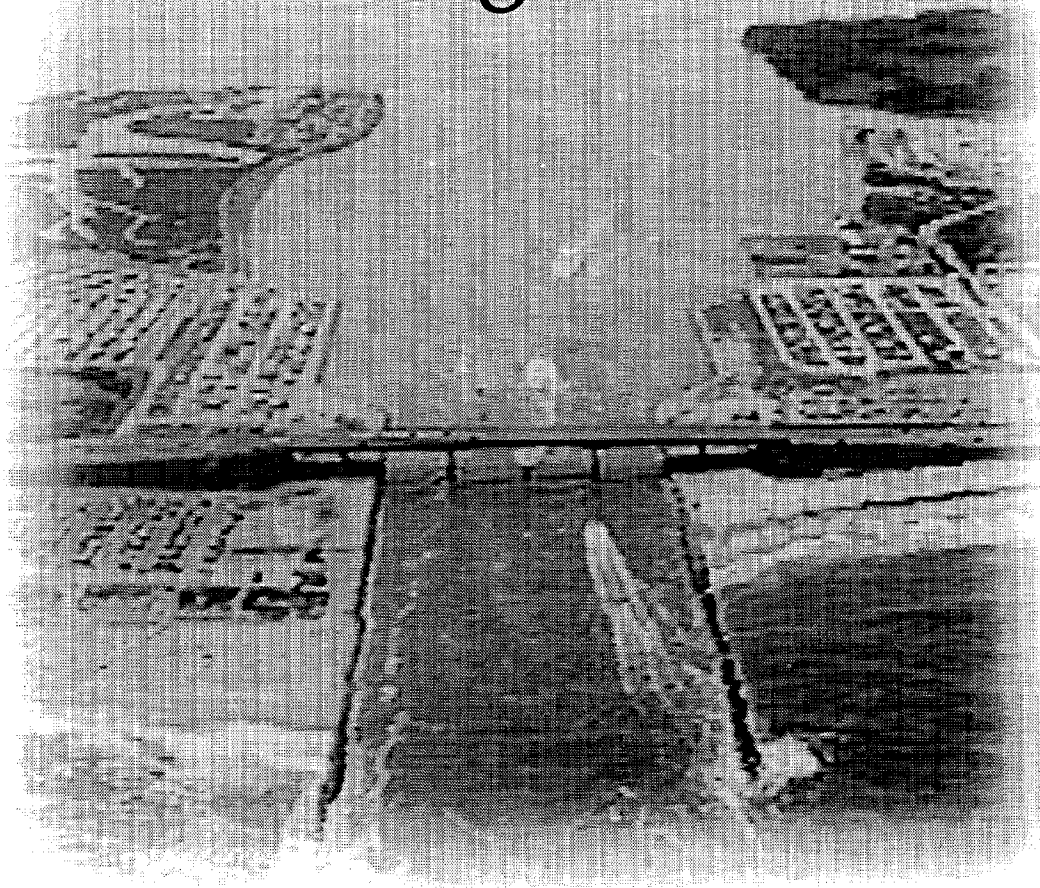


**Chapters 1-5
of the
Delaware Inland Bays
Comprehensive Conservation
and Management Plan**



June 1995

A COMPREHENSIVE

CONSERVATION AND MANAGEMENT PLAN

for

DELAWARE'S INLAND BAYS

June 1995

Dedication

To the late Barbara Porter,

*whose active presence over many years of effort to
restore the Inland Bays serves as a model and
inspiration to us all.*

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Historical Background

For well over two decades Delawareans have been concerned for the Inland Bays - Indian River, Rehoboth, and Little Assawoman. The Sea Grant Advisory Council, concerned about the impacts of unplanned growth on the Bays, sponsored a 1983 report, *Decisions for Delaware*, which stated the need for a comprehensive strategy to conserve these vulnerable resources. The report concluded that before such a strategy could be developed, a Governor's bipartisan task force must be established to recommend a strategic plan for managing the Bays. The Governor's Inland Bays Task Force was established; it reviewed the problems facing the Bays and in 1984 issued recommendations for their protection. Included among the task force recommendations was the establishment of a monitoring committee to oversee the implementation of the recommendations. The Inland Bays Monitoring Committee worked from 1984 to 1989 to ensure that the recommendations were carried out. More than 60 percent of the task force recommendations have been implemented.

Much work remains to be done to improve the environment in the Bays' watershed, although much has been done already. First, as the population in the watershed grows there remains a lack of comprehensive planning for sewage treatment and shoreline preservation. Secondly, the viability and growth of the agricultural industry presents new challenges for continuing the reduction of nutrients from these operations. The Inland Bays Estuary Program carried on this work through the Comprehensive Conservation and Management Plan (CCMP) development and implementation process. The Center for the Inland Bays shall continue implementing the CCMP.

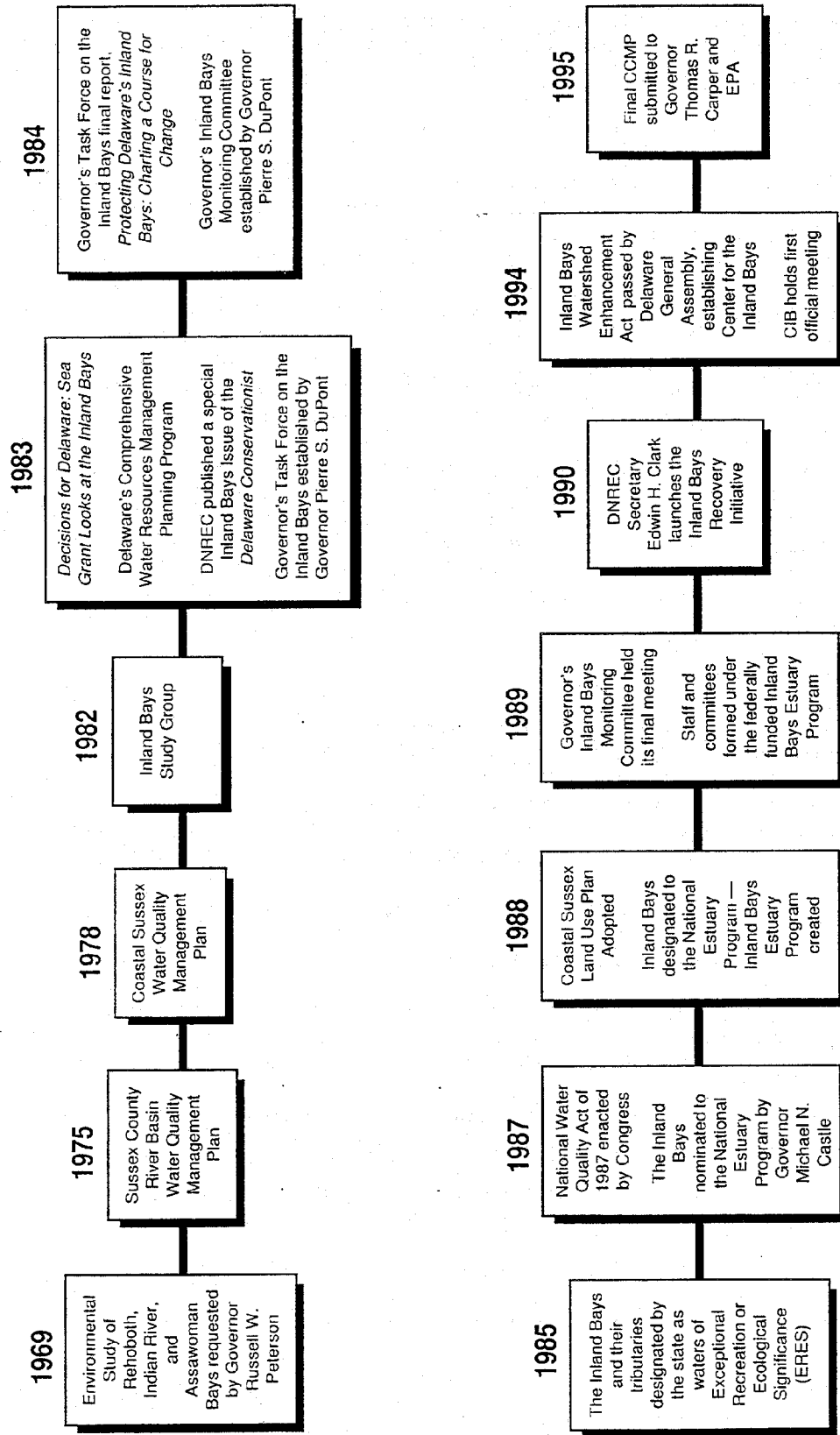
The Inland Bays Estuary Program

The Inland Bays Estuary Program began in 1988 when the U.S. Environmental Protection Agency (EPA) convened a Management Conference at the request of Governor Michael Castle. A Management Conference is an organized group of committees charged with deciding what actions to take to protect or restore an estuary - a biologically productive waterway where fresh water drained from the land mixes with salt water from the ocean. Under the federal Clean Water Act, which established the National Estuary Program, Management Conferences must carry out seven major tasks to improve estuaries like the Inland Bays:

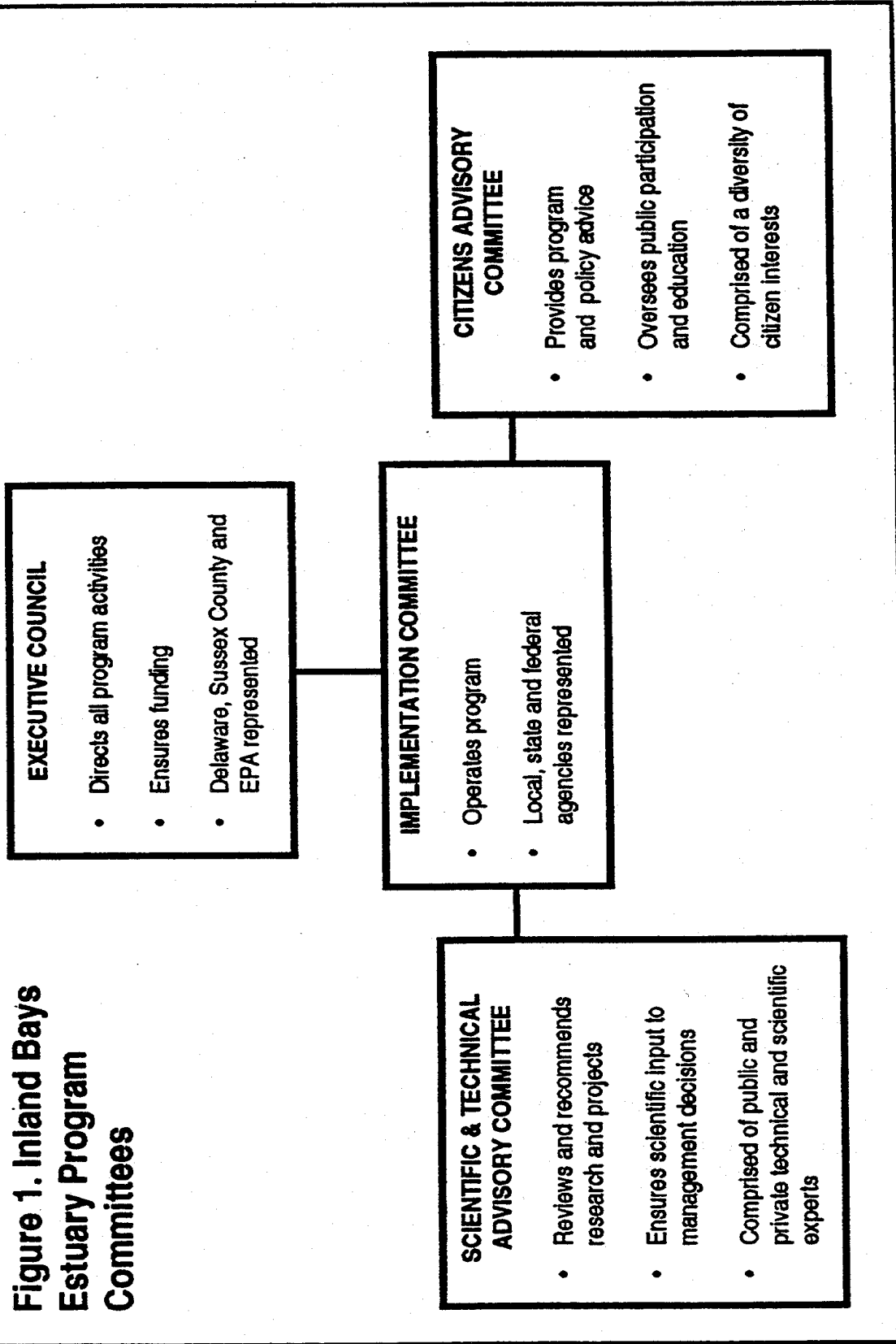
- ! Assess trends in the estuary's water quality, natural resources, and uses.
- ! Identify causes of environmental problems by collecting and analyzing data.
- ! Assess pollutant loadings in the estuary and relate them to observed changes in water quality, uses, and natural resources. (These first three required tasks comprise the characterization of the Bays. See Appendix F. *The Characterization of the Inland Bays* and Chapter 2. *State of the Bays*.)
- ! Recommend and schedule priority actions to restore and maintain the estuary and identify the means to carry out these actions - the Comprehensive Conservation and Management Plan.
- ! Ensure coordination on priority actions among federal, state, and local agencies involved in the conference.
- ! Monitor the effectiveness of actions taken under the CCMP.
- ! Ensure that federal assistance and development programs are consistent with the goals of the plan.

Figure a.

Timeline of Inland Bays Programs and Management Efforts



**Figure 1. Inland Bays
Estuary Program
Committees**



Chapter 1. INTRODUCTION TO THE INLAND BAYS ESTUARY PROGRAM

The Delaware Department of Natural Resources and Environmental Control (DNREC), the Department of Health and Social Services, Sussex County and EPA were represented on the Executive Council.

Scientists and many interested and affected businesses, organizations, and individuals played important roles through the Scientific and Technical Advisory Committee (STAC) and the Citizens Advisory Committee (CAC). The Implementation Committee was made up of representatives from all federal, State, and Sussex County agencies with responsibilities for environmental and public health protection, resource conservation, and land use management and of chairs of the STAC and CAC (see Figure 1. Inland Bays Estuary Program Committees). The Inland Bays Estuary Program was administered by DNREC staff.

After months of review and deliberation by these committees, the Management Conference agreed on goals and objectives for the Inland Bays Estuary Program. These goals and objectives, along with the findings of the report, *The Characterization of the Inland Bays* (see Appendix F), and other studies, form the base for the CCMP. In order of priority, the goals are as follows:

- ! Establish and implement a comprehensive nonpoint source pollution control program.
- ! Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat.
- ! Develop and implement comprehensive zoning ordinances, laws, and regulations at all levels of government that promote environmentally sound land use.
- ! Establish and implement a comprehensive wastewater management program.
- ! Develop and implement a ground water management program that protects and improves drinking water supplies.
- ! Develop and implement a water use plan.
- ! Establish and implement a shoreline protection program that addresses both natural processes and human activities.
- ! Coordinate Inland Bays management with existing solid waste, air pollution, and toxics programs.
- ! As much as possible, ensure that all public participation, information, and education are a part of planning and management activities related to the Inland Bays.

The Management Conference committees met regularly as the CCMP process evolved. After agreeing on goals and objectives, the committees began reviewing the problems of the Bays. They agreed to address those problems of greatest concern, particularly those related to nutrient overenrichment and habitat loss, for which solutions are available and are economically and politically feasible, though perhaps controversial. (The Problem Ranking Matrix is presented as an introductory section to Appendix F. *The Characterization of the Inland Bays*.) Many

Chapter 1. INTRODUCTION TO THE INLAND BAYS ESTUARY PROGRAM

issues remain, however. Some of these, such as urban nonpoint source runoff, will be addressed as part of the Pollution Control Strategy; others are included in Chapter 5 of the CCMP, *Future Needs*.

Public Participation in the Management Conference

A key role of the Management Conference was to ensure that all work be directly linked to the needs of people living, working, and playing in the watershed. To ensure that the CCMP reflected the public interest, myriad opportunities were provided for public education and input:

- ! In 1989, a sample of 301 Sussex County residents systematically drawn from residential listings in the Sussex County telephone directory (the 1989 Sussex County population was 111,434) were asked how they and other members of their households used the Inland Bays and about their environmental concerns for these waters. In response to this opinion survey 93% said it was important for them "just to know that these waters are there." The opinions of respondents showed that 97 percent favored prohibiting discharges of pollutants, 83 percent favored restricting building and development, and 82 percent favored strictly enforcing environmental laws.
- ! Three public meetings held in 1990 showed the following response by 115 citizens in attendance out of 113,225 total county residents. Of those citizens attending, 91 percent strongly favored controls on agricultural runoff and 93 percent strongly favored controls on residential septic systems.
- ! The Citizens Advisory Committee, which includes members from various groups of local citizens, has met regularly since being established in 1989. This committee has provided ongoing input to the estuary program and includes the individuals and groups listed in the beginning of the CCMP.
- ! The Scientific and Technical Advisory Committee has also met regularly and has been a source of continuing input.
- ! Public meetings and workshops, as well as Inland Bays Appreciation Days and other events, are part of the ongoing and intensive public education program aimed at schools and the adult community. A variety of educational materials such as fact sheets, slide presentations, and displays have been prepared and distributed for use in these programs. Inland Bays staff have sponsored numerous estuary events and made many presentations to community groups. (See Appendix B. *Comprehensive Public Participation and Education Plan*, Background.)
- ! The Burton Island Interpretive Nature Trail opened in 1991, displaying natural wonders around the Bays.
- ! To guide the drafting of the CCMP, roundtable discussions and "vision workshops" were held periodically through CCMP completion.
- ! Business People for the Bays has been established to promote Bay awareness and events.
- ! Led by an effort of the Citizens Advisory Committee to establish a nonprofit advocacy group for the Inland Bays watershed, the *Inland Bays Watershed Enhancement Act* was enacted by the Delaware General Assembly. This law establishes a Center for the Inland Bays, a nonprofit organization to oversee and facilitate the implementation of a long-term approach for the wise use and enhancement of the Inland Bays watershed.

Chapter 1. INTRODUCTION TO THE INLAND BAYS ESTUARY PROGRAM

- ! At each stage of CCMP development, workshops for elected officials, public meetings throughout Sussex County, and vision workshops encouraged CCMP input. In all, nearly 300 citizens and officials participated in public meetings (the 1990 Sussex County population was 113,225). In addition, more than 200 committee members and resource experts contributed ideas and technical information used to formulate each tactical action of the CCMP. Based on this input, the document has been periodically revised, yielding five draft CCMPs, each circulated to about 1,100 people for review. (See Appendix C. *Public Input and Response Summary*.)

Early Accomplishments of the Estuary Program

As work toward the CCMP progressed, a number of supporting efforts helped lay the groundwork.

The **Inland Bays Recovery Initiative**, a two-year program that began in March 1990, has been integral to the estuary program. (See Appendix E. *Recovery Initiatives - Final Report*.) The purpose of the Recovery Initiative was to field-test ideas that could be central to the CCMP; therefore, the CCMP is based largely on what has been learned through the Recovery Initiative. This Initiative achieved significant results that are described throughout this document; some are outlined as follow:

- ! Conservation plans were developed for more than 49,274 out of 60,000 acres of cropland.
- ! We C.A.R.E. (Comprehensive Agricultural Resource Effort) program began, providing farmers with nutrient and pest management services, testing, and education.
- ! New stormwater management regulations were enacted, allowing intensive review and monitoring of stormwater management plans and sediment control for new development; over 1,158 erosion control plans were reviewed and 2,820 sites were inspected.
- ! New marina regulations began protecting water quality and living resources.
- ! Work was begun to provide central sewage collection and treatment systems to the Inland Bays area, replacing about 4,600 septic systems.
- ! Educational efforts began to focus on faulty septic systems and stormwater runoff.
- ! A land-use planning consultant was hired by Sussex County to prepare local ordinances that encourage environmentally protective development, including cluster development, within the County.
- ! Open space was and continues to be acquired through the program of land acquisition by the Department of Natural Resources and Environmental Control. (As part of another effort, the Agricultural Preservation District Program of the Agricultural Lands Preservation Foundation is moving ahead with nearly 14,000 acres preserved Statewide.)
- ! A review and update of the Coastal Sussex Land-Use Plan began.
- ! Another program of the Recovery Initiative provided free trees to property owners to improve wildlife habitat and continues to provide other amenities to residential developments.

Chapter 1. INTRODUCTION TO THE INLAND BAYS ESTUARY PROGRAM

- ! To protect and enhance fish and wildfowl populations, efforts were begun to plant aquatic grass, disperse seeds, and remove abandoned crab pots.

In addition to Recovery Initiatives, **Action Plan Demonstration Projects** designed to test new techniques were started. Lessons learned from these projects will influence a number of the tactics selected for implementation in the CCMP. (See Appendix D. *Project Summaries*.)

- ! One project resulted in the construction of a two-acre wetland and pond system to remove pollutants from stormwater at the Sussex County Industrial Park.
- ! Another successful Action Plan Demonstration Project is leading to the reduced use of bulkheads and increased use of natural vegetation and stones to protect shorelines throughout the watershed.
- ! The program hired a conservation planner to continue and expand on the development of comprehensive conservation plans for farms in the watershed. These plans include techniques for managing nutrients, water resources, woodlands, wildlands and integrating crop and pest management.
- ! A three-tiered project sought to continue advances being made by farmers in the control of nitrates from poultry manure. The projects used proven techniques, including storing poultry manure in field-pad structures, and is still testing an applicator for side-dressing poultry manure and using floor barriers in poultry houses. Results from the side-dressing and floor barriers projects are not yet complete. These will be monitored to determine which can be used as models or, when appropriate, what follow-up is required.

The **Water-Use Activity Impacts Report**, prepared in 1989, will serve as a basis for developing a Water-Use Plan for managing use of the Bays waters.

The **Inland Bays Citizen Monitoring Program**, developed by the University of Delaware Sea Grant Marine Advisory Service, is monitoring 30 to 50 sites using more than 50 volunteers.

A computerized **Geographic Information System (GIS)** is providing topographical and other information especially useful in planning water and wetland programs and in issuing permits.

Important **research efforts** began early in the program and include the following studies that are included as part of the characterization effort:

- ! Nitrogen and phosphorus levels were studied by the University of Delaware College of Marine Studies to determine which of these nutrients affect the production of algae in various parts of the estuary. This information is being used to determine the nutrients that need to be controlled and their location in the watershed, thus maximizing the effectiveness of management actions.
- ! Recent research by Delaware Geological Survey found that high nitrogen levels in ground water discharges to Rehoboth and Indian River Bays come from a variety of sources including fertilizer and manure applications over the years.
- ! Another College of Marine Studies investigation focused on circulation and flushing patterns in Rehoboth and Indian River Bays. It appears that pollutants, which attach to sediment particles in Indian River, may

Chapter 1. INTRODUCTION TO THE INLAND BAYS ESTUARY PROGRAM

not be flushed out if they are trapped by bottom waters. This result may be due to the tendency of surface water to move toward sea and bottom waters to move toward land. In Rehoboth Bay, circulation tends to be driven by wind.

A new **hydrodynamic and water quality model** was used to develop a Pollution Control Strategy for the CCMP.

The Natural Resources Conservation Service is identifying areas in which to focus water quality treatment technologies as part of a national **Hydrologic Unit Area** project. Results will be used to further refine existing agricultural runoff control tactics.

The **Indian River Watershed Protection Plan** provides for assistance to landowners implementing conservation practices that include building structures for water control and waste management, tree planting, buffer stripping, and managing wetlands.

A number of **recently enacted laws, regulations, and initiatives** are expected to be utilized as part of CCMP implementation.

- ! Well and Septic Permit Law - Establishes permit system for wells and septic systems. (State statute)
- ! Revised Surface Water Quality Standards - Raises standards beginning in 1990. (State regulation)
- ! Land Protection Act - Provides for public-private partnerships for land acquisition, conservation easements, and land protection. (State statute)
- ! Agricultural Lands Protection Act - Establishes policy to preserve and protect agricultural lands. (State statute)
- ! Erosion and Sedimentation Control Act and Sediment and Stormwater Regulations - Establishes stormwater management program in rural and urban areas and expands erosion and sediment control programs. (State statute and regulations)
- ! Marina Regulations - Controls new marina construction, restricts detrimental impacts from upgrading existing marinas, and establishes good housekeeping procedures. (State regulations)
- ! Subaqueous Lands Regulations - Establishes application procedures, fees, and criteria for permitting and leasing subaqueous lands and restricts installation and use of shoreline erosion control structures in tidal wetlands. (State regulations)
- ! Wetlands Regulations - Establishes policy to preserve and protect tidal wetlands and a permitting process and restrictions for dredging, building bulkheads, and other uses of tidal wetlands. (State regulations)
- ! Inland Bays Watershed Enhancement Act - Establishes the Center for the Inland Bays as the entity to oversee and facilitate both the implementation of the CCMP and a long-term approach to the wise use and enhancement of the watershed.

Chapter 2. THE STATE OF THE BAYS

The Inland Bays have been the subject of numerous scientific and technical studies created to measure their current environmental status and to determine trends. The findings of these studies have contributed in large part to the development of CCMP action plans designed to limit additional detrimental effects and to reverse current adverse trends in water quality and living resources. The most notable of these studies is *The Characterization of the Inland Bays* (see Appendix F). The Scientific and Technical Advisory Committee (STAC) provided guidance and oversight for all recent studies and analyses.

Physical Description of the Inland Bays

Delaware's Inland Bays consist of three interconnected bodies of water - Indian River Bay, Little Assawoman Bay, and Rehoboth Bay - located in the southeastern part of Delaware, in Sussex County (see Figure 2. *Map of Inland Bays Watershed*). Rehoboth and Little Assawoman Bays are estuaries built on sand bars; Indian River Bay is a drowned river valley. The Bays and their tributaries cover about 32 square miles and drain a 300-square-mile watershed. They have a marsh area of 9 square miles, a mean low-water volume of 4 billion cubic feet, and a freshwater discharge of 300 cubic feet per second. Almost 30 square miles of the Inland Bays are classified as shellfish waters, of which 19 square miles presently are approved for shellfishing. There are about 126 people per square mile of the Inland Bays watershed. The Inland Bays are tidally flushed, with estimates typically converging on 90-100 days for Indian River Bay and 80 days for Rehoboth Bay. No flushing estimates are available for Little Assawoman Bay.

Fresh water enters the Bays through ground water discharges, by runoff from land, and from tributaries. Salt water from the Atlantic Ocean enters the Bays through the Indian River Inlet, Lewes and Rehoboth Canal, Roosevelt Inlet, and the Assawoman Canal, which connects Little Assawoman Bay to Indian River Bay. Natural channels connect Rehoboth and Indian River Bays near Massey's Landing; Assawoman Canal connects Little Assawoman Bay to Indian River Bay.

According to historical accounts and natural records preserved in sediment cores, the links between the Inland Bays and the ocean are very fragile. The Indian River Inlet, the main link, has deepened and shoaled, temporarily closed, and migrated along the barrier island. Between 1935 and 1939, there was no free connection at all between the Bays and the sea; this led to the destruction of marine and estuarine organisms and habitats and to their replacement by freshwater organisms. In 1940, a new channel to the ocean was created — Indian River Inlet — providing the first stable connection between the upland and the sea and creating a more permanent estuary.

