of watersheds ranked on the basis of impairment (based on the

state's § 303(d) list prepared under the federal Clean Water Act).[26] The Board was then to decide on whether to approve continuation of the existing priority watersheds based on the list and DNR and DATCP recommendations.[27] In 1998, the Board voted to approve continuation of *all* of the existing priority watersheds. The continued priority watershed projects will remain a substantial part of the state's program for many years, as the phase-out is expected to run through 2008.

Base-Level County Planning and Funding

Chapter 92 was amended in 1997 and in 1999 to redirect a significant portion of the state's nonpoint efforts. The new focus is on providing a base level of staff and funding for *all* counties, rather than only priority watersheds.

Under an older provision of Chapter 92, DATCP was required to identify priority soil erosion control counties.[28] Under that program, which was never large, a county LCC was to prepare a county land and water resource management plan which specified maximum acceptable rates of soil erosion, identified specific land parcels exceeding acceptable erosion rates and management practices that would bring these lands into compliance, and identified other nonpoint source pollution.[29] This plan was then to be reviewed by the DATCP and Board, and cost share money was to be provided to deal with problems.

Under the 1997 legislation, the priority soil erosion county designation was abolished. Now *every county* is to prepare a land and water resources management plan. The plan must be a multi-year action plan of three to five years, not focused only on soil erosion, but also on meeting water quality objectives through control of nonpoint sources. Counties are encouraged to incorporate the use of local ordinances to achieve their water quality objectives. Under 1999 legislation, each county will be provided with funding to plan for and begin implementing the nonpoint source performance standards discussed below.[30]

DATCP has been given a goal to provide each of the state's 72 counties with an average of $100,000 for cost shares ($7.2 million). It will also provide funding for 3 staff persons for each county (cost shared at 100 percent, 70 percent, and 50 percent), another $7.1 million.[31] About $6 million in base budget funding was transferred from DNR to DATCP for the program.

Competitive Grant Programs

Act 27 also established a new $2 million competitive grant program under which any county or local government or local lake association could apply to DNR for nonpoint source grants. This was intended to help overcome a perceived imbalance that urban watersheds were only receiving 25 percent of priority watershed monies. DNR was required to develop a scoring system for the new money, including 1) the extent to which BMPs will be used in the project; 2) the level of impairment of the water (§303d list); 3) the extent to which the project will result in the attainment of water quality objectives; 4) local interest in the project; 5) the inclusion of a means to measure the results of the project; and 6) the extent to which the project proposes to use federal funding. DNR, with DATCP consultation, scores each project and the Board selects projects for funding by November 1.[32]

In 1999, the legislature authorized a further targeted competitive program. It allows anyone, including non-profit groups, to apply to DNR for funding for nonpoint source projects for up to four years. This funding may address anything from watershed scale to subwatersheds to site-specific actions. The program is starting with $1 million. DNR anticipates a substantial increase to this program in the future.

In 1999 the legislature also established a new urban competitive nonpoint source program administered by DNR. The program will have $19 million available in grants. Additional bond funding has been made available for nonpoint source controls, including urban and stormwater controls.

Other Funding

Wisconsin's priority watershed program has been used to target US EPA § 319 funds. Rather than projects applying separately for 319 grants as in most other states, Wisconsin has used 319 funding to augment the state's own funding for priority watersheds. Wisconsin received $2.583 million in 1999 and has been allocated $5.166 million for 2000.

USDA's Environmental Quality Improvement Program (EQIP) has been active in Wisconsin since 1997. The Natural Resources Conservation Service (NRCS) office in Wisconsin establishes EQIP priority watersheds. These are not limited to state priority watersheds. However, incorporating the availability of other sources of funding in the NRCS ranking system gave DNR priority watersheds an advantage in obtaining EQIP funds. The program received $3.2 million in funding in 1998 and again in 1999, of which $2.8 million was reserved for EQIP priority watersheds. Wisconsin's EQIP program also focuses on educational programs. NRCS has received $800,000 during the past three years to implement educational programs. Any local organization can apply for this funding as long as the educational efforts will be directed towards producers.

Standard Setting

Act 27 introduced formal standard setting requirements to the state's nonpoint source programs.

Act 27 requires DNR to prescribe, by rule, performance standards for *non-agricultural nonpoint sources*. The performance standards must be designed to achieve water quality standards.[33] DNR must also, by rule, specify a process for developing and disseminating technical specifications to implement these performance standards.[34]

For *agricultural nonpoint sources*, DNR, in consultation with DATCP, must promulgate rules prescribing performance standards and prohibitions to achieve water quality standards. For its part, DATCP must, in consultation with DNR, promulgate rules prescribing conservation practices to implement the performance standards and prohibitions. DATCP must also identify, by rule, the *process* by which agricultural technical standards are to be developed and disseminated,[35]and develop and disseminate technical standards to implement the performance standards.[36] The agricultural performance standards must at a minimum require livestock operations to 1) have no overflow of

manure storage structures; 2) have no unconfined manure pile in a water quality management area; 3) allow no direct runoff from a feedlot or stored manure into water; and 4) prevent unlimited access by livestock to water in a location where high concentrations of animal cause stream bank erosion.[37] The conservation practices and technical standards must at a minimum address animal waste management, nutrients applied to soil, and cropland sediment delivery.[38]

The performance standards and technical specifications rulemakings are scheduled to be completed in 2000.[39] The standard-setting processes relate not only to cost-share requirements, but also to the enforceable mechanisms used in Wisconsin. County-based land and water resources management plans will be required, at a minimum, to address the statewide performance standards and prohibitions. The DNR and DATCP are pursuing an approach that would set statewide performance standards and prohibitions, but that would also provide for targeted performance standards that may be established by DNR or local governments in particular watersheds where statewide performance standards are not adequate to meet water quality goals. Statewide standards would apply to cropland soil erosion, soil loss from riparian fields, manure storage and management, nutrient management, standards for new development and redevelopment during construction activities, and for management of stormwater after construction, and for management of pollution from previously developed urban areas.

Forestry standards are not currently under development as existing forestry BMPs are fairly recent in Wisconsin and hence will be given an opportunity for experience to be gained using them.

