

Water-Policy Issues Related to the Chesapeake Bay

**Five Papers from Meetings of the
American Society of Civil Engineers**

**Virginia Water Resources Research Center
Virginia Polytechnic Institute and State University
Blacksburg**

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INTRODUCTION

The Chesapeake Bay is truly an impressive estuarine body. Its surface area amounts to 2,200 square miles (double if you include its tributaries). Its shoreline measures 7,000 miles. It is the habitat for some 2,700 plant and animal species. The commercial finfish and shellfish catch amounts to a billion dollars a year, while no mere dollar total could measure the worth of the recreational catch or the pleasure of several hundred thousand boat owners whose craft are registered in bay ports.

The bay has been subjected to enormous pressures. Some 13.6 million people live in its drainage area, which covers 64,000 square miles and includes some of the fastest growing areas in the United States. Five thousand point sources discharge 1.5 billion gallons of treated effluent into the bay—about the same as the average daily flow of the York and Rappahannock rivers. Two of the East Coast's five largest ports—Baltimore and Hampton Roads—are at opposite ends of the bay.

In recent years, the bay's decline in water quality, commercial fishing value, and wetlands (which, on a per-square-foot basis, are among the most protein productive in the world) has been significant and a source of concern. Revitalizing the bay is the focus of the five papers published here.

To a layperson, the first two are interesting because both approach the bay holistically—one from the perspective of a lawyer, the other from the perspective of a scientist. In "The Chesapeake Bay Preservation Act: A Step toward the Public Trust Doctrine," Virginia House of Delegates member W. Tayloe Murphy, Jr. argues that the way we use land and the frequency with which it changes ownership requires a change in the legal concept of ownership. Some resources, he writes, are so important to our individual and collective survival that they need to be held in trust for the benefit of all. He counts the bay as one of those resources and by sponsoring the Chesapeake Bay Preservation Act has enabled the Commonwealth to take a step toward the public trust doctrine as the legal underpinning for managing its air, water, and land. Murphy recognizes that many of the activities that go on in the bay's drainage area have an impact upon the bay, and therefore those activities must be regulated if the bay is to be a viable natural resource for the benefit of all. His legislation, he believes, provides a framework for regulation to that end.

Jolene E. Chinchilli, senior staff scientist with the Chesapeake Bay Foundation, writes in "Develop-

In recent years, the bay's decline in water quality, commercial fishing value, and wetlands has been significant and a source of concern. Revitalizing the bay is the focus of the five papers published here

ment and a Clean Bay: Is Coexistence Possible?" that scientists and resource managers are beginning to view the ecosystem as the scientific framework for problem solving. Such a perspective requires an interdisciplinary approach, which is not easily achieved because most scientists and engineers are still taught to think in relatively narrow terms.

The challenge of getting scientists to take an interdisciplinary approach seems a trifle, however, when compared to overcoming the legal and political impediments to environmental problem solving. Each state, she writes, has a distinct history and set of political realities that must be dealt with. For example, Pennsylvania supplies half the fresh water coming into the bay and a significant portion of the nutrients, but it does not benefit economically from the bay to the extent that Maryland and Virginia do. "It should not be surprising," she writes, "that the bay cleanup is not Pennsylvania's highest environmental priority."

The challenge of restoring the bay is further exacerbated by the fact that most environmental legislation has a single-medium orientation—the Clean Water Act, for example—and as a result promotes a fragmented approach to solving environmental problems. Some, she acknowledges, believe that saving the bay requires the creation of an interstate commission with the authority to set baywide standards and policies, but such an approach would be resisted because it would require the individual states to give up some of their authority. The most practical solution, she concludes, is to press at every turn for increased cooperation among the bay entities and integration of their programs. Otherwise, "we may . . . ultimately fail in our efforts to Save the Bay."

For many years, Edward W. Christoffers writes in "Wetlands: What They Are and Why They Are Important," wetlands were viewed as "'wastelands' that did little more than breed snakes and mosquitoes" and governments at all levels sought to

dredge, drain, and fill them to create agricultural lands, industrial sites, and housing developments. Today, we know better because we have a clearer understanding of their many roles. Wetlands trap nutrients, serve as flood buffers, help to recharge groundwater, and make important contributions to the nation's commercial and recreational fisheries, which add about \$13 billion a year to our gross national product. They need protection because their loss is almost always irreversible. In the bay, Christoffers concludes, the federal program provides an ecosystem approach to their protection that crosses state lines.

Even after agreeing upon goals for the bay, there remains the challenge of how best to achieve them, Bernard J. Caton writes in "Nutrient Reduction to the Bay: What's Equitable, Feasible, and Likely." For example, the signatories to the 1988 Chesapeake Bay Agreement approved an across-the-board 40 percent reduction of nutrients entering the bay by the year 2000 without considering its cost effectiveness. We need to explore reduction programs based on the nutrient loading problems of each river basin, he writes. But as important as well-planned nutrient control measures are to the success of the program, it is more important for "officials and residents of the states and the district [to] take their commitment to the Chesapeake Bay Agreement seriously and make valid efforts to reach the nutrient reduction goals outlined in the strategy."

In the final paper, "The 1987 Chesapeake Bay Agreement: What's in It, What's Not, and Why,"

Keith J. Buttleman, administrator of Virginia's Council on the Environment, provides a glimpse into the backing-and-hauling that goes into negotiating a complex political agreement. He points out, for example, that it was neither technically nor economically feasible to require the District of Columbia to reduce its point-source phosphorus discharge by 40 percent when its Blue Plains advanced wastewater treatment plant was already removing 96 percent of the phosphorus contained in the effluent. He further notes that the document focuses on more than technical problems. Public participation, public access, and public education were also on the minds of the framers. Without instilling a sense of stewardship in the public, he observes, no lasting improvement to the bay can be made.

The Water Center is pleased to make these papers available to an audience larger than the one fortunate to hear them at the 15th Annual Speciality Conference of the Water Resources Planning and Management Division of the American Society of Civil Engineers, June 1-3, 1988, in Norfolk, Virginia. Each focuses on the strong commitment that those who value the bay are being asked to make to achieve the goals of the 1988 agreement. Agreements hammered out by politicians, even with considerable technical support, seldom amount to much without the strong support of the public. The 1988 Chesapeake Bay Agreement will be no exception.

—William R. Walker
Director

The Chesapeake Bay Preservation Act: A Step toward the Public Trust Doctrine

Some resources are so important to sustaining the quality of our lives that they must be protected for all of us. The bay is one of them.

W. Tayloe Murphy, Jr.

To me, it is axiomatic that how we treat the land, especially the shore land, is how we treat the water. We have moved somewhat belatedly in that direction where the Chesapeake Bay and its tributaries are concerned. Attention to the soil is now the cornerstone of our efforts to stem nonpoint-source water-quality problems, particularly from nutrient overenrichment. But only in the last few years, and in 1988 in particular with the passage of the Chesapeake Bay Preservation Act, have our general land-use policies begun to reflect an underlying concept of land and its use as part of the overall ecological "community." Before discussing implementation of the new Chesapeake Bay Preservation Act, perhaps it would be well to examine the problems that led me to sponsor the bill in the first place.