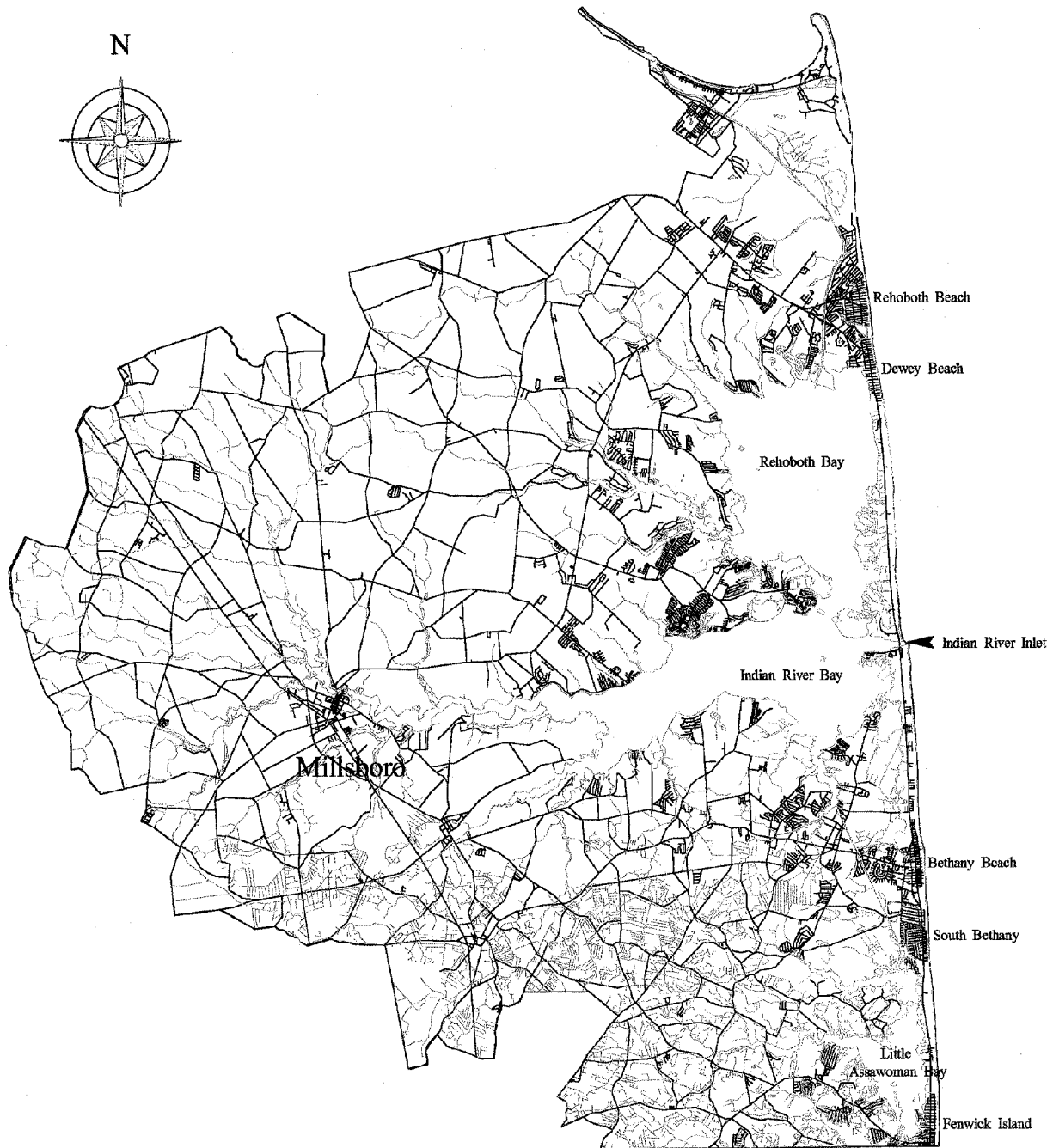
The Inland Bays are shallow, having an average low-water depth of three to eight feet and a tidal range of about three feet. There is some anecdotal evidence that the Bays are getting even more shallow. This is due in part to sedimentation, but also to lower water levels during ebb tides. For any system where the average depth is only three feet, any change can have a dramatic effect.

Tidal flushing is disproportionate around the estuary because of the restricted connections with the Atlantic Ocean. For example, the east end of Indian River Bay and southern Rehoboth Bay are well flushed by tidal water twice a day, while most of the other waters are replaced at a much slower rate.

Although the Bays are slowly and unevenly flushed, they create a natural estuarine environment for finfish, shellfish, and waterfowl, which can engender high biological productivity. This high productivity, however, depends upon the delicate balance between the living resources of the estuary and the quality of their physical environment. An increase in saltwater levels can threaten this balance.

Figure 2

Delaware Inland Bays Study Area



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The marshes and wetland areas - about nine square miles - that form buffer zones between the upland and open water environments are critical to the Bays' living resources. In these areas nutrients are stored and supplied, and finfish, shellfish, and waterfowl are nurtured. Wetlands also help to mitigate shoreline erosion. Any changes to wetlands and other physical attributes of the Inland Bays can dramatically alter the natural balance of the Bays and their living resources.

Inland Bays Facts

Drainage Area: 300 square miles
Water Surface Area: 32 square miles
Marsh Area: 9 square miles
Mean Low-Water Volume: 4 billion cubic feet
Average Low-Water Depth: 3-8 feet
Fresh Water Discharge: 300 cubic feet per second
Classified Shellfish Waters: 30 square miles, of which 19 square miles approved for shellfishing
Population: 126 people per square mile of watershed; about 120,000 people live in the watershed
Days Tidally Flushed Annually: Indian River Bay - 90-100 Days
Rehoboth Bay - 80 Days
Little Assawoman Bay - Not Available

Impact of Inland Bays Demographics

The population of Sussex County increased from 80,356 in 1970 to 113,225 in 1990; it is projected to increase further to almost 150,000 by 2011. These increases will strain the capacity of sanitary sewers, public water supplies, and other County infrastructure and services. Moreover, additional seasonal and weekend visitors who come for vacation and recreation tend to further strain local capability to provide services.

Increases in population can be costly to residents throughout Sussex County. For example, in the last few years, Sussex County alone spent \$40 million on sewerage projects at Long Neck and Dagsboro-Frankfort, and a major new project is expected to cost \$60 million by the time it is completed. Additional funds will be required by municipalities for upgrading sewage treatment capacity at about 15 municipal systems over the next 20 years, including Seaford, Milton, Lewes, and Selbyville facilities. Several privately-operated systems will need upgrading as well.

Future estimates of the impact of additional population growth are provided by the results of a study done by Dr. Sherm Rosen during the course of work on the CCMP. His study attempted to measure the demand for public facilities and services to accommodate potential population growth in Sussex County. His research showed that an additional \$50 million might be required in the next 20 years and that additional funds would likely be required for upgrading all sewage treatment plants within the Inland Bays watershed over the next 20 years. Moreover, the construction of new roads and improvements to existing roadways demanded by new residents can result in an even more rapid expansion of development into rural areas with accompanying commercial and industrial development.

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Sussex County does not have an areawide water supply system. Instead, the people of Sussex County obtain water from municipal systems, private wells, or private water suppliers - all of which get their supplies from groundwater sources. At this time, there does not appear to be a pending water supply problem resulting from an increase in population; however, there is a serious need to protect the quality of groundwater supplies.

The poultry industry in Sussex County has grown also. The number of chickens raised and processed for food has increased over the last 20 years. Recent figures show that about 83 million chickens are produced in the watershed, creating around 95,450 tons of manure each year. This amount of manure provides 3,054 tons of nitrogen toward the nutrient needs of crops grown in the area. Chicken manure, chicken processing by-products, and chicken carcasses are all potential sources of nutrients and are frequently utilized in the Inland Bays area to provide for the nutrient needs of crops grown on the fields of the watershed.

Priority Problems of the Inland Bays

The Inland Bays exhibit problems not unlike those of other mid-Atlantic estuaries. The Delaware Inland Bays Management Conference identified the following priority problems: *eutrophication*, due to nutrient overenrichment, and *habitat loss or modification*, due in large part to erosion, sedimentation, and past dredging and filling. Other areas identified as priorities include circulation and flushing in the Bays, pathogens, and sea-level rise.

EUTROPHICATION

The Inland Bays are, overall, highly eutrophic. Using a classification scheme developed for the Chesapeake Bay, the Inland Bays are among the most highly nutrient enriched of the 32 sub-estuarine systems in the Chesapeake Bay rankings. The middle and upper segments of Indian River Bay are more nutrient enriched than any segment of the Chesapeake. The general water quality in Rehoboth Bay is healthy to fair; the water quality in Little Assawoman and Indian River Bays ranges from degraded to healthy. The significant increases in tidal flushing during the past 20 years may have slowed the progression of eutrophication, especially in the lower Indian River Bay where higher salinity levels exist due to tidal flushing.

In a 1986 study, Ritter estimated the contributions of nutrients from various sources around the Bays. The results of this study, while very general due to the data collection and analysis procedures, did reach several general conclusions. The study found that for Indian River and Little Assawoman Bays, the application of fertilizers and manures to agricultural and urban lands was a source of nitrogen and phosphorus. Applications of fertilizers and manures to sandy, low organic matter soils often lead to greater rates of leaching into ground water of nutrients, when the application of fertilizers exceeds the agronomic needs of crops or is subject to unusual weather conditions. For Rehoboth Bay, precipitation, forest lands, septic tanks, urban development, and agriculture were identified as contributors of nitrogen. Point sources were identified as the major input for phosphorus.

A 1988-1990 study of total nutrient loads to the Rehoboth and Indian River Bays by the U.S. Army Corps of Engineers (COE) tends to support Ritter's findings that nonpoint sources, among which are included urban runoff and agricultural nutrients, comprise the principal nutrient inputs to the Bays. However, the COE study concluded that nitrogen loads from point sources (sewage treatment and industrial plants) are a smaller fraction of total nutrients and that atmospheric nitrogen loads are a much larger fraction of the total nitrogen loads in the estuary than estimated by Ritter.

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Each of the Bays exhibits a typical array of estuarine living resources, with some notable exceptions. Phytoplankton are highly prolific in the upper and middle portions of Indian River Bay, the areas closest to nutrient sources. Rehoboth Bay represents an intermediate level of both phytoplankton and nutrients. The area nearest to the Indian River Inlet has the lowest concentrations of both.

The same relationship is seen in the clarity of the water: The areas in the upper portions of the tributaries have the highest turbidity; those nearest the Inlet, the most clarity. The highest turbidity levels occur between Memorial Day and Labor Day, probably as a result of increased phytoplankton and microbial growth and heavy boat traffic.

Overall Water Quality and Trends

In general, the water quality of Rehoboth Bay is healthy to fair, while the water quality of Little Assawoman Bay and Indian River Bay ranges from healthy to degraded. An important indicator of the water quality of the Inland Bays is the status of their invertebrate community, which is a significant component of both aquatic and terrestrial living resources because it links autotrophic producers (plants and algae) that get their energy from the sun to heterotrophic consumers that get their energy from other living things. The invertebrates include microscopic forms that require magnification to be seen clearly, such as zooplankton, and macroscopic forms such as blue crabs, shrimp, and clams. The latter group, the macroinvertebrates, are the primary food source for most fish species in both estuarine and fresh waters and, therefore, are critical to the survival of predatory fish such as largemouth bass, striped bass, flounder, and fish-eating birds such as osprey, cormorants, and eagles.

A 1991 Statewide survey conducted by the Department of Natural Resources and Environmental Control provides recent information on the condition of the benthic macroinvertebrate community in the nontidal streams of Kent and Sussex counties. This study found that in Sussex County, 31 percent of perennial streams were in "good" condition, while 69 percent were either in "fair" or "poor" condition. The percentage in "good" condition would have been even lower if headwater intermittent streams had been included in the study. Habitat alteration to promote drainage was identified as the major cause of impairment within 84 percent of the "poor" sites exhibiting "poor" habitat conditions (1992 State of Delaware Watershed Assessment Report). Biological integrity, habitat quality, and water quality are inexorably linked. Thus, the "poor" condition of nontidal streams in the Inland Bays watershed reflects not only their own "poor" condition, but also "poor" water quality delivered to the Inland Bays downstream.

HABITAT LOSS

The combination of excessive nutrient levels and high turbidity seems to have eliminated the growth of submerged aquatic vegetation (SAV), such as eel grass, in the Inland Bays. This probably has significant ecological effects since SAV is desirable habitat for a large variety of finfish and shellfish. Although its habitat function may be provided by other benthic algae, like seaweeds, SAV is also food for certain types of waterfowl. Seaweeds probably also play a role in holding excess nutrients during the summer, but high levels of nutrients and turbidity have a degrading effect on seaweeds as well.

Similarly, high turbidity adversely affects benthic microalgae found throughout the Bays. Normally, microalgae reduce nutrients in the water and sediments, through photosynthesis, and serve as plant biomass, a food source for small benthic invertebrates. In turn, small benthic invertebrates are a food source for juvenile finfish, such as flounder and tautog. Reduction of light reaching the Bays' bottoms severely limits microalgae photosynthesis, disrupts the food chain, and stresses the Bays' estuarine system.

Chapter 2. THE STATE OF THE BAYS

The Inland Bays historically have provided nursery areas and habitats for a variety of shellfish, finfish, and other wildlife and their food species. Over the past century, many of these desirable species have declined in numbers due to the loss of suitable habitat and the availability of appropriate food. For example, more than 2,000 acres of tidal wetlands have been lost, primarily because of dredging and filling in the Inland Bays. This represents about a quarter of the habitat.

Previously existing oyster, soft clam, and bay scallop fisheries are essentially extinct. Hard clams and blue crabs are currently the only shellfish species of commercial or recreational importance in the Bays. Although apparently holding their own, these fisheries are potentially susceptible to overfishing, declines in water quality, bacterial contamination of their growing areas, low oxygen concentrations in the Bays, and toxic contamination from material such as boat bottom paints.

The Bays have traditionally supported large spawning runs of anadromous fish such as alewife, herring, shad, and striped bass. However, since the Indian River Inlet has deepened and its cross section has increased, five times more salt water enters the lower Indian River and Rehoboth Bays than entered 50 years ago. This means that the amount of freshwater habitat for anadromous fish has declined dramatically; the presence of anadromous fish in the Bays has declined correspondingly. Dredging and deepening of the navigational channels to the headwaters of tributaries have also contributed to the movement of salt water upstream.

The Bays continue to be important nursery and growing areas for many estuarine and marine fish such as menhaden, spot, winter flounder, and summer flounder.

The living resources of the Inland Bays suffer from increased nutrient levels, shifts in the phytoplankton community that may lead to toxic "red tides," replacement of food species for some shellfish, and increased turbidity. Further, low nighttime oxygen levels in poorly mixed waters can result in fish and shellfish stress or even death if they cannot avoid anoxic areas. In the Inland Bays, there are 26 miles of dead-end lagoons, where the water cannot adequately circulate. Numerous fish kills in recent years have been related either to low-oxygen or anoxic waters or to "red tides."

Overall Living Resources Health and Trends

No current comprehensive data base is available by which to define the status of the benthic invertebrate community in the tidal portions of the Inland Bays. The last comprehensive survey of Rehoboth Bay and Indian River Bay was conducted over 20 years ago between 1968 and 1970. No comprehensive historical data exist for Little Assawoman Bay. Contemporary surveys of all three Inland Bays are limited to no more than four stations in any one Bay and, therefore, are inadequate to characterize current status or identify trends. The benthic community can serve as an excellent indicator of the condition of the Bays' living resources and their response to changes in water quality and habitat. The absence of benthic invertebrate data is a significant gap in the Inland Bays' characterization.

However, current and historical data do exist to characterize the benthic invertebrate community within the dead-end and poorly flushed man-made lagoons of the Inland Bays. In 1973, 1974, and 1991, water-quality and benthic-invertebrate data were collected in selected lagoons and compared to conditions in nearby tidal creeks and bays. The results showed that man-made, dead-end lagoons contained extremely impaired invertebrate communities compared to nearby creek and bay sites. In some lagoons, no animals were found. These conditions were due to poor flushing, which caused extremely low dissolved oxygen (DO) levels (<2.0 mg/l) during the

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summer months. While some recovery occurred during the remainder of the year, repeated summer low DO events resulted in a severely impaired invertebrate community throughout the year.

Dead-end lagoons proliferate around the Inland Bays. They cover over 495 acres with a shoreline length of more than 47 miles. While not much can be done to improve dead-end lagoons other than to eliminate them, recent changes in public perception of shoreline stabilization, accomplished through education, have brought rapid and extensive changes in the use of riprap and vegetative shoreline stabilization.

SEDIMENTATION

The Inland Bays have been filling with sediment at the rate of 5-10 inches during the past 50 years, while the rate of sea-level rise has been about 4 inches over the same period. In addition to shoaling of the Bays due to sedimentation, the tidal amplitude also has been modified. The cross-sectional area of the inlet has increased by four times since 1939. As the cross-section increased over time, the tidal wave passing through the inlet increased and was propagated through the Bays, causing higher high tides and lower low tides. This means that spring low-tide elevations are lower (9 inches for Rehoboth and 12 inches for Indian River Bay) than they were 50 years ago.

Glossary of Terms Used in Characterization

Anadromous Fish: Fish that spend their adult lives in the sea but swim upriver to fresh water to breed

Anoxic: Water without the freely available oxygen vital to fish and other aquatic life

Bacteria: Microscopic plants important to humans for their chemical or disease-causing effects

Benthic Organism: Aquatic plant or animal life found at the bottom of a body of water

Estuary: A body of water where fresh water from land mixes with salt water from the ocean

Eutrophication: The aging process during which a water body slowly dies from an overabundance of plant life

Habitat: A place where a plant or animal normally lives

Inorganic: Matter composed of material other than plant or animal

Lagoon: A small, shallow body of water associated with a larger body of water

Microalgae: Microscopic single-celled or filamentous multi-celled plants

Microbe: A tiny germ or micro-organism

Nutrient: A substance that promotes growth by furnishing nourishment

Organic: Matter composed of plant or animal material

Photosynthesis: Formation of carbohydrates in the chlorophyll-containing tissues of plants in the presence of sunlight

Phytoplankton: Microscopic floating plants

Submerged Aquatic Vegetation (SAV): Eelgrass and other sea grasses attached to the water bottom

Toxicant: A poisonous substance

Turbidity: A cloudy condition in water due to suspended silt or organic matter

Chapter 3. ACTION PLANS

The characterization report of the Inland Bays (See Appendix F) provides a picture of the current state of the Inland Bays. This picture should encourage all residents and visitors to undertake even greater efforts to bring additional gains to returning the Inland Bays to a healthy condition. Despite the efforts and successes of recent years, continued positive improvement will be required if the Inland Bays are to return to a desirable condition.

To help meet this obligation, the Inland Bays Estuary Program developed the Comprehensive Conservation and Management Plan (CCMP). At the heart of the CCMP are action plans and implementation tactics that prescribe actions that can and should be taken by all levels of government, industrial and business sectors, private and public organizations and institutions, and the public. Through this integrated, comprehensive set of actions, the Bays can be restored and protected. The action plans described in this section reflect public consensus and address five targeted areas:

- ! **Education and Outreach**
- ! **Agricultural Sources**
- ! **Industrial, Municipal, and Septic System Sources**
- ! **Land Use**
- ! **Habitat Protection**

The action plans evolved as part of a collaborative process among Management Conference committees, scientific and technical experts, and the public, beginning in 1989. The process included establishing goals and objectives, identifying and studying the Bays problems, ranking those problems so that those of greatest concern and with the best hope for solution would be addressed first, and developing action plans and tactics to address those problems.

These action plans and tactics are interrelated. For example, a tactic designed to reduce nutrient inputs to the Bays may also result in habitat protection. The estimated total cost for implementing the CCMP from 1996 through 2000 is more than \$39 million. Public participation and education of the people who use the Inland Bays are a necessary part of any successful tactic.

The action plans that comprise the core of this CCMP have been revised periodically to reflect discussions with members of affected groups, elected officials, and the general public. Discussion and consensus building continued throughout the CCMP development process. The CCMP was approved by Governor Thomas Carper on March 28, 1995, and was submitted to the Administrator of the U.S. Environmental Protection Agency (EPA) for approval.

The Center for the Inland Bays will be responsible for coordinating CCMP implementation and for determining future actions to preserve the watershed.

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

Public education and outreach are integral to the development of the CCMP and to its implementation. As a result of an active educational program and public outreach effort, the CCMP reflects the broad spectrum of public views and interests needed to ensure that the CCMP will become public policy for managing, conserving, and restoring the Inland Bays. (Appendix C is a *Public Input and Response Summary*, which describes written and verbal public comments received throughout the CCMP review process.)

During CCMP development, the educational and outreach programs consisted of efforts to raise the awareness of, inform, and enlist the long-term support of the general public, special interests, and their leaders and representatives. Meetings, special events, publications, press releases, speaking engagements, public service announcements, and displays/exhibits were used throughout the CCMP process to involve target audiences - members of various interest groups, Bays users, and the general adult public. Because children influence their parents' behavior and attitudes, schoolchildren were also an important audience for the Bays educational efforts.

Education is a never-ending process. Therefore, public outreach and education strategies also support the implementation of the CCMP and each individual tactic (Appendix B is a *Comprehensive Public Participation and Education Plan*). Without carefully conceived outreach and education strategies, implementation of the CCMP cannot succeed on any scale. Outreach and education will be incorporated into every aspect of CCMP implementation.

One action plan for educating and involving the public was selected by the Management Conference: Implement the Inland Bays Comprehensive Public Participation and Education Plan.

Implement the Inland Bays Comprehensive Public Participation and Education Plan

Action Plan

The Inland Bays *Comprehensive Public Participation and Education Plan* will be carried out to assist in ensuring that the CCMP becomes public policy and that Inland Bays citizens and visitors become stewards of the watershed.

An emphasis will be placed on reducing nutrient input and habitat loss. To reduce nutrient input from all point and nonpoint sources, to encourage land-use practices that are environmentally sound, and to assist in stemming the loss of valuable habitats, all citizens - potential polluters - must understand the results of their actions. Therefore, the current education program will be enhanced to reach all potential polluters, from householders to developers. Implementation of the action plan will begin as soon as funding for initial activities is secured.

Background

The Comprehensive Conservation and Management Plan (CCMP) evolved over six years of discussions among government managers, scientists, technical resource experts, and citizens about the problems of the Inland Bays and potential remedial management actions to address these problems.

In addition to many committee meetings, public meetings, and seminars, a series of five Vision Workshops were held for the sole purpose of determining the tactical action plans that address the priority problems identified by the Management Conference and that form the heart of the CCMP. During the Vision Workshops, key members of the Management Conference formulated, revised, and refined the CCMP actions. In addition, resource experts met

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

to comment on and revise various drafts. This input, as well as technical reports and other important information, was compiled and edited as part of an iterative process of the Management Conference.

The September 1992 preliminary draft CCMP was the culmination of a lengthy and thoughtful process - determining priority problems, evaluating management options, considering public opinion, and determining economic and political feasibility. It was also the beginning of a long public review and comment process that resulted in an April 1993 Addendum, an October 1993 draft, a July 1994 final draft, an October 1994 final draft, and a March 1995 final draft revised.

The following are highlights from the public input process on these draft CCMPs:

- ! During public meetings from November 1992 to July 1993 Public Input forms were distributed. Overwhelming support for the September 1992 Preliminary Draft CCMP and its April 1993 Addendum was expressed; more than 91 percent of those who responded to the Public Input Forms "support the actions in the CCMP" to address the problems of the Inland Bays.
- ! Nearly 300 citizens and officials participated in public meetings and workshops; in addition, over 200 served on advisory committees.
- ! As a result of public input, several CCMP tactics proposed in the Preliminary Draft were modified; none was completely opposed.
- ! Major decisions and actions resulting from public discussions:
 1. Governance - An Implementation Council was recommended to govern CCMP implementation and oversight. This recommendation was combined with strong support for action by the Delaware Legislature to protect and restore the Inland Bays. As a result, the *Inland Bays Watershed Enhancement Act* was enacted in June 1994. The Act establishes the Center for the Inland Bays, a nonprofit organization that will oversee and facilitate CCMP implementation as well as a longer-term approach to the wise use and enhancement of the Inland Bays watershed. The Implementation Council is now called the Board of Directors.
 2. Office of Land-Use Planning and Conservation - A Governor's Executive Order to establish a new office to oversee and guide environmentally-sensitive development was another strong public recommendation.
 3. It was thought critical that all State agencies, Sussex County, and local municipalities work together to protect the Inland Bays watershed - the waters of the Bays, their tributaries, living resources and habitat. All planning and zoning ordinances should be consistent with the CCMP.
 4. Public education for users of the Inland Bays should be enhanced to promote stewardship of the Bays and bolster the considerable support for the following voluntary actions:
 - ! Developers following environmentally sensitive development principles until new land-use and habitat protection ordinances and guidelines are in place.

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

- ! Boaters and other users of the Bays being made aware of wake and propeller damage and respecting sensitive natural resource habitat areas.
- 5. The use of "user fees" to support educational and restoration efforts was supported by a majority of respondents during 1993 public meetings.
- 6. Comments on the July 1994 draft from the Farm Bureau and the Sierra Club reflect strongly held opposing views that the CCMP not lead to regulatory actions and that many practices in the watershed should be banned, respectively. Both groups recommend that tactics not identified in the CCMP be added. Because considerable studies and analyses are required to develop new tactics, these recommendations will be considered by the Center for the Inland Bays following the adoption of this CCMP.

The government agencies, environmental groups, businesses, and individuals involved in the Inland Bays Estuary Program have worked for many years to plan and carry out public outreach and education programs. These activities have resulted in large part in the consensus-building effort that created the CCMP. Public participation and education, proven successful so far, will continue and will be accelerated during CCMP implementation.

It has been shown that when citizens understand the negative consequences of some of their everyday actions and are shown how to avoid such actions, they will respond favorably. Recycling is a good example of how citizens have changed their throwaway habits. Inland Bays citizens can be shown how to prevent pollution and to preserve the Bays as well.

Projected Costs and Funding Strategy

To implement this tactic during the five-year period beginning 1996, approximately \$250,000 will be expended by the Center for the Inland Bays, primarily using Clean Water Act funding. These funds will be supplemented with State General Funds, including implementing agencies' resources, and foundation grants. For detailed funding information, see CCMP Appendix H. *Funding* and the attachment that follows this tactic.

Implementation Strategy

The *Public Participation and Education Plan*, developed with the Citizens Advisory Committee and a committee comprised of implementing agencies, will be carried out as soon as funds are available and will be enhanced over time. An Outreach Coordinator, responsible to the Executive Director of the Center for the Inland Bays, will oversee implementation of the public participation and education plan, manage contracts for outreach and education work and informational products, and provide support wherever necessary or desirable. The Outreach Coordinator will maximize the internal resources of the Center and supplement these resources by seeking support from implementing agencies and other interested organizations. The Coordinator may contract for outside assistance to implement various components of the public participation and education plan as needed.