DNR Abatement Orders

DNR has authority to issue abatement orders for both agricultural and non-agricultural nonpoint sources of pollution determined to be "significant." Significance includes "pollution which causes the violation of a water quality standard, pollution which significantly impairs aquatic habitat or organisms, pollution which restricts navigation due to sedimentation, pollution which is deleterious to human health or pollution which otherwise significantly impairs water quality."[40] While the abatement order authority operates in both priority and non-priority watersheds, DNR can issue orders for abatement of *agricultural* nonpoint source pollution in priority watersheds *only* if the site has been designated a critical site.[41]

The process begins when DNR sends a written a notice of intent to issue the order to the person responsible for the source of pollution. The notice of intent describes DNR's findings and provides the individual at least one year to abate the pollution or implement the required BMPs, unless the pollution is causing severe water quality degradation, in which case a temporary emergency order (described below) may be issued.[42] If an order is issued and compliance still does not occur, civil forfeitures of up to $5,000 per day are authorized; the state may recover its cosets of investigation and attorney's fees. In addition the DNR may take the action itself and recover the costs incurred.[43]

Agricultural sources are subject to additional procedures. DNR must send the notice of intent to the LCC and DATCP.[44] DATCP must provide the person responsible for the pollution a list of management practices that would reduce pollution to a level acceptable to DNR, as well as a list of sources of financial and technical assistance available from DATCP and other sources.[45]

DATCP must issue a report to DNR within one year after the date of the notice describing the actions taken by the person and providing a recommendation as to whether DNR should issue an order. DNR may not issue an order until it receives DATCP's report.[46]

If the notice of intent involves agricultural pollution in a priority watershed, the LCC may within 60 days of the notice disapprove issuance of an order. DNR can request the Board to review an LCC disapproval decision.[47] If the LCC approves the proposed order, the owner may obtain a review of the proposed order by filing a written request with the Board.[48]

DNR is prohibited from requiring any agricultural facility or practice that was in existence prior to October 14, 1997, to comply with newly prescribed performance standards, prohibitions, conservation practices or technical standards unless cost-share funding is made available.[49]

Despite the one year minimum abatement period, and the special review requirements applicable to agricultural sources, DNR may issue a temporary emergency order before issuing a notice of intent if the pollution is causing or will cause severe water quality degradation and the required abatement action does not involve a capital expense. If the source is agricultural, DNR must provide a copy of the order to DATCP and the appropriate LCCs. As soon as practicable after a temporary order has been issued, DNR must either issue a written notice of intent to issue a regular abatement order or rescind the temporary order.[50]

DNR's abatement order authority has seldom been invoked. Rather it has served chiefly as a back stop to cost share and technical assistance approaches. DNR has used its abatement order authority at least 10 to15 times.

Animal Waste Notices of Discharge

DNR does not have authority to issue nonpoint source abatement orders for pollution caused by animal waste. But it has a complaint-driven process available under its animal waste management regulations (NR 243) to address complaints.[51] If investigation of a complaint reveals that an animal waste pollution discharge is significant, the DNR issues a Notice of Discharge (NOD), which requires correction of pollution. The NOD identifies the problem and potential solutions and identifies cost share and technical assistance sources; it allows a minimum of 60 days and a maximum of two years to remedy the problem. The designated county agency (land conservation commissions) may seek to review the proposed corrective action plan. Issuance of the NOD expressly makes the operator eligible for DATCP cost-share funding during the time that the NOD is in force. If the operator does not remedy the problem, then DNR requires the operator to obtain a state NPDES permit which specifies all of the requirements to abate the discharge and bring the facility into compliance.[52] Accepted animal waste management practices must be used in implementing corrective measures needed for runoff control, storage, or disposal of animal wastes.[53] However, the DNR may not require an animal feeding operation in existence prior to October 14, 1997 to comply with newly prescribed performance standards, prohibitions, conservation practices or technical standards unless cost-sharing is available.[54] If the operator ignores the NOD and also fails to obtain an NPDES permit, the whole range of judicial enforcement tools comes into effect (including civil forfeitures of up to $10,000 per day).[55] Statewide, DNR has issued NODs to about 550 AFOs during the course of the program. Recently, the NOD program at the state level has changed from a reactive

program to a targeted program, focusing on complaints arising in outstanding resource waters, exceptional value resource waters, 303 (d) waters, or source water protection. DATCP currently plays a role in administering cost shares for AFOs; it maintains a database of NOD recipients, updated quarterly. In the future, it appears that DNR will be responsible for handling these cost shares (or arranging them with federal agricultural agencies).

Local Ordinances

Wisconsin law authorizes numerous kinds of enforceable local ordinances that may be directed at nonpoint source water pollution.

Under Chapter 92, a county, city, village or town has explicit authority to enact ordinances for soil and water conservation or nonpoint source pollution abatement. Such ordinances may regulate "land use, land management, and pollutant management practices."[56] The ordinance may be made applicable throughout a county or to any part of it, including both incorporated and unincorporated areas. However, the ordinance must be adopted by the county board and by *referendum* of the voters in the area covered by the ordinance. Enforcement of an ordinance adopted under Chapter 92 requires an LCC to make a reasonable effort to contact a landowner and to provide a plan and identify any cost-shares that are available, at least one year before taking any enforcement action. Enforcement includes civil forfeitures (penalties) and injunctions.

Counties, cities, villages, and towns also have authority to adopt certain other ordinances *without* referendum. These include enforceable shoreland ordinances,[57] livestock operation and manure management ordinances,[58] and zoning ordinances that address construction erosion and stormwater runoff.[59] Each of these is enforceable by the local jurisdiction through civil forfeitures (penalties) and injunctions. For example, local governments may enact ordinances requiring manure storage facilities constructed after July 2, 1983 to meet local standards.[60] Likewise, livestock operations that do not meet the new nonpoint performance standards established under Act 27 may be regulated by local ordinance if necessary to achieve water quality standards, provided that cost sharing is made available if the operation was initiated prior to October 14, 1997.[61] Shoreland management ordinances adopted under these provisions may be enforced only if cost share funding is made available.[62]

Local zoning ordinances may also help protect lands under, abutting or lying close to navigable waters. The purposes of such ordinances are to "further the maintenance of safe and healthful conditions; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structure and land uses...."[63] The DNR is responsible for providing general recommended standards and criteria for navigable water protection regulations and their administration, and for authorizing such regulations.