PROBLEM I: THE MYTH OF LOCAL CONTROL IN LAND-USE DECISIONS

In discussions that I have had with landowners, particularly with those who currently hold large rural properties that have remained in the control of a single family for a long time, I often hear: "Personally, I wouldn't do anything with my property that would bring harm to the bay, or to the environment in general, but I don't want anyone, particularly the government, telling me what to do or not to do with my land. I'm responsible, and I can take care of it"

When the holding of land here in Virginia was more apt to be measured in generations rather than in a mere term of years, there seems to have been a beneficial corollary to the attitude that one should be able to do with his land what he pleases. That

corollary was embodied in the belief that it was each landowner's responsibility to preserve and, if possible, to enlarge the family holdings for the next and succeeding generations. This aspect of "stewardship" often inhibited a landowner from exercising his full rights of alienation. Land was then a form of social status in its own right, not a means to that status as it is today. No one wanted to be remembered as the black sheep who lost the family land. This attitude offered a modicum of protection that is absent in today's land market, where the norm is the subdivision of land into ever smaller and smaller units with ever increasing intensity of use. Whatever validity the old attitudes might have once had in promoting the stability of open space land patterns, it certainly no longer exists.

But looking at land-use regulation only in the personal sense—that is, how it might affect me—evades the real problem, which is our collective assault on the land. This view continues to promote a misunderstanding of our relationship with the land. Moreover, mistrust of governmental solutions in general is deeply ingrained in the Commonwealth and, nowhere, perhaps, is our mistrust of government deeper and more destructive than in our attitude toward regulating the use of our land.

In Virginia it has been dogma in conventional political wisdom that since we do not like centralized state control, we make our land-use decisions *locally*. We contend that if we do need any guidance in how we use our land, that guidance should be from our neighbors; there is certainly no basis or need for the "intrusion" of state government into the matter. In fact, localities are often constrained from making wise local land-use decisions either by a lack of authority or by a lack of capability and resources to gather and analyze information—much to the environment's detriment, I might add.

Until recently, in the area of land-use regulation, the General Assembly had been somewhat delinquent in addressing the "Dillon Rule" question: that

W. Tayloe Murphy, Jr. is a member of the Virginia House of Delegates from the Northern Neck Community of Warsaw.

The basic concept behind the way I believe we should deal with the land and with the Chesapeake Bay is the public trust doctrine

is, the granting of explicit environmental protection powers to localities. Moreover, the problem was compounded by the fact that, until recently, the Virginia Supreme Court rather regularly interpreted local zoning authority to be limited generally to the matter of approving the "highest and best use."

Thus, our localities were caught in a "vacuum" created, on the one hand, by a lack of authority delegated from the General Assembly to carry out locally their own land-use policies and, on the other hand, by a lack of guidance from the appropriate state agencies that would enable them to compensate for this lack of authority. When important zoning and subdivision decisions were being made, little, if any, consultation took place between state land-use and environmental experts and the localities. In short, rather than having a policy of local planning, and hence no state planning, there has been a policy not to plan at all. This is what I call "the myth of local control," the misconception on our part that if the landowner and local planners needed guidance in land-use decisions, our counties and municipalities were uniformly adequately endowed with the expertise and authority to give that guidance.

PROBLEM II: INADEQUATE PURSUIT OF THE PUBLIC TRUST DOCTRINE

The basic concept behind the way I believe we should deal with the land and with the Chesapeake Bay is the public trust doctrine. This honorable-sounding term has a noble idea behind it, one that I suspect forms the philosophical underpinning for modern environmentalism as we know it. The principle simply stated is this: some resources, such as the waters, the air, and the wildlife therein, are so important to sustaining the quality of our collective lives—and, in the final analysis, for sustaining our individual lives as well—that they must be protected for all of us in a manner that we lawyers term a "trust." In summary, the rights of a few must not be allowed to harm the rights that belong to everyone. This example of the need for enlightened self-interest often conflicts with more readily discernible examples of economic self-interest. Nevertheless, because of the importance of these common re-

sources, the concept is one that should never be allowed to elude the consciousness of elected officials.

In 1971 the Virginia Constitution was rewritten and, arguably, the public trust doctrine was adopted as Virginia's fundamental environmental policy. Article XI of the 1971 Constitution reads as follows:

... it shall be the Commonwealth's policy to protect its atmosphere, lands, and waters from pollution, impairment or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth.

Article XI goes on to admonish the General Assembly to pass laws to that end, thus potentially extending the traditional public trust doctrine to the protection of the whole environment. However, the Virginia Supreme Court held in the case of *Robb v. Shockoe Slip Foundation*, that public trust protection extends only so far as the General Assembly has directed in legislation, thus putting us lawmakers in the position of having to "put up or shut up." This year we responded with the Chesapeake Bay Preservation Act, designed to provide the land stewardship we have lost or abandoned as individuals.

We know that people and their activities have led to the deterioration of the bay, and that only changes in their practices can halt it. All of the user groups seem to acknowledge this in the abstract. But when specific changes are proposed, even changes based on reasonable scientific evidence, fingers tend to be pointed in other directions. Everyone seems to say, "it's not me." Where the deterioration of the Chesapeake Bay is concerned, the farmers point to industries and municipalities, industries point to farmers and municipalities, municipalities point to industries and farmers, and the watermen, with some justification, point to everyone else.

Let's take a look at those rugged individuals we call "Chesapeake Bay Watermen." They are of special interest to me because a large number of them are my lifelong neighbors, and they live and work in the District I represent. It is natural that I would hear from them quite often. More important, they symbolize all of those whose interest in the bay depends upon the productive uses of the water, as opposed to those whose uses degrade its quality. In other words, their use is the same as that of the swimmer, the sailor, and the recreational boater or fisherman.

Although the watermen are the harvesters of the delicate living resources that we see as threatened by everyone else's activities, their use of the "commons" receives, it seems to me, less pro-

tection than other users whose activities are generally more harmful. For example, the land developer or waste discharger who obtains and complies with all required permits may, nevertheless, foul the water. And, because of his permits, he is not answerable for the damage he may have caused. The difficulty with the state's permit process is that it only works to mitigate environmental damage—not to eliminate it, as is often claimed. From the waterman's perspective, however, no permits or licenses protect his use; they simply limit his activities.

But why is this so? Why is not the waterman's use more adequately protected? Again, to me it seems rooted in our collective concept of "property" and the kinds of uses of property that the law deems "reasonable." Virginia adheres to a concept of property rights that is not compatible with the public trust doctrine because it neither recognizes nor protects property other than that which is privately owned in fee simple. In other words, our system's method of dealing with "unreasonable" uses is still rooted in the common law theory of nuisance.

Although riparian landowners may enjoy their neighbors from unreasonable uses that appreciably diminish the value or uses of their riparian lands, our environmental agencies have been very reluctant to step boldly into the gap to define what are unreasonable uses of private property affecting the commons—and to stop them. In other words, watermen working the bay are not deemed to own any "property" in the sense that our laws protect it from injury for their benefit.

The ultimate question in this line of thinking becomes: how do we determine who is our neighbor, from the standpoint of property rights protection? In my judgement, the watermen and other legitimate users of the commons are as much the neighbor of the shoreline property owner as is the adjacent owner of upland property. Accordingly, our laws should protect the commons user as surely as it does the private landowners and we should view both the land and the water for land-use purposes, as an interrelated ecological "community."