The Outreach Coordinator will orchestrate implementation of the outreach/education program, making sure the right audiences are reached and involved at the appropriate time and that they are fulfilling their intended obligations. Table 1. summarizes the outreach activities over five years, as presented in Appendix B., the *Comprehensive Public Participation and Education Plan*. The Outreach Coordinator will work with the Executive

Table 1

PUBLIC OUTREACH ACTIVITIES SUMMARY

| What | Who | When | How Much | Where |
|---|---------------------------------|------------------|-------------|--|
| IB Citizen Monitoring | Citizen Monitoring Coordinator | 1995 | \$35,000/yr | State General Funded |
| IB Monitoring Report (in newsletter and newspapers) | Citizen Monitoring Coordinator | 1996 twice/yr | \$1,200/yr | USEPA Other grants |
| Expand the mailing list of concerned individuals and members of target groups | PP&E Coordinator | 1996 | Salary | USEPA |
| Develop brochures and fact sheets | PP&E Coordinator | 1996 | \$5,000 | USEPA CAC Fund |
| Develop and staff displays | PP&E Coordinator and others | 1996 | \$1,000/yr | USEPA CAC Fund |
| Videotapes and slide shows | PP&E Coordinator and others | 1996 | \$1,000/yr | USEPA |
| Public speaking engagements and media guest appearances | PP&E Coordinator and others | 1997 | Salary | USEPA |
| Media Promotion | PP&E Coordinator | 1997 | \$2,000/yr | Foundation Grants |
| Public Service Announcements | PP&E Coordinator | 1997 | Salary | USEPA |
| Press Releases/articles | PP&E Coordinator and others | 1997 | Salary | USEPA |
| Public meetings, workshops, conferences, hearings | PP&E Coordinator and others | 1997 | \$2,000/yr | USEPA Foundation Grants CAC Fund |
| Inland Bays TV documentary | PP&E Coordinator and contractor | 1998 | \$25,000 | USEPA Foundation Grants CAC Fund |
| Inland Bays Discovery Book | PP&E Coordinator and contractor | 1998 | \$20,000 | USEPA Foundation Grants CAC Fund |
| Pass-thru grants | PP&E Coordinator | 1998 | \$20,000/yr | USEPA Foundation Grants CAC Fund |
| Fundraising/awarenessraising events | PP&E Coordinator and others | Continuous | \$2,000/yr | USEPA Foundation Grants CAC Fund |

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

Director to solicit financial and other donations, and seek foundation and federal grants to support implementation of educational activities.

The timeframe for this plan is as follows:

- ! In 1996, the *Comprehensive Public Participation and Education Plan* will be expanded and implementation will begin. The first priority will be to hire an Outreach Coordinator, who will begin by developing a program that explains the mission of the Center and elicits public interest and support. Information materials, such as a brochure, display, and an audio-visual presentation, will support this effort by telling people how they can help.
- ! By 1997, the plan will be actively implemented under the Center for the Inland Bays with the advice, consent, and support of the Public Participation and Education Committee, composed of representatives from the Center's Board of Directors' organizations, lead and supporting organizations, and other groups selected for their interest or expertise. All parts of the plan will be implemented, including educational support for each tactic.
- ! Over the longer term - 1998 to 2000 and beyond - educational and outreach efforts will continue and the plan will be updated periodically.

Lead and Supporting Agencies/Target Audiences

Lead:

Center for the Inland Bays - provide staff support and general funding

Support and ongoing communications will occur for each action plan and tactic with the following agencies and audiences:

Delaware Department of Natural Resources and Environmental Control - provide staff resources

Sussex Conservation District - provide staff resources

Sussex County and Municipal Governments - provide staff resources

Delaware Department of Agriculture - provide staff resources

Delaware Department of Health and Social Services - provide staff resources

University of Delaware - provide staff resources

Citizens Advisory Committee - provide voluntary support and fund-raising

Delmarva Poultry Industry, Inc. - provide staff resources

Federal and Other State Agencies - provide informational and financial assistance

Ongoing communications will occur for each action plan and tactic with the following audiences, and their support will be sought:

Chambers of Commerce - target audience/potential resource

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

Real estate agencies - target audience/potential resource

Home Builders Association of Lower Delaware - target audience/potential resource

Developers/Development Associations - target audience/potential resource

Civic Organizations - target audience/potential resource

Clubs, including Coast Guard and Marine Clubs - target audience/potential resource

Environmental Organizations - target audience/potential resource

Schools - target audience/potential resource

Agricultural Community - target audience/potential resource

Future Farmers of America/4-H - target audience/potential resource

National Pollutant Discharge Elimination System (NPDES) facilities - target audience/potential resource

Fishermen (recreational/commercial) - target audience/potential resource

Other recreational sports people - target audience/potential resource

Retirees - target audience/potential resource

Tourists - target audience/potential resource

Measuring Results

If sufficient funds are available, scientifically constructed surveys of local residents will be used to determine the success of educational and outreach programs, along with other action measures of the CCMP. The number of educational programs conducted in schools will be recorded and reported. Scientific measurements of public support for further planning and efforts to protect and restore the Bays will be documented. The educational and outreach programs should also result in a reduction in pollution as measured by ongoing review of the condition of the Inland Bays. Long-term trends in improved water quality will measure the ultimate success of the entire program, including educational efforts.

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Education and Outreach Action Plan: Implement the Inland Bays Comprehensive Public Participation and Education Plan

Lead Agency/Division: Center for Inland Bays

Contact for Information: Bill Brierly, Telephone 302-739-5409

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000*

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Personnel Costs | \$ 30,000 | \$ 30,000 | \$ 30,000 | \$ 30,000 | \$ 30,000 | \$150,000 |
| Capital Costs (>5K) | 5,000 | - | - | - | - | - |
| Operating Expenses | 15,000 | 20,000 | 20,000 | 20,000 | 20,000 | 100,000 |
| TOTAL | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 250,000 |

*Based on ½ time for a PP&E Coordinator for overall coordination only plus some money for occasional contractual or seasonal help.

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|------------------------------------|
| <u>FY 1996</u> | Source 1 | EPA - Clean Water Act, 104 (b) (3) |
| | Source 2 | General State Funds (in kind) |
| | Source 3 | Foundation Grants/Donations |
| <u>FY 1997</u> | Source 1 | EPA - Clean Water Act, 104 (b) (3) |
| | Source 2 | General State Funds (in kind) |
| | Source 3 | Foundation Grants/Donations |
| <u>FY 1998</u> | Source 1 | EPA - Clean Water Act, 104 (b) (3) |
| | Source 2 | General State Funds (in kind) |
| | Source 3 | Foundation Grants/Donations |
| <u>FY 1999</u> | Source 1 | EPA - Clean Water Act. 104 (b) (3) |
| | Source 2 | General State Funds (in kind) |
| | Source 3 | Foundation Grants/Donations |
| <u>FY 2000</u> | Source 1 | Foundation Grants |

Chapter 3. PUBLIC PARTICIPATION AND EDUCATION ACTION PLAN

Source 2 Federal Grants

Source 3 General State Funds

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PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

From 1997-2000 a minimum of 25K additional will be needed annually to provide outreach and education for the 17 tactics. In addition to each lead and support agency providing in-kind support, foundation grants, donations, and federal grants will be sought.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Pass-through grants - 25K annually. Media program - 50K annually.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

100K annually through a combination of federal and foundation grants.

Chapter 3. AGRICULTURAL SOURCE ACTION PLAN

The goal of the Agricultural Source Action Plan is to continue the reduction in surface and groundwater nutrient inputs to the Inland Bays from agricultural operations. The action plan will emphasize specific measures in the areas of conservation planning, nutrient utilization and reduction, monitoring, and farm management practices.

Reduction of agriculturally-generated nutrients and pollutants requires a specialized knowledge of agriculture in general and Delaware's farm community in particular.

Delaware's strategy for on-farm pollution abatement is dependent on several key points:

1. The Inland Bays Watershed is largely owned by farmers. State-owned land and urban acreage account for less than 25 percent of the watershed's total land area.
2. Because of this acreage, agricultural contributions may look large, but are actually quite small on a per acre basis.
3. Agriculture is locked into an inflexible price economy. Farmers cannot raise prices to recover costs, but are dependent on international, national, and regional market prices.
4. Crop cycle times are quite long, making farmers resistant to unproven innovation. A change in farm practices made for environmental reasons may affect the profitability of a 1-year production cycle.
5. Rising land values have negatively impacted agriculture's return on equity (ROE). Based on figures contained in the *Delaware Agricultural Statistics Summary*, one can conclude that a significant number of individual producers experienced negative ROE's during any one growing season. (1992 Delaware Agricultural Statistical Summary, 11/93).
6. The vagaries of weather produce situations where nutrient loading will inevitably exceed optimal levels. A dry spring followed by sudden heavy rains will cause nutrient laden surface water to course into Delaware Inland Bays in spite of the best efforts of environmentally-minded farmers.
7. On-farm regulatory efforts have produced fierce political opposition, yet cost share and cooperative programs have been widely accepted. In fact, demand for cost-share funds exceeds supply across the watershed. (SCD FY94 Conservation Cost Share Report).

These observations combine to strongly influence the *Agricultural Source Action Plan and Tactics*. It is apparent that hastening the demise of an individual farm by impacting its profitability will only increase the supply of farmland on the development market, a result which can have disastrous consequences from both land use and environmental points of view, since studies (*Technical Supplement for Chesapeake Bay Nutrient Reduction Plan, 1988; Population Growth and Development in the Chesapeake Bay Watershed to the Year 2020, 1988*) have demonstrated that developed lands contribute more nutrients and pollutants than agland and seldom or never revert to lands which are valuable environmentally.

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A course of action has been designed to enable farmers to respond environmentally while staying in business. The *Inland Bays CCMP's Agricultural Source Action Plan* has been facilitated by the Delaware agricultural community's long history of conservation planning and its consistent participation in a wide variety of conservation programs.

The number of poultry operations and chickens within the watershed has grown in recent years. Agricultural operations within the Inland Bays watershed are among the contributors to nutrients in the estuary.

Years ago applications of livestock manure, primarily poultry manure, in the watershed is known to have contributed to nitrates occurring in groundwater, streams, and bays. In recent years, agricultural operations have continually improved through the initiative and cooperation of farmers with several agencies. The question of whether poultry houses are a source of nitrates is now being studied.

For several years various public agencies have been involved in educational programs designed to promote Best Management Practices (BMPs) in the agricultural community. These agency efforts, in cooperation with farmers, have sought to increase the efficiency of farm operations, increasing profits while enhancing the protection of ground and surface waters and wildlife habitat. Continued participation by private industry, including poultry integrators, the agricultural industry, and commodity groups will be needed.

The agricultural contribution to a healthy economy in the watershed is widely recognized. Agriculture is the principal industry in Sussex County, in particular, and Delaware as a whole. Public support for the preservation of farmland has been high and should be a shared goal throughout the implementation of the CCMP. The preservation of farmland will provide not only for the food and fiber needs of Delaware and continued support for the economy of the region, but will help provide for desirable habitat and environmental amenities.

Educational and BMP implementation goals will be achieved through implementing the Comprehensive Conservation Plans under the We C.A.R.E. program (Comprehensive Agricultural Resources Effort). We C.A.R.E. programs can include the management of nutrients, agricultural waste, integrated crop and pest management, conservation cropping, water resources protection, farmstead planning, and woodland/wildlife planning. Farmers work cooperatively with We C.A.R.E. conservation planners to develop effective conservation plans for their land. The history of technological transfer on American farms shows that enhanced education and outreach efforts will tend to be the most viable support for the agricultural nonpoint source program.

In March 1990, Governor Michael Castle and Delaware Department of Natural Resources and Environmental Control Secretary Edwin "Toby" Clark announced the Inland Bays Recovery Initiative, a two-year "action now" agenda. Some of the goals of the Initiative were not achieved in two years, but progress continues to be made. The greatest accomplishment of the Initiative has been the creation of a team of federal, state, and local officials, environmentalists, farmers, homeowners, and business people willing to work together to solve the problems of the Bays. A basic premise of the Initiative was that it is better to set a positive example than it is to dictate solutions. This premise continues within the CCMP's five Action Plans.

One important task of the Recovery Initiative was to field-test ideas that, if successful, would be part of the Inland Bays Estuary Program CCMP. Even more important, the Recovery Initiative established a team willing to work together and

Chapter 3. AGRICULTURAL SOURCE ACTION PLAN

with environmentalists, farmers, homeowners, and business people to help solve the environmental problems of the Bays. This team, which includes representatives from each division within DNREC and from the Delaware Department of Agriculture, University of Delaware Cooperative Extension System, USDA Natural Resources Conservation Service, and Sussex Conservation District, played a key role in the Management Conference and will continue to work together to implement the CCMP.

Most important, the Recovery Initiative developed a shared sense of how to focus efforts for the greatest possible effect. Just as in the past, the team found that farmers will work together and make best use of the assistance offered on behalf of the Bays recovery. The combination of education and cost sharing, where appropriate, to further conservation measures in the public interest, has proven to be a workable combination.

As documented in the final report of the Recovery Initiative, the following accomplishments were achieved:

- ! Up-to-date conservation plans, including management of erosion, animal waste, and nutrients, were developed for more than a quarter of the cropland in the watershed. About 49,274 acres were covered by new conservation plans. Additional acreage were likely covered by conservation plans developed for previous federal agricultural programs.
- ! Comprehensive nutrient and pest management services, testing, and education were provided to farmers in the watershed and over 400 Nutrient Management Budgets were developed.
- ! Technical and financial assistance was provided to farmers to help them operate more efficiently and with less adverse environmental impact. A total of 60 copies of an educational video were delivered to farmers and, with team assistance, BMPs were installed on watershed farms.
- ! New funding and redirected existing funding was provided to ensure financial capacity to meet program goals. Two full-time staff members were hired and two others were hired in cooperative programs. Funding came from various sources, including from the Small Watershed Initiative.
- ! Cooperative programs with large landholders were developed to demonstrate BMPs. About 100 people toured farms with successful BMPs in place. The University of Delaware Cooperative Extension System began a strip-trial project to demonstrate the economic and environmental value of nutrient management.

Building on these and other existing activities and with the assistance of agricultural resource experts, the Management Conference selected the implementation of one comprehensive action plan: Develop and implement Comprehensive Conservation Plans for all farms in the Inland Bays watershed.

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To carry out this action plan, these specific tactics will be implemented:

- Tactic A:** Continue conservation planning for the Inland Bays through the Sussex Conservation District
- Tactic B:** Develop nutrient utilization and distribution alternatives
- Tactic C:** Manage and plant forested/vegetative buffers
- Tactic D:** Continue and enhance a tracking system for the implementation of conservation plans and BMPs under the We C.A.R.E. program
- Tactic E:** Continue research to determine if there is a relationship between nutrient movement and poultry houses

Develop and Implement Comprehensive Conservation Plans for All Farms in the Inland Bays Watershed

Action Plan

The action plan aims to expand efforts in establishing Comprehensive Conservation Plans on all Inland Bays watershed farms. A further aim is to provide support for the implementation of the plans already developed on many farms in the watershed.

Background

Yield Goals and Nutrient Management

The conservation planning process will emphasize those agricultural practices that reduce or eliminate excess nitrates in the environment.

When yield goals are determined, Conservation Planners assist farmers in calculating the nutrients required to achieve the yield goal. The conservation planning process takes into account the use of both chemical and manure fertilizers and develops a plan for the proper agronomic application of a balanced program that is suitable to the farmer's operation and the yield goal.

Chicken carcasses are a part of a normal poultry operation. Livestock producers are now being encouraged to use composters as one way to dispose of carcasses. The resulting compost can be applied to croplands and utilized in the growing of crops. Other ways of utilizing chicken carcasses are also possible such as incineration, rendering, freezing, acid preservation, lactic fermentation, and extrusion.

Livestock Manure Distribution

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As mentioned earlier, some areas produce more livestock manure than can be economically applied to cropland in Sussex County. Redistribution of this "wealth" is the key to better, cost-effective, efficient farm operations as well as reduced nutrient impacts on ground and surface waters.

Under this action plan, Delaware Waste Management Guidelines will be followed to assure proper nutrient application. To support manure distribution initiatives, a Manure Clearinghouse has been established by the University of Delaware and operated by the Delmarva Poultry Industry, Inc. In addition, monetary incentives to encourage private industry to explore manure utilization are being considered. Other ideas being looked at include stabilizing and pelletizing manure for homeowner as well as farmer use and redistributing excess manure to other areas, including out of State.

Forested/Vegetative Buffers

By using forested and other vegetative buffers, wildlife habitat and air quality are enhanced, soil erosion is reduced, and nutrients are absorbed. The CCMP action plan will build on existing programs for its implementation.

Poultry Houses

A number of research projects to determine the extent and nature of nitrate migration from poultry houses are now under way or completed. Final results are now available or still awaited; all significant findings will be used as part of a larger research effort concerning nutrients from poultry houses.

Projected Costs and Funding Strategy

The aggregated five-year cost of implementing the agricultural action plan is more than \$1 million; the cost of continuing research will soon be determined. Funding will come primarily from USDA Hydrologic Unit Activity (HUA), Public Law-566, CZARA Section 6217, and Clean Water Act Section 319. For detailed funding information see Appendix H. *Funding* and the attachment following each tactic.

Implementation Strategy

Tactic A: Continue Conservation Planning for the Inland Bays Watershed Through the Sussex Conservation District

Tactic Description

To continue the record of nutrient reduction, Conservation Planners, as part of the We C.A.R.E. program in the Sussex Conservation District, will collaborate with farm producers to improve nutrient and manure management. This activity will not only help the continued reduction of nutrients to the Bays, but will also help increase overall farm efficiency. To supplement this tactic, poultry integrators, the agri-chemical industry, and farm commodity groups will be asked to help.

Conservation planning will continue under this tactic with the goal of all farms in the watershed completing Comprehensive Conservation Plans.

Conservation plans should address the management of nutrients and agricultural waste, integrated crop management (ICM), conservation cropping, the management of water resources, farmstead planning, and woodland/wildlife planning. Plans can include a conservation planning map, soil maps, a determination of soil loss rates, options available to reduce soil erosion as needed, a crop nutrient budget, manure analysis, and forest and wildlife habitat enhancement recommendations.

Eight poultry integrators are involved in operations within the watershed. These integrators have assisted in the past with environmental improvements to their industry and will be solicited to assist in the future in the proper disposition of poultry manure. Their efforts to assist in promoting and implementing proper disposal methods will be key to future successes.

After 1998, planners will monitor the implementation of plans and monitor successes. As always, Conservation Plans should remain flexible and open to the cooperative additions of new Best Management Practices technologies.

To successfully implement this tactic, Conservation Planners have worked and will continue to work with farmers to overcome a number of barriers:

- ! Mistrust by farmers of the Department of Natural Resources and Environmental Control.
- ! Reliance on traditional farming practices with no incentive to change.
- ! Economic pressure on farmers to move away from crops and toward intensive livestock operations and commercial land development.
- ! Limited research and implementation opportunities for innovations in farming practices due to the annual nature of the farming enterprise.

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- ! Lack of recognition by farmers of the economic benefits of adopting BMPs.
- ! Pressures on farmers to adopt new farming practices before such practices are researched and proven to be effective and efficient.

Conservation planners, recognizing these obstacles, are actively engaged in one-on-one problem solving with farmers, finding sources of cost sharing and low-interest loans, educating farmers about new methods and technologies, involving them in demonstration projects, and promoting research to help find answers in the future.

Lead and Supporting Agencies

Lead:

Sussex Conservation District - secure funding and provide staff to develop conservation plans and to follow up

Support:

USDA Natural Resources Conservation Service - provide technical and financial assistance to Sussex Conservation District

USDA Agriculture Stabilization and Conservation Service - provide financial assistance to farmers through cost sharing

University of Delaware, College of Agricultural Sciences and Cooperative Extension System - provide information, education, and research

Delaware Department of Agriculture - provide technical assistance for forestry, and general information and education

DNREC - provide technical and financial assistance under nonpoint source and soil and water conservation programs; and enforce applicable State water quality laws and regulations

U.S. Environmental Protection Agency - provide technical, financial assistance, and oversight under Clean Water Act nonpoint source program; and enforce applicable Federal laws and regulations

U.S. Geological Survey - provide ground water research

Delaware Geological Survey - provide ground water research

Delmarva Poultry Industry, Inc. - provide information, education, and funding for research

Integrators (eight Delmarva poultry companies), Agri-Chemical Industry, Commodity Groups - provide information, education, and other support

Measuring Results

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To determine results from implementing this tactic, the following points are being considered:

- ! Computer modeling may be used to estimate nutrient reductions for individual parcels of land.
- ! Measurement can be done indirectly - for example, through a tracking system that calculates a certain nutrient loading to the environment before the practice is changed, and then recalculates a nutrient reduction after the new practice is implemented.
- ! Because of historical releases of nutrients to the ground and surface waters, water quality monitoring will initially show little, if any, improvement. Therefore, indirect measures supplemented by water quality and biological monitoring must be used.

Chapter 3. AGRICULTURAL SOURCE ACTION PLAN

Agricultural Source Action Plan: Develop and Implement Conservation Plans for All Farms in the Inlands Bays Watershed

Tactic A: Continue conservation planning through Sussex Conservation District

Lead Agency/Division: Sussex Conservation District

Contact for Information: Eric Helm Buehl, Telephone 302-856-7215

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Personnel Costs | \$129,138 | \$129,138 | \$149,808 | \$149,808 | \$149,808 | \$707,700 |
| Capital Costs (>5K) | 31,200 | - | - | - | - | 31,200 |
| Operating Expenses | 17,255 | 11,855 | 13,566 | 12,966 | 12,966 | 68,608 |
| TOTAL | 177,593 | 140,993 | 163,374 | 162,774 | 162,774 | 807,508 |

PART 2 FUNDING SOURCES

FY 1996 Source 1 EPA - Clean Water Act, 319
Delaware Coastal Management/NOAA CZARA 6217
Center for the Inland Bays

FY 1997 Source 1 EPA - Clean Water Act, 319
Delaware Coastal Management/NOAA CZARA 6217
Center for the Inland Bays

FY 1998 Source 1 EPA - Clean Water Act, 319
Delaware Coastal Management/NOAA CZARA 6217
Center for the Inland Bays

FY 1999 Source 1 EPA - Clean Water Act, 319
Delaware Coastal Management/NOAA CZARA 6217
Center for the Inland Bays

FY 2000 Source 1 EPA - Clean Water Act, 319
Delaware Coastal Management/NOAA CZARA 6217

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Center for the Inland Bays

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Continued federal and state cutbacks and reorganization could result in shortfalls.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

! Continued Conservation Planning with follow up to ensure implementation.

! Installation of BMPs.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

\$3M from CZARA, EPA, and State General Fund.

Tactic B: Develop Nutrient Utilization and Distribution Alternatives

Tactic Description

Under the CCMP, better ways to utilize and distribute livestock manure, starting with poultry manure, are being investigated and initiated: first, through education and, ultimately, through a cost-share program.

Implementation Strategy

Currently Delmarva Poultry Industry, Inc., is operating an information clearinghouse established by the University of Delaware Cooperative Extension System to facilitate the distribution of excess manure. The University of Delaware Cooperative Extension System, in cooperation with Delaware State University, is conducting experiments using pelletized poultry manure as cattle feed. Some private companies are exploring the potential for using pellets for garden fertilizer and other uses.

The results of this research will be announced by the University of Delaware, which will also make recommendations based on the research, and will educate the public about the effort. Conservation Planners from the Sussex Conservation District will inform farmers about new techniques and findings from the research. If appropriate, cost share will be sought to apply these findings on farms in the Inland Bays watershed.

To implement this tactic, three steps are being considered:

- ! Supporting research efforts with EPA and private funds as necessary.
- ! Providing information, education, and technical assistance to support research findings and any recommended BMPs, beginning in 1995 and continuing.
- ! Securing longer-term cost sharing for certain additional BMPs, based on research findings.

To prevent any roadblocks to full implementation, the following measures are being taken:

- ! State, federal, and private funds are being provided to do market analyses of pelletized manure and forest products
- ! Funding for cost sharing and for studying utilization methods is being explored.
- ! The complicated economics and practicality of redistributing manure is being researched and evaluated.

Lead and Supporting Agencies

Lead:

Chapter 3. AGRICULTURAL SOURCE ACTION PLAN

Sussex Conservation District - provide information and educational assistance through conservation planners; provide and coordinate cost-share programs for implementation

Support:

USDA Natural Resources Conservation Service - provide technical and financial assistance

USDA Agricultural Stabilization and Conservation Service (ASCS) - provide financial assistance to farmers through cost sharing

Delmarva Poultry Industry, Inc. - operate the clearinghouse and provide information and education

University of Delaware - provide research

Delaware State University - provide research

University of Delaware, Cooperative Extension System - provide information, education, and research

Delaware Department of Agriculture - provide biomass research and general information and education

DNREC - provide technical and financial assistance and regulatory support under nonpoint source and soil and water conservation programs

Measuring Results

To measure results, nutrient utilization and distribution goals will be developed and evaluation milestones will be developed.

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Tactic B: Develop nutrient utilization and distribution alternatives

Lead Agency/Division: Sussex Conservation District*

Contact for Information: Eric Buehl, Telephone 302-856-7215

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000*

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------|------|------|------|------|-------|
| Personnel Costs | | | | | | |
| Capital Costs (>5K) | | | | | | |
| Operating Expenses | | | | | | |
| TOTAL | | | | | | |

*Currently all funding is for research into new methods for utilizing and distributing manure. Sussex Conservation District information/education costs are included as part of Tactic A. Until research is completed, cost shares cannot be determined.

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|-------|
| <u>FY 1996</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1997</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1998</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | _____ |

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Source 2 _____

Source 3 _____

Tactic C: Manage and Plant Forested\Vegetative Buffers

Tactic Description

Under this tactic, management of existing forested\vegetative buffers and forested lands will be encouraged, and tree or other vegetative plantings will be promoted where needed as buffers; reforestation will be promoted and managed, where profitable, on lands not economically suitable for other crops. The goal for this new initiative is to develop 50 management plans covering at least 2,000 acres of affected lands and to plant 750 acres of new forest\vegetation.

Implementation of Tactic

Implementation of this tactic will build on several current cost-sharing activities under federal programs administered by the USDA Agricultural Stabilization and Conservation Service (ASCS), USDA Natural Resources Conservation Service (NRCS), and the USDA Forest Service (USFS):

- ! Forestry Incentive Program (ASCS)
- ! Agricultural Conservation Practice (ASCS)
- ! Conservation Reserve Program (ASCS)
- ! PL-566 Program (NRCS)
- ! Stewardship Incentives Program (USFS)

This new initiative will begin in 1996 if grant monies are successfully raised to cover this pro-active program. Currently, the Delaware Department of Agriculture, Forest Service, responds to requests for assistance on a first come basis. When funding is secured, a new full-time person will implement this tactic through education, outreach, and technical assistance. All outreach, as well as requests and referrals, will be handled through the Indian River Watershed forester of the Delaware Forest Service, located in the Sussex County Office.

The short-term approach will be to pursue accelerated implementation of forest management in the Inland Bays watershed. This implementation strategy will stress both the economic and environmental importance of forests to the watershed landowners. Public education activities will emphasize the availability of free technical advice and cost shares, where available, for tree planting and conservation improvements. The importance of forest lands and forest/vegetative buffers in the improvement of water quality will be stressed. Longer term activities, through the year 2000, will continue to emphasize the economic and environmental importance of forest and farmlands in the Inland Bays watershed. Follow-up advice for the management of existing and planned conservation practices will also be provided. Funding for these accelerated efforts is far from certain, however.

This tactic will stress education that is needed to avoid potential barriers to this plan, including public apathy toward the opportunity, lack of public awareness of the program, and lack of funding. In addition, reforestation on economically marginal cropland may be difficult. Further education of farmers will be necessary to evaluate for them the economic potential of crops versus trees on some land, especially in the light of the fact that many marginal croplands could become development sites.

Lead and Supporting Agencies

Lead:

Delaware Department of Agriculture, Forest Service - provide technical assistance and implementation

Support:

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U.S. Forest Service, Radnor, Pennsylvania - provide Stewardship Incentives Program cost shares

USDA Natural Resources Conservation Service - provide PL-556 cost shares

USDA Agricultural Stabilization and Conservation Service (ASCS) - provide cost share assistance

Sussex Conservation District - provide education and information

Measuring Results

Achievements will be measured by the number of forested\vegetative buffer and forest management plans written by the Delaware Forest Service and the acres of trees or vegetative conservation cover planted in the watershed.