Wisconsin counties are *required* to adopt zoning and subdivision regulations for the protection of shorelands in unincorporated areas.[64] State regulations require that these county shoreland ordinances include, at a minimum, zoning regulations for shoreland-wetland zoning districts.[65] The ordinances must "provide sufficient control of the use of shorelands to afford the protection of water quality...."[66] The regulations further specify minimum components, including building setbacks that "conform to health, safety and welfare requirements, preserve natural beauty,

reduce flood hazards and avoid water pollution."[67] The regulations also require limits on alterations to existing nonconforming structures.[68] Exemptions from local shoreland zoning ordinances are provided for state highway and bridge work and for farm drainage ditches in certain circumstances.[69] Where a county has not adopted an ordinance that meets the "reasonable minimum standards," the DNR is to adopt an ordinance to be administered by the county.[70]

State law also requires municipalities (cities and villages) to adopt shoreland zoning ordinances to protect wetlands.[71] State regulations establish minimum standards for the municipal ordinances. If a municipality fails to establish an ordinance that meets "reasonable minimum standards," the DNR is to adopt an ordinance for the municipality.[72] Enforcement mechanisms are specified in the local ordinance. In addition, the DNR may initiate enforcement through fines (not more than $50 per day) and injunctions if it determines that the city or village fails to keep its ordinance “current, effective and enforceable.” [73]

State law provides that county ordinances in general "shall be enforced by appropriate fines and penalties," and may be enforced by injunction in a suit by the local government or local affected property owners.[74] State law also provides that violations of city zoning ordinances are punishable by fine and by imprisonment for failure to pay such fine, and that violators are subject to suit by local government or affected property owners to prevent or correct the unlawful practice.[75]

Wisconsin law authorizes municipal and county construction site erosion control ordinances "for the efficient use, conservation, development and protection of this state's groundwater [and] surface water," for the prevention and control of water pollution, and for the control of building sites and placement of structures and land uses.[76] Indeed, under the priority watershed program, DNR was authorized to determine that a county, city, village or town was required, as a condition of a grant, to develop a construction site erosion control ordinance in order to meet the water quality objectives.[77]

DNR must establish the minimum standards for local ordinances covering erosion from site activities other than construction of a building.[78] The minimum standards must require regulation of site erosion where the activity involves grading or other land disturbance of 4,000 square feet or more; moving 400 cubic yards or more of material by excavation or filling; constructing a street, highway, or bridge; pipeline construction exceeding 300 feet; or an activity requiring a subdivision plat approval or certified survey.[79] DNR’s minimum standards for storm water management must also regulate any residential development larger than five acres (or larger than 3 acres with 1.5 acres of impervious surfaces) or any non-residential development larger than 3 acres.[80] The DNR must consult with the Department of Transportation in developing minimum erosion control and stormwater management standards for street, highway, road or bridge construction.[81] Site erosion control ordinances must require consistency with the Wisconsin Construction Site Best Management Practice Handbook.[82] The Wisconsin Department of Industry, Labor, and Human Relations (DILHR) has developed standards for erosion control related to building construction – for one and two family dwellings and commercial construction projects.[83] Certified local building inspectors or county inspectors enforce these building construction erosion control requirements.

Discussion and Analysis

Wisconsin's many nonpoint source program mechanisms can be observed in operation by examining watershed experiences in western (La Crosse County) and eastern (Brown County) parts of the state.

La Crosse County Nonpoint Source Controls

La Crosse County, with a population of about 90,000, contains portions of three river basins: the Black in the northern part of the county, the La Crosse in the center, and the Bad Axe in the south, all flowing westward to the Mississippi. There are two lakes in the county: Lake Onalaska (5,400 acres of flowage) created by Corps of Engineers dams on the Black and Mississippi Rivers, and Lake Neshonoc (600 acres) created by a dam on the La Crosse River. The county has 274 miles of streams and 730 surface acres of lakes excluding Onalaska. Water sampling in 1998 showed that 84 percent of the county's streams do not meet standards for whole body contact recreation.[84] The county is urbanizing although it still has significant crop and livestock operations. Nonpoint source water quality impairments are attributed to cropland soil erosion, sedimentation from urban development, pesticide and fertilizer runoff, and animal waste runoff. The county's topography has caused runoff problems, as it is a flat plain dissected by streams and gullies, which often have steep slopes. Residential construction is occurring on some of these steeper lands. La Crosse County has a five member LCC, and the county's department of land conservation (DLC) has a six member staff.

Priority Watershed Program

The Lower Black River watershed (one of the three primary watersheds in the county) was selected as a priority watershed project in the early 1980s, and received funding for roughly ten years. At the time that this watershed was chosen for the program, much of the planning responsibility was centralized in DNR. The county's Department of Land Conservation (DLC) provided information on the watershed and DNR developed a fairly generic plan for the county using boilerplate formatting. DNR has greatly increased the county role in recent years of the project, although developing the plan now takes more time. The priority watershed program built staff capacity in the DLC, and the staff hired during the project continue to work in the department.

In its priority watershed effort, La Crosse County focused on implementing streambank corridor practices to prevent soil erosion, on feedlot improvement, and on contour strip cropping. The county had no baseline data, so no numerical phosphorous reduction goal was established and evaluation of the project's success was done on a site-by-site basis. The project also had very little water quality testing or monitoring, although DNR used some bio-monitoring data to conclude that the project had positive results. Lack of baseline water quality data and monitoring results proved problematic for the DLC, which now has instituted an aggressive monitoring program to assess the success of its own recent water quality programs and local ordinances.

Other Watershed Planning

La Crosse County's original cropland erosion control plan was adopted in 1988 in accordance with chapter 92. Approximately 94 percent of the county's identified cropland is under some kind of plan. The county plan established soil loss goals and identified needs for conservation practices as well as for cost-shares and technical assistance. The county attributes not attaining these goals to lack

of adequate state funding (particularly base level funding). County officials hope that the additional base level funding provided under the state's revised nonpoint program will make achievement possible.