THE CHALLENGE: IMPLEMENTING THE NEW CHESAPEAKE BAY PRESERVATION ACT

The users of the commons obtained a forum in 1985, when I and the other Virginia members of the Chesapeake Bay Commission urged the General Assembly to fund a policy dialogue group to focus

While local governments in the Tidewater area are required to adopt programs under the act, local governments outside Tidewater may also employ its provisions

on land-use issues and water quality in the bay. The 1986 General Assembly did so, forming the Chesapeake Bay Land-Use Roundtable, a group composed of legislators, farmers, industrialists, developers, local government officials, environmentalists, and citizen activists. I was fortunate enough to be a member of that group and to participate in its deliberations. The roundtable had numerous meetings over the subsequent year and a half, and in November 1987 issued findings and recommendations calling for a clarification of state land-use policy and local land-use powers, minimum state standards for sensitive shoreline environments, state consistency and advisory requirements, increased coordination between state agencies and local governments, state technical and financial assistance to local governments, and a new citizen board to oversee these new requirements.

Believing that 1988 was the year to act, what with the signing of a new Chesapeake Bay Compact providing optimal momentum, I assembled a drafting committee composed of planners and lawyers with experience in state and local government matters, land development and other commercial matters, and public interest environmental protection. These drafters labored diligently to write legislation that incorporated the recommendations of the Land-Use Roundtable to the maximum extent practicable.

Thus was born the 1988 Chesapeake Bay Preservation Act, H.B. 925, endorsed by Governor Gerald L. Baliles and sponsored by me as a member of the Land-Use Roundtable. The act enjoyed broad support among the General Assembly members. Though subject to considerable debate in both the General Assembly and the press, the act passed both Houses with only six dissenting votes.

Essential Features of the Act

Let me describe the act's essential features.

A cooperative state-local program is established to require that local governments in Tidewater Virginia define and protect environmentally sensitive lands to be designated as "Chesapeake Bay Pres-

At the heart of the act is the Local Assistance Board, which will provide a form of state oversight and control that is new in the state-local government relationship

ervation Areas," and to incorporate general water-quality protection measures into their comprehensive plans, zoning ordinances, and subdivision ordinances. These local government initiatives are to be accomplished with state financial and technical assistance and oversight. While local governments in the Tidewater area are required to adopt programs under the act, local governments outside Tidewater may also employ its provisions. This program provides, I believe, an equitable means to promote the protection of Chesapeake Bay waters that many of us have been supporting for a number of years. I am highly appreciative of the efforts of the members of the Land-Use Roundtable and the drafters of the act. They have performed a very beneficial service for the bay and for the people of the Commonwealth.

The act closely follows both the language of Virginia Code Title 15.1, dealing with local government land-use regulation, and the State Water Control Law, in order to achieve a good "fit" between their authorities. This is extremely important for legal, administrative, and equitable reasons. Legally, the act must neither usurp present local government authority where land use is concerned, nor infringe upon areas of clear state interest and primacy, such as the State Water Control Board's authority over the control of point-source discharges of municipalities and industries. Administratively, the act should not add excessive or redundant bureaucratic burdens. Equitably, the act must not unnecessarily change the traditional manner in which individuals make their own decisions about how to use their land to the maximum extent feasible. I believe that this attention to "fit" accomplishes these necessary requirements.

Chesapeake Bay Local Assistance Board

To implement this program, a new nine-member citizen board, called the Chesapeake Bay Local Assistance Board, and a supporting department are established. The board is invested with powers and duties generally consistent with other state boards.

Of primary importance is the requirement that the board develop two sets of criteria for use by local

governments, one for the designation of the Chesapeake Bay Preservation Areas and the other for making land-use decisions in these areas. This form of state oversight and control is a new and innovative feature in the Virginia state-local government relationship. It is the very heart of the act, and was, therefore, the major issue debated in the course of the act's passage. Proponents of the act, like me, argued that under the "Dillon Rule" the Commonwealth had not in the past granted local governments sufficient authority to protect general water quality, and that, therefore, such explicit authority and oversight were necessary. Opponents countered that state intrusion of any kind was simply an unwarranted and unwanted usurpation of local government authority.

The General Assembly reacted to the debate by the inclusion of considerable "balancing" language in the section delineating the criteria development. On the one hand, language almost identical to that used to develop water-quality standards under the State Water Control Law requires the board to consider the economic and social costs and benefits of the criteria. On the other hand, again borrowing from the State Water Control Law, water quality for purposes of the act is broadly construed to specifically include beneficial uses, aquatic life, and water conservation, in addition to other health, safety, and welfare parameters. Finally, perhaps reacting to many Virginians' somewhat vague perception of the Maryland Critical Areas Law, and particularly to its 1,000 foot definition and large lot requirements, the General Assembly admonished the board to include in the second set of criteria a wide variety of land-use measures, such as performance standards and best management practices, in addition to other planning and zoning concepts, to protect water quality. This should allow flexible local programs that protect water quality rather than simply imposing arbitrary density controls.

Public Participation Required

To further ensure that the rights of everyone involved are protected, development of the criteria is required to be by regulations adopted in accordance with the procedures of the Virginia Administrative Process Act, which include "up-front" public participation requirements, notice and comment procedures during the criteria development period, and post-hoc administrative and judicial appeal. Moreover, it is important to note that local government programs developed under the act are presump-

tively valid and only the board has the authority to institute legal actions to require local government compliance with the act. This is designed to discourage and avoid needless litigation after the local programs are adopted. Perhaps even more important is the section of the act that specifically recognizes and protects the vested rights of individual landowners as defined by the courts.

Once a local government has a program designating its Chesapeake Bay Preservation Areas, state agency actions must be consistent with that program. This measure is designed as an additional guarantee that local governments retain their autonomy in land-use decision making. To make the optimal use of state government expertise, local governments can request and receive within 90 days an advisory state review for consistency with the provisions of the act for any use or development of land anywhere in that local government's jurisdiction, not just within Chesapeake Bay Preservation Areas. This advisory review, in addition to the general authority given to local governments to protect the quality of state waters consistent with the provisions of the act, gives local governments the ability to examine more closely those uses and development of land outside of preservation areas that could affect water quality within such areas.

What Local Governments Can Do

A question necessarily arises as to what local governments can do to protect water quality in their jurisdictions during this period of program development. I believe that the broad definition of state waters and water quality adopted from the State Water Control Law, and the authority and requirement to protect the quality of state waters consistent with the provisions of "the new act," im-

If state and local government work together to achieve the goals of the act, future generations may look to 1988 as a year that made a difference

plies that local governments can during the criteria development period augment their existing planning and zoning authority to protect water quality, as several jurisdictions had already done prior to the act's effective date. After the development of the criteria they must, of course, incorporate such changes and use the criteria.

This transitional period should benefit all involved. Prior to the act's passage a number of jurisdictions were modifying their local ordinances to attempt to protect various values associated with water quality. For example, the city of Virginia Beach recently revised its development ordinance to include stormwater provisions to protect water quality. The Middle Peninsula Planning District Commission has developed the Dragon Run Conservation District to protect that unique watershed. These efforts can now continue with added assurance that the power to protect water quality has been unequivocally granted by the General Assembly. The criteria development process will benefit from these transitional programs and the transitional programs will benefit from the guidelines that become available through the development of the criteria. The implementation of the Chesapeake Bay Preservation Act challenges both the state and local Tidewater jurisdictions to work together, cooperatively, to stem further degradation from land-use and development. If they meet the challenge successfully, future generations may say that 1988 was a year that made a difference.