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Tactic C: Manage and plant forested/vegetative buffers

Lead Agency/Division: Department of Agriculture, Division of Resource Management

Contact for Information: Nancy Milliken, Telephone 302-856-5594

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|-----------------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Personnel Costs* | \$ 48,000 | \$ 48,000 | \$ 48,000 | \$ 48,000 | \$ 48,000 | \$240,000 |
| Capital Costs (>5K) | - | - | - | - | - | - |
| Operating Expenses ** | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 10,000 |
| TOTAL | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 | 250,000 |

*A position dedicated to working on this and other forestry-water quality enhancement technical assistance for Inland Bays area

**Includes cost of one Inland Bays tree planting workshop annually

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|--------------------------|
| <u>FY 1996</u> | Source 1 | <u>CZARA 6217</u> |
| | Source 2 | <u>Foundation grants</u> |
| | Source 3 | _____ |
| <u>FY 1997</u> | Source 1 | <u>CZARA 6217</u> |
| | Source 2 | <u>Foundation grants</u> |
| | Source 3 | _____ |
| <u>FY 1998</u> | Source 1 | <u>CZARA 6217</u> |
| | Source 2 | <u>Foundation grants</u> |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | <u>CZARA 6217</u> |
| | Source 2 | <u>Foundation grants</u> |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | <u>CZARA 6217</u> |

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Source 2 Foundation grants

Source 3 _____

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Currently no funding exists for this new initiative. Center for Inland Bays will apply for grants under CZARA 6217 and from foundations.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Full time position for developing outreach and management plans.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Uncertain.

Tactic D: Continue and Enhance a Tracking System for the Implementation of Conservation Plans and BMPs under We C.A.R.E. Program

Tactic Description

An implementation tracking system will continue and will be expanded under the Field Office Computer System (FOCS) to help estimate load reductions for farm Conservation Plans and Best Management Practices.

Implementation of Tactic

To implement this system, aerial photography is being used to establish baseline land-use information. As information continues to be gathered through the development of the conservation plans, it will be added to the data system. For example, information will be included about what improvements or BMPs a landowner has already applied to his land and what changes or BMPs will be applied by the landowner in the future. The Computer-Assisted Management and Planning Systems (CAMPS) is being used to record landowners' planning decisions; site visits under We C.A.R.E. confirm the use of the Best Management Practices. CAMPS indicates the actual acreage planned, implemented, and incorporated into the system annually. The purpose of this model is to assist in estimating potential changes in nutrient loads to the Inland Bays brought about by improvements in land practices. To improve and upgrade CAMPS, FOCS recently began to operate in the Natural Resources Conservation Service field office.

The Geographic Information System (GIS) operated by DNREC is also being used to record the land acreage under conservation plans; this information can be incorporated into a nutrient loading model. An assessment will determine the most efficient way to measure nutrient loading. Only detailed monitoring over a long period of time can confirm results of the Best Management Practices implementation.

Baseline information has been recorded in CAMPS for the past five years. Under the conservation planning process, it takes about one month to record data for 3,000 to 5,000 acres of conservation planning in a watershed. The data management system is being used primarily in the Indian River watershed, but is also used throughout the Bays. All available information is now loaded in CAMPS. The necessary baseline information on the Inland Bays will continue to be developed through the next few years, until 1998. From 1998 and beyond, implementation activity will focus on monitoring. Load reductions will be estimated as BMPs are installed and new practices are recorded in FOCS.

Lead and Supporting Agencies

Lead:

USDA Natural Resources Conservation Service - provide financial and technical assistance

Support:

Sussex Conservation District - gather data and provide lead in the field under the We C.A.R.E. program

University of Delaware, Cooperative Extension System - provide information and education

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Delaware Geological Survey - provide groundwater monitoring data

DNREC - provide GIS, monitoring, and financial support

Measuring Results

The first measure is the operation of CAMPS - already shown to be a successful and effective tracking system. The tracking system is measuring the number of BMPs planned and applied and the amount of nutrient reductions. In the longer term - 1998 and beyond - improvements in water quality will be noted.

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Tactic D: Continue and enhance a tracking system for the implementation of conservation plans and best management practices.

Lead Agency/Division: Natural Resources Conservation Service

Contact for Information: Paul Petrichenko, Telephone 302-678-4180

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Personnel Costs | \$ 20,000 | \$ 20,000 | \$ 20,000 | \$ 20,000 | \$ 20,000 | \$100,000 |
| Capital Costs (>5K) | 5,000 | 5,000 | - | - | - | 10,000 |
| Operating Expenses | 5,000 | 5,000 | 3,000 | 1,000 | 1,000 | 15,000 |
| TOTAL | 30,000 | 30,000 | 23,000 | 21,000 | 21,000 | 125,000 |

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|---|
| <u>FY 1996</u> | Source 1 | <u>Natural Resources Conservation Service</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1997</u> | Source 1 | <u>Natural Resources Conservation Service</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1998</u> | Source 1 | <u>Natural Resources Conservation Service</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | <u>Natural Resources Conservation Service</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | <u>Natural Resources Conservation Service</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |

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PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Same.

Tactic E: Continue Research to Determine if There Is a Significant Relationship Between Nutrient Movement and Poultry Houses

Tactic Description

Multi-year research is under way to evaluate the release of nutrients under poultry houses. If research results warrant it, a continued program of research and evaluation will be used to determine how to best manage nutrients in conjunction with poultry houses. The first series of studies may determine if there is a problem at those particular sites, and what additional research may be needed.

Other projects supporting this tactic follow:

- ! Funded by DNREC in 1992 with EPA Clean Water Act - Section 319 funds, the University of Delaware attempted to demonstrate cost-effective nitrogen and moisture barrier alternatives for the floor of broiler houses. This project documented installation costs, observed soil moisture profiles and soil nitrogen content profiles, and evaluated broiler production in side-by-side comparisons of pairs of old and new houses with, and without, floor barriers. The final report was made available in March 1995.
- ! Delmarva Poultry Industry, Inc. provided funding in the spring of 1993 to allow for additional monitoring at one of the broiler house sites. USDA-Cooperative Extension funds are being used to demonstrate the effect of the floor moisture barriers on reducing the incidence of salmonella. The results of this project are scheduled to be available in late 1995.
- ! Delmarva Power and Light provided funding to support the evaluation of fly ash flowable fill as a barrier for poultry house floors.

Implementation of Tactic

Based on the research now under way and any new research that is undertaken, the University of Delaware will recommend actions and will support recommendations with information and education. Any future guidelines would be based on University of Delaware recommendations. The Sussex Conservation District would be responsible for implementing any guidelines that may be promulgated. Guideline implementation, as in other areas of plan implementation, would probably require cost sharing, technical assistance, and other resources in the cooperative spirit of other tactics. For now, the best approach is to continue research to determine if any problems exist relative to poultry houses and nutrients.

Lead and Supporting Agencies

Lead:

University of Delaware - conduct research; report, inform, and make recommendations

Sussex Conservation District - implement and coordinate cost-share and other program tools

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Support:

Sussex Conservation District - evaluate research and review responses

USDA Natural Resources Conservation Service - evaluate research and review responses

University of Delaware, Delaware Cooperative Extension and the College of Agricultural Sciences, Agricultural Experiment - conduct and evaluate research, review responses, and make recommendations based on research results

Delaware State University - conduct and evaluate research, review responses, and make recommendations based on research results

Delaware Department of Agriculture - evaluate research and review responses

DNREC - review research and provide technical and financial assistance through State Revolving Fund as needed

Delmarva Poultry Industry, Inc., Farm Bureau, Grange, commodity groups - evaluate research and review responses

USDA Agricultural Stabilization and Conservation Service - provide cost sharing as needed

Measuring Results

Results will be measured by the publication of research findings and team effort to evaluate research findings and possible implications of findings.

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Tactic E: Continue research to determine relationship between nutrient movement and poultry houses*

Lead Agency/Division:

Contact for Information:

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000*

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------|------|------|------|------|-------|
| Personnel Costs | | | | | | |
| Capital Costs (>5K) | | | | | | |
| Operating Expenses | | | | | | |
| TOTAL | | | | | | |

*Research is under way. Projected costs of additional research needs have not yet been identified. Implementation is unclear at this time.

PART 2 FUNDING SOURCES

FY 1996 Source 1 _____

Source 2 _____

Source 3 _____

FY 1997 Source 1 _____

Source 2 _____

Source 3 _____

FY 1998 Source 1 _____

Source 2 _____

Source 3 _____

FY 1999 Source 1 _____

Source 2 _____

Source 3 _____

FY 2000 Source 1 _____

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Source 2 _____

Source 3 _____

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Additional funding to continue needed research will be sought from federal and private grants.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

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The goal of this action plan is to reduce nutrient inputs to the Inland Bays by controlling industrial, municipal, and septic system point and nonpoint source discharges. Current sources of concern to the Inland Bays Estuary Program are industrial and municipal wastewater treatment plant discharges and, although traditionally considered nonpoint sources, septic systems. Nutrient overenrichment has led to pervasive eutrophication in parts of the estuary, especially in summer. Septic systems in areas with high water tables and poor soils have also resulted in high levels of nutrients in ground water.

Efforts that began under the Recovery Initiative to explore new techniques for treating wastewater and to investigate funding for areawide septic system management are continuing as part of this action plan.

Goals for nutrient reduction were proposed by the Management Conference to gradually reduce point source discharges so that ultimately there will be no significant discharges to the Inland Bays or its tributaries. To achieve this goal a Pollution Control Strategy was developed. A new computer model was used to assess nutrient loads and to determine the Phase I Total Maximum Daily Loads for point and nonpoint sources in the Bays watershed. The draft Pollution Control Strategy for the Inland Bays was completed in September 1994; after a public hearing and discussion, the strategy is expected to take effect in 1995.

Another key component of this strategy is to control septic system discharges by tying certain septic systems to central collection and treatment facilities.

The action plan selected by the Management Conference will take a major step toward achieving a policy of no significant discharges to the Bays: Implement the Pollution Control Strategy. To carry out this action plan, two key tactics will be undertaken:

Tactic A: Meet the nutrient reduction goals of the Pollution Control Strategy

Tactic B: Tie new and certain existing development to appropriate sewage treatment infrastructure

Both implementation tactics will be addressed as part of the public participation and education program.

Implement the Pollution Control Strategy

Action Plan

The purpose of the Pollution Control Strategy is to meet numerical goals - Total Maximum Daily Loads - for reducing nutrient inputs to the Bays, to meet Delaware's Water Quality Standards, and to reach the Management Conference goal of a 90 percent nutrient reduction by 1998. The proposed Pollution Control Strategy will accomplish these by optimizing nutrient removal at existing facilities and developing and implementing Best Management Practices for nonpoint sources.

Recently completed computer modeling determined the total nitrogen and phosphorus loads to the Bays and the maximum daily nutrient loads that can be received in the Bays if water quality standards and CCMP goals are to be

Chapter 3. INDUSTRIAL, MUNICIPAL, AND SEPTIC SYSTEM ACTION PLAN

met. Results of the modeling established levels of load reductions from point and nonpoint sources that will be needed for healthy Bays.

Based on these findings, the Pollution Control Strategy will use a two-phased approach to reaching Total Maximum Daily Loads. Phase I calls for biological nutrient removal for some sewage treatment plants, implementation of Best Management Practices to control nonpoint sources, and limiting total nutrient loads from other point sources. Following meetings with facility operators and owners, workshops, and a public hearing, it is expected that Phase I will go into effect by the end of 1995.

Phase II will be developed by 1998 and take effect by 1999. It will consist of revisions and refinements based on the results of monitoring and new data entered into the computer model.

To help achieve the goal, the action plan also calls for connecting all new Inland Bays development within a Coastal Conservation Zone of 1,000 feet from the water to central sewer systems, using land treatment or other alternative treatment technologies that minimize nutrient discharges to surface and ground waters. Lots of one acre or more will continue to use on-site systems, but nutrient removal may be required. The Inland Bays Regional Wastewater Facility, located on Long Neck, is expected to ultimately accept wastewater from all area sewer connections built now and in the future. Currently, this system, which irrigates crops by spraying treated wastewater, serves only the Long Neck area.

Background

NPDES Program

The Department of Natural Resources and Environmental Control's (DNREC) Surface Water Discharges Section administers the federal National Pollutant Discharge Elimination System (NPDES) program for Delaware. Point source discharges of pollutants are controlled through this permitting program which identifies the following: specific pollutants to be controlled, allowable discharge amounts of each pollutant, timetables for installation of certain pollution control equipment, an implementation schedule for certain procedures, and plans for discharge monitoring at the facility. Permit limits are set by State and federal water quality standards and pollution control laws and regulations. Permits are issued for a period not to exceed five years.

DNREC staff members conduct periodic inspections of wastewater treatment facilities, collect water samples from discharges, and analyze water samples to determine levels of pollutants and compliance with permit limits. Additionally, each facility monitors its own discharge(s) and submits monthly reports to DNREC for review.

State Water Quality Standards

Section 11.5 of the State Water Quality Standards specifies the following designated uses for the waters of the Inland Bays subbasins: primary contact recreation; secondary contact recreation; fish, aquatic life, and wildlife; and industrial water supply.

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The Indian River Bay, Rehoboth Bay, and marine portions of the Indian River are designated as waters of Exceptional Recreational or Ecological Significance (ERES), recognizing them as special natural assets to be protected and enhanced for future generations of Delawareans. Under State law, DNREC is required to develop a Pollution Control Strategy for ERES waters. This requires assessing the pollution to the waters, identifying the aspects of the stream basin that are recreationally or ecologically important, identifying how ERES standards will be met, and indicating changes that are to be made to State plans for pollution control and resource management to ensure implementation of the Pollution Control Strategy.

Section 7 of the Water Quality Standards, recognizing the need to promote the growth of submerged aquatic vegetation, establishes ambient concentrations for dissolved inorganic nitrogen, dissolved inorganic phosphorus, and total suspended solids in the Inland Bays.

Computer Modeling

The development of the Pollution Control Strategy involved intensive water quality and hydrodynamic sampling and measurement (water movement—flows, circulation, flushing in and out of the inlet, computer modeling) and pollution control decision making. To successfully achieve this, the necessary water quality and hydrodynamic sampling and measurement were completed. Individual wastewater treatment facility operators voluntarily collected and analyzed samples from each discharge to determine concentrations of nitrogen and phosphorus in the effluent. Inland Bays Estuary Program researchers gathered critical pieces of information to fill gaps in knowledge regarding the amount of nutrients entering the Bays via ground water, the fate of nutrients once in the Bays, the response of microscopic plants to nitrogen and/or phosphorus in different parts of the estuary, and the way water circulates in the Bays. These efforts greatly enhanced knowledge about the quantity of nitrogen and phosphorus entering the Bays and the fate of these nutrients once in the estuary.

Through computer modeling, information was generated to accurately determine the nutrient reductions necessary to achieve healthy Bays. The model used a series of mathematical equations that approximate natural and human-induced conditions in the aquatic system. Based on the results of computer modeling and the findings of different load reduction scenarios, target nutrient reduction loads have been proposed as part of a Pollution Control Strategy that reflects these targeted load reductions - Total Maximum Daily Loads.

In order to determine the maximum permissible nutrient loads that can be discharged, a variety of scenarios were run through the computer. One scenario was selected that would result in a significant water quality improvement of the Bays and would not only meet but exceed the expected improvements of the stated goal of a 90 percent reduction of nutrient loads from point sources by 1998.

Sewage Treatment and Septic Systems

The other aspect of this action plan - tie all new and certain existing developments to central sewage collection and innovative treatment systems - will result in reducing nutrient overenrichment of surface waters, as well as reducing nutrient contamination of ground water. Contamination from existing septic systems must be addressed if long-term surface water nutrient reductions are expected. This will be accomplished by requiring new wastewater sources within

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the Sussex County Coastal Conservation Zone to tie into central systems, installing central collection and treatment systems in areas with poor soils and high water tables, and requiring individual, on-site systems to include nutrient removal.

Projected Costs and Funding Strategy

The aggregated cost of implementing both Tactics A and B for five fiscal years 1996-2000 is approximately \$23,369,454. Funds will come primarily from CWA Sections 104(b) and 319; Coastal Zone Act Reauthorization Amendments, Section 6217; PL-566, USDA watershed protection and flood protection act; State Revolving Fund, State General Funds, Sussex County Bonds, Rural Development Association/Farmers Home Adm., and penalties and fees. For detailed funding information see Appendix H. *Funding* and attachments to Tactics A and B.

Implementation Strategy

Tactic A: Meet the Nutrient Reduction Goals of the Pollution Control Strategy

Tactic Description

Efforts now under way will continue to refine numerical goals for reducing nutrients to levels that will sustain the life of the Inland Bays. Once set, a major effort will ensue to be sure the goals are met. The ultimate goal over the long term, proclaimed by regulators and citizens alike, is to eliminate all significant discharges.

Addressing these goals and with the help of computer modeling results, a Pollution Control Strategy is being developed. Implementation will begin late in 1995. Based on the strategy, new permits for wastewater discharges will be issued.

Implementation of Tactic

The Pollution Control Strategy, now under development, will be adopted by the end of 1995, and implementation will then start. New or updated permits that reflect the goals of the strategy will be issued at that time.

The new Inland Bays water quality and hydrodynamic computer model has been used to evaluate a number of nutrient reduction scenarios aimed at meeting water quality standards for nitrogen and phosphorus. As a result of this exercise, nutrient reduction goals are being reviewed. Until then, the following point source nutrient reduction goals have been proposed. These goals will be updated as part of the development of the Pollution Control Strategy.

! Reduce nutrients 50 percent by December 1996.

! Reduce nutrients 90 percent by December 1998.

Progress is already being made toward achieving these nutrient reductions. For example, phosphorus loads from the Millsboro sewage treatment plant are being reduced as a result of a 1993 upgrade and wastewater from the Frankford Elementary School is now being diverted to the Frankford/Dagsboro spray irrigation system.

Specific considerations for the Pollution Control Strategy will consist of two phases. Phase I will include the following:

! Review and update nutrient reduction goals for all point and nonpoint sources as part of the Pollution Control Strategy.

! Implement nutrient reduction options, including biological nutrient removal, for selected sewage treatment plants as part of the Pollution Control Strategy.

! Implement best management practices to control nutrient loads from nonpoint sources (see *Agricultural Source Action Plan*).

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- ! Limit the total nutrient loads from other point sources in the watershed.
- ! Monitor nutrients in effluent at all facilities.
- ! Provide annual reports of nutrient reduction progress.

Phase II, which will start in 1998, will include revisions to the Pollution Control Strategy resulting from monitoring and new data entered into the computer model.

To a great extent, the success of pollution control efforts will depend upon the ability of agency staff to work with clients to help them understand and implement desired changes. Most people like personal, friendly attention and respond well to it. The value of this approach has been amply proven in efforts to involve the agricultural community in using Best Management Practices and to involve property owners in using alternative means of shoreline stabilization. Following meetings and workshops with affected parties and a public hearing, Phase I will be adopted by the end of 1995.

Also key to the success of this tactic is the willingness of the public to accept implementation costs. Successful implementation will require acceptance of the Pollution Control Strategy and support of implementation costs by local governments, industries, and taxpayers. In addition, funding for costly nutrient removal technology must be secured. Public education will be important in support of this effort.

Implementation of the strategy will begin in 1995 and continue beyond 1999.

Lead and Supporting Agencies

Lead:

DNREC - develop Phases I and II of the Pollution Control Strategy, including a strategy for addressing nonpoint sources; implement the point source portion; issue permits and enforce compliance

Support:

U.S. Environmental Protection Agency - provide technical and financial assistance and Clean Water Act oversight

U.S. Army Corps of Engineers - provide technical assistance with respect to the computer model

Natural Resources Conservation Service - implement nonpoint source portion of Pollution Control Strategy

Sussex Conservation District - implement nonpoint source portion of Pollution Control Strategy

Department of Agriculture - implement forestry portion of Pollution Control Strategy

Sussex County/Municipalities - develop and implement/enforce planning/zoning ordinances to comply with Pollution Control Strategy

Measuring Results

It is expected that by achieving nutrient load reductions, algal levels will be reduced, allowing light to reach water bottoms, helping underwater grasses to thrive, and providing habitats for species that once lived in the Bays. Results will be measured by tracking the installation of pollution control equipment and by monitoring effluent, water quality, and biological factors (see Appendix G. *Monitoring Plan*). Success will be determined by whether numerical reduction goals are met.

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Industrial, Municipal, and Septic System Action Plan: Implement the Pollution Control Strategy

Tactic A: Meet the nutrient reduction goals of the Pollution Control Strategy

Lead Agency/Division: DNREC/Division of Water Resources

Contact for Information: John Schneider, Telephone 302-739-4590

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|----------------------------------|------------------|----------------|----------------|----------------|----------------|------------------|
| Personnel Costs ¹ | 18,700 | 19,500 | 20,200 | 21,000 | 21,900 | 101,300 |
| Capital Costs (>5K) ² | 1,348,000 | 106,879 | 662,749 | 555,870 | 251,337 | 2,924,836 |
| Operating Expenses ² | 94,360 | 101,842 | 148,234 | 187,145 | 204,738 | 736,319 |
| TOTAL | 1,461,060 | 228,221 | 831,183 | 764,015 | 477,975 | 3,762,455 |

¹Personnel costs include costs of re-evaluating nutrient reduction targets (modeling) and developing NPDES permits.

²Capital costs and operating expenses to upgrade 4 Wastewater Treatment Plants to include Biological Nutrient Removal.

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|--|
| <u>FY 1996</u> | Source 1 | <u>EPA - Clean Water Act, State Revolving Fund (SRF)/Bonds (Capital Improvement)</u> |
| | Source 2 | <u>State General Fund (Personnel Costs)</u> |
| | Source 3 | <u>User Fees</u> |
| <u>FY 1997</u> | Source 1 | <u>EPA - Clean Water Act, SRF/Bonds</u> |
| | Source 2 | <u>State General Fund</u> |
| | Source 3 | <u>User Fees</u> |
| <u>FY 1998</u> | Source 1 | <u>EPA - Clean Water Act, SRF/Bonds</u> |
| | Source 2 | <u>State General Fund</u> |
| | Source 3 | <u>User Fees</u> |
| <u>FY 1999</u> | Source 1 | <u>EPA - Clean Water Act, SRF/Bonds</u> |
| | Source 2 | <u>State General Fund</u> |
| | Source 3 | <u>User Fees</u> |
| <u>FY 2000</u> | Source 1 | <u>EPA - Clean Water Act, SRF/Bonds</u> |
| | Source 2 | <u>State General Fund</u> |
| | Source 3 | <u>User Fees</u> |

Projected Capital Improvement Cost for Implementing BNR

| City | 1996 | 1997 | 1998 | 1999 | 2000 | Total |
|------|------|------|------|------|------|-------|
|------|------|------|------|------|------|-------|

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| | | | | | | |
|--------------|--------------------|------------------|------------------|------------------|------------------|--------------------|
| Rehoboth | \$1,348,000 | \$0 | \$0 | \$0 | \$0 | \$1,348,000 |
| Georgetown | \$0 | \$106,879 | \$106,879 | \$0 | \$0 | \$213,759 |
| Millsboro | \$0 | \$0 | \$304,533 | \$304,533 | \$0 | \$609,066 |
| Lewes | \$0 | \$0 | \$251,337 | \$251,337 | \$251,337 | \$754,012 |
| Total | \$1,348,000 | \$106,879 | \$662,749 | \$555,870 | \$251,337 | \$2,924,836 |

Projected Operation and Maintenance Cost

| | 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-----------|
| Cumulative Capital Cost | \$1,348,000 | \$1,454,879 | \$2,117,629 | \$2,673,499 | \$2,924,836 | |
| O&M Cost (Assumed 7% of Cons. Cost) | \$94,360 | \$101,842 | \$148,234 | \$187,145 | \$204,738 | \$736,319 |

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Capital costs and operational costs will be determined once nutrient reduction results are analyzed and P.C.S. is updated.

Tactic B: Tie New and Certain Existing Development to Appropriate Sewage Treatment Infrastructure

Tactic Description

The most efficient way to reduce household nutrient contamination of waterways is to prevent contamination in the first place. By disposing of wastewater via central sewage collection and treatment systems, pollution from septic systems is prevented. The following four concurrent strategies emerge as the best and most practical approach:

- ! Tie all new wastewater sources within the Coastal Conservation Zone (1,000 feet) to central sewer systems, such as a community drain field or a small sewage treatment plant that uses land treatment or alternative treatment technologies to minimize nutrient discharge to groundwater. Current law requires property within a sanitary sewer district to tie in.
- ! On lots of at least one acre, allow the use of individual on-site wastewater treatment systems, but consider requiring those systems to remove nutrients. (The State is now considering increasing lot size requirements to one acre to obtain approval for on-site septic systems. For lots under one acre, nutrient removal or connection to a community collection and treatment system would be required.)
- ! Install central systems in areas where the threat of ground water and surface water contamination has been determined.
- ! If ground water and/or surface water is shown to be contaminated, institute a ban on new on-site systems.

The first three strategies are pollution prevention strategies and are currently being implemented. The first two strategies deal with current and future development; the third - the retrofit option - addresses existing development; the last would virtually ban any new development until a central collection and treatment system is operational. This tactic may change as other sewage treatment technologies are evaluated and proven effective for use in Sussex County.

Implementation of Tactic

The first strategy - linking all new wastewater sources within the Coastal Conservation Zone to central sewer systems - involves using intermediate steps that lead toward a permanent solution. For example, in an area where central collection is not planned for some time and soil and water table conditions are suitable, a community system can be installed that serves more than one dwelling unit. This would include a collection system; that way, when a central collection system is made available, waste water can be routed away from the community system and tied to a larger, centralized system. In other words, a community drain field discharge would eventually be routed, using the existing collection system, to a sewage treatment plant.

The South Coastal Area Planning Study created eight sewer district areas where community systems, such as dry systems that tie to central holding systems, are required. If soil conditions permit, individual holding tanks or on-site systems are allowed. This study is being implemented incrementally. Full implementation - installing collection

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systems in the most serious problem areas at a cost of about \$8 Million - will be under way by 1997 if the funding is available. A Route 13 (from Greenwood to Delmar) Planning Study is also being considered.

In some areas, advanced sewage treatment systems are required. In the Coastal Conservation Zone or in areas with poorly drained soils, DNREC will recommend to Sussex County that central systems be required.

To address on-site wastewater treatment systems on lots of one or more acres, a second strategy is nutrient removal through mechanical devices, such as sand filters, recirculating sand filters, or biological contactors; chemical addition; or discharge to wetlands. This strategy is appropriate in cases where a central system is not anticipated for as many as ten years. This strategy is satisfactory only if soils permit or if a system provides advanced treatment and nutrient removal that can meet drinking water standards.

In areas where the threat of ground and surface water contamination has been determined, a third strategy is the eventual installation of central systems. Areas with poorly drained soils, high water tables, high-density development, or small-lot development are being considered first. These identified "hot spots" include the areas in and around Ocean View, Millville, Cedar Neck, Oak Orchard, and Angola Neck.

Where it has been determined that a health threat is imminent because of ground or surface water contamination, such as the West Rehoboth area, a fourth, extremely controversial strategy emerges: Prohibit the installation of any new on-site systems. With this strategy, a virtual ban on development would be in effect until a central sewage collection and treatment system were installed or wastewater holding tanks could be used as temporary collection and storage systems. These holding tanks could be pumped out by waste haulers, who could then take the wastewater to sewage treatment facilities. This is an extremely expensive alternative, the cost of which would be borne by the developer and eventually the home buyer.

To address the problems in West Rehoboth, a sewage treatment project is now under way and is due for completion by the end of 1995, when the four-million-gallon-a-day sewage treatment plant will be operational. Since 1989, about \$57 million has been spent or committed for the West Rehoboth project.