La Crosse County's new Land and Water Resource Management Plan (required per Act 27) was adopted by the county and approved by DATCP in 1999.[85] It includes identification of data needs, the status of water pollution and erosion issues in the county, a work plan for achieving performance standards, and revenue sources. The plan gives detailed descriptions of how the county ordinances described below (and other programs) are designed to operate; and it identifies watershed objectives. In the state review process the DNR called it "one of the best...plans we have had an opportunity to review," while DATCP in its approval memorandum called it an "excellent plan."[86]

Erosion Control Ordinance

La Crosse County adopted a land disturbance erosion control ordinance in 1992. The county used authority provided by the state's general zoning law in order to avoid the referendum that would have been required had it adopted such an ordinance under chapter 92.[87] The erosion control ordinance applies only in unincorporated areas of the county. It regulates land disturbances of 4,000 sq. feet or greater on slopes less than 20 percent, and disturbances of 2,000 sq. feet or greater on 20-30 percent slopes. The ordinance prohibits development on slopes greater than 30 percent. The ordinance also covers logging road installation, and tracks timber cutting notices filed by landowners. In addition to these sites, the ordinance has a catch-all provision that allows the county to regulate other sites that are causing severe erosion (even if a structure has already been completed).[88]

The ordinance requires submission of a detailed erosion and sedimentation control plan and schedules to the LCC for approval. The county Department of Land Conservation (DLC) issues the erosion control permit. There are three categories of permit. These depend on the slope of the site and the location of the site in relation to the shoreline. The amount of information required and the permit fee increases for each category. It usually takes the county three days to process the information and issue the permit. Data from 1992 to 1998 show that each year between 123-197 permits were granted for activities on 0-12 percent slopes, 17-34 permits on 13-20 percent slopes, and 7-20 permits on 21-30 percent slopes. Logging road permits ranged from 16-32 per year.[89] Enforcement is with stop work orders, permit revocations, forfeitures of $50-500 per offense/day plus costs of prosecution, or injunction.

The county has experienced some difficulty with its ordinance because in 1994 the state adopted a provision in the Uniform Dwelling Code (UDC) prescribing erosion controls for construction of 1 and 2 family homes.[90] The state standards are arguably less stringent than those in the county erosion ordinance. The UDC provisions have been interpreted to allow enforcement only where sediment is actually leaving the site. In contrast, the county erosion control ordinance requires that the erosion control plan be implemented as specified regardless of any offsite impacts.

Eventually the county agreed to apply the state standards for residential construction, and became the enforcer of the state UDC through memoranda of understanding with 10 of the 12 townships. But the grading of sites and roads, and development-wide activities are regulated under the stricter county standards. Once construction of the residence is to begin, the state standards apply. Under the UDC, the county issues a notice of non-compliance. The operator has 72 hours to

respond to the notice and fix the problem. If the problem is not repaired the county will issue a stop work order. Although the county can use the courts, it prefers not to because of concern about possible delays, and concern that sediment or erosion violations may not result in a substantial sanction. The county process for enforcement of the county ordinance is similar.

Animal Waste Management Ordinance

La Crosse County's animal waste management ordinance was adopted in December 1998 to implement the animal waste performance standards under Act 27.[91] It requires permits for new manure management impoundments and feedlots. Preexisting feedlots are exempt from enforcement and permit requirements unless a site evaluation has been completed and cost-share funding is provided.

Manure management plans are required for unconfined manure stacks within 1,000 feet of a lake or 300 feet of a stream ("water quality management areas"). Also the ordinance prohibits direct runoff from feedlots (defined as discharging 5 lbs. or greater total phosphorous) and from "mismanaged pastures" within the water quality management area. Mismanaged pastures are defined as areas where confinement of livestock for feeding, browsing, or loafing prevents the adequate maintenance of sod cover, causing bank erosion.

Manure management plans are required for any farmer who receives cost shares, and for any operation constructing a new manure storage pit. The county allows certified private planners to develop manure management plans, but prefers to have farmers develop their own plans in group sessions that DLC conducts. In order to construct a new manure storage pit, a farmer must provide the county with a construction plan developed by a professional engineer and pay a $50 fee. The county does not inspect these sites to ensure that they are constructed as planned; the ordinance gives the professional engineer this responsibility.

Direct runoff from feedlots is prohibited by both the county ordinance and by Chapter 281. The county ordinance defines direct runoff as runoff containing more than 5 lbs of phosphorous per year. The phosphorous load is determined using NRCS's BARNY model, which accounts for the amount and type of livestock, slope of the site, the water at the site, and vegetation. The county has been in conflict with some state officials over the definition of direct runoff. While the state has generally preferred a definition based on the number of animal units, the county believes that such a cutoff point would not be effective in addressing problems caused by small but concentrated dairy operations in the county (many of which, even though including fewer than 100 cattle, cause problems because of the steep topography near the waterways).

The county is working to achieve voluntary compliance, and is offering 100 percent cost share for measures that achieve the county's standards. Cost share funding may be obtained from DATCP, from DNR, or from the county's own "environmental fund." The environmental fund, established in 1998, provides county funding for low-cost practices that have high water quality benefits, such as grass filter areas.[92] Feedlot owners voluntarily seeking assistance will receive first priority for cost shares; the next priority will be volunteers responding to county action in county-targeted watersheds. The county will not seek to provide cost shares for manure storage pits, nor for practices associated with the expansion or the establishment of a new feedlot. The DLC believes that expansion of a business inherently includes costs for protection of the environment, and that the public should not bear those costs.

The county intends to focus its cost shares on existing facilities, as it cannot enforce the new standards against an existing facility (constructed before 1997) unless it can provide cost share assistance. Enforcement has not yet occurred under the ordinance, but when the county begins to enforce the law, it intends to proceed by watersheds on a priority basis. Enforcement will begin with notices of noncompliance setting a timetable for compliance. Stop work orders are authorized if a notice of noncompliance has expired and the severity of the runoff is such that a stop work order is deemed to be warranted. Violations of orders are subject to injunction, and to a civil forfeiture of $50 to $500 per day of offense plus costs of prosecution.