Chesapeake Bay Restoration Program: Is an Integrated Approach Possible?

Only if we change the way we manage our resources will a truly integrated and coordinated bay restoration program be established.

Jolene E. Chinchilli

Until the 1987 Chesapeake Bay Agreement was signed, the agreement of 1983 was the cornerstone of the bay restoration program. Maryland, Virginia, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission, and Environmental Protection Agency were the original partners in the 1983 agreement. It was a relatively short document—just a few paragraphs recognizing the decline in water quality and living resources of the bay and the need for a cooperative approach to fully address the extent, complexity, and sources of pollutants entering the bay. It also established three basic elements of a cooperative structure to develop and coordinate a comprehensive Bay cleanup effort: 1) the Chesapeake Executive Council, 2) the council's implementation committee, and 3) EPA's Chesapeake Bay Liaison Office.

STRUCTURE OF BAY PROGRAM

The current structure of the bay program is presented in Figure 1. The executive council is composed of the governors of Maryland, Virginia, and Pennsylvania, the mayor of the District of Columbia, the administrator of EPA and the chairman of the Chesapeake Bay Commission. The function of the council is to assess and oversee the implementation of coordinated plans to restore the bay, to exert leadership, to garner public support, and to be accountable for progress made under terms of the agreement. The council receives advice from a citizens advisory committee (CAC), which represents a variety of interests (e.g. agriculture, business, conservation, and fishing) and all participating jurisdictions. The CAC provides a public perspective on policy issues. Two new advisory committees

were established under the 1987 agreement. A local government advisory committee advises the council on increasing local government participation in the bay program. A panel of experts was established to prepare a report on population growth and land development patterns in the bay region through the year 2020. The panel is also charged with making recommendations to the council on the best means of managing this growth.

An implementation committee is the council's operating arm. It is made up of state and federal agency representatives who are appointed by the executive council. The implementation committee has a number of subcommittees and work groups and is advised by the scientific and technical advisory committee (STAC). It represents the academic and applied research communities.

EPA's Chesapeake Bay Liaison Office (CBLO) provides administrative, technical, and public information support to the council and its auxiliary groups. CBLO staff members also administer grants and contracts, and carry out special projects as assigned by the council.

Another important player in the bay program, and a signatory to the bay agreement, is the Chesapeake Bay Commission. The commission assists the legislatures of Virginia, Maryland, and Pennsylvania by identifying bay-related issues that require legislative action. In addition, its members coordinate the development of consistent legislation among the three states. Membership includes a cabinet member and a citizen from each state.

These, then, are the basic coordinating institutions of the bay program.

DISINCENTIVES TO ACTION

The signing of the original 1983 bay agreement was truly a historic event for the bay. The mood at the signing ceremony was one of great optimism and

Jolene E. Chinchilli is senior scientist and assistant Virginia director of the Chesapeake Bay Foundation.

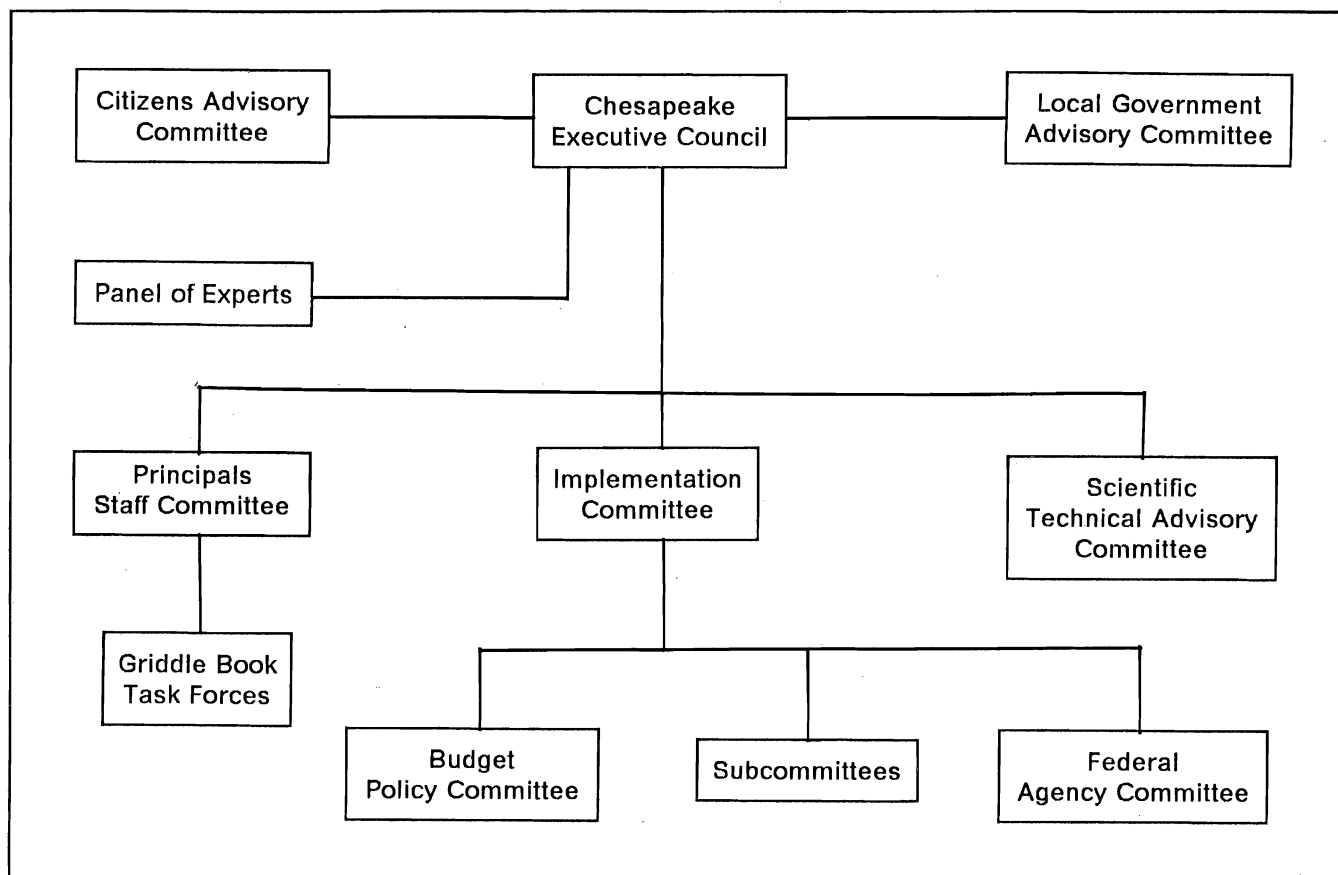


Figure 1: Chesapeake Bay Program Organization

high expectations for the future. The principal participants spoke with great enthusiasm about the bay and the new spirit of cooperation that would make bay restoration possible. But there was one person there that day who offered some sobering thoughts. Jacques Cousteau spoke about the ecologic and economic importance and the beauty of the bay and the need to take aggressive action to restore and protect such a valuable resource. But he was not optimistic about our likelihood of success. He warned us of the enormous political disincentives to collective action, and he pointed out that as long and arduous as it had been to get to this point, the real difficulties—maintaining momentum and inter-jurisdictional cooperation—were ahead of us.