All strategies are being implemented now and over the long term until completion by the year 2000. In addition to the West Rehoboth project, the Sussex County Engineering Department has scheduled the installation of central wastewater systems for identified "hot spots" in the Coastal Conservation Zone. Cedar Neck is the first to begin. Millville and some areas of Ocean View have shown interest in a central system. In addition, the County has extended the existing system to contiguous areas. To further support this tactic, a Sussex County ordinance requires dry sewers in certain new subdivisions located in the Coastal Planning Area or in an existing sewer district.

To achieve full implementation, State septic regulations will need to be revised to address compliance with Coastal Zone requirements that lots of less than one acre be tied to community systems and that only lots of one-acre or more may receive permits for septic systems. The septic systems may be also required to use advanced wastewater treatment.

For construction projects, federal, State, and County grants and loans are used. To repay loans, user fees are levied on property owners. Implementation of this tactic requires public acceptance through awareness, the ability to create new

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sewer districts, financing for infrastructure, resources provided by the State or County to address "hot spots," State bonding and financing capabilities, and State and federal grants and loans.

The following would aid in carrying out these activities:

- ! Revision of State of Delaware Septic System Regulations to restrict on-site systems in Coastal Conservation Zones.
- ! Enforcement of the County Coastal Conservation Zone ordinance, requiring community or central systems.

Though this tactic is feasible, alternative tactics have also been considered by the Management Conference:

- ! Evaluate and provide recommendations with regard to the definition of the Coastal Conservation Zone (CCZ) to determine appropriateness. Currently, there is a one-acre minimum lot size requirement to install an on-site septic system in the CCZ.
- ! Tie all new Inland Bays development with lots less than one-acre to central sewer systems that utilize land treatment; or in those cases where soils and water table height are suitable, tie new development to community systems that discharge a highly treated effluent to drainfields. Requiring large-lot development to tie into central systems may be too restrictive for the rest of the County.

Lead and Supporting Agencies

Lead:

Sussex County - establish and enforce ordinances; issue bonds

DNREC - provide for public education, financial and technical assistance; regulate as needed

Support:

U.S. Environmental Protection Agency - provide financial and technical assistance, regulate and provide oversight under Clean Water Act

Delaware General Assembly - provide funding under SRF

Farmers Home Administration - provide funding under Farmers Home Loans/Grants

Measuring Results

Because of various other sources of ground and surface water contamination, it will be difficult, if not impossible, to attribute any reduced nutrient levels to this specific tactic. Therefore, the success of this and other tactics will be measured by an improvement in water quality determined through the DNREC monitoring program (see Appendix G).

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Tactic B: Tie new and certain existing development to appropriate sewage treatment infrastructure

Lead Agency/Division: Sussex County Engineering Department

Contact for Information: Robert W. Wood, Telephone 302-855-7718

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|----------------|------------------|------------------|------------------|----------------|-------------------|
| Personnel Costs | 33,000 | 35,000 | 37,000 | 39,000 | 41,000 | 185,000 |
| Capital Costs (>5K) | 250,000 | 7,417,000 | 9,235,000 | 2,303,000 | - | 19,205,000 |
| Operating Expenses | 30,000 | 32,000 | 40,000 | 50,000 | 65,000 | 217,000 |
| TOTAL | 313,000 | 7,484,000 | 9,312,000 | 2,392,000 | 106,000 | 19,607,000 |

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|--|
| <u>FY 1996</u> | Source 1 | <u>State Revolving Fund (SRF) (0.125)</u> |
| | Source 2 | <u>Rural Development Assn./Farmers Home Admin. (RDA) (0.075)</u> |
| | Source 3 | <u>County Bonds (0.050)</u> |
| <u>FY 1997</u> | Source 1 | <u>SRF (4.142)</u> |
| | Source 2 | <u>RDA (3.225)</u> |
| | Source 3 | <u>Bonds (0.050)</u> |
| <u>FY 1998</u> | Source 1 | <u>SRF (4.018)</u> |
| | Source 2 | <u>RDA (5.217)</u> |
| | Source 3 | <u>-</u> |
| <u>FY 1999</u> | Source 1 | <u>SRF (0.290)</u> |
| | Source 2 | <u>RDA (2.013)</u> |
| | Source 3 | <u>_____</u> |
| <u>FY 2000</u> | Source 1 | <u>_____</u> |
| | Source 2 | <u>_____</u> |
| | Source 3 | <u>_____</u> |

Chapter 3. INDUSTRIAL, MUNICIPAL, AND SEPTIC SYSTEM ACTION PLAN

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

The County has completed studies indicating expenditures (pending funding) over next 20 years of \$50 million, with a potential of an additional \$30 million resulting from studies scheduled for near future.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Current projects requiring funding are indicated with potential sources on Part 2.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

RDA and SRF funding at lower than commercial lending rates will make projects viable.

Chapter 3. LAND-USE ACTION PLAN

The goal of the land-use action plan is to prevent additional habitat loss and nutrient overenrichment by developing sound land-use plans, passing supportive regulations and zoning ordinances, and providing for trained staff to implement the plan.

In the past, inattention to environmentally sensitive land-use planning has greatly contributed to current losses of valuable habitat in uplands, along shorelines, and in shallow waters. This lack of attention has also resulted in excessive levels of sediments and nutrients in waterways. Future land-disturbing activities should be undertaken with great care and appreciation for habitat and open spaces. For example, trees and other vegetation serve as nurseries and shelter for wildlife, take up nutrients, and impede the flow of and filter stormwater runoff from urban areas and rural lands to waterways.

To fully appreciate the impact of land-use changes on nutrient and sediment loading to the Bays, it is important to understand the per-acre nutrient and sedimentation contribution from various land activities. For example, forests contribute a certain amount of nutrients to both ground and surface waters. If these forested lands are converted to another use, such as low-density housing development, an increase in per-acre loading will occur. The amount of that increase, however, depends upon a number of factors, such as whether stormwater retention ponds and other controls are used.

Through the Inland Bays Recovery Initiative, State and County officials at all levels, planners, administrators, and elected officials began a cooperative effort that has led to improved land-use planning. This cooperation is based on the premise that land-use decisions will remain at the local level, but that effective planning assistance can be provided by the State.

In the CCMP, controlling land use depends on a number of factors such as the importance of local land-use planning, the role of the State Development Advisory Service, the effect of the State sediment and stormwater control program, and the potential for new regulations to replace voluntary efforts. CCMP land-use tactics also are tied to reducing the loss of habitat (see Habitat Protection Action Plans) and abating sediment and nutrient input (see Agricultural and Industrial, Municipal, and Septic Source Action Plans) to the Bays resulting from existing land uses and from future land-disturbing activities.

The Management Conference selected the following action plan: Ensure that land use and development are consistent with the goals of the CCMP.

The action plan consists of two key tactics:

Tactic A: Review and meet land-use goals in the Coastal Sussex Land-Use Plan

Tactic B: Require environmentally sensitive development

Ensure That Land Use and Development Are Consistent with the Goals of the CCMP

Action Plan

To lessen the impacts of development, the Management Conference and, beginning in 1995, the Center for the Inland Bays will work closely with Sussex County and municipalities to ensure that land use and development are consistent with the actions in the CCMP. The Management Conference hopes to ensure a more clearly defined public policy related to land development, increased public involvement in formulating this policy, and the expansion of goals into strategies that include standards for land development.

The goals of the Coastal Sussex Land-Use Plan are inseparable from those of the CCMP; therefore, any differences between the two plans will be reconciled. Also integral to this action plan will be to require "environmentally sensitive" development in Sussex County - land development that uses measures to protect or improve the environment. The land development goals of Sussex County are also closely linked with habitat protection tactics (see Habitat Protection Action Plans).

Background

Sussex County Planning

In the Inland Bays watershed, development is guided by the Coastal Sussex Land-Use Plan, which was approved by the Sussex County Council in March 1988. The current plan serves only as a guide and does not have the force of law, regulation, or ordinance; however, parts of the plan have been and are continuing to be enacted. By December 1996, the Coastal Sussex Land-Use Plan will be revised to reflect requirements of the new State Quality of Life law.

Individual land-use decisions are considered by three bodies:

- ! Sussex County Council — five elected officials representing five districts
- ! Planning and Zoning Commission — five members appointed by the Sussex County Council
- ! Board of Adjustments — five members appointed by Sussex County Council

As prescribed by Delaware law, the Board of Adjustments makes final decisions on Special Use Exceptions and Variances. No appeal options exist at the County level; instead, appeals are heard by the State Superior Court. The Planning and Zoning Commission makes recommendations to Sussex County Council, and the Council, by simple majority, adopts or rejects the recommendations. In the case of subdivisions, the Planning and Zoning Commission makes final decisions.

The Planning and Zoning Commission is assisted by the Sussex County Planning and Zoning Department. A Technical Advisory Committee meets monthly, if needed, to review subdivisions, conditional uses, and Residential Planned Community site plans, if required. The Committee is made up of representatives of appropriate State and County agencies; the agencies represented may have regulatory authority over the proposed development or activity, or a representative may serve in an advisory capacity. In cases where a State agency has authority over certain aspects

Chapter 3. LAND-USE ACTION PLAN

of the proposal, the County will make a final decision on the application; however, State permits and approvals are still needed before construction can start.

With the 1988 adoption of the Coastal Sussex Land-Use Plan, the County set forth land-use goals and objectives. The objectives of the plan are to 1) maintain and enhance the quality of life for the residents in the planning area; 2) protect the Inland Bays, critical areas, beach and dune systems; 3) promote and protect the agricultural economy; 4) determine the type and rate of growth that can be accommodated; 5) provide economic and innovative housing options; and 6) provide a clear plan and mechanisms for implementation.

The Coastal Sussex Land-Use Plan also contains certain implementation steps which recommend that zoning ordinances be created for various zoning categories: residential zones and appropriate densities, manufactured home parks, campgrounds and recreational parks, marina zoning, and commercial zoning. The plan also provides for implementation steps that recommend creating buffer areas along wetlands; establishing sunset provisions to close out unfulfilled plans for developments; creating stormwater management regulations; adopting a uniform building code; and revising and updating subdivision regulations.

Many of the goals and implementation steps have been adopted, many have been developed and recommended to County Council for approval, and many have not been developed fully at this time. Sussex County Planning and Zoning is currently reviewing the status of the planning and determining which goals have been met. This is being done in preparation for updating the plan by 1996, when the County plans to combine the coastal and western Sussex plans and to meet the requirements of the State Quality of Life law.

Natural Lands Trust Assistance

Through the Inland Bays Recovery Initiative and the Inland Bays Estuary Program, professional planning assistance has been provided to the County by the Natural Lands Trust. The major emphasis of this assistance was to develop ordinances that promote open space area interconnections as stormwater buffers, wildlife corridors, and walking trails, and to provide design standards that encourage new planned residential communities that follow traditional neighborhood standards.

The planner reviewed and evaluated land management and development practices for residential planned communities through identification of existing standards, resolution of conflicts between existing standards, and identification of proactive standards designed to allow both for development and for improved environmental protection. The Natural Lands Trust planner reviewed two subdivisions in the second phase of the contract with the County and redesigned a proposed development to demonstrate practices that are cost effective and preserve open space.

Development Advisory Service (DAS)

Sussex County Planning and Zoning Department staff frequently refer applicants to the DAS, which has been administered by DNREC. Serving as advisors on DAS are representatives from the five DNREC divisions, Department of Transportation, Department of Health and Social Services, Department of Agriculture, Department of Community Affairs, and other State agencies that have related regulatory authority or wish to serve in an advisory capacity.

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Currently, DAS members receive information about and comment on proposed subdivisions, Residential Planned Communities, or other activities from aquaculture to zoos. Prospective applicants present a development plan, receive comments from DAS members, and ask questions about regulations or other concerns. Written comments are provided to applicants, along with copies of regulations and other information, contact names, and phone numbers.

The various agencies involved in the DAS process were not provided with the staffing and funding necessary to participate fully. Also, comments provided to applicants may not be site-specific enough to help the applicant make substantial changes to protect the environment. Through the implementation of the CCMP, the DAS will be restructured to provide higher-quality, more specific recommendations to developers to help them change traditional ways of thinking and to address specific environmental protection concerns early in the development process. A restructured DAS is expected to save agencies and developers a great deal of time and money. Incorporated towns will be encouraged to work closely with the revitalized DAS.

All land-use planning in incorporated areas of the Inland Bays watershed is handled by individual cities and towns. The County has no jurisdiction over town ordinances. Because most of the coastal land, except for State parks, is controlled by incorporated towns, the Sussex County Association of Towns have been asked to work on CCMP implementation as part of the Center for the Inland Bays.

Stormwater Program

Regulations: Stormwater control is a critical component of environmentally sensitive land development. Delaware's stormwater regulations, which went into effect in July 1991, are designed to allow minimal sediment, nutrient, and stormwater impacts from all future development. The regulations apply to parcels greater than 5,000 square feet (approximately 1/10 of an acre). The Sussex Conservation District administers the stormwater program in the County. DNREC provides initial funding, technical assistance, and oversight. To support this program and aid developers, DNREC developed a design manual for stormwater projects.

Applicants are charged fees to cover the costs of administering the program, including inspection. Each year, Sussex Conservation District staff inspect stormwater management structures. If any structure requires maintenance or repair, the owner or homeowners' association will be responsible.

The Sediment and Stormwater Management Program is not an effort to enhance the environment. Rather, the goal is to minimize the effects of land-disturbing activities on streams, rivers, and bays by reducing sediment-related contamination leaving a site. Neither is the program designed to retrofit existing developments. Because the program is relatively new, it still is not known if the fee schedule will adequately cover costs. However, under the regulations, a governmental body can designate a watershed for special consideration, a stormwater utility can be established, and fees can be charged to residents in the designated watershed.

Stormwater Action Plan Demonstration Projects: As long-term results of two Action Plan Demonstration Projects are measured, they will continue to provide guidance for addressing the impacts of stormwater. In the short term, both are serving as stormwater control models for developers.

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An artificial wetland was created at Georgetown Industrial Park. The two-acre wetland is being used to treat runoff from the 300-acre watershed that includes Georgetown Airport and a business park. The project was designed to reduce nutrient and sediment loads to the Bays while creating a small park with a walking path and an informational sign describing the benefits of the wetland. Constructed in 1991, it drains about 200 acres. Planting was done by 150 students from surrounding schools in May 1992, using 8,000 wetland plants.

This project taught that ponds such as this are applicable wherever urbanization is occurring. It also taught that constructed wetlands are an excellent urban stormwater management option and, if located in the vicinity of natural wetlands, can enhance the establishment of wetland species. Another lesson is that the pond's location should be a major consideration because of the cost of transporting soil excavated from the site. Because this site was near an airport, costs were saved as fill material was needed for runway expansion. The system, which is now being monitored, is removing pollutants and providing wildlife habitat, as well as offering educational and aesthetic experiences.

The second project is treating stormwater in an urban setting by building a sand filter at the Rehoboth Park and Ride lot to intercept and treat runoff before it enters a nearby stream.

This multi-agency project involved the design and construction of a precast sand filter system, an approach designed for water quality control on relatively small sites with high degrees of impervious surfaces. At this site, the sand filter intercepts runoff from 1.2 acres of impervious parking lot, using a two-chamber system: The first chamber acts as a sediment trap; the second filters the runoff. Ten outfall pipes lead to an adjacent swale.

This system can be applied elsewhere, but with two caveats: First, in a very cold climate, freezing water in the sediment trap could render the system ineffective; second, the cost of the system (more than \$52,000) suggests that it be used only in high traffic areas with impervious surfaces and that costs could be reduced if it is possible to place the heavily reinforced filter out of vehicular traffic areas. Sand filters should be used at intensively urbanized sites such as described here that need only to address water quality.

Projected Costs and Funding Strategy

The total five-year cost to implement the land-use action plan is approximately \$2.3 million; funding sources include State and County General Funds, primarily, to be supplemented with Coastal Zone Act Reauthorization Amendments, 6217, and EPA grants. For detailed funding information see Appendix H. *Funding* and attachments to Tactics A and B.

Implementation Strategy

Tactic A: Review and Meet Land-Use Goals in the Coastal Sussex Land-Use Plan

Tactic Description

Sussex County is currently reviewing its land-use goals. Outside experts and State personnel have supported this effort by providing financial assistance and technical advice. The review, revisions, and activities aimed to meet land-use goals for the Inland Bays area of Sussex County will be a cooperative effort, with full public involvement in goal setting.

The County plans to complete revisions to the Coastal Sussex Land-Use Plan, along with supporting ordinances that will give it the weight of law, by December 1996.

Implementation of Tactic

Beginning with the Recovery Initiative, this action plan builds on collaboration. The County is now reviewing the existing goals as outlined in the Coastal Sussex Land-Use Plan. From now through 1995, Sussex County will work with support agencies (listed below) to evaluate the existing goals and determine if they are adequate to protect water quality and living resources, preserve the rural character of the watershed, and comply with the State Quality of Life legislation. The County is committed to establishing and meeting the schedule for adopting the Plan and necessary ordinances. It is about 80 percent complete. Ultimately, the County hopes these ordinances will be backed by State law.

Sussex County has begun to lay the groundwork for ensuring that local land use and development are consistent with the goals of the CCMP and that habitat areas are protected through the following actions:

- ! A County Ordinance has established a Coastal Conservation Zone (within the land areas encompassed by the 1988 Coastal Sussex Land-Use Plan and the 1990 Western Sussex Land-Use Plan) that encompasses 1,000 feet landward from the mean high water line or adjacent flood plains of tidal water bodies, rivers, or their major tributaries. In this Coastal Conservation Zone, any new lot not provided with central sewers and water must be at least one acre in size, with a minimum lot width of 150 feet and a minimum lot frontage along tidal water bodies of 150 feet.
- ! An ordinance was enacted in February 1994 to create setback lines for manure storage and composting facilities on farmland. The setbacks follow the existing setback lines for poultry houses and hog houses and feedlots.
- ! An ordinance was established to create a 30-foot forested buffer along the property lines of major subdivisions that adjoin agricultural lands.

Chapter 3. LAND-USE ACTION PLAN

- ! An additional ordinance is pending to provide for a building-setback line at federally-defined wetlands. However, if federal agencies continue to issue permits allowing residential construction in wetlands, the ordinance will not be adopted.
- ! Another ordinance has been proposed to require deed holders to inform potential buyers of subdivisions (1) if wetlands are on or adjacent to the property and (2) that permits could be required. A disclosure statement would read: "This site contains regulated wetlands. Activities within these wetlands may require a permit from the U.S. Army Corps of Engineers or the State of Delaware."
- ! As a result of public input, a proposal to amend the Residential Planned Community ordinance to encourage environmentally sensitive developments that would create open space; protect tree cover, wildlife habitat, and water quality; and preserve other environmentally sensitive features was introduced, but not accepted as proposed. Environmentally sensitive development would have been accomplished by reducing lot size without reducing the number of houses in a proposed subdivision and with less cost for roads and other infrastructure. The proposed ordinance is being revised for consideration by the Sussex County Planning and Zoning Commission, the public, and the County Council.
- ! The Inland Bays Management Conference has proposed that the County Council also consider adoption of open space design standards. Before they are adopted by the County, the standards would be reviewed and agreed upon through a public/private partnership of the County, State, home builders associations, realtors, citizens, and others. The County Council is now considering this.

Enactment of the pending ordinances is expected. The Sussex Land-Use Plan now being developed with additional ordinances is near completion. By the end of 1996, when the Land-Use Plan and its ordinances are adopted, enforcement will begin and will be ongoing. The Plan will have the force of law.

The County process is facing two potential obstacles to its efforts:

- ! The State is currently developing a new transportation plan. The County may be expected to delay its plan until this State process is completed.
- ! State regulations do not now support County ordinances. For example, the County has been pressured to order building setbacks from wetlands and to limit septic systems to not-smaller-than- one-acre lots. DNREC has no setback regulation and issues permits for septic systems on one-half-acre lots. (DNREC is now considering limiting permits for septic to a minimum lot size of one acre.)

Lead and Support Agencies

Lead:

Sussex County - update Coastal Land-Use Plan; develop, adopt, enforce land-use ordinances

Support:

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DNREC - provide technical assistance

Sussex Conservation District - provide technical assistance; enforce stormwater regulations

Measuring Results

Success will be measured by counting the number of acres of land preserved and restored and by monitoring water quality to determine nutrient and sediment load reductions. Success will also be measured by the adoption and achievement of goals and objectives, and by the adoption and enforcement of ordinances.

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Land-Use Action Plan: Ensure That Land Use and Development Are Consistent with the Goals of the CCMP

Tactic A: Review and meet land-use goals in the Coastal Sussex Land-Use Plan

Lead Agency/Division: Sussex County

Contact for Information: Robert Stickels, Telephone 302-855-7741

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Personnel Costs | 30,000 | 32,500 | 34,125 | 36,000 | 37,800 | 171,225 |
| Capital Costs (>5K) | 2,500 | 1,500 | 1,000 | 1,000 | 1,500 | 7,500 |
| Operating Expenses | 4,500 | 4,725 | 5,000 | 5,250 | 5,600 | 25,075 |
| TOTAL | 37,800 | 38,725 | 40,125 | 42,250 | 44,900 | 203,800 |

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|----------------------------|
| <u>FY 1996</u> | Source 1 | <u>County General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1997</u> | Source 1 | <u>County General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1998</u> | Source 1 | <u>County General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | <u>County General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | <u>County General Fund</u> |

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Source 2 _____

Source 3 _____

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

40K average annually from County General Fund.

Tactic B: Require Environmentally Sensitive Development

Tactic Description

Significant benefits to the Inland Bays are expected to result from the use of environmentally sensitive development practices. At first, assistance and incentives will be provided to developers in Sussex County to help them conform to environmentally protective practices; eventually, these practices will be written into ordinances. Key among these practices will be to provide for habitat and buffer areas on the land through reducing paved areas and maximizing open space, and to treat stormwater that inevitably comes from developed areas. The goals of this tactic are to maximize open space and to minimize post-development increases in environmental impacts from sediments, nutrients, and stormwater.

Environmentally sensitive development will be required through measures such as establishing flexible design standards, flexible performance standards, conceptual design assistance, and rewards and incentives for going beyond the requirements in new and existing developments. These requirements will provide for open space, protect sensitive habitats, create buffer areas, and preserve trees. Proper redevelopment of a previously impacted site can also fix past wrongs, especially with respect to erosion and stormwater controls.

To administer this effort, a restructured Development Advisory Service (DAS) will facilitate the regulatory review and permitting process, provide design assistance, and educate developers.

Implementation of Tactic

To develop and implement land-use requirements for environmentally sensitive development, a change in the role of the DAS will be necessary. The Management Conference proposed that the DAS process be conducted by the State and be made mandatory for all development within Sussex County, including incorporated towns. In its new role, the DAS will provide three services: education/outreach to developers, project design assistance, and regulatory process assistance. The revitalized DAS will be part of the new Office of State Planning Coordination, which was created by Governor Tom Carper in 1995.

The DAS will be coordinated by an individual who is knowledgeable about all relevant State requirements and will actively participate in County Council meetings, relaying comments and recommendations to decisionmakers. The DAS coordinator will be the first State point of contact for prospective applicants. Sussex County and incorporated towns will refer all applicants to the DAS. Applicants will be instructed on the environmental goals of the State, County, and municipality, the DAS process, and stormwater control requirements.

Once a development is designed based on State standards and requirements, the DAS coordinator will direct the applicant to the appropriate regulatory agencies. Each State regulatory agency will provide a single point of contact for all regulatory issues (stormwater regulations, for example). This contact will serve as the facilitator for the DAS process by providing comments on the required permits. Permits that conform to agreed upon land-use practices are expected to proceed expeditiously through the permitting process.

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A major implementation element is education and technical assistance. The DAS will sponsor educational workshops and seminars that will help to reduce resistance to new development practices and explain how to comply with environmental protection techniques.

Implementation of the expanded DAS will begin by 1996, building on the existing process as recommended by the Management Conference. The Governor's Permitting Task Force has also recommended that DAS be upgraded. A draft proposal was reviewed and a final proposal is being considered.

The Governor's Cabinet Committee on State Planning Issues has been concerned about growth, just as the Management Conference has. In a draft "Vision Document" this concern is expressed as a need to ensure that growth is consistent with "a sense of belonging, a sense of identity, and a sense of community". The State's proposed planning goals include protecting farmland and open space, encouraging public water and wastewater systems, and are generally consistent with goals of the CCMP.

During 1995, the following implementation steps are being taken:

- ! An office overseeing land-use planning and coordination will be established.
- ! A planning and land-use coordinator will be assigned.
- ! A technical coordination entity will be created with planners from State and local agencies.
- ! An advisory panel on Intergovernmental Planning and Coordination will be activated.

By the end of 1996, this tactic will be fully implemented.

In addition to upgrading the DAS as part of the new State office, the stormwater control program is crucial to environmentally protective development. Therefore, to strengthen the stormwater control program by 1998 and beyond, the following activities should be considered:

- ! Designate the Inland Bays as a priority watershed for NPDES and other stormwater controls; in other words, regulate stormwater discharges as point sources and require NPDES permits.
- ! Address older developments by investigating retrofitting such as runoff controls into lagoons, filters for parking lots, and pollution prevention/waste minimization techniques.

Lead and Supporting Agencies

Lead:

DNREC - administer DAS in 1995

Office of State Planning Coordination - administer DAS after 1995

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Support:

DNREC - provide technical assistance and advice

Sussex Conservation District - provide technical assistance; enforce stormwater regulations

Delaware Department Of Transportation - provide technical assistance

Delaware Department of Health and Social Services - provide technical assistance

Delaware Department of Agriculture - provide technical assistance

Delaware Department of State - provide technical assistance

Delaware Development Office - provide technical assistance

Delaware Public Service Commission - provide technical assistance

Sussex County - provide technical assistance

Incorporated towns - provide technical assistance

Measuring Results

Success will be measured by counting the number of acres of land preserved and restored and by monitoring water quality to determine nutrient and sediment load reductions.

Quantitative results will be determined by measuring the amount of

- ! Land coverage/density; development costs per acre or unit; infrastructure costs per unit, including streets, water, and sewer

- ! Acres of open space protected

- ! Acres of stream corridor buffered

- ! Acres of wetlands and subaqueous lands buffered

Qualitative results will be assessed by

- ! Utilization of innovative planning strategies by developers

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- ! Ability to make DAS mandatory
- ! Ability to hire additional staff to assist in land-use planning

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Tactic B: Require environmentally sensitive development.

Lead Agency/Division: DNREC/State Land-Use Planning and Conservation Office

Contact for Information: David Hugg, Telephone 302-739-3091

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000*

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|----------------|----------------|----------------|----------------|----------------|------------------|
| Personnel Costs* | \$240,000 | \$320,000 | \$400,000 | \$400,000 | \$400,000 | \$1,760,000 |
| Capital Costs (>5K) | 80,000 | 20,000 | 20,000 | - | - | 120,000 |
| Operating Expenses | 30,000 | 40,000 | 50,000 | 50,000 | 50,000 | 220,000 |
| TOTAL | 350,000 | 380,000 | 470,000 | 450,000 | 450,000 | 2,100,000 |

*This means a staff of state-local planning coordinators/local advocates to work with local governments in the development process; some site review/design technical assistance; and staff involved in developing/proposing/ implementing new regulatory schemes and standards. Some of this staff would likely be reassigned to State Planning from other agencies.

Note: A much reduced effort more like the current ("old") DAS involves 2-3 people at lower levels and with fewer other costs, perhaps in total to 100K.