State Enforcement

In La Crosse County, the relevant enforcement authority is ordinarily the county DLC. In part this is because DNR enforcement staff are spread thinly. For instance, one DNR enforcement staff person is assigned to deal with animal waste complaints in more than ten counties in the area. The DLC also has concern with the speed of state response to complaints referred by the DLC. Officials note that the response is slowed by the process and the number of agencies involved. For instance, one case investigated by DNR as a result of a complaint referred by the DLC has taken several years to resolve, in part because of the division of functions – DNR information gathering

and enforcement, DATCP technical remedy design, and county distribution of cost share funding.

DNR has apparently not used its nonpoint source abatement order authority in La Crosse County. DLC reports one instance in which the county requested that DNR issue an abatement order. In this case, a large quantity of sediment ran from a quarry into a trout stream, covering the streambed with clay. DNR declined to issue an order, expressing concern that an abatement order would not be upheld in court because DNR might have to demonstrate that the discharge was intentional. The county anticipates using its erosion and sediment control ordinance in the future in such cases where necessary.

Brown County Nonpoint Source Controls

Brown County lies within the Fox-Wolf Basin, which drains 6400 square miles, discharging into Lake Michigan at Green Bay. This is the second largest tributary contributor of sediment to lake Michigan, as well as the largest contributor of phosphorous. Nonpoint discharges from agricultural land are the primary sources of the sediment and nutrients throughout the basin and in Brown County. The region is experiencing a rapid growth in the size of dairy operations, with a total of 200,000 milk cows in Brown County and its 5 bordering counties (33,000 in Brown County alone, which is first in the state in density of cows).[93] About a third of the cows in Brown County are concentrated on ten very large farms. Most of the crop agriculture in the area is corn and alfalfa. The county is also facing significant urban sprawl and growth. The township of Bellevue is the fastest growing in the state, and the village of Alloway is the fastest growing village in the state. The city of Green Bay has over 100,000 residents and is increasing in population. The county has over 200,000 residents. The county's Land Conservation Department has 17 staff, including 3 agronomists to do nutrient management planning.

Priority Watershed Projects

Brown County has five on-going priority watershed projects. These are the East River (started in 1989), Red River (1995), Branch River (1996), Duck Creek (1997), and Apple/Ashwabenon Creek (1997).[94] The East River is the largest area, and the watershed most centrally located in the county, bisecting it from north to south. The county has 150 contracts with landowners in this watershed. Some of the newer priority watershed projects have critical sites.

The large number of staff in the county is due to the high number of priority watershed projects. Of its $1.1 million annual budget, the department receives $750,000 from the state and $350,000 from the county. Most of the staff time is devoted to working in priority watershed areas. The program has built the capability of the staff.

Projects in Brown County have generally focused on reduction of sediment or phosphorous pollution. Each plan included a detailed inventory of problems and potential sources in the watershed. The LCD set goals for the reduction of each pollutant and used models to determine the contribution of each source to the water body. Using the inventory of sources, the county could determine the number of practices that must be installed or initiated to achieve the goal. The implementation plan stated the desired water quality improvement and the type and number of practices required to achieve the goal. Critical sites were designated in the newer priority watershed

by use of similar inventory and modeling techniques. When the county submitted the project for public review, proposed critical sites were not identified by name but by number. Once the project was submitted to DNR, the landowners were contacted and informed that their land is a critical site and that they must participate or face potential enforcement by DNR. DNR will enforce against critical sites, although in Brown County most landowners cooperated with the program. Although landowners of critical sites often installed a number of conservation practices, they were not required to develop a full conservation plan but to install only those practices which would bring their properties below the required pollutant discharge level contemplated by the implementation plan.

For each practice, the state has established a cost share. The funding a project receives is directly related to the number of proposed practices, to ensure that the county will be able to provide sufficient cost shares. This process is subject to some negotiation, and with the approval of DNR, counties can reduce the cost share provided to cooperators. Brown County has also increased the cost share it has provided as an incentive when it found that DNR's incentives were not sufficient to encourage participation. For instance, DNR's incentive rates for conservation tillage were $15/acre for 3 years, and Brown County raised the rate to $18.50/acre for up to 6 years, if necessary. Raising the rate allowed farmers to more easily purchase the required equipment. The types of practices stressed in the priority watershed cost-share program have changed since it began in 1978. Originally, the program focused on the construction of "brick and mortar" practices, such as manure storage facilities. In 1978, the state cost share for a manure storage facility was $6000; it has now increased to $35,000. The program has switched to focus on lower-cost measures such as conservation tillage, buffer strips, and manure management.

Funding for priority watershed projects depends on the size of the watershed as well as on the practices funded; urban projects will receive more funding than rural projects because the practices are much more expensive. Generally, the grants reflect funding for a 75% participation rate. The various priority watershed projects in Brown County have received from $0.5 million to $2.5 million in funding.

Other sources of funding often reach the county through the priority watershed program. For instance, EPA § 319 money goes to DNR, which uses the funds to supplement funding available for priority watershed projects. Brown County received a $600,000 EQIP grant to supplement state funding in a priority watershed when state funding was particularly low. The priority watershed funds available to the county helped it leverage the EQIP funds effectively, however, and improved the chances that this watershed would be funded through EQIP. The Duck-Ashwabenon portion of the Duck-Apple-Ashwabenon watershed in Brown County received funding in 1997 and 1998 from EQIP.

Assessment of the result of the priority watershed program is conducted primarily by the use of water quality modeling. Based on the number of practices implemented and the water quality improvement predicted for each practice, the county will determine the water quality improvements achieved throughout the watershed. Continuous water quality monitoring would be more costly, and the county plans to assess its progress in achieving its land and water quality management planning goals with the same model-based mechanisms.

Animal Waste Management

The county's animal waste management ordinance was passed by the county board in 1985. It

was significantly amended on January 20, 1999. The ordinance applies only in unincorporated areas, which comprise most of the county.

The original 1985 ordinance regulated the construction of animal waste storage facilities and feedlots. The ordinance required a permit to construct or alter an animal waste management facility and compliance with NRCS Technical Guide standards in the design of the facility. The county began to encounter opposition from town governments to proposed siting of new facilities. The protests generally concerned locating animal waste storage facilities near proposed developments or existing residences. These conflicts, along with Act 27's provisions for performance standards and prohibitions, led to some of the changes in the 1999 amendments to the ordinance. The 1999 amendments added setback requirements and nutrient management requirements. Variances in setback from property lines may be allowed with the approval of the neighboring landowners; four variances have been granted.