At the signing ceremony, each jurisdiction announced its own program of bay cleanup initiatives. These initiatives were of vital importance to the bay restoration effort; they moved the program forward and provided a focus for the public and state environmental agencies. But they were coordinated only in the sense that all addressed the identified problems of the bay—nutrient enrichment, decline

of living resources, and contamination by toxic substances. Each set of initiatives, however, was still tailored to each state's individual needs. I mention this not to diminish the importance of those first initiatives, but only to point out the natural tendency of the states to focus on their own individual needs and hope that, collectively, these programs would act to effect a positive change in the bay as a whole. Cousteau's words were ringing true.

Today, five years later, we have a new bay agreement with specific goals and commitments with respect to water quality, living resources, and growth and development. The 1987 agreement recognizes that the bay's importance transcends regional boundaries and commits to managing the bay as an integrated ecosystem. In order to do this, many of the agreement's commitments speak specifically of basinwide strategies to be developed and implemented.

We are now seeing the first draft of the strategies that are being developed to meet various commitments of the new agreement and Cousteau's admonitions come to mind once again. An initial review

of these strategies reinforces the notion that effective coordination will be difficult to achieve despite the best efforts of those involved in developing these strategies.

CHALLENGES

What are some of the challenges that lie ahead as we attempt to manage the bay as an integrated system?

The September 1983 final report of the EPA bay study recognized the importance of addressing the bay's problems from an ecosystem perspective. It adopted as an overall goal: "...to restore and maintain the bay's ecological integrity." Such an ambitious goal presents major challenges to ecological and institutional research and to our present management capabilities.

In general, scientists and resource managers are beginning to view the ecosystem as the scientific framework for problem solving. However, this requires an interdisciplinary approach to technical and scientific issues that can be difficult to accomplish. A variety of specialists from wildlife and fisheries management to aquatic chemistry, to hydraulic modeling come into play, and individuals proficient in one of these areas are not usually knowledgeable in the others. Consequently, intercommunication among these specialists is often poor. Most educational programs in the sciences and engineering are still relatively narrow in scope. In addition, scientists and engineers within their own particular fields of expertise may view aquatic systems from very different perspectives. An aquatic ecologist, for instance, may see a body of water in terms of habitat and food chains while a sanitary engineer may see it in terms of assimilative capacity for wastewater discharge.

Needed: An Ecosystem Perspective

We need to promote and support interdisciplinary programs in our educational institutions and encourage more interaction among scientists working on various aspects of bay issues. Also, we should not delude ourselves about the limitations of our knowledge regarding ecosystems such as the bay. We must remember that the sophisticated models we're relying on to give us all the answers to bay management questions are not only the sum total of our collective knowledge of the bay—they also represent the sum total of our ignorance of bay processes.

Some believe the only way we will ever achieve management of the bay is to set up an interstate commission with the authority to set baywide standards and policies

A much bigger challenge, I believe, is establishing the ecosystem perspective as the accepted political and legal framework for environmental problem solving.

From the political perspective, we need to recognize that each state has its own unique political climate and realities and historical approach to environmental protection. Or, there simply may not be a large constituency for a coordinated bay cleanup effort. For example, Pennsylvania is an important partner in the bay program. The Susquehanna River, which drains the middle portion of that state, supplies 50 percent of the fresh water coming into the bay. Along with that fresh water comes a significant amount of pollutants, particularly nutrients. The pollutant-loading from the Susquehanna has a major impact on the upper bay, but the upper bay is Maryland, not Pennsylvania, waters. Also, Pennsylvania does not border the bay, nor does it benefit economically from the bay to the extent Maryland and Virginia do. Consequently, its citizens do not readily identify with the bay. Given this, and that Pennsylvania has its own pressing environmental problems, it should not be surprising if the bay cleanup effort is not Pennsylvania's highest environmental priority. Can Pennsylvania's politicians afford to allocate monies to bay cleanup when there are pressing problems closer to home?

Another challenge that is already facing us is the equity issue. The question is; should all jurisdictions contribute equally to cleanup efforts regardless of their contribution to the problem or historical investment in pollution control?

From the legal perspective, most existing environmental legislation, while important and, in many cases, effective, promotes fragmented environmental management rather than an integrated, coordinated approach. Most environmental laws have a single-medium orientation, i.e., they address a single environmental medium (e.g. the Clean Air Act and the Clean Water Act). Since this results in fragmented management within each state, it becomes even more difficult to coordinate these programs among the states.

Some recent research indicates that multi-institutional and multijurisdictional resource manage-

Some recent research indicates that multi-institutional and multijurisdictional resource management efforts are more successful when they are enabled and supported by legislative mandates. It has been suggested by some that the only way that we will ever achieve effective management of the bay is to set up an interstate commission with the authority to set baywide standards and policies that must be adhered to by all involved jurisdictions. This option is not a popular one with individual states because it would mean relinquishing some of their authority to a regional body.

Bureaucratic Resistance to Change

A major obstacle to effective coordination and implementation of baywide strategies is a strong bureaucratic resistance to change. Each state has a bias toward its own bureaucratic processes and procedures. There is a tendency to emphasize stability and gradual change regardless of the overall coherence or effectiveness of the program. Also, agency administrators are concerned with more than the impact of the program on the resource. They are also trying to achieve administrative efficiency and political acceptability and are trying to avoid excessive controversy and court challenge.

In addition, state agencies have limited resources and funding while their environmental management responsibilities are increasing as more federal programs are delegated to the states. Meeting existing program responsibilities is the first priority for these agencies and coordinating efforts usually take a back seat.

CONCLUSION

Given these obstacles to a coordinated baywide management strategy, should we be cynical about ever achieving it? I think the answer is "No." The concept of a coordinated, ecosystem approach to restoring the bay is a very resilient one—even in the face of numerous obstacles. It is stated again and again to be the most desirable approach. With every round of planning and strategy development, we come a little closer to achieving that goal. For example, we now have a coordinated baywide monitoring effort in place. Recently, the Chesapeake Bay Commission successfully coordinated passage of phosphate detergent ban legislation and legislation severely restricting the use of TBT antifoulant paints in both Maryland and Virginia.

Should we continue to be critical of present efforts that fall short of the desired level of cooperation? I believe the answer is "Yes." There is strong resistance to changing the way we have traditionally managed our natural resources. It is important that we take every opportunity to point out, particularly in the planning stages, where the level of coordination is inadequate. We must continue to bring this issue to the attention of the public and decision makers so that a strong administrative, legislative and public constituency for a truly integrated and coordinated bay restoration program is built within each state. If we don't demand better integration of our collective efforts we may, as Cousteau feared, ultimately fail in our efforts to Save the Bay.

Wetlands: What They Are and Why They Are Important

Highly diverse in composition, these marshy lands that surround much of the Chesapeake Bay share one thing in common: They teem with life.

Edward W. Christoffers

The term "wetlands" evokes many different images in the minds of the public. In Chesapeake Bay, the wetlands bring to mind the vast *Spartina* marshes of the Eastern Shore. However, wetlands are much more diverse than this image indicates. The U. S. Fish and Wildlife Service lists five major systems: marine, estuarine, riverine, lacustrine and palustrine (see box for definitions). They are further divided into subsystems and classes.