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|---|
| <u>FY 1996</u> | Source 1 | <u>State General Funds**</u> |
| | Source 2 | <u>Coastal Zone Management Program</u> |
| | Source 3 | <u>EPA - Clean Water Act, 319, Clean Air Act/Transportation</u> |
| <u>FY 1997</u> | Source 1 | <u>State General Funds**</u> |
| | Source 2 | <u>Coastal Zone Management Program</u> |
| | Source 3 | <u>EPA - Clean Water Act, 319, Clean Air Act/Transportation</u> |
| <u>FY 1998</u> | Source 1 | <u>State General Funds**</u> |
| | Source 2 | <u>Coastal Zone Management Program</u> |

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| | | |
|----------------|----------|---|
| | Source 3 | <u>EPA - Clean Water Act, 319, Clean Air Act/Transportation</u> |
| <u>FY 1999</u> | Source 1 | <u>State General Funds**</u> |
| | Source 2 | <u>Coastal Zone Management Program</u> |
| | Source 3 | <u>EPA - Clean Water Act, 319, Clean Air Act/Transportation</u> |
| <u>FY 2000</u> | Source 1 | <u>State General Funds**</u> |
| | Source 2 | <u>Coastal Zone Management Program</u> |
| | Source 3 | <u>EPA - Clean Water Act, 319, Clean Air Act/Transportation</u> |

**Assumes reassignment to State Planning Office as well as new staff

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

\$500,000 annually from a combination of federal and state funds.

Chapter 3. HABITAT PROTECTION ACTION PLAN

The goal of the habitat protection action plan is to protect, restore, and enhance living resources by improving water quality, controlling land use, and reducing habitat loss. Preserving habitat requires comprehensive planning to maintain the integrity of the Inland Bays by protecting freshwater wetlands; protecting shallow water, subaqueous land, and upland habitats; identifying, protecting, and enhancing living resources; and prohibiting damaging activities. At the same time, responsible public access and use of the Bays is highly desirable.

Over the years, a considerable area of habitat in the Inland Bays has been lost or damaged because of sedimentation, bulkheading, dredging, boat wakes, filling wetlands to create uplands, and a variety of other reasons. The first step in developing a habitat protection program is to inform the public about this historic loss of valuable habitat for birds, fish, and other living resources and to take steps to prevent future loss and restore damaged habitat. The public education program will help build public awareness and an attitude that promotes stewardship of the Bays watershed.

Through the 1990-1992 Recovery Initiative, marina regulations have led to the protection of marina-related wetlands and to a reduction in marina pollution. The Recovery Initiative also promoted the use of natural vegetation and stone to stabilize the shoreline and encouraged tree planting in housing developments adjacent to the Bays. Efforts to protect shellfishing led to the removal of abandoned crab pots, conditional reopening of at least one improved shellfishing area, and stocking of shellfish in clean areas of the Bays. To enhance wildlife diversity, Recovery Initiative efforts encouraged native freshwater food plants for wildlife by reducing the salinity in impounded wetlands, demonstrated that submerged aquatic vegetation can be re-established, and encouraged landowners to plant vegetation to support wildlife. Finally, detailed Natural Heritage Inventories were started and are still being conducted.

The Management Conference of the Inland Bays Estuary Program selected a CCMP action plan that will protect habitat and living resources while providing for public access to the Inland Bays. The Habitat Protection Action Plan will be closely tied to the Coastal Sussex Land-Use Plan, environmentally sensitive development, nutrient reduction activities, as well as to the tree/vegetative planting and management program described under the *Agricultural Source Action Plan*. The selected action plan: Develop a comprehensive habitat protection action plan for the Inland Bays.

To implement this action plan, the following tactics will be implemented:

- Tactic A:** Create a Resource Protection Area management plan
- Tactic B:** Develop Sussex County habitat protection ordinances
- Tactic C:** Establish an Inland Bays Comprehensive Water-Use Plan
- Tactic D:** Establish a shoreline building-setback line
- Tactic E:** Expand public land acquisition, protection, and access
- Tactic F:** Promote natural alternatives to bulkheading
- Tactic G:** Review, update, and codify the Inland Bays Dredge Plan

Develop a Comprehensive Habitat Protection Action Plan

Action Plan

This action plan is designed to take a comprehensive view of all existing and developing activities in the watershed that affect living resources and their habitats, including human uses of these habitats. Through this effort, conflicting human uses and living resource needs will be reconciled.

Background

User Conflicts

Habitat loss is exacerbated by the conflicting needs of people who use the Bays. Conflicts develop when users of the Bays perceive that their rights or uses are infringed upon by other uses or users. The cause of this perceived infringement can occur on the open waters, at the shoreline, within the watershed at a small tributary, and even far inland, where nonpoint source runoff may threaten living resources, habitat, or water quality downstream.

Often crisis management does not provide a considered, balanced solution to environmental problems; solutions are often narrowly or poorly focused, creating more problems than they solve. A better, more rational approach to environmental management is to take a comprehensive view of the system and try to evaluate the problems and dynamics of the present condition, as well as future trends.

Since the Inland Bays' natural resources have been adversely affected historically and currently exist at below-optimal levels, there is great potential for improved habitat and greater numbers of desirable organisms. This improvement will require proper management, stewardship, and responsible use and harvest by the public. Likewise, existing uses can be protected and expanded by zoning portions of the Bays for specific uses.

Low-impact activities such as kayaking, canoeing, and wind surfing can exist, if properly managed, in conjunction with sensitive habitats and species. High-impact activities, on the other hand, can be located in deeper water, away from sensitive areas or shorelines where they may be detrimental or nuisances. Other activities can necessarily be excluded from the Bays. Prime aquatic habitats can be set aside as aquatic sanctuaries open for education, research, and management. The overall goal is to decrease user conflict and pressure while maintaining and enhancing water quality, living resources, and habitat in the public interest.

Living Resources

Historically, the Inland Bays have been characterized by a continual dynamic flux in its physical, chemical, and biological nature. Within recent memory, the estuary has changed from an almost freshwater impoundment to today's highly saline condition, with a resulting shift in its biological community.

During the past forty years, significant changes have occurred around and within the Inland Bays watershed that have dramatically altered the dynamic estuarine balance and composition. Both natural and human-caused changes in water

Chapter 3. HABITAT PROTECTION ACTION PLAN

quality (turbidity, nutrients, temperature, etc.) and dramatic changes in flushing, circulation, and bottom sediments have redefined the Inland Bays.

Substantial habitat modifications attributable to agricultural activities and residential development have resulted in major shifts in living resources within the Bays. Large beds of submerged aquatic vegetation (SAV) used to thrive in the Bays, supporting populations of waterfowl, fish, and scallops in numbers that have not been seen in decades.

There are presently no substantial SAV beds in the Inland Bays; potential habitat may currently be limited and existing habitat is marginal. For these reasons, and because of other concurrent uses of the Bays, protecting areas where test planting is being attempted is both feasible and desirable. If SAV is to become re-established, it must be protected. Healthy SAV beds will become primary shellfish spawning sanctuaries and finfish nursery areas.

Where shell or stone aggregate are planted on hard clay water bottoms, clam rakes and crab claws cannot easily reach the bottom-dwelling clams. Therefore, clam populations can be increased by planting these materials to exclude human harvesters and offer protection from predators. Dense populations of clams increase the likelihood of effective spawning and offer promise of a reversal in the trend of decline in production of successful year-classes.

Because fish are highly mobile, establishing Resource Protection Areas (RPAs) for fish spawning and nursery areas will be difficult. The entire Inland Bay system functions as a finfish nursery habitat. Areas of moderate to low salinity, which have emergent/submergent aquatic vegetation (EAV/SAV or *Spartina*) and/or macroalgae, possibly would be good candidate sites for Resource Protection Areas. As protective cover, SAV and macroalgae could be given the highest priorities. Fish passage into currently blocked waterbodies, through fish ladders or lifts, would allow re-establishment of previously existing breeding sites for anadromous fish species such as striped bass and white perch.

Currently under way are early DNREC initiatives designed to identify and characterize rare and endangered species and to identify, classify, and map a few critical habitat areas, and existing and potential public access areas. In addition, another DNREC effort is beginning to identify, classify, and map areas where conflicts among various human uses and between human uses and valuable resources may exist. DNREC will review and update existing maps and update habitat and other sensitive area data. As a result, habitat/living resources maps will be compiled into a Geographic Information System. These initiatives will provide the information needed to help develop Resource Protection Areas, Sussex County Habitat Protection Ordinances, and a Comprehensive Water-Use Plan. A brief description of each initiative follows.

Natural Heritage Inventory - The Natural Heritage Inventory is collecting Statewide information on the status and location of rare plants, animals, and unique natural communities. The Natural Heritage Inventory is identifying both critical bottomland and upland habitats, which will serve to conserve wetlands and forested habitats. Through Natural Heritage Inventory, unique sea-level fens have been identified that contain an unusually high level of plants and animals. DNREC, working with a land developer, is preparing a monitoring plan and a protection strategy for these fens. This and other ongoing work will be used by the State in establishing Resource Protection Areas and by Sussex County in developing habitat protection ordinances.

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Resource Protection Areas (RPAs) - Habitats that support sensitive living resources and are adversely affected by human uses will be identified and mapped on a watershed basis, and recommendations for their protection will be proposed. Areas in need of critical classification and potential protection, conservation, or management may include fresh and tidal wetlands; shallow water/nearshore habitats; fish and wildlife breeding, nursery, and feeding areas; and critical habitats identified by the Natural Heritage Inventory. An example of an RPA might be a shallow water habitat threatened by excessive or irresponsible motor boating. Once these areas are mapped, a Resource Protection Area Management Plan will address their protection.

Aquatic Sanctuaries - Habitats that function as breeding, nursery, shelter, and feeding areas for a multitude of fish and bird species will be identified, classified, and mapped. These habitats may be considered as sanctuaries within RPAs for even more intensive management. The classification scheme will include whether or not the area is unique to the region. An example of a potential aquatic sanctuary is Rehoboth Marsh, which supports colonies of nesting shorebirds and provides a direct source of food for young birds. Other examples include certain shallow water areas that may provide for the potential reintroduction of submerged aquatic vegetation, which would support populations of fish, shellfish, and other invertebrates. The Resource Protection Area Management Plan will address the protection of aquatic sanctuaries within RPAs.

Public Access Areas - Public recreational access to the Inland Bays and their tributaries consists of boating and shoreline access through marinas and boat ramps, shoreline access through docks and natural shorelines, beaches, nature areas, and bridges. These areas are provided through federal, State, and local government auspices and by private means. As part of DNREC's initiative, recreational opportunities such as sailing, boating, fishing, crabbing, clamming, picnicking, swimming, and other low-impact uses will be identified and mapped. A 1991 DNREC/Sea Grant survey of shoreline property owners and Bays users determined use characteristics of the Bays, providing baseline data. A public access inventory due to be completed in 1995 is already determining boating, fishing, and traditional recreational areas. Promoting and managing public access areas will be considered as part of the Water-Use Plan.

User Conflict and Hazardous Areas - In 1989, a report on water-use activity impacts was prepared, laying the foundation for a Comprehensive Water-Use Plan. Building on that report, a DNREC effort is starting to identify areas that tend to be crowded and therefore potentially hazardous and areas where different human uses conflict, such as between watercraft and equipment used for fishing and shellfishing. These areas will be identified and mapped, along with areas where human uses adversely affect sensitive habitat areas, such as clam raking in newly planted submerged aquatic vegetation beds. The goal of the Water-Use Plan is to resolve such conflicts equitably and to suggest management options, such as requiring the establishment and enforcement of navigational and safety rules in hazard areas, placing channel markers to warn of sand bars and sensitive shallow habitats, posting signs to point out the most suitable route around dangerous and sensitive areas, and using "Slow. No Wake" signs to protect living resources, their habitat, and people.

Land-Use Practices

In the past, upland development in the Inland Bays watershed has not reflected sufficient understanding or appreciation of the natural environment. This has led to adverse impacts on the natural system and on its living resources.

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Land Protection Act

Delaware's General Assembly passed a Land Protection Act in 1990. Its requirements are directed at protecting 20 designated State Resource Areas (SRA). Each State Resource Area is comprised of lands that contain a wide variety of natural and cultural resources significant to Delaware. In addition, the Act created a funding source and an Open Space Council, which recommends expenditures of funds for land protection. The Act requires counties to incorporate protective measures for SRAs in planning, zoning, and ordinances, for which funding is provided.

Currently only two percent of the land in Delaware is protected. The goal, by the year 2000, is to have 18 percent of the land protected, comprising 210,000 acres Statewide. In Sussex County, nearly 37,000 acres are currently protected. Under the Land Protection Program, another 40,000 Sussex County acres are targeted for protection.

The Land Protection Act provides for \$7 million per year Statewide for ten years (1990-2000) from a fund to protect SRAs. A portion of this fund is expected to be spent within four SRAs in Sussex County. It is likely to take more than ten years to protect all the State Resource Areas. In addition, presently anticipated funds may fall short of what is needed to protect all SRAs.

The Open Space Council is authorized to spend the \$7 million per year of State funds for open spaces. The Land Protection Working Group is composed of representatives from the DNREC Divisions of Parks and Recreation and Fish and Wildlife; the Department of State Division of Historical and Cultural Affairs; the Department of Agriculture, Forestry Section; and representatives from Sussex County. The Group recommends to the Open Space Council tracts most worthy of protection that fall within the 20 State Resource Areas. Their input drives the decisions of the Open Space Council.

Since the State cannot afford to purchase all of the lands in the identified State Resource Areas and greenways, a variety of land protection methods including these will be pursued:

- ! Conservation easements
- ! Purchase of development rights
- ! Tax incentives
- ! Deed restrictions
- ! Estate planning
- ! County land-use plans, zoning, and ordinances
- ! Natural area registration and nature preserve dedication

Bulkheading

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Historically, bulkheading of a shoreline has been the preferred method of shoreline stabilization. While bulkheads did provide a formidable barrier against erosion, significant environmental damage resulted from their use, and significant portions of the Inland Bays experienced hardening of the shorelines.

Erosion actually increased in the immediate area at the toe of the bulkhead and along adjacent unprotected shorelines. As a result, turbidity increased, intertidal and shallow water habitat was lost, and wave energy was reflected off the bulkhead, leading to the loss of nearby wetlands and shallow water habitat. Additionally, chemicals used to treat the timber to prevent bio-fouling were toxic to non-target aquatic living resources such as shellfish. In many instances, bulkheading was installed not because of erosion but simply because the landowner wanted a "curb" on the water side of the property line.

To determine if shorelines could be stabilized using alternative methods, an Action Plan Demonstration Project resulted in stone and vegetative erosion control constructs at two sites. These projects showed that erosion can be controlled and marsh habit can be created using alternatives to bulkheading.

Shoreline

Except for ocean beachfronts, shoreline regression has not been considered sufficiently in planning for upland development. The Beach Act of 1984 directs DNREC to regulate construction or development along beach shorelines, including those of the Inland Bays. The State's authority to implement this tactic is only partial, however, since tributaries do not currently fall under its jurisdiction (only the bays and mouths of tributaries are covered under the Beach Act of 1984).

Dredging

Dredging has kept boating channels open and maintained tidal exchange. If not managed properly, however, dredging can also result in adverse impacts to the aquatic environment, such as the loss of wetland and shallow water habitat or a reduction in water quality.

The current dredge plan requirements, adopted as policy for all dredging applications, can be successfully bypassed by private citizens or firms that are willing to fund their own dredging. Since it was adopted as DNREC policy in 1986, the dredge plan requirements have applied only to State-funded dredging.

Projected Costs and Funding Strategy

The total five-year cost to implement the habitat protection action plan is a little more than \$11 million; funding sources include State General Funds, federal and State grants, and Clean Water Act, Section 106; in addition, foundation grants will be solicited. The largest part of this expenditure is for land acquisition under the Land Protection Act. For detailed funding information see Appendix H. *Funding* and attachments following each tactic.

Implementation Strategy

Tactic A: Create a Resource Protection Area Management Plan

Tactic Description

A Resource Protection Area (RPA) Management Plan will be developed to protect aquatic habitat and its dependent living resources, including important functions and values (for example, spawning, nursery, feeding, migratory pathways, staging areas, etc.). The goal of the RPA Management Plan is to re-establish living resources into areas of historical use and to enhance marginal and substandard habitats of the Bays. This tactic is a new initiative for which little or no current data exist.

Implementation of Tactic

The purpose of this plan is to develop a strategy for designating sensitive locations in need of protection and for establishing and managing Resource Protection Areas (RPAs). Plans are being developed to identify, classify, and map these areas. Under consideration for RPAs are shallow waters, areas along shorelines, and upland to 1,000 feet from the tidal water line. For example, the 1,000-foot Sussex County Coastal Conservation Zones (CCZ) expanded to shallow waters could form the general location in which RPAs could be selected. An RPA Management Plan will include criteria for designating Inland Bays sensitive locations, identification of known sensitive locations, and designating Resource Protection Areas.

Candidate RPA sites will be screened and monitored to evaluate living resource requirements in areas of historical occurrence. Some sites being considered are the Rehoboth Marsh Area in Rehoboth Bay adjacent to Delaware Seashore State Park, the area in the northwest corner of Little Assawoman Bay adjacent to Little Assawoman State Wildlife Area, Indian River Bay east of Quillens Point, and Pepper Creek. An attempt will be made to account for the wide range of annual estuarine variability. Screening will occur as part of the habitat mapping efforts to locate mitigation sites for future RPAs. Strategies and realistic schedules will be developed for each RPA, along with a management plan and objectives.

The intent of RPAs is to establish a sanctuary within an RPA that will optimize that area to its highest use and yield. Therefore, Resource Protection Areas will be identified for priority species and, where possible, managed for multiple species and natural uses. Subaqueous areas may be set aside as protected areas or natural resource sanctuaries. These RPAs may be protected from human uses while new planting and seeding takes hold; but when possible, low-impact recreational or educational activities should be allowed within the sanctuaries.

Monitoring and enforcement will be a necessary component in the success of the RPAs. Documentation of successes and failures are required to keep the program moving ahead. Periodic surveys will be conducted at critical stages to evaluate techniques, protocols, and objective achievements. Mid-course changes will be considered for possible implementation.

To create RPAs and an RPA Management Plan, the following specific phases are planned:

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- ! Beginning in 1995, establish a mitigation bank. This special fund would hold fines paid by violators of resource protection laws and fees charged for losses resulting from activities where adverse impacts could not be avoided. The bank would be used to help restore lost habitat functions and values.
- ! Some data have already been collected. If funding is available, by the end of 1996 enough data will have been gathered to develop criteria and make initial evaluations and recommendations for RPAs. As part of this work, DNREC will identify and assess habitats, then recommend RPAs and sanctuaries within RPAs that may require even more intensive management. Sanctuaries could include hard clam propagation areas and bird nesting sites. As part of this work, areas in need of remediation and rehabilitation will be identified and a course of action to restore optimal biological potential will be determined.
- ! By the end of 1997, a work group of habitat resource experts from agencies and private groups will be established to select seven or eight sanctuary areas where opportunities exist for protecting, restoring, or augmenting valuable species and/or habitats within the Inland Bays area.
- ! In 1998, at least one RPA each year will begin to protect, restore, and augment valuable species and/or habitats within RPAs and their sanctuaries. For example, if eelgrass beds are found to exist, they will be protected from clam rakes and boat propellers; certain areas will be restored by planting eelgrass and eventually seeding bay scallops; and habitat will be improved through seeding, limiting harvests of clams, and/or other means.
- ! During 1999 and beyond, RPAs and sanctuaries will be protected by marking areas with signs and educating public users and through citizen monitoring and enforcement by State Park Rangers and Marine Police.
- ! Over the long term - beyond 2000 - the RPAs will be monitored and evaluated, and populations of living resources will be managed.
- ! Also over the long term identification of additional potential sanctuaries for protection, restoration, and augmentation will continue.

To ensure that RPAs are developed and implemented, other CCMP tactics will address related concerns: development and implementation of a Water-Use Plan will help to resolve any conflicts over RPAs and ease their implementation; land-use tactics are addressing the development and use of adjacent uplands or additional habitat modifications; and point and nonpoint source control tactics will address suitable water quality conditions needed for sanctuaries to be enhanced with SAV planting or shellfish seeding.

Resources to continue the background work now under way to develop a Resource Protection Area Management Plan are questionable. The habitat mapping needed for this and other habitat-related tactics will require additional computer hardware and software. EPA funding for this was denied.

Lead and Supporting Agencies

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Lead:

DNREC Division of Water Resources, Watershed Assessment Branch - develop data (complete surveys, identify and evaluate sites, document on GIS and maps), provide funding and technical work, make recommendations, establish work group to draw RPAs and sanctuaries, implement

Support:

DNREC Divisions of Fish and Wildlife, Soil and Water Conservation, and Parks and Recreation - provide funding and technical assistance, contribute Natural Heritage Inventory data

EPA - provide funding

Department of Health and Social Services, Division of Public Health - provide health data

National Marine Fisheries Service - provide data from existing work

U.S. Fish and Wildlife Service - provide data and potential funds

National Marine Fisheries Service - provide data

Measuring Results

Success will be measured by the increase of important resources such as additional acres of SAV, increases in clam recruitment index, and other biometric quantification as appropriate. Resource inventories will be part of an annual monitoring effort that includes surveys of clam recruitment, juvenile finfish, and SAV.

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Habitat Protection Action Plan: Develop a Comprehensive Habitat Protection Plan

Tactic A: Create a resource protection area management plan.

Lead Agency/Division: DNREC/Water Resources

Contact for Information: John Schneider, Telephone 302-739-4590

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------------|---------------|----------------|----------------|---------------|----------------|
| Personnel Costs | 32,000 | 43,000 | 67,000 | 68,850 | 70,000 | 280,850 |
| Capital Costs (>5K) | 15,000 | - | 17,000 | 22,000 | - | 54,000 |
| Operating Expenses | 26,500 | 27,500 | 25,000 | 26,500 | 28,200 | 133,700 |
| TOTAL | 73,500 | 70,500 | 109,000 | 117,350 | 98,200 | 468,550 |

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|---------------------------------------|
| <u>FY 1996</u> | Source 1 | <u>State General Fund (personnel)</u> |
| | Source 2 | <u>EPA - Clean Water Act, 106</u> |
| | Source 3 | <u>Other EPA Funds</u> |
| <u>FY 1997</u> | Source 1 | <u>State General Fund (personnel)</u> |
| | Source 2 | <u>EPA - Clean Water Act, 106</u> |
| | Source 3 | <u>Other EPA Funds</u> |
| <u>FY 1998</u> | Source 1 | <u>State General Fund (personnel)</u> |
| | Source 2 | <u>EPA - Clean Water Act, 106</u> |
| | Source 3 | <u>Other EPA Funds</u> |
| <u>FY 1999</u> | Source 1 | <u>State General Fund (personnel)</u> |
| | Source 2 | <u>EPA - Clean Water Act, 106</u> |
| | Source 3 | <u>Other EPA Funds</u> |
| <u>FY 2000</u> | Source 1 | <u>State General Fund (personnel)</u> |
| | Source 2 | <u>EPA - Clean Water Act, 106</u> |

Chapter 3. HABITAT PROTECTION ACTION PLAN

Source 3 Other EPA Funds

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

For the next 5 years, "other EPA funds" are uncertain. Funding to complete mapping, database development, including hardware and software, is not available at this time. It is needed to support development of Habitat Tactics A, B, C, D.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Database to support development of Habitat Tactics A, B, C, D. Foundation grants and donations will be sought to support implementation activities such as SAV planting, educational signs, navigational markers, etc.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Approximately 6 sites at \$50,000 per site will be developed after 2000. This will include interpretive/educational program, signs, markers. With increased development, more sites will be stressed and in need of protection. Grants from foundations and federal agencies, including Fish and Wildlife and NOAA, will be sought.

Tactic B: Develop Sussex County Habitat Protection Ordinances

Tactic Description

For the long-term protection and enhancement of the Inland Bays, Sussex County must establish effective and efficient ordinances to protect habitat. Sussex County has already begun to lay the groundwork for ensuring that habitat areas are protected through actions outlined in the *Land-Use Action Plan*.

Building on these existing and additional proposed ordinances and on potential habitat data described above, the County will adopt ordinances now pending and develop new habitat protection ordinances by 1997.

Implementation of Tactic

The State efforts described in the *Background* section above will assist Sussex County by identifying and mapping valuable and critical habitats, including wetlands, natural areas, important terrestrial and aquatic areas, migratory bird habitat, rare plant and animal habitats, and those habitats that support valuable natural living resource communities. Based on its findings, the State will develop the protective measures and regulations best suited for the various habitat and species types. The County will then develop supporting ordinances.

The Delaware Natural Heritage Inventory, within DNREC, is collecting information on the status and locations of rare plants, animals, and unique natural communities in Sussex County and throughout the State. However, assessments still need to be conducted on all valuable aquatic and terrestrial habitat, especially those lying within, adjacent to, or contiguous with the 1,000-foot Coastal Conservation Zone (CCZ) surrounding the Inland Bays and their tributaries.

For example, fish spawning, nursery, and feeding areas will be identified, mapped, and prioritized for use in evaluating development plans. The evaluation process will consider habitat functions and values to prioritize areas in need of protection, management or remediation. This will also help local planners identify and mitigate potential adverse environmental impacts of proposed development projects and assist Sussex County in promoting open space within developments.

The State will consider the need for new laws or regulations during 1996 and 1997. During 1997 and 1998, Sussex County will develop ordinances that reflect protection efforts for important species and habitats and preservation of open space. Attention will be focused on minimization of habitat destruction and, when damage is unavoidable, mitigation of sites and species. The County will adopt and enforce these ordinances.

The following activities will support the development and adoption of ordinances:

- ! Sussex County will continue to receive State assistance in focusing development activities in less-valuable areas, minimizing habitat alteration, and emphasizing conservation of on-site natural resources.
- ! With the establishment of a new State Office of Land-Use Planning and Conservation, developers will be required to submit development plans that help protect important habitats and sensitive species. Developers

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will be encouraged to cooperate through the DAS. A role for the public in the County project review process is important and will be stressed.

- ! The Sussex County Technical Advisory Committee process will establish minimum standards for land-disturbing activities in the context of a Statewide Comprehensive Wetlands Plan for fresh and tidal wetlands.
- ! Wetlands delineations will continue to be required for each land-disturbing project.
- ! Cooperation between the Natural Heritage Inventory and County officials will continue to improve early identification of critical resource areas.
- ! Identification of sensitive habitats and natural communities that may be adversely impacted by a proposed development or the resultant activity will lead to the elimination or mitigation of project impacts.
- ! The feasibility of developing incentives to encourage environmentally sensitive land development will be explored.

Implementation steps from 1996 to 1998 include the following:

- ! By 1996, DNREC will distribute habitat inventories and assessments in maps or digital format — Geographic Information System (GIS).
- ! By 1996, DNREC will establish a critical habitat work group to set criteria for evaluating and identifying critical areas and to rank those areas.
- ! By 1997, comprehensive resource mapping of habitat areas within the Inland Bays watershed and evaluation and prioritization of important sites will be completed.
- ! In 1996 and 1997, review existing legislation, and if necessary, enact new State regulations and laws.
- ! In 1997, Sussex County will continue to utilize the Technical Advisory Committee that includes a State partnership with the County and local municipalities.
- ! In 1997 and 1998, Sussex County will develop environmental protection regulations and ordinances that comply with the CCMP habitat protection goals and are consistent with State laws and regulations.
- ! The County will add environmental specialists to County staff by 1997.

During 1998 and 1999 and beyond, these steps will be taken:

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- ! Perform maintenance inspections of habitat areas and do follow-up surveys to evaluate success of improved land use planning.

Implementation will depend upon adequate funding for habitat inventories and adequate staff for conducting land-use planning activities; effective addressing of local concern that protecting the natural and cultural environment may result in a reduction in the tax base; obtaining regulatory authority over wetlands; and the State's timely identification of rare plants, rare animals, and unique natural communities.