The ordinance currently requires animal feedlots and animal waste storage facilities to meet county standards and specifications.[95] The standards and specifications were developed by a group of 14 farmers representing the farm bureau, town chairmen, county Farm Services Agency committee, and large dairy operations. The ordinance also incorporates the four prohibitions included in the state's 1997 Act 27, prohibiting 1) overflow of manure storage structures; 2) unconfined manure stacking; 3) direct runoff from feedlots or stored manure to waters of the state; 4) unlimited access of livestock to water of the state where such a practice prevents sod cover maintenance. Under the county ordinance, new and existing animal feedlots must not discharge more than 20 lbs of phosphorous annually, and new animal feedlots must meet setback requirements from adjacent properties, lakes and streams, and groundwater. New, expanded or modified animal waste storage facilities must meet NRCS technical standards and similar setback requirements. Every animal waste storage facility must develop a nutrient management plan. The plan must be submitted annually to the Land Conservation Department while the facility is in use. An abandonment plan must be submitted for any animal waste storage facility, whether existing or new. The ordinance requires operators to obtain permits from the LCD for any existing animal feedlots with more than 500 animal units, for any new animal feedlots with more than 40 animal units, and for any sites that violate the four prohibitions described above or that have received a notice of discharge (NOD) from the DNR.

Violations of the ordinance are punishable by civil forfeiture of not less than $50 plus costs of prosecution, with each day constituting a separate offense. Injunctions or restraining orders may also be sought by the county.[96]

Since 1985, the county has approved 190 permits for animal feedlots and animal waste storage facilities. One of the county's new efforts under the 1999 ordinance will be to develop nutrient management plans for the 190 existing permitted facilities. Also, in an inventory for the county's Land and Water Conservation Plan, the county identified 20 sites which are discharging more than 20 lbs of phosphorous annually. It plans to address five of these sites each year.

Over 150 animal waste storage facilities have been installed in Brown County since the original ordinance, using state and federal cost share programs. The county cannot require any modification to *existing* barnyards without a cost share. The county will not provide cost share for nutrient management practices or animal waste storage, citing these costs as a cost of doing business. The state has provided the cost share funding to address modifications of barnyards, including animal waste storage facilities.

Shoreland Ordinances

Brown County has adopted two separate ordinances regulating agricultural activities on shorelands – one in 1991 and one in 1998. Both are used in controlling nonpoint source pollution in the county.

The *Shoreland and Floodplain Management Zoning Ordinance* was passed in October 1991.[97] This ordinance is intended to address sediment problems. Green Bay harbor requires significant dredging at great cost. Two watersheds near the mouth of the Fox River contribute 65 percent of the sediment and 55 percent of the phosphorous to Green Bay while comprising only 7 percent of the land area. The county determined that a program of stream buffers on the 1200 miles of streams in Brown County would greatly reduce sediment runoff to Green Bay. The 1991 ordinance requires a minimum of 35 feet of land free of row crops, and seeded to grass, alfalfa, or a close-growing crop to be maintained along the edge of all navigable streams. The exact width of the required buffer is determined by use of a rating worksheet that accounts for slope, land use, and drainage area.

The1991 shoreland management ordinance also provides that in cases where a pollution problem results from grazing or pasturing of livestock, fencing must be installed no closer than 16 ½ feet from the edge of the stream unless another solution is approved by the county Land Conservation Department. The stream fencing provision is enforceable only where cost share funds are available for any required practices. Subject to these provisions, however, the ordinance explicitly permits landowners to water their livestock in streams in some manner.[98]

The county provides landowners with incentive payments of $500 per acre taken out of production under the ordinance. The county uses both state and county funding to provide incentive payments. The county has contributed $10,000 per year, but may double its funding this year. The county will allow payment of incentives to farmers who include additional acres by squaring off their fields instead of contouring along the stream. Due to the incentives offered, demand for participation has been very high, and some farmers want to enroll as much land as possible. The county will only pay incentives as far as the buffer is justifiable by use of the ratings sheet. Buffers can be mowed by landowners, but not plowed. All buffers are perpetual, and a restrictive covenant is attached to the deed stating requiring a future landowner to contact the LCD before removing the buffer. State cost share funds have also been available up to 70 percent for seeding and shaping of the buffer.

Of the 1200 stream miles in Brown County, 500 were determined to be adequately buffered at the time the 1991 ordinance was passed. The county program has established buffers on 200 additional miles of stream. The county goal is to install 50 miles of buffers each year for the next ten years. The LCD staff often identifies landowners who are subject to the buffer requirements while working with them on contracts for other conservation practices. If a staff member identifies an unbuffered stream, he or she will inform the landowner of the requirement to have a stream buffer, and will require the landowner to install a buffer in order to continue working on other cost shared practices.

The Wisconsin farmland preservation program, a state program that provides tax incentives to farmers to keep their land in agriculture, requires that farmers operate to stay below the T value for erosion. There are 800 to 900 farms in this program in the county, and their plans are reviewed by the Land Conservation Department. When the LCD is reviewing the plans, staff also address stream buffers.

There have been more takers than available cost share funds, and while the county has not required anyone to install a buffer without providing cost share, in order to meet its 50 mile goal next year it will do so. The county plans to leverage other cost share funding (e.g. for animal waste or conservation practices) to encourage landowners to install buffers without cost shares. The county will also use the animal waste management ordinance to identify people who are required to have buffers, and will use GIS to determine which landowners have the largest stretches of stream that require buffers. The office will target such landowners and send staff to discuss the ordinance with them.

The county has had some problems with landowners who do not maintain their buffers. This has been particularly a problem with large dairy operations, where contractors or lessees might plow the buffer. The landowner is generally unaware of these violations. When the county identifies violations, it first requires that the buffer be reseeded at the landowner's expense. If a second violation occurs, the county will install posts marking the buffer. Repeat offenders can be turned over to the county attorney for civil enforcement, but this has never been done.