KINDS OF WETLANDS

Wetlands types one is likely to encounter within the Chesapeake Bay area include the following:

Marine Beach/Unconsolidated Shores

These systems exist primarily along the Atlantic Coast and near the mouth of the bay. They are frequented by shorebirds which feed on microorganisms and small invertebrates that live primarily in the intertidal and subtidal zone. The free-swimming larval forms of many of these species are an important part of oceanic planktonic assemblage.

Estuarine Intertidal Flats

Found throughout the estuary and once thought to have little value, these habitats are important feeding areas for the forage base (small fish and invertebrates which usually feed on vegetative material and serve as food for higher-level consumers) and commercially and recreationally valuable species.

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These flats play a vital role in energy transfer from adjacent wetlands and are home to numerous invertebrates including worms, clams, and snails.

Estuarine Intertidal/Subtidal Oyster Reefs

These habitats, long appreciated for the tasty mollusks they produce, have a unique faunal assemblage. Included are sea squirts, sea anemones, mussels, barnacles, mud crabs, worms, and various other species of fish, including gobies and blennies. It is an area of intense biological activity in which the organisms have developed a close association with one another over eons.

Estuarine Aquatic Vegetation Beds

Submerged aquatic vegetation (SAV) beds are important estuarine habitats. In fact, the decline of SAV in the Chesapeake Bay was one of the events that triggered the original round of studies that led to the present bay program. In the higher salinity zones, SAV beds are populated by eelgrass and widgeon grass. As the water becomes fresher, we find redhead grass, sago and horned pondweed. Plants in the tidal freshwater water zones include wild celery, common waterweed, coontail and bushy pondweed. In the mid and lower bay, these important habitats are colonized by a wide variety of animals, including hydroids, tunicates, slipper shells, tube worms, amphipods, isopods, crabs, shrimp, pipefish, sea horses, and various species of fish. In the fresher upper bay these habitats are colonized by a different group of animals.

Estuarine Emergent

This marsh type, by far the best known wetland in the bay, is regularly flooded twice daily and dominated by saltmarsh cordgrass, the most important

marsh plant in the estuary. Other plants commonly found in this type of wetland are sea lavender and glassworts. Regularly flooded marshes are essential habitats for young fish and many species of invertebrates. Narrow passages and tidal ponds provide shelter from predators and important feeding areas. Invertebrates commonly found include fiddler crabs, marsh crabs, shrimp, ribbed mussels and the marsh periwinkle. The ribbed mussel plays an important role in phosphorus cycling. Larval forms of these species are an important component of the bay's planktonic community. Fish species found in or adjacent to these wetlands in mid-salinity zones include striped killifish, mumichog, bay anchovy and hogchoker. Young weakfish, spot, striped mullet, needlefish and menhaden are found in higher salinity marshes in the lower bay.

Saltmarsh

The high marsh or irregularly flooded saltmarsh in mid-bay is dominated by black needlerush. At higher elevations saltmeadow hay and salt grass are the dominant species. These wetlands are flooded only by wind-driven or the higher high tides. Even with this infrequent flooding, the saltmarsh snail still retains an aquatic free-swimming larval form. It has accomplished this by developing a synchrony between its reproductive cycle and the spring high tides. These wetlands also have a high wildlife value.

Freshwater Tidal

Many of the bay's rivers contain extensive stands of tidal freshwater wetlands. These are some of the most beautiful wetlands and support numerous species of flowering plants. They include arrow arum, pickerelweed and the yellow pond lily. Other plants found in freshwater wetlands include wild rice, cattail, American three square, marsh hibiscus and big cordgrass. These wetlands are often located adjacent to important anadromous spawning zones (shad, river herring, striped bass). Invertebrates common to these wetlands are freshwater limpets, mussels and fingernail clams. The seeds of a number of plants have high wildlife value.

Scrub Shrub

These wetlands are usually found at the upper limits of the tidal zone and are flooded by storm events and spring high water. They occur only in the es-

tuarine and palustrine systems, but are one of the most widespread wetland types in the country. They are dominated by woody vegetation less than six meters tall. Species common to this type of wetland in the estuarine system are sea-myrtle and marsh elder. In the palustrine system, common plants are alders, willows, buttonbush, red osier dogwood, bog birch, bog laurel and leather leaf. These wetlands contain a variety of animals and have high wildlife value.

Forested Wetlands

This type of wetland is characterized by woody vegetation that is six meters tall or taller. Like the shrub wetland, forested wetlands are found above the upper fringe of the tidal zone in both the estuarine and palustrine systems. These wetlands usually have an overstory of large trees, an understory of young trees or shrubs, and a herbaceous layer. Plants common to the palustrine forested wetlands include red maple, American elm, ashes, black gum, swamp white oak, bald cypress and Atlantic white cedar. Wetlands of this type are generally flooded seasonally and provide important habitat for many aquatic species as well as upland wildlife. The species inhabiting these wetlands vary with the salinity of the adjacent waterway. However, the following types of organisms can usually be found: isopods, amphipods, millipedes, oligochaete worms, beetles, aquatic insects, sphaeriid clams, snails, fiddler crabs, crayfish, fish (top minnows, killifish, darters, perch, bullheads, pickerel), amphibians, reptiles, passerine birds and mammals.

IMPORTANCE TO THE BAY'S ECOSYSTEM

Having discussed some of the various types of wetlands found in the bay's drainage, let us now move on to their importance to the bay's ecosystem and living marine resources. Wetlands, as little as 30 years ago, were viewed as "wastelands" that did little more than breed snakes and mosquitoes. Government programs were devised to "reclaim" these lands and they were dredged, drained and filled to create marginally productive agricultural lands, industrial sites, and housing developments. Some individuals still hold these outdated views. Fortunately, these individuals are a minority today, and we now recognize wetlands as one of the most diverse and productive ecosystems on earth.

In the sections describing the various types of wetlands, there was information on the types of

plants and animals that occur in these habitats. Wetlands are, however, more than just the sum of these living parts. They interact to form holistic ecosystems that support a vast protein factory. Wetlands provide a flood buffer by allowing floodwaters and storm tides to spill out over them, thereby lessening the severity of the flood. They provide erosion control by binding the soil with their root or rhizome systems. The vegetative portion of the plants also helps to break and dissipate wave energy. Submerged aquatic vegetation also serves this important role. In addition, wetlands function as nutrient and sediment traps for upland nonpoint source runoff, and recycle much of the captured nutrients into usable organic material. These materials are cycled and recycled between the marsh, adjacent tidal flats, and the biota they support.

The freshwater wetlands in some locations play an important role in groundwater recharge. Because the vast majority of citizens living within the bay's watershed depend on groundwater, it is very important that we preserve this unique function. Wetlands also have very high wildlife values. They are used as breeding, nesting and feeding areas by ducks, colonial nesting birds, black birds, turkeys, deer and bear. The forested wetlands are particularly important in this regard. Finally, wetlands are important to the bay's living marine resources. Not only are they home to a vast number of species, as noted earlier, but they also export substantial amounts of organic "detritus" which helps fuel the estuarine food chain. The biomass per acre of ma-

terial produced rivals that of some of our cultivated crops like corn.

There is still debate in the scientific community over the importance of the contributions of phytoplankton and detrital material to the estuaries overall energy budget. Studies in southeastern estuaries utilizing the feeding energetics of menhaden have demonstrated that the energy provided by phytoplankton is insufficient to support the menhaden standing stock. Researchers have identified a gut flora assemblage, similar to that of termites, which allows menhaden to directly utilize the detrital material.