Lead and Supporting Agencies

Lead:

Sussex County - develop, adopt, and enforce ordinances in support of State requirements

DNREC - identify and recommend critical areas and management techniques for habitat protection and enact laws and regulations as needed

Support:

Municipalities - develop ordinances consistent with State and County

Private groups and businesses: The Nature Conservancy, real estate agencies, Chambers of Commerce, etc. - provide input, inform constituencies

Measuring Results

Results will be determined after 2000 by measuring the following:

- ! Number of acres of important habitats identified and evaluated
- ! Number of acres, species, and unique natural communities protected
- ! Number of acres of riparian wetlands protected from being destroyed or altered
- ! Number of acres of habitat mitigated and/or enhanced
- ! Adherence to approved policy
- ! Changes in land-use planning

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Tactic B: Develop Sussex County habitat protection ordinances

Lead Agency/Division: Sussex County

Contact for Information: Bob Stickels, Telephone 302-855-7741

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|------|----------|----------|----------|----------|-----------|
| Personnel Costs | - | \$30,000 | \$31,500 | \$33,100 | \$33,100 | \$127,700 |
| Capital Costs (>5K) | - | 5,000 | 1,000 | 1,000 | 1,000 | 8,000 |
| Operating Expenses | - | 7,500 | 6,500 | 6,500 | 6,500 | 26,500 |
| TOTAL | - | 42,500 | 39,000 | 40,600 | 40,600 | 162,700 |

PART 2 FUNDING SOURCES

FY 1997 Source 1 County General Funds

 Source 2 State Grants

 Source 3 Federal Grants

FY 1998 Source 1 County General Funds

 Source 2 State Grants

 Source 3 Federal Grants

FY 1999 Source 1 County General Funds

 Source 2 State Grants

 Source 3 Federal Grants

FY 2000 Source 1 County General Funds

 Source 2 State Grants

 Source 3 Federal Grants

FY 2001 Source 1 County General Funds

 Source 2 State Grants

 Source 3 Federal Grants

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Chapter 3. HABITAT PROTECTION ACTION PLAN

None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

40K average annually to enforce ordinances will come from County General Funds.

Tactic C: Establish an Inland Bays Comprehensive Water-Use Plan

Tactic Description

With increasing use of the limited areas and resources of the Inland Bays, conflicts have developed among user groups and between users and the natural resources of the estuarine system. A comprehensive Water-Use Plan will be developed that will allow recreational uses of the Bays while protecting the Bays' sensitive natural resources. The purpose of the Water-Use Plan, which will link with the Coastal Sussex Land-Use Plan, is to provide for both a healthy environment and satisfactory and safe recreational experiences using a "common sense" approach.

The Water-Use Plan will be based on the findings and recommendations of a variety of documents, including but not limited to three 1989 reports: *Water-Use Activity Impact Reports* (Battelle), *Sussex County Residents Report Their Uses of and Environmental Concerns for Waters of the Inland Bays* (Hollander, Cohen), and *Citizen Input to the Draft Water-Use Plan for Delaware's Inland Bays* (MDR). A recently released report *Recreational Boating on Delaware's Inland Bays: Implications for Social and Environmental Carrying Capacity* (University of Delaware, Sea Grant) and other documents will also be considered.

The 1989 reports indicate that public use of the Inland Bays is extensive and that the public is highly concerned about protecting the Bays for public use. The public also wants to find a balance between recreational uses of the Bays and a healthy estuarine environment. The Battelle report concludes that human "impacts have been part of the Inland Bays region for hundreds of years, but it has recently reached critical proportions and is now tipping the ecosystem away from the qualities that originally drew people toward it."

Following up on these reports, Sea Grant looked at the Inland Bays "carrying capacity" to determine both environmental impacts and people's needs for recreation. The study focused on boating impacts on the Bays and on boater satisfaction and perception. It made a number of management recommendations that will be considered by the Center for the Inland Bays' Citizens Advisory Committee, Water-Use Subcommittee, as it develops a Water-Use Plan.

A recreational use index under development will help determine potential safety hazard areas, peak boating periods, and general recreational use patterns within the Bays and will assist in long-range trend development and planning.

The Water-Use Plan will allow the State and the public to reach consensus on how to achieve a high-quality recreational experience, while sustaining and maintaining a balanced, biologically diverse aquatic community in the Inland Bays. The Water-Use Plan will focus on the Bays and will address valuable aquatic habitats, living resources, and human activities and uses. After identifying the conflicts among various human uses and between human uses and living resources requirements, the Water-Use Plan subcommittee will review these conflicts, attempt to resolve them through a process of negotiation, and recommend a Water-Use Plan that will protect and conserve the Bays, while being flexible and dynamic enough to account for future needs and changes in living resource and human use patterns.

One area of conflict already being addressed is the threat to shellfish beds from boat sewage disposal. A one-year \$78,000 grant was received to survey the Bays, plan for pumping/dumping stations, construct two stations, and provide for boater education. The survey of marinas, pumpouts, and boats was completed and longer-term planning will soon

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begin. About 90 percent of the boats on the Bays are small and do not have pumpouts on board. Currently there are only five privately-owned pumpout stations throughout the Bays. In addition, one public pumpout/dump, with an underground holding tank, in the Cedar Neck area and one private station are scheduled for early 1995 completion. An educational program is developing around the theme: "Delaware boaters don't dump, they pump."

Implementing this program will help to achieve a "no-discharge zone" goal for the Inland Bays as an expected 1996 goal for the Water-Use Plan. By 1999, the full Water-Use Plan will be implemented and boat-waste dumping and other user conflicts will be avoided.

Implementation of Tactic

In conjunction with the Citizens Advisory Committee, Sussex County and other interested State, federal, and local agencies and interested citizens, DNREC will establish a Water-Use Plan to

- ! Benefit and protect existing uses - swimming, boating, and fishing - of the Bays.
- ! Provide an enjoyable and safe recreational experience for the general public.
- ! Provide convenient and adequate access to the Bays for the general public.
- ! Protect and enhance the Bays' living resources, habitat, and water quality.

The Water-Use Plan Subcommittee meets on a regular basis and is working on preliminary draft plans. As part of the development process, existing information is being evaluated to determine current water uses within the Inland Bays and future problem areas. Considerations include

- Human health and safety,
- Living resource status and trends,
- Historic and current habitat conditions,
- Public access and use limitations, and
- Recreational use patterns of the Bays.

To monitor and promote the restoration, maintenance, and management of the Bays for the public benefit, the Center for the Inland Bays will conduct educational programs and outreach to enlighten the public about the environmental impact of certain types of recreational activity and will review existing legislation and/or regulations or suggest new enabling legislation needed to implement the Inland Bays Comprehensive Water-Use Plan.

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The Water-Use Plan, being developed in concert with other CCMP activities, will be completed by 1997 and refined and implemented by 1999. Because it will respond to changing growth patterns and needs, it will be revised and refined on an ongoing basis.

The following steps are expected to be taken by the Citizens Advisory Committee Water-Use Subcommittee, with technical assistance from DNREC staff:

- ! In 1995 and 1996, review and update existing maps and habitat and sensitive area information; compile and review information on public access; compile comprehensive habitat/living resources/user conflict maps; and enter data as part of DNREC's Geographic Information System.
- ! In 1996, identify existing and potential user conflicts and hazardous areas, and establish the Bays as a no-discharge zone.
- ! Also in 1996, provide a mechanism for resolution of conflicts among users and between users and potential Resource Protection Areas.
- ! In 1997, develop management options for public access/recreation areas and user conflict and hazard areas. Options to be considered may include channel markers and other signage, public education, navigational safety, public access, restoration, environmental protection, and enforcement.
- ! In 1998, present recommended options at public meetings and select options for a Comprehensive Water-Use Plan.
- ! In 1999, implement selected options.

Because this work is dependent in large part on the mapping work to be done as part of Resource Protection Area planning, this schedule could slip without adequate funds to complete required computerized mapping.

Lead and Supporting Agencies

Lead:

DNREC - provide staff support for effort

Citizens Advisory Committee - develop and select options; ensure implementation by obtaining the support of the public and the political mandate

Support:

Department of Health and Social Services - provide information

Sussex County/Municipalities - provide input and information

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Recreational Clubs, Private Groups, Environmental Groups, Interested citizens - provide input and information

Measuring Results

Results will be measured by the achievement of the goals established in the Water-Use Plan.

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Tactic C: Establish an Inland Bays Comprehensive Water-Use Plan.

Lead Agency/Division: DNREC/Water Resources

Contact for Information: John Schneider, Telephone 302-739-4590

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------------|---------------|---------------|----------------|---------------|----------------|
| Personnel Costs | 24,000 | 24,700 | 25,700 | 74,000 | 26,700 | 175,100 |
| Capital Costs (>5K) | - | - | - | 20,000 | - | 20,000 |
| Operating Expenses | 8,000 | 8,000 | 1,500 | 27,000 | 25,000 | 69,500 |
| TOTAL | 32,000 | 32,700 | 27,200 | 121,000 | 51,700 | 264,600 |

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|---------------------------|
| <u>FY 1996</u> | Source 1 | <u>State General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1997</u> | Source 1 | <u>State General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1998</u> | Source 1 | <u>State General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | <u>State General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | <u>State General Fund</u> |
| | Source 2 | _____ |
| | Source 3 | _____ |

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

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Funding is not certain. To the extent that these activities are consistent with other state activities, "piggybacking" can occur. Example: channel marking in dredging area, enhancing public access areas in parks, marking "NO WAKE: SAV Planting" areas, etc. (See below.)

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Funding for educational signs, fishing/crabbing piers, dumping/pumpout stations, roped-off areas, boater education programs, etc. will be sought from foundations, State General Fund, Wallops-Breaux, and other sources.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Dedicated funding for enforcement of existing rules, such as boating safety, will be required over the long term. It is hoped that the State will support this with at least two additional officers.

Tactic D: Establish a Shoreline Building-Setback Line

Tactic Description

To protect valuable fish and wildlife habitat, a protective building-setback line should be established along the entire shoreline of the Inland Bays. These setbacks will be supported initially by a DNREC educational effort that promotes voluntary building setbacks, followed by State criteria and improved County and local ordinances, and eventually by State law or regulation as needed.

Building setbacks should be based on habitat value and on natural shoreline regression, which forces productive habitats to move inland with the shoreline (due to sea level rise or other factors). In addition, an adequate building-setback line would diminish the effect of a severe coastal storm by protecting human life and private property. Excessive enrichment of the Bays will be mitigated by allowing the establishment of natural vegetated buffers within part or all of the setback line while providing a transition zone that would benefit wildlife and increase land values (also see *Agricultural Source, Tactic C*).

The State will develop an educational/demonstration project, criteria, and ultimately a law and/or regulations, if needed, for shoreline building-setbacks that will reflect the intensity of development, the use and value of the waters, and the natural habitat of the shoreline area. Because local jurisdictions become involved in proposed development projects very early in the land-use planning and permitting process, the local jurisdictions could implement this tactic more efficiently and effectively than the State. Local land-use plans and zoning ordinances that establish setbacks in the Inland Bays region are expected to be supported by the State's educational effort. For example, Sussex County's ordinances that establish a Coastal Conservation Zone and a 50-foot County shoreline building-setback line lay the groundwork for establishing and enforcing stricter rules where needed. An additional Sussex County ordinance is pending to provide for a building-setback line at federally-defined wetlands.

The short-term goal - through 1997 - is to protect wetlands, dune, and other valued habitats through education and voluntary efforts and through zoning ordinances to meet State criteria. The long-term goal is to realize a net gain of these important areas through State regulation if necessary.

Implementation of Tactic

To promote this building-setback goal, a map of the historical erosion in the Indian River and Rehoboth Bays produced under a contract with the University of Maryland will be used, and the following implementation steps will be taken through 1997:

- ! Begin public education on the benefits of setbacks. This will include informing both the Legislature and the public about the real value of setbacks over the perceived benefit of being located directly on the shoreline;
- ! Enlist the support of land preservation groups, such as The Nature Conservancy, to educate property owners, acquire shorefront property, and mitigate degraded property adjacent to waters;

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- ! Map Little Assawoman Bay; and
- ! Apply for and implement grants for 20 education/demonstration projects (Approximately \$5,000 each) over two years to show the benefits of a variety of "backyard" shoreline habitats.
- ! Encourage additional legislation to provide State authority for land bordering tributaries; and

In 1998:

- ! Develop criteria for appropriate setbacks - from 50 to more than 300 feet - for various shoreline, subaqueous, and upstream conditions based on lessons learned from demonstrations;
- ! Create a partnership among State, Sussex County, and local jurisdictions to complement State policies (possible delegation of administration and enforcement) and allow the formation of "home rule" priorities and values;
- ! Revise the Sussex County setback ordinance to reflect the State criteria and manage shoreline to prevent erosion, reduce urban runoff, and promote the benefits to wildlife and native plant species.

After 1998, State legislation and/or regulation should be considered, if necessary.

Lead and Supporting Agencies

Lead:

DNREC, Division of Water Resources, Wetlands and Aquatic Protection Branch and Division of Soil and Water Conservation, Shoreline and Waterways Management Section - provide technical support and education, and develop criteria and, if needed, regulation and/or legislation

Sussex County and municipal governments - develop and adopt setback ordinances following State criteria

Measuring Results

Success will be achieved if

- ! An educational effort leads to voluntary use of shoreline setbacks, and
- ! Criteria are developed and ordinances are adopted and enforced.
- ! In the long term, water quality, living resource, and habitat benefits are achieved by the success of retaining the function and values of wetlands and shoreline features.

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Tactic D: Establish a shoreline building-setback line

Lead Agency/Division: DNREC Divisions of Water Resources and Soil and Water Conservation, and Sussex County

Contact for Information: Jim Chaconas, Telephone 302-739-4691

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000*

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------------|---------------|----------|----------|----------|----------------|
| Personnel Costs | 45,000 | 45,000 | - | - | - | 90,000 |
| Capital Costs (>5K) | 50,000 | 50,000 | - | - | - | 100,000 |
| Operating Expenses | - | - | - | - | - | - |
| TOTAL | 95,000 | 95,000 | - | - | - | 190,000 |

*DNREC educational efforts and Sussex County ordinance development and adoption activities will be part of ongoing staff work. No additional costs are anticipated.

PART 2 FUNDING SOURCES

| | | |
|----------------|----------|--------------------------------|
| <u>FY 1996</u> | Source 1 | <u>EPA Demonstration Grant</u> |
| | Source 2 | <u>CZARA 6217</u> |
| | Source 3 | <u>Foundation Grants</u> |
| <u>FY 1997</u> | Source 1 | <u>EPA Demonstration Grant</u> |
| | Source 2 | <u>CZARA 6217</u> |
| | Source 3 | <u>Foundation Grants</u> |
| <u>FY 1998</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 1999</u> | Source 1 | _____ |
| | Source 2 | _____ |
| | Source 3 | _____ |
| <u>FY 2000</u> | Source 1 | _____ |

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Source 2 _____

Source 3 _____

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Funding for this educational/demonstration tactic would be funded solely through grants.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

- ! Demonstration Grants for Backyard Natural Habitats
- ! Educational Program for Developers

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

None.

Tactic E: Expand Public Land Acquisition, Protection, and Access

Tactic Description

One key way to preserve important habitats is to expand efforts by State and local governments and private groups to acquire or otherwise protect valuable lands. These valuable lands include wetland and dune habitat, rare species and unique natural communities, vegetative buffers along streams and bodies of water, and open space for habitat or recreation. Habitat can also be protected and enhanced by preserving vegetated buffers, requiring shoreline building setbacks for development, establishing greenways, and identifying and ensuring public availability of potential recreational access to the Inland Bays. In Sussex County, more than 40,000 acres are protected; at least 40,000 additional acres are targeted for protection under the Land Protection Act. Of these 40,000 acres, about 20,000 are State managed, more than 8,800 are federally managed, and over 12,000 are privately managed.

The Greenways Program recommends establishing a Statewide network of open space corridors. These corridors should connect residential communities, schools, work places, parks, forests, wildlife areas, and natural communities as well as protect rare species and critical habitat. Additional recreational access points for fishing, boating, and other recreational activities are currently being identified and mapped.

Working with the Open Space Council which is advised by the Land Protection Working Group, the Secretary of DNREC will protect some of the 40,000 acres of the Inland Bays' State Resource Area. Approximately \$7 million annually is available Statewide for open space protection.

Implementation of Tactic

The following actions are now under way by DNREC Division of Parks and Recreation and will continue:

- ! Continue to acquire lands for public recreation and natural resource protection.
- ! Review and make recommendations to Sussex County and municipalities on planning, development, and zoning permits and ordinances.
- ! Review proposed County and municipal actions and recommend natural resource protection and public access opportunities.
- ! Continue to work with the Land Protection Working Group to help identify and protect open space areas around the Inland Bays.

From 1995 through 1998, these steps will be taken:

- ! The Wildlife Habitat Enhancement Council will be involved in land protection efforts in Sussex County and will explore ways for private businesses to protect wildlife.

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- ! County and other ordinances to protect critical habitat and State Resource Areas will be developed or strengthened, and additional open space and recreational opportunities will be provided.
- ! Work with private conservation agencies will be increased.
- ! Developers will be encouraged to provide open space and public access.
- ! Sussex County and towns will continue to be encouraged to acquire lands for open space. Both the County and municipalities are eligible for park acquisition and development grants from both the Delaware Land and Water Conservation Trust Fund and the federal Land and Water Conservation Fund. Through both programs, up to 50 percent of the total project cost is eligible for funding.
- ! Greenways protection efforts will be fostered by the Citizens Advisory Committee.
- ! Other funds and programs will be explored to support this effort, including the Agricultural Lands Preservation Act (3 *Del.C.*, Chapter 9), which is administered by Delaware Department of Agriculture, Pittman-Robertson Act, Dingell-Johnson Act, Wallops-Breaux Act, and North American Wetland Conservation Act, which are administered by the DNREC Division of Fish and Wildlife. In addition, public-private partnerships with private conservation groups will be solidified.

Lead and Supporting Agencies

Lead:

DNREC, Division of Parks and Recreation - identify and implement land acquisition, protection, and access opportunities

Support:

Open Space Council - recommend land for acquisition

Sussex County and municipalities - develop and adopt ordinances; approve land acquisition and protection efforts at the local level

DNREC, Division of Fish and Wildlife - identify and provide access areas for recreational fishing and boating or environmental education

Measuring Results

Success will be measured based on how much additional land actually falls under protection either within SRAs, greenways, Sussex County and municipal park land, or private management. Success will also be measured by the number of additional access points to the Bays that are available for public use.

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Tactic E: Expand public land acquisition, protection, and access.

Lead Agency/Division: DNREC, Division of Parks and Recreation

Contact for Information: Ron Vickers, Telephone 302-739-3423

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Personnel Costs | 76,120 | 77,973 | 79,878 | 81,836 | 83,848 | 399,655 |
| Capital Costs (>5K) | 1,800,000 | 1,800,000 | 1,800,000 | 1,800,000 | 1,800,000 | 9,000,000 |
| Operating Expenses | 1,000 | 1,050 | 1,100 | 1,158 | 1,216 | 5,524 |
| TOTAL | 1,877,120 | 1,879,023 | 1,880,978 | 1,882,994 | 1,885,064 | 9,405,179 |

PART 2 FUNDING SOURCES

FY 1996 Source 1 State General Fund and Appropriated Special Funds

Source 2 Land Protection Act

Source 3 State and Federal Matching Grants

FY 1997 Source 1 State General Fund and Appropriated Special Funds

Source 2 Land Protection Act

Source 3 State and Federal Matching Grants

FY 1998 Source 1 State General Fund and Appropriated Special Funds

Source 2 Land Protection Act

Source 3 State and Federal Matching Grants

FY 1999 Source 1 State General Fund and Appropriated Special Funds

Source 2 Land Protection Act

Source 3 State and Federal Matching Grants

FY 2000 Source 1 State General Fund and Appropriated Special Funds

Source 2 Land Protection Act

Source 3 State and Federal Matching Grants

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

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None.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

New funding for additional land purchases and to extend life of program.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Depending upon increases in land values and land protection needs, approximately \$2M annually would be needed. This money could come as a result of State revenue bonds, extension of Land Protection Act, federal grants, and partnerships with conservation organizations to leverage private foundation grants.

Tactic F: Promote Natural Alternatives to Bulkheading

Tactic Description

To promote the use of natural alternatives to bulkheading, a strong public education program is being implemented. This program explains the harmful effects of bulkheading and the environmental benefits of natural alternatives.

In locations with low wind and wave activity, vegetation alone can protect shorelines from erosion. In areas with high wind and wave activity, additional shoreline protection such as rip-rap may be needed, even though it will ultimately inhibit or prohibit the natural landward migration of wetlands.

Various combinations of wetlands and rip-rap for erosion control are effective stabilization techniques for areas with moderate erosion. In higher-energy environments, the use of non-vertical, low-profile rock revetments or sills has been found to be as effective, structurally and economically, as traditional bulkheading. Rock also allows for the creation of habitat in this intertidal zone and does not increase erosion next to the bulkhead or on adjacent unprotected shorelines.

Action Plan Demonstration Projects like the new alternative shoreline stabilization at two demonstration sites have shown success at controlling erosion and creating marsh habitat. As a result of lessons learned from this project, an educational program for shorefront property owners is actively helping these owners understand the benefits of non-structural solutions. The program is assisting shoreline property owners to identify their problems and find non-structural solutions. To date, several seminars for developers have been conducted and a shoreline erosion brochure is being distributed. The brochure instructs property owners, bulkhead contractors, and developers about how to protect shorelines against wave action, how to abate runoff, how to deal with steep slopes and seepage that causes bank erosion, what is the most effective vegetation to plant, whether vegetation should be used alone or with rip-rap, and how to maintain the shoreline. As a result of this effort, property is being protected from erosion, and shoreline and near-shore habitats are being preserved.

Current permitting procedures allow bulkheads only in artificial lagoons that are at least 75 percent bulkheaded or, in rare instances, where a bulkhead is deemed by the State to be the only viable alternative for shoreline stabilization. Current regulatory criteria and policies promote the use of rip-rap and vegetative controls as the preferred methods of stabilizing shorelines. Contractors are now voluntarily recommending rip-rap for needed bulkhead replacements.

In addition, there may be economic benefits to the property owner that include not having to replace decaying bulkheads, an increased value of property if beach is improved, and the possibility of extending shorefront property with natural stabilization methods, which is not allowed with bulkheads.

Managing and planting forested/vegetative buffers (see *Agricultural Source, Tactic C*) is another component of this tactic. The Department of Agriculture, Delaware Forestry Service will assist with the management of existing forest lands and, if possible, with tree planting where requested.

Implementation of Tactic

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Implementation will include continuing the public education component of the effort to promote natural shoreline stabilization techniques and permitting only the least deleterious, most effective shoreline stabilization method.

Through 1996, an expert in the local Sussex Conservation District office will be trained to provide education and technical assistance to landowners.

1997 and 1998 activities will include these steps:

- ! Establishing financial or legislative incentives (tax breaks) for property owners who use environmentally-sensitive shoreline stabilization techniques.
- ! Seeking federal assistance to establish a cost-sharing program similar to Maryland's. Delegating the cost-share program to the County through the Sussex Conservation District with DNREC oversight.
- ! Retrofitting bulkheaded shoreline areas with approved alternative stabilization methods (rip-rap, vegetation, etc.) as failing bulkhead replacement becomes necessary.

After 1998, vegetation planting will develop into a continuous enhancement program, since erosion is a continuing problem, and the effort to use alternatives to bulkheads will be fully implemented.

To ensure implementation, these steps will be needed:

- ! Continue education of property owners and bulkheading contractors,
- ! Provide sufficient funding to implement cost-share,
- ! Develop tax incentives, and
- ! Resolve conflicts between property protection rights and wetlands and shoreline protection.

In the longer term, additional State regulation and County and local ordinances may be necessary if these steps are not successful.

Lead and Supporting Agencies

Lead:

DNREC Wetlands and Aquatic Protection Branch - approve or deny applications for shoreline stabilization permits; provide training, technical assistance, and public education; enforce permits; regulate if necessary

Support:

Sussex Conservation District - provide technical assistance and education.

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DNREC, Shoreline and Waterways Management Section - provide technical assistance and education

USDA Natural Resources Conservation Service - provide technical assistance and education

Measuring Results

Results will be measured based on the percentage of shoreline using natural alternatives.

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Tactic F: Promote natural alternatives to bulkheading.

Lead Agency/Division: DNREC/Division of Water Resources

Contact for Information: Jim Chaconas, Telephone 302-739-4691

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|--|--|--|--|--|--|----------------|
| Personnel Costs* | \$ 20,000 (District) | \$ 20,000 (District) | \$ 20,000 (District) | \$ 20,000 (District) | \$ 20,000 (District) | \$100,000 |
| Capital Costs** (>5K) (or federal) | \$100,000 (5,000 per landowner @ 20 landowners) | \$100,000 (5,000 per landowner @ 20 landowners) | \$100,000 (5,000 per landowner @ 20 landowners) | \$100,000 (5,000 per landowner @ 20 landowners) | \$100,000 (5,000 per landowner @ 20 landowners) | 500,000 |
| Operating Expenses | 1,200 (½ time vehicle) | 1,200 | 1,200 | 1,200 | 1,200 | 6,000 |
| TOTAL | 120,000 | 120,000 | 120,000 | 120,000 | 120,000 | 606,000 |

* The initial cost of achieving this goal is currently paid in the form of salaries for DNREC staff in the regulatory program, as the alternatives are promoted through landowner field assistance by all staff. The additional cost would be to provide a person to Sussex Conservation District (possibly ½ time) if existing personnel were not adequate to handle the workload, so that they would provide field assistance to landowners (tracked by DNREC).

** Providing tax incentives or financial aid to landowners using natural alternatives--cost variable--amount available determines number of participating landowners per year?

PART 2 FUNDING SOURCES

FY 1996 Source 1 EPA+
 Source 2 Corps of Engineers+
 Source 3 _____

FY 1997 Source 1 EPA+
 Source 2 Corps of Engineers+
 Source 3 _____

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| | | |
|----------------|----------|----------------------------|
| <u>FY 1998</u> | Source 1 | <u>EPA+</u> |
| | Source 2 | <u>Corps of Engineers+</u> |
| | Source 3 | |
| <u>FY 1999</u> | Source 1 | <u>EPA+</u> |
| | Source 2 | <u>Corps of Engineers+</u> |
| | Source 3 | |
| <u>FY 2000</u> | Source 1 | <u>EPA+</u> |
| | Source 2 | <u>Corps of Engineers+</u> |
| | Source 3 | |

+ Would like to be set up similar to program in Maryland for matching funds for alternative shoreline stabilization methods. Money is distributed through DNR of Conservation Districts in Maryland (10% - 25% - 50% matching funds).

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

None, unless additional staff is needed for Sussex Conservation District staff.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

None.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Landowner expense only.

Tactic G: Review, Update, and Codify the Inland Bays Dredge Plan

Tactic Description

The Inland Bays Dredge Plan will be reviewed and, where appropriate, updated to protect important habitats by applying the most current aquatic habitat and living resource impact assessment methods and by ensuring that dredge projects reflect the best dredging technologies and methods to minimize adverse impacts. The plan, which is currently DNREC policy, will then be incorporated into DNREC's "Regulations Governing the Use of Subaqueous Lands" and govern private as well as State-funded projects.

In 1986, at the request of the Governor's Task Force on the Inland Bays, DNREC adopted the Inland Bays Dredge Plan as policy. The plan established criteria and a methodology for evaluating proposed navigational channel dredge projects in the Inland Bays region in terms of both environmental and economic factors. The plan classified and mapped areas, such as creeks, rivers, and canals, which are appropriate or inappropriate for dredging. The classification determinations were based on several factors, including recent dredging history and living resources and their habitats.