The county passed its *Agricultural Shoreland Management Ordinance* in January 1998.[99] While the ordinance addresses similar concerns as the shoreland ordinance of 1991, it is both broader in scope (in the land areas it regulates) and more limited (in that *all* practices under this ordinance require cost shares, in accordance with recent amendments to Wis. Stat. 92.17). This ordinance regulates activities in the "agricultural shoreland corridor" which is defined as land extending 20 feet from each bank of a perennial stream or from the centerline of an intermittent stream, or the high water mark of a lake; and activities in the "agricultural shoreland management area" which is land within 300 feet of perennial stream banks or the centerline of an intermittent stream, or the high water mark for a lake.

The 1998 ordinance generally requires all agricultural activities within the agricultural shoreland management area to prevent erosion and to minimize movement of sediment to surface water. It prohibits cropland with annually tilled soils from exceeding T, and requires pastures to comply with NRCS Technical Guidance for pasture and hayland management and with University of Wisconsin-Extension guides for rotational grazing. The ordinance also requires all land in the management area on which manure or other nutrients are applied to develop a nutrient management plan.

Within the agricultural shoreland corridor, the ordinance requires that a vegetative buffer be maintained, and prohibits row cropping and tillage. Barnyards (defined as a feedlot, dry lot or area other than a pasture where animals have been fed, confined, maintained, or stabled for 45 or more days in any 12 month period) are prohibited in the agricultural shoreland corridor unless an approved management system is installed. The requirement to maintain a vegetative buffer is similar to the requirement in the county's 1991 ordinance. The county (after battling with the state) included in the 1998 ordinance language providing that "Any conflict or inconsistency between this ordinance and Brown County's Shoreland Zoning Ordinance will be governed by the more restrictive provision." This enables the county to continue to require a 35 foot vegetative buffer as specified in the earlier ordinance, even though the newer ordinance (following DATCP models) only requires a 20 foot buffer in the agricultural shoreland corridor. The county further takes the position that cost shares are not required for the installation of buffers because they are not required by the more restrictive earlier ordinance.

The Land Conservation Department administers and enforces this ordinance. The LCD is required to notify landowners in violation by mailing a notice of problem, including a list of BMPs to address the problem and a statement allowing the landowner to appeal the decision. The 1998 ordinance includes a provision allowing for variances if cost share funds are not provided. Variances are also permitted due to excessive county staff workload or if conservation practices will still not bring the landowner into compliance with the ordinance. The LCD will work with the landowner to develop a conservation plan and a schedule of implementation, and must notify the landowner when funds are available to install or implement the required practices. Penalties include civil forfeitures of up to $50 per day of violation, and the ordinance may be enforced by injunction.

State law allows townships, as well as counties, to develop agricultural shoreland management ordinances, and three towns in Brown County have done so. Towns and counties that have developed an ordinance receive state funding for cost shares to implement the required practices. The LCD administers the ordinance for towns that have passed one, and receives separate cost share money from the state to use in the towns.

State Enforcement

DNR issues 5 to 10 NODs under the NR 243 provisions in Brown County for animal waste each year. The program is complaint driven and most often it is neighbors who report the violations or problems. DNR staff must be able to prove that there has been a discharge to surface or groundwater. Evidence of the discharge is generally persistent enough that it is not difficult to demonstrate that a discharge occurred. If the animal waste site is in a priority watershed, DNR cost sharing is available. If not, the county does not normally provide cost sharing for construction of animal waste storage facilities but does have some funding from DATCP associated with the land and water planning process. This funding can only be used for construction of practices with a twenty year life span. DNR staff cannot recall needing to issue an NPDES permit as a result of noncompliance with an NOD in the county.

DNR does not frequently issue abatement orders for sediment related pollution. Problems with land development generally get referred to the county zoning office for action.

Conclusions

The Wisconsin nonpoint efforts reflect substantial funding, attention to standards, and some use of enforceable mechanisms. The priority watershed approach served as the main paradigm for planning, funding, and regulatory attention. Now, Wisconsin seems to be devoting more base funding and assistance to areas that have not received priority attention in the past, while adding competitive grant programs to take advantage of local initiative.

The enforceable provisions of Wisconsin's nonpoint programs are administered by DNR and by the counties. These are significant, but greatly subordinate to the substantial technical assistance efforts and cost shares available through counties, DATCP, and DNR (including federal 319 and EQIP funds). The state generally relies on counties to handle violations through enforcement of local ordinances. State level enforcement can be time consuming and complex. At the local level, too, enforcement generally follows assistance; stop work orders are more common than civil forfeitures or judicial actions.

Wisconsin has statewide standards and practices and is developing even more detailed performance standards and technical specifications. However, state and county conflicts over standards may hinder a county's ability to handle its nonpoint source pollution problems. La Crosse County has some concerns over enforcement of its animal waste management ordinances because its standards are not entirely in line with state requirements. Brown County has also negotiated with the state to ensure that enforcement of its ordinances is less dependent on the availability of cost shares. While the state's goal of ensuring equity among its counties has increased the focus on counties – both through funding redistribution and the development of statewide performance standards and specifications – the program has also constrained some efforts.

The biennial legislative struggles over how much authority and budget control DATCP and DNR should have respectively, have also increased the complexity and variability of the Wisconsin nonpoint effort. Substantial state agency rulemakings are in progress (largely in response to the 1997 Act 27), but it is not clear whether major modifications will continue to occur each legislative biennium. It may be important to allow the state and county programs the breathing space to establish an ongoing and predictable mode of operation.