Wetland detrital production is important to the nation's commercial and recreational fisheries. In 1986, 70 percent (4.3 billion pounds) of the commercial harvest by weight and 66 percent (\$5.5 billion) by value were estuarine-dependent species. This percentage breakdown approximates the mix of estuarine-dependent species found and harvested in the Chesapeake Bay, giving us a baywide commercial harvest in 1986 of 431.9 million pounds with a value of \$259.2 million to the regional economy. Recreational fishing, in Maryland alone in 1979, was estimated to add \$396 million to the economy. Nationally, these fisheries added \$13 billion to our gross national product. Species falling into this classification included: striped bass, American shad, menhaden, river herring, sea trout/weakfish, flounder, drum and spot, to mention a few.

Although we know more about the value and function of wetlands today, we are still incurring losses. Between the mid-1950s and the late-1970s, wetland losses within the Chesapeake Bay drainage area averaged 2,800 acres annually. The vast majority of these losses occurred in nontidal areas as a result of agricultural activity and the construction of ponds and lakes. The construction of ponds alone resulted in 25 percent of the losses. Currently, 1.2 million acres of wetlands representing approximately 3 percent of the land mass, exist within the drainage basin.

WETLANDS DEFINITIONS

Marine: of or pertaining to the ocean

Estuarine: of or pertaining to an estuary, which is an area, such as the Chesapeake Bay, where there is a mixing of fresh and saltwater

Riverine: of or pertaining to a river system, including all types of wetlands except those dominated by trees, shrubs, persistent emergents or systems with a salinity above 0.5 percent

Lacustrine: of or pertaining to a lake-like system with a salinity always less than 0.5 percent and excluding wetlands containing trees, shrubs or persistent emergents

Palustrine: includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, and all similar wetlands occurring in tidal areas where the salinity is below 0.5 percent

LAWS TO PROTECT WETLANDS

Now that we have some idea of what wetlands do and why they are important, we can discuss the laws enacted to provide for their wise use and protection. The Corps of Engineers, utilizing the Rivers and Harbors Act of 1899, regulates all construction activities in navigable waters of the United States. These regulations cover wetlands occurring below the mean high water line, including placement of fill.

All the jurisdictions within the bay drainage also have programs to regulate tidal wetlands.

Nontidal wetlands, which compose about 75 percent of the bay's wetlands, are regulated under Section 404 of the Clean Water Act. This program, administered by the Corps of Engineers for the Environmental Protection Agency, regulates the placement of fill material. Presently, only Pennsylvania has a state-run program to control activities in nontidal wetlands. This statute, adopted in 1978, is administered by the Bureau of Dams and Waterway Management of the Department of Environmental Resources. Both Maryland and Virginia are in the process of developing state programs. Virginia's program was introduced in the 1988 legislative session and has been carried over for a vote in 1989. Maryland is planning to introduce their legislative proposal in the 1989 session. While Maryland proposes to regulate on a statewide basis as does Pennsylvania, Virginia's proposal, unfortunately, would only cover the area defined by code as Tidewater Virginia. This would leave the bulk of Virginia's nontidal wetlands unprotected.

WHO SHOULD PROTECT WETLANDS?

This leads us to ask who should regulate wetlands, the state or federal government? As pointed out in the previous paragraph, the federal program is the only program in Maryland and Virginia. The federal program provides a broad coordinated baywide approach to the regulation and protection of these important habitats. This allows for an ecosystem approach much like the existing Chesapeake Bay Program. In addition, many of the species that depend on our estuaries and their associated wetlands habitats are migratory. For example, striped bass, American shad, and menhaden that use the Chesapeake Bay are captured along our coast both to the north and south. These species are also subject to joint federal (Mid-Atlantic Fisheries Management Council) and state (Atlantic States Marine Fisheries Commission) management across state lines. I see no reason why our wetlands conservation programs cannot be constructed in a similar fashion. In fact, the baywide wetlands policy currently under development should result in this type of program being implemented.

Nutrient Reduction to the Bay: What's Equitable, Feasible, and Likely

The cost effectiveness of an across-the-board 40 percent reduction should be considered and increasingly costly management decisions for the future need to be anticipated.

Bernard J. Caton

Nutrient enrichment has been identified by the U.S. Environmental Protection Agency (EPA) as a major factor in the decline of the Chesapeake Bay. Wastewater discharges and agricultural and urban runoff from areas surrounding the bay are the primary sources of excess phosphorus and nitrogen that cause oxygen depletion of the bay's bottom waters. A consensus has been reached among officials of Virginia, Pennsylvania, Maryland, the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency—the participants in the Chesapeake Bay Agreement—that reduction of nutrients entering the bay must have a high priority.

The question of what constitutes an equitable policy for nutrient reduction has been discussed for some time by the bay agreement participants, but the term "equitable" remains to be defined. Does equitable mean that each of the jurisdictions (the states and the district) should reduce a proportionate amount of nutrients? If so, how should the proportion be determined? Should the reduction be the same for point and nonpoint sources? Should each jurisdiction develop a program to remove proportionate amounts based on composite flows of excessive nutrients into the bay? Or would the most cost-effective means of reduction be determined by sophisticated mathematical modeling?

The jurisdictions hope that some of these questions will be answered as they work toward a common goal. As part of the Chesapeake Bay Agreement, the jurisdictions committed themselves to a 40 percent reduction of nutrients entering the bay by the year 2000 and drew up a long-range schedule for reaching that goal. In the spring of 1988, representatives of point- and nonpoint-source

management agencies from each of the jurisdictions prepared strategies outlining their respective plans for reducing their share of nutrients entering the bay. By July 1988, the Water Quality Task Group, composed of representatives from all the signatories, had drafted the *Basinwide Nutrient Reduction Strategy*, summarizing the major common elements of the four jurisdictions' plans. When representatives of the signatories met in July, they reviewed the strategy and made a commitment to its implementation.

The strategy is divided into three phases (see Table 1). Each phase allots overall goals and specific tasks for the jurisdictions.

As a basis for setting nutrient reduction goals for each of the four jurisdictions, the strategy establishes nutrient base loads for point sources in 1985 and nonpoint sources in the average rainfall year. The reduction goals for each are:

Locality	MILLIONS OF POUNDS A YEAR			
	Phosphorus		Nitrogen	
	1985	2000	1985	2000
DC	0.225	0.179	14.538	8.723
MD	6.895	4.137	52.910	31.746
PA	3.254	1.950	60.860	36.540
VA	8.456	5.073	59.641	35.784

Several key issues and questions for consideration in implementing an equitable nutrient reduction strategy have been identified by the bay agreement participants. Progress made toward nutrient reduction before 1985—brought about primarily by the use of BMPs and installation of advanced treatment facilities—needs to be more thoroughly evaluated. The cost effectiveness of an across-the-board 40 percent reduction should be considered. Increasingly difficult and costly management decisions for the future need to be anticipated. Reduction programs tailored to specific river basins and their nutrient loading problems should be ex-

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plored. Successful nutrient reduction from nonpoint sources will require additional work in determining base load and load reduction figures, in developing enhanced modeling and monitoring data, and in improving our knowledge of BMP effectiveness.

Some issues are certain, however, and must be dealt with if the reduction strategy is to succeed. The water-quality model of the bay must be com-

pleted and used to determine the best methods of achieving nutrient reduction. Well-planned and effectively completed nutrient control measures are clearly necessary. Perhaps most important, officials and residents of the states and the district must take their commitment to the Chesapeake Bay Agreement seriously and make valid efforts to reach the nutrient reduction goals outlined in the strategy.