ENDNOTES

1. In addition to the documentary sources cited, the following individuals were interviewed in connection with this case study: Bob Behrens, DNR Regional Office; Don Franke, Lacrosse County Land Conservation Department; Lynn Goldade, DNR; Bill Hafs, Brown County Land Conservation Department; Dave Jelinski, DATCP; Jim Jolly, Brown County Land Conservation Department; Jill Jonas, DNR; Al Shea, DNR; Jan Whitcomb, NRCS Wisconsin.
2. Wis. Stat. § 281.20.
3. Wis. Admin. Code (WAC) NR 243.
4. Wis. Stat. § 281.20.
5. Wis. Stat. ch. 283; WAC NR 243.
6. Wis. Stat. § 92.11, § 92.15, § 92.16, § 92.17, § 59.693, § 60.627, § 61. 354, § 62.234.
7. Wis. Stat. §§ 281.65(4)(a) and (ar).
8. Wis. Stat. § 92.05(1).
9. Wis. Stat. § 92.06(1)(b).
10. Wis. Stat. § 281.65(2)(am).
11. Wis. Stat. § 92.11.
12. WAC NR 121.
13. Wis. Stat. § 281.65(4).
14. Wis. Stat. § 281.65(4)(g).
15. Wis. Stat. §§ 281.65(4)(g)(3)-(5).
16. WAC NR 120.08(1).
17. Wis. Stat. §§ 281.65(4)(g)(8)(a)-(e).
18. WAC NR 120.08(2).
19. Wis. Stat. §§ 281.65(8)(a) and (e).
20. Wis. Stat. § 281.65(8)(f).
21. Wis. Stat. §§ 281.65(8)(b),(c), and (k).
22. Wis. Stat. § 281.65(5w).
23. Wis. Stat. § 281.65(7).
24. Wis. Stat. § 281.65(4)(g)(8)(am).
25. Wis. Stat. § 281.65(5y).
26. Wis. Stat. § 281.65(4)(c).
27. Wis. Stat. §281.65(3)(a)(2).
28. Wis. Stat. §92.10(3) - repealed in 1999.
29. Wis. Stat. § 92.10(6)(1997).
30. Wis. Stat. § 92.10(6)(1999).
31. § 92.14(6).
32. Wis. Stat. §§ 281.65(4c).
33. Wis. Stat. § 281.16(2)(a).
34. Wis. Stat. § 281.65(2)(b).
35. Wis. Stat. § 281.16(3)(a).
36. Wis. Stat. §§ 281.16(3)(b) and (c).
37. Wis. Stat. § 281.16(3)(a)(1-4).
38. Wis. Stat. § 281.16(3)(d).
39. See DNR and DATCP, Nonpoint Source Program Redesign Initiative (Sept. 1999 draft).
40. Wis. Stat. § 281.20(1)(a).

41. Wis. Stat. § 281.20(1)(a).
42. Wis. Stat. § 281.20(3)(a).
43. Wis. Stat. §§ 281.98(1),(2), 281.19(7).
44. Wis. Stat. §§ 281.20(3)(b)and (c).
45. Wis. Stat. § 281.20(3)(c)(1).
46. Wis. Stat. § 281.20(3)(c)(2).
47. Wis. Stat. §§ 281.20(3)(b) and (5)(a).
48. Wis. Stat. §§ 281.20(5)(a) and (b).
49. Wis. Stat. § 281.16(3)(e).
50. Wis. Stat. § 281.20(3)(d).
51. Wis. Stat. ch. 283.
52. NR § 243.23.
53. NR § 243.26.
54. Wis. Stat. §281.16(4).
55. Wis. Stat. § 283.91.
56. Wis. Stat. § 92.11.
57. Wis. Stat. § 92.17.
58. Wis. Stat. §§ 92.15, 92.16.
59. Wis. Stat. §§ 59.693, 60.627, 61.354, 62.234.
60. Wis. Stat. § 92.16.
61. Wis. Stat. §§ 92.15(3) and (5).
62. Wis. Stat. §§ 92.17, 92.14(3)(b) (1997); § 92.17(2m) (1999).
63. Wis. Stat. § 281.31.
64. Wis. Stat. § 59.971.
65. WAC NR 115.05(1).
66. WAC NR 115.05(3).
67. WAC NR 115.05(3).
68. WAC NR 115.05(e).
69. WAC NR 115.02, 115.03(5).
70. WAC NR 115.01(1).
71. Wis. Stat. § 62.231, 61.351.
72. Wis. Stat. § 62.231(6).
73. Wis Stat. § 87.30(2); WAC NR 117.06(3).
74. Wis. Stat. § 59.97(11).
75. Wis. Stat. § 62.23(7)(f).
76. Wis. Stat. § 281.33. See also WS 59.69 and 59.693, which specifically authorize county zoning ordinances for construction site erosion control at sites where the activities do not include construction of a building.
77. Wis. Stat. §281.65(4)(g)(5).
78. Wis. Stat. §281.33(3)(a)(1).
79. Wis. Stat. §281.33(3)(b).
80. Wis. Stat. §§281.33(3)(a)(1) and (c).
81. Wis. Stat. §§281.33(3)(a)(1) and (2).
82. WAC NR 120.16.
83. WAC IHLR Chap. 21. (esp. 21.125 - one and two family residential construction).
84. La Crosse County Land and Water Resource Management Plan (1999).
85. Wis. Stat. 92.10(6)(1997).

86. La Crosse County Land and Water Resource Management Plan (1999) App. D-F.
87. Wis. Stat. § 59.693; cited in La Crosse County Erosion Control Land Disturbance Ordinance, Chapter 21.
88. La Crosse County Erosion Control Land Disturbance Ordinance, 21.07(e).
89. La Crosse County Land and Water Resource Management Plan (1999).
90. WAC ILHR 21.125.
91. Wis. Stat. §281.16(3). Animal Waste Management Ordinance of the General Code of La Crosse County, Chapter 23. Ordinance 15/12-98.
92. La Crosse County Land & Water Resource Management Plan (rev. March 8, 1999).
93. Impacts of Agriculture on Water Quality in the Green Bay Ecosystem and Proactive Agriculture Approaches to Protecting Water Quality (Brown County Land Conservation Department).
94. William C. Hafs, *Rural Management for Nonpoint Source Control* (n.d.).
95. Brown County Ordinance § 26.11.
96. Brown County Ordinance § 26.12.
97. Brown County Ordinance ch. 22; see especially § 22.24.
98. Wis. Stat. § 92.14(3m) (1997) required state cost share funding for any stream fencing required by local shoreland management ordinances, but the 1999 amendments to state law repealed this provision and replaced it with §92.14(3)(b)(1) which simply makes such cost share funding available to counties. However, § 92.17(2m)(1999), provides that a county cannot enforce a shoreland ordinance unless the county uses state funds provided under §92.14(3)(b) for the required purposes, and that a city, village, or town with such an ordinance cannot enforce it unless the county provides it such state funds.
99. Brown County Ordinance ch. 10.