TABLE 1
Chesapeake Bay
Nutrient Reduction Strategy

Phase I: 1985-July 1988

Point-Source Programs

- Municipal wastewater treatment plant phosphorus removal
- Permit compliance programs
- Phosphate detergent bans
- Dual biological nutrient removal demonstration projects
- Water-quality standards
- Patuxent River Basin nitrogen removal

Agricultural Nonpoint-Source Programs

- Agricultural conservation program
- Watershed protection projects
- Conservation reserve program
- Rural clean water projects
- Education assistance funding program
- Technical assistance
- Animal waste control programs
- State agricultural cost-share programs

Urban Nonpoint-Source Programs

- Soil erosion and sedimentation laws
- Stormwater management regulatory programs
- Retrofit and demonstration projects
- Combined sewer overflow controls

Other Programs

- Critical areas-riparian-wetland laws

Phase II: July 1988-December 1991

Point-Source Programs

- Continued installation of phosphorus removal
- Policies encouraging nitrogen removal, coupled with other permit-required upgrades
- State revolving loan fund programs

- Nitrogen removal feasibility and targeting studies

Agricultural Nonpoint-Source Programs

- Increased staffing for existing programs
- Nutrient management plans (manure and fertilizer)
- Forested buffer strips
- Targeting of control program
- Incentives for conservation compliance
- Increased interprogram coordination
- Improved geographical information systems

Urban Nonpoint-Source Programs

- Expanded stormwater management regulatory authority
- Stormwater utility (grant) program for targeted installation and maintenance of Best Management Practices
- Combined sewer overflow effectiveness evaluation
- Increased implementation and enforcement of existing and new stormwater laws

Other Programs

- Improved and increased nutrient monitoring and reduction
- Establishment of Chesapeake Bay Preservation Areas

Phase III: December 1991-2000

Point-Source Programs

- Regulatory programs for nitrogen removal
- Financial assistance programs

Nonpoint-Source Programs

- Expansion of agricultural control programs
 - Expansion of urban control programs
-

The 1987 Chesapeake Bay Agreement: What's in it, What's Not, and Why

Between the 1983 and 1987 agreements, the signatories gained a sense of program direction and realized that not all the problems plaguing the bay required technical solutions. Even a fishing tournament could help.

Keith J. Buttleman

The groundwork for the 1987 Chesapeake Bay Agreement was laid with the signing of the first agreement in 1983. The 1983 agreement consisted of several paragraphs which acknowledged that the bay was in trouble and needed a coordinated effort by private citizens, public interest groups, and government at all levels to save it. The 1983 agreement established the following program framework:

- An Executive Council of policy officials to provide oversight of the effort
- A technical working group, known as the Implementation Committee
- Two advisory committees: one of citizens, the other of scientists and academicians.

Between 1983 and 1987 those groups established mechanisms for coordinating their efforts, discussing their problems, airing their concerns, and ensuring public involvement by individual states and by citizens across the region.

There were several factors which prompted a growing interest in development of a new agreement:

- The participants had had three years experience of working through the growing pains of this program
- A sense of program direction existed
- More scientific information had been collected
- Many of the original moving forces behind the agreement (such as Governor Chuck Robb of Virginia and Governor Harry Hughes of Maryland) were no longer directly involved in the program.

It was time for a renewal of the commitment.

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Virginia Governor Gerald Baliles had become chairman of the Chesapeake Executive Council in January 1987. That May he established an ad hoc group to draft a new document based on the citizen comments he had received. The members of the group represented the entities that signed the 1983 agreement: Virginia, Maryland, Pennsylvania, the District of Columbia, the Environmental Protection Agency, and the Chesapeake Bay Commission. The drafting committee, as it became known, was chaired by Virginia's secretary of natural resources, John Daniel, II.

The group met throughout the summer of 1987. Draft language was offered, edited, debated, then decided. On occasion language that had been rejected was resurrected. There were two ways to organize the document, and the decision on which method to use changed several times. The group agreed on concepts, and I was charged with developing the "resounding prose" as well as the "bureaucratese." Finally, the governors themselves made some additional changes during their August 1987 session.

Certain issues required delicacy. For example, nutrient over-enrichment of the bay was a recognized fact, and reduction of the two main culprits (nitrogen and phosphorus) was accepted as necessary. But expressing an overall goal to reduce the flow of both nutrients from the states and the District of Columbia was difficult.

For example, the District of Columbia's Blue Plains advance wastewater treatment plant removes 96 percent of the phosphorus contained in the effluent. It is neither technically nor economically feasible for the District to promise to remove 40 percent of its point-source phosphorus discharge. Hence, the introduction of the equity concept. The agreement states: ". . . by July 1988, to develop, adopt, and begin implementation of a basinwide strategy to equitably achieve by the year 2000 at

least a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Chesapeake Bay."

At one point it was suggested that rather than identify the two particular nutrients, nitrogen and phosphorus, the document should indicate the need for a reduction of nutrients in general. However, that language was considered too vague, especially since most of the bay community was aware of the nutrients at issue.

Even now there are varying interpretations of exactly what the commitment requires of the jurisdictions. Some believe there must be a 40 percent reduction of nutrients from each entity—hence, each tributary. Others feel the true test will be based on measurements in the bay itself. This is still the subject of lively debate.

The new agreement made some slight alterations in the structure of the Chesapeake Bay Program. Although the basic structure is the same, the most significant change is at the top. Under the 1983 agreement, the Chesapeake Executive Council members were cabinet and policy officials. To highlight the importance attached to the bay program, this was changed. Those who signed the 1987 agreement—the chiefs of the bay states, the District, EPA, and the Bay Commission—now compose the executive council.

Recognizing the work loads and time constraints established by the new agreement, the executive council created a support group to keep the program on track. Even the name of this group went through several changes—the Oversight Committee, the Policy Committee, etc.—until it was decided to refer to it as the Principals' Staff Committee. The committee members are the cabinet and policy officials who had been the executive council in the past.

The agreement does not contain specific numbers on toxic substances or water quality standards. This recognizes that differences exist among the entities in the bay basin. Certain limitations are indeed necessary, but the agreement is designed not to interfere with the internal mechanisms of each state.

The new agreement is not totally a technical document. It focuses on the real sources of the bay's decline but also contains commitments in other areas, including public participation and public access. The public access issue prompted debate because of concern that increased access could start anew the cycle of decline. It was concluded that public access is a viable need that must be coupled with education to encourage a sense of stewardship.

Not all of the commitments are serious and bureaucratic. Governor Baliles suggested a fishing tournament as a means to publicize the importance of the bay as a recreational resource. Governor Schaefer of Maryland liked the idea immediately. Some felt the fishing tournament commitment was frivolous and detracted from the serious intent of the agreement. But the executive council insisted, believing that such an activity is an effective way to reach the general public and raise its awareness. Virginia has held its Governor's Cup tournament for three years and has begun to see some significant fund-raising potential along with obvious values of public awareness. This year, Maryland joined Virginia with its Governor's Cup tournament on the same day.

There remains much to be done to improve the quality of the bay, but the directions and mechanisms established by the 1987 Chesapeake Bay Agreement will do much to get us where we want to be.

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