When the plan was adopted, it was recommended that the evaluation criteria and classification system be applied to private as well as State-funded projects. It was also recommended that the plan be incorporated into State subaqueous lands regulations. To date, neither of these recommendations has been implemented.

The realization of these recommendations will have several benefits. Properly managed dredging will remove sediment loads that are slowly filling in the Bays, will remove from the system toxic substances and nutrients bound to the sediments, and will minimize dredging to only that which is necessary to achieve a desired objective, such as allowing only minimum channel depths to accommodate expected boat traffic while protecting valuable and functional habitats. It will also ensure that dredge projects, both private and State-funded, will be subjected to the most current methods of evaluating natural resource impacts and minimizing any adverse impacts from dredging.

Implementation of Tactic

- ! In 1995 and 1996, the Inland Bays Dredge Plan will be reviewed and, where appropriate, updated to ensure that the most current aquatic habitat and living resource impact assessment methods will be used and that dredge projects reflect the best dredging technologies and methods to minimize adverse impacts.
- ! In 1996, the plan will be incorporated into the State "Regulations Governing the Use of Subaqueous Lands" and govern both private and State-funded projects.
- ! DNREC procedures will be followed for amending regulations and for incorporation into State subaqueous lands regulations. Public hearings will be held, comments will be noted and incorporated, and new regulations will be adopted.
- ! DNREC will work with the public and the Legislature to seek support for changes in policy and will resolve internal policy issues.

Lead and Supporting Agencies

Lead:

DNREC, Division of Water Resources - assist with review of dredge plan and in performing assessments, regulate, and issue and enforce permits; secure contract funds

DNREC, Division of Soil and Water Conservation - assist with review of dredge plan and in performing assessments, perform dredge operations; secure contract funds

Support:

Delaware Department of Health and Social Services - perform water quality testing

Measuring Results

Success will be measured by the revision, as appropriate, of the current dredge policy and the adoption and enforcement of new regulations that are designed to minimize impacts, ensure environmental sensitivity, as well as cover private dredge operations.

Chapter 3. HABITAT PROTECTION ACTION PLAN

Tactic G: Review, upgrade, and codify the Inland Bays Dredge Plan

Lead Agency/Division: DNREC Divisions of Soil and Water Conservation
and Water Resources

Contact for Information: Chuck Williams, Telephone 302-739-4411

PART I PROJECTED COSTS FOR FEDERAL FISCAL YEARS 1996-2000

| | FY 1996 | 1997 | 1998 | 1999 | 2000 | TOTAL |
|---------------------|---------|------|------|------|------|--------|
| Personnel Costs* | 50,000 | - | - | - | - | 50,000 |
| Capital Costs (>5K) | - | - | - | - | - | - |
| Operating Expenses | - | - | - | - | - | - |
| TOTAL | 50,000 | - | - | - | - | 50,000 |

*Costs associated with achieving this tactic will be for retaining the services of the consulting firm who originally developed the Inland Bays Dredge Plan for DNREC, BCM, Inc. of Plymouth Meeting, Pennsylvania. They will be responsible for reviewing the existing document and amending it where appropriate. Anticipated DNREC staff time and resources which will be expended while assisting with this task have not been included.

PART 2 FUNDING SOURCES

- FY 1996 Source 1 State General Fund
- Source 2 Coastal Zone Management Program

Chapter 3. HABITAT PROTECTION ACTION PLAN

PART 3 EXPECTED SHORTFALLS/FUNDING STRATEGY

Need funds to contract with consultant to update study. Anticipate State General Fund or backup from Delaware Coastal Management Program.

PART 4 ACTIVITIES IN SEARCH OF FUNDING

Contract/Consultant.

PART 5 PROJECTED LONG-TERM COSTS (2020)/POTENTIAL SOURCES

Periodic reviews by staff would be covered under State General Fund.

Introduction

There are currently at least 13 federal and 12 State of Delaware agencies, Sussex County and 12 local governments, and many public and private organizations involved in projects that affect the Inland Bays or have authority for aspects of Inland Bays management (see Appendix A. *Organizational Guide to Delaware's Inland Bays* and Appendix J. *Base Program Analysis*).

To effectively bring together these units, an Implementation Council was called for by the Management Conference to oversee CCMP implementation and to oversee and facilitate the implementation of a long-term approach for the wise use and enhancement of the Inland Bays watershed. The following pages outline the steps leading to the formation of an interim Implementation Council, presents decisions made by this interim Implementation Council at its organizational meetings during the spring of 1994, and explains that the Implementation Council was superseded by the Center for the Inland Bays' Board of Directors.

Working in tandem with the interim Implementation Council and the Citizens Advisory Committee, Representative John Schroeder and other members of the State Legislature from Sussex County sponsored HB 540 - *Inland Bays Watershed Enhancement Act*, Attachment 1. This legislation evolved from earlier Management Conference agreements regarding the need to enact an Inland Bays Protection Act, to establish a nonprofit advocacy group for the Inland Bays, and to establish a tax-exempt group to facilitate fund-raising activities.

The *Inland Bays Watershed Enhancement Act* was enacted on June 30, 1994, establishing the Center for the Inland Bays; the members of the Implementation Council were incorporated into its Board of Directors. The first official meeting of the Board was held on September 14, 1994, when officers were elected and other organizational matters were discussed. The Chairperson of the Board is Dr. Kent Price, a knowledgeable and active participant in the Management Conference and, since its beginning, chair of the Scientific and Technical Advisory Committee.

CCMP Implementation Matrix

Although many federal and State agencies, Sussex County, and towns and organizations are involved in Inland Bays-related activities, there are relatively few entities with designated authority or standing to implement the CCMP tactical action plans.

Table 2. *Authorities Governing Tactical Action Plans* lists the 17 tactical action plans that comprise the core of the CCMP and the agencies or organizations with the authority, resources, and expertise to implement them.

Options Considered for Governance

The Management Conference has been funded through an EPA grant to develop the CCMP and to obtain the necessary commitments for its implementation. Funding for the Management Conference ends when the CCMP is adopted in June 1995; therefore, the Management Conference thought it was critical that a governing body be established as early as possible to oversee the completion, implementation, and funding of the CCMP.

At least four options for CCMP implementation or governance were considered by the Management Conference. Questions were addressed such as: What form of CCMP oversight authority is appropriate or necessary to coordinate implementation, evaluate progress, and revise the CCMP as new information and priorities emerge?

The seven primary functions of the governing body were considered as follow:

1. Maintain updated Memoranda of Understanding among implementing parties to ensure political and funding agreements, implementation schedules, etc.
2. Oversee progress toward implementation of each tactical action plan.
3. Facilitate adoption of various portions of the CCMP into policies, plans, budgets, laws, regulations, and actions of each participating agency or organization.
4. Coordinate ongoing evaluations of the CCMP and prescribe corrective actions as needed.
5. Review requirements and ensure federal consistency with the CCMP.
6. Provide a forum for public participation.
7. Consider and address future needs and emerging environmental issues.

Attachment 2 presents the four optional structures that were considered for overseeing the implementation of the CCMP, with pros and cons for each. These and other options were discussed in many public forums during the public input process.

Consensus for the Implementation Council

At a December 1992 Vision Workshop, participants reached the following agreements after comprehensive discussions of the four management options in Attachment 2:

Chapter 4. CCMP IMPLEMENTATION: GOVERNANCE

- ! The Implementation Council was determined to be the best approach for successful implementation of the CCMP.

- ! The seven functions listed above were deemed appropriate, although they should be modified and additional functions added as needed.

Table 2. Authorities Governing Tactical Action Plans

| Tactics to a Cleaner Inland Bays | | Authority to Implement | | | | Responsible Agency | Resources (who provides the financial resources) | Expertise (who has the expertise) |
|----------------------------------|---|------------------------|-----------|-------------------|-----------------------|---|---|---|
| | | ¹ All | State Law | State Reg. or BMP | County or Munic. Ord. | | | |
| ED A | Implement the comprehensive public participation and education plan | X | | | | DNREC | USEPA, DNREC | Center for the Inland Bays' PP&E Coordinator and PP&E Committee |
| AG A | Continue conservation planning through the Sussex Conservation District | X | | | | Sussex Conservation District | USEPA, DNREC USDA, U of D Coop Ext Sys, SCD, Sussex County | SCD, DNREC USDA, U of D Coop Ext Sys |
| AG B | Develop nutrient utilization and distribution alternatives | X | | | | Sussex Conservation District | USEPA, DNREC USDA, SCD | SCD, USDA DNREC |
| AG C | Manage and plant forested/vegetative buffers | X | | | | Delaware Dept. of Agriculture | USEPA, DNREC USDA, DDA | DDA |
| AG D | Continue and enhance a tracking system for the implementation of conservation plans and Best Management Practices | X | | | | USDA Natural Resources Conservation Service | USDA | USDA |
| AG E | Continue research to determine relationship between nutrient movement and poultry houses | | | X | | University of Delaware | USEPA, DNREC USDA, SCD | U of D |
| IMS A | Meet the nutrient reduction goals of the Pollution Control Strategy | | X | X | | DNREC | DNREC | DNREC |
| IMS B | Tie new and certain existing development to appropriate sewage treatment infrastructure | | | X | X | DNREC | DNREC | DNREC |
| LU A | Review and meet land-use goals in the Coastal Sussex Land-Use Plan | | X | | X | Sussex County | DNREC Sussex County | DNREC Sussex County |
| LU B | Require environmentally-sensitive development | | X | | X | Sussex County | DNREC Sussex County | DNREC Sussex County |
| HP A | Create a Resource Protection Area management plan | | X | | | DNREC | DNREC | DNREC |
| HP B | Develop Sussex County habitat protection ordinances | | X | X | X | Sussex County | DNREC Sussex County | DNREC Sussex County |
| HP C | Establish an Inland Bays Water-Use Plan | | X | X | | DNREC | DNREC | DNREC |
| HP D | Establish a shoreline building-setback line | | X | X | X | Sussex County Municipalities | DNREC Sussex County, Municipalities | DNREC Sussex County, Municipalities |
| HP E | Expand public land acquisition, protection and access | | X | | X | DNREC | DNREC Sussex County | DNREC Sussex County |
| HP F | Promote natural alternatives to bulkheading | | X | X | | DNREC | DNREC | DNREC |
| HP G | Review, update and codify the Inland Bays Dredge Plan | | X | X | | DNREC | DNREC | DNREC |

¹No authority is needed to implement these tactics. Implementation could be done by any lead.

! The proposed standing members of the Implementation Council:

- Secretary, Department of Natural Resources and Environmental Control
- Administrator, Sussex County
- Secretary, Department of Health and Social Services
- Secretary, Department of Agriculture
- President, Sussex County Association of Towns
- Chair, Scientific and Technical Advisory Committee
- Chair, Citizens Advisory Committee

! The current Scientific and Technical Advisory Committee (STAC) and Citizens Advisory Committee (CAC) should continue as formal advisory bodies.

! All meetings of the Implementation Council should be open and experts in various subject matters should be invited in, as needed; therefore, there is no need for other permanent advisors or for non-voting members.

! The Implementation Council should select its Chair and Chair-elect (second year) on a rotational basis.

! The Implementation Council should begin to organize in early 1994, before completion of the CCMP.

! An Executive Director should report to the Implementation Council and supervise staff.

To further develop and refine these recommendations, a Task Force was established. The Task Force was also charged with preparing a strategy to initiate two key identified needs that would support the Implementation Council: (1) An Inland Bays Protection Act, as proposed Legislation (later to evolve into the *Inland Bays Watershed Enhancement Act*), and (2) a State Planning/Conservation Development Office, as a potentially immediate Executive Order.

To initiate action, the Task Force was directed to prepare a presentation for Secretaries-Designate and for other appropriate officials, which includes three elements: (1) CCMP overview; (2) Public Input and Response Summary, emphasizing recommendations for a planning office and an Inland Bays Protection Act; and (3) a draft outline of a bill to establish an Inland Bays Protection Act. The Task Force was asked to determine key elements of the bill, find a sponsoring Legislator or Legislators, search for model legislation, and, with the guidance and support of its sponsor(s), draft the bill and determine public support.

Task Force Recommendations

The Task Force met in March 1993 to take up the charge of the Vision Workshop participants. The meeting focused on changes to the Implementation Council functions and membership, a draft Implementation Agreement, and procedures for initiating an Inland Bays Protection Act and a new State office to coordinate land-use and conservation planning.

Implementation Council

The Task Force, after extensive review and discussion, determined that the membership of the Implementation Council should remain as listed above, but that the Council should be authorized to modify its membership, as needed; establish its own operating procedures; and establish technical advisory committees to serve the full Council or individual members, if needed.

The following modifications were suggested for the functions of the Implementation Council:

1. Develop new and update and maintain existing Memoranda of Understanding among implementing parties to ensure political and funding agreements, implementation schedules, and ensure federal agency consistency with the CCMP.
2. Oversee progress toward implementation of each tactical action plan.
3. Facilitate adoption of various portions and continuation of the CCMP through policies, plans, budgets, laws, regulations, and actions of each participating agency or organization.
4. Coordinate ongoing evaluations of the effectiveness of CCMP actions toward improving the quality of the Inland Bays watershed, and prescribe corrective actions as needed.
5. Provide a forum for public participation and education.
6. Consider and address future needs and emerging environmental issues with respect to the Inland Bays.
7. Develop annual work plans and budgets to support the Implementation Council and to implement the CCMP tactical actions.

Implementation Council Agreement

The Task Force agreed upon the content of an Inland Bays CCMP Implementation Agreement and appropriate signatories - members of the Implementation Council. (Attachments 3 and 4 are final revised versions.)

Procedures: Inland Bays Protection Act and Land-Use Planning and Conservation Office

The Task Force, as directed by the December 1992 Vision Workshop agreement, identified the key elements of an Inland Bays Protection Act (IBPA), defined the mission of a State planning agency, and outlined a simple process for developing support for these actions.

! IBPA Key Elements

1. Establish the Implementation Council to oversee CCMP implementation, including its agreed upon functions and membership, and provide for staff and operating budget.
2. Incorporate the CCMP as State policy/law and include funding to implement the tactics.
3. Provide for funding to educate the public about the Inland Bays and how to preserve and protect them.
4. Direct State agencies, Sussex County, and Sussex County cities and towns to support the CCMP through enactment of policies, regulations, and ordinances that are consistent with the CCMP.

! Office of Land-Use Planning and Conservation

A new Delaware Office of Land-Use Planning and Conservation would provide for a broad overview of land development to ensure that environmentally sensitive land-use practices are understood and followed. The new Office would support a Development Advisory Service to provide hands-on assistance to developers.

! Developing Support

The Task Force agreed that several steps should be followed to develop the support needed to implement the Inland Bays Protection Act and the new Office and that both could be accomplished through either Legislative or Executive action. Steps include the following actions:

1. A briefing package was developed as outlined at the Vision Workshop (see above).
2. Informal briefings were held for the new Secretaries of Agriculture and Natural Resources and Environmental Control.
3. After June/July 1993 public meetings on the CCMP Addendum, an Executive Council meeting was convened to discuss the CCMP, its implementation, and public input, including the need for an Inland Bays Protection Act and an Office of Land-Use Planning and Conservation. The input and support of the Executive Council was solicited. (The Executive Council currently includes EPA, Sussex County, and Delaware's Secretaries of Health and Social Services and Natural Resources and Environmental Control; the Secretary of Agriculture was also invited to participate.)
4. Key members of the Management Conference, including the Chairs of the Scientific and Technical Advisory Committee and the Citizens Advisory Committee, met with State Legislators to brief them on the CCMP, its implementation, and public input, including the need for an Inland Bays Protection Act and an Office of Land-Use Planning and Conservation. Their interest in supporting the CCMP was determined and their input sought.

Representative Schroeder elected to take the lead in introducing a bill that would establish an organization to facilitate implementation of the CCMP and a long-term approach to addressing the enhancement of the Inland Bays watershed. It was clear that no State funds could be authorized.

Further Agreements

At the Fifth Vision Workshop in July 1993, agreement was reached on a strategy for securing support from proposed Implementation Council members and lead and support implementation entities, and for starting the Implementation Council.

The discussion led to the following conclusions:

- ! The proposed membership of the Inland Bays Implementation Council is appropriate.
- ! It is important to have involvement of the Sussex County Association of Towns (SCAT). Towns' interests include sewage treatment plants, zoning, potential user fees, and consistency issues. SCAT could be represented by a subcommittee of representatives of Rehoboth, Millsboro, Lewes and Georgetown. (Subsequently, the estuary program manager pursued and received SCAT support and a representative was selected to be on the Implementation Council.)
- ! It would be better to have Letters of Commitment or Memoranda of Understanding to secure support from each lead and supporting agency rather than have lead agencies sign the Implementation Agreement. (It was later decided by the Implementation Council to include Sussex Conservation District; therefore, all implementing agencies are now on the Council.)
- ! It is essential that an executive director be hired for the Implementation Council. This should be its first order of business. If possible, initial funding should come from EPA implementation monies (CWA, Section 320).
- ! It is critical to develop a political base to establish both an Inland Bays Protection Act and the Inland Bays Implementation Council; in addition, an advocacy group is sorely needed.
- ! An organization, such as a nonprofit foundation, is needed to acquire and raise funds and to award grants.
- ! The Inland Bays education program should be enhanced.

Executive Council Comments, November 1993

The Executive Council, the governing body of the estuary program Management Conference, agreed that, since sections of the Department of Health and Social Services that deal with marine and shellfish and drinking water programs are now part of DNREC, DHSS should not be represented on the Implementation Council. The Executive Council also agreed that establishing an Office of Land-Use Planning and Conservation would best be accomplished by a State entity other than the Implementation Council.

Implementation Council Meetings and Decisions

The Implementation Council, the body recommended by the Management Conference to coordinate CCMP implementation and to facilitate a long-term process for enhancing the Inland Bays watershed, met three times from March to June 1994 to establish organizational procedures and to make other organizational decisions. Decisions included

- ! Adding Sussex Conservation District to the Council

- ! Supporting a bill introduced by Representative John Schroeder - *Inland Bays Watershed Enhancement Act* - which would establish a Center for the Inland Bays and be administered by a Board of Directors that would include Implementation Council members.
- ! Revising the Implementation Agreement and its signatories, members of the Implementation Council (see Attachments 3 and 4).
- ! Adopting the organization and procedures that comprise Figure 3.

Citizen Advisory Committee Actions

During 1994, the CAC sought legal assistance to establish a nonprofit organization to serve as a vehicle for receiving and distributing governmental and private sector grant funds. These funds would support efforts to help implement the CCMP and to conduct other Inland Bays educational and watershed enhancement projects. Articles of Incorporation and By-Laws were developed to establish the Center for the Inland Bays. This development tracked with Legislative action and with activities and actions of the interim Implementation Council.

Legislative Action

To support recommendations made by Sussex County citizens and members of the Management Conference, a bill was introduced by Representative John Schroeder - *The Inland Bays Watershed Enhancement Act*. Now enacted by the Delaware General Assembly, this law establishes a Center for the Inland Bays to be administered by a Board of Directors that includes Implementation Council members (see Attachment 4), and receives advice from two Legislative appointees and representatives of EPA and other federal agencies, as appropriate. The Act, which appears as Attachment 1, is summarized in Figure 3.

Board of Directors Meeting - September 14, 1994

The first meeting of the Board was held in Lewes. The following decisions were reached:

- ! The CAC recommendation that the appointees of the State Legislative leaders be voting members of the Board will be taken up during the 1995 session of the Delaware General Assembly.
- ! The newly elected officers were

Chairperson: Kent Price, Chair of the Scientific and Technical Advisory Committee

Vice Chairperson: William McGowan, Chair of the Citizens Advisory Committee

Secretary: John Tarburton, Secretary of Agriculture

Treasurer: Gregory McCabe, Representative of the Sussex Conservation District.

- ! An Executive Committee, appointed by the Chair, will review the draft Articles of Incorporation and By-Laws to be sure they reflect the will of the Board and the dictates of the Inland Bays Watershed Enhancement Act. For example, the By-Laws will show that the Executive Director is to be recruited and hired by the Board, and serves the Board. The attorney will make changes and, when the Board is satisfied, will file the Articles and By-Laws with the appropriate agencies to obtain nonprofit, tax-exempt status.
- ! An Executive Director's salary could come from EPA, through pooling agency funds, or from foundation grants. The Executive Committee will explore options for this as well as for office space.
- ! Following the requirement to hold quarterly meetings (at least), the next meeting was set for December 14, 1994, and rescheduled for January 27, 1995.

Board of Directors Meeting - January 27, 1995

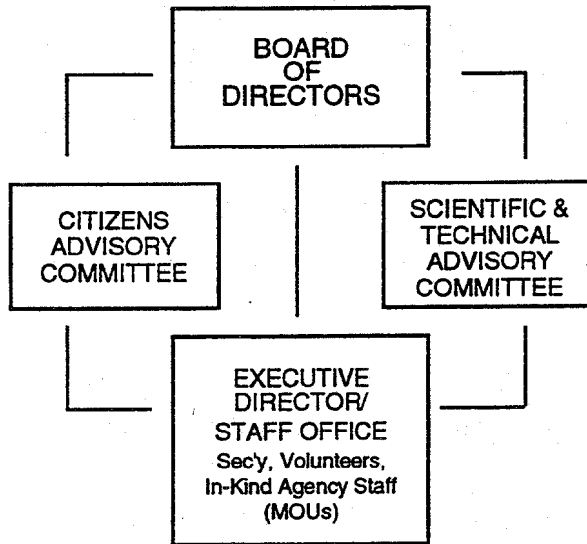
The second meeting of the Board was held in Lewes. The following decisions were made:

- ! The Center will file an application to the IRS for 501 (c) (3) status, enabling the Center to receive tax-exempt contributions.
- ! Bylaws were amended.
- ! Committees were established to complete a short-term Strategic Plan and to develop fundraising strategies and proposals.
- ! Grace Pierce-Beck (newly elected Chairperson of the Citizens Advisory Committee) was elected to succeed William McGowan as Vice Chairperson of the Board.

Implementation Timeline

A summary and schedule of tactics and actions to be implemented under the oversight of the Board of Directors, Center for the Inland Bays, is presented in Table 3.

Figure 3. Center for the Inland Bays



THE CENTER FOR THE INLAND BAYS

The Center for the Inland Bays is an independent entity to be established by Delaware Law and/or IRS Code [501(c) (3)]. Initial administration may be undertaken in cooperation with Sussex Conservation District or the University of Delaware.

PURPOSE

The purpose of the Center for the Inland Bays is to oversee and facilitate the implementation of a long-term approach for the wise use and enhancement of the Inland Bays watershed.

BOARD OF DIRECTORS

The Center for the Inland Bays shall be administered by a Board of Directors which consists of the following members:

- Citizens Advisory Committee, Chair*
- Department of Agriculture, Secretary*
- Department of Natural Resources and Environmental Control, Secretary*
- Scientific and Technical Advisory Committee, Chair*
- Sussex Conservation District, Representative*
- Sussex County Association of Towns, Representative*
- Sussex County Council, Administrator*

The President Pro Tem of the Senate and the Speaker of the House may each designate one non-voting, Ex-Officio member from Sussex County.

The U.S. Environmental Protection Agency and other federal agencies may serve as non-voting, Ex-Officio members.

The Inland Bays Estuary Program Scientific and Technical Advisory Committee (STAC) and Citizens Advisory Committee (CAC) will serve as formal advisory bodies to the Board of Directors.

PROCEDURES

All meetings of the Board of Directors will be open and advertised, according to Delaware law. Experts in various subject matters may be invited in as needed. Meetings will be held quarterly, or as deemed necessary.

The Board of Directors will select its officers at an annual meeting. All procedures will be followed according to the By-Laws of the Center for the Inland Bays.

RESPONSIBILITIES OF THE BOARD OF DIRECTORS

1. Develop new and update and maintain existing Memoranda of Understanding among implementing parties to ensure political and funding agreements and implementation schedules, and to ensure federal agency consistency with the Comprehensive Conservation and Management Plan (CCMP).
2. Oversee progress toward implementation of each tactical action plan.
3. Working with appropriate agencies and organizations, facilitate adoption of various portions of the CCMP and continue CCMP implementation through policies, plans, budgets, laws, regulations, and actions of each participating agency or organization.
4. Coordinate ongoing evaluations of the effectiveness of CCMP actions toward improving the quality of the Inland Bays watershed, and recommend corrective actions as needed.
5. Provide a forum for public participation and education.
6. Consider and address future needs and emerging issues with respect to the Inland Bays watershed's wise use and enhancement.
7. Develop annual work plans and budgets to support the Center for the Inland Bays and to oversee and facilitate implementation of the CCMP tactical actions.

RESPONSIBILITIES OF THE EXECUTIVE DIRECTOR

An Executive Director will report to the Board of Directors and will supervise staff. The Executive Director will be responsible for the following:

1. Setting up and coordinating agenda development for Board of Directors meetings.
2. Overseeing administration.
3. Fund raising, including developing grant proposals.
4. Developing and implementing public information and education programs and coordinating public relations.
5. Evaluating and reporting progress toward CCMP implementation.
6. Ensuring Board of Directors accountability for fulfilling grant requirements.
7. Acting as liaison and providing staff support to Citizens and Scientific and Technical Advisory Committees.
8. Developing and carrying out agreements of the Center for the Inland Bays and its Board of Directors.
9. Preparing solicitations for proposals and making recommendations for the award of grants for educational and restoration projects.
10. Preparing work plans and budgets for Board of Directors approval.
11. Performing other duties as assigned by the Board of Directors.



SPONSOR: Rep. Schroeder; Reps.
Bunting, Carey, Ewing,
Fallon, Lee, Schroeder,
West; Sens. Cordrey,
Venables, Voshell

HOUSE OF REPRESENTATIVES

137TH GENERAL ASSEMBLY

5 40 JUN 2 1994

HOUSE BILL NO. _____

AN ACT TO AMEND TITLE 7 OF THE DELAWARE CODE RELATING TO THE PRESERVATION OF INLAND BAYS, AND CREATING THE INLAND BAYS' WATERSHED ENHANCEMENT ACT.

1 WHEREAS, the deterioration of water quality and the loss of natural habitat
2 threaten public health and the environment, the viability of the economic
3 base, and the quality of life around Delaware's Inland Bays' watershed; and

4 WHEREAS, the Inland Bays watershed is affected by actions in many
5 communities, by activities of many individuals, and by decisions made by many
6 agencies and organizations; and

7 WHEREAS, since 1969, State of Delaware, federal government, and local
8 officials, scientists, organizations, and citizens have worked to identify the
9 most significant environmental programs affecting the Inland Bays' watershed,
10 to investigate the causes of these problems, and to consent on the strategy
11 for solving these problems; and

12 WHEREAS, for the past five years, participants in the Inland Bays Estuary
13 Program have targeted nutrient overenrichment and habitat loss as priority
14 environmental problems; and

15 WHEREAS, the Inland Bays Estuary Program has developed the Comprehensive
16 Conservation and Management Plan (CCMP) to mitigate these priority problems;
17 and

18 WHEREAS, commitments from federal, State, and local agencies and
19 organizations responsible for the implementation of the CCMP are critical to
20 its success; and

21 WHEREAS, hundreds of citizens have expressed strong support for the CCMP
22 and its implementation to protect and restore the Inland Bays' watershed;

23 NOW, THEREFORE:

1 BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF DELAWARE:

2 Section 1. AMEND Title 7 of the Delaware Code by creating a new Chapter 76,
3 which new chapter shall read as follows:

4 "§7601. Title.

5 This chapter shall be known, and may be cited as 'The Inland Bays'
6 Watershed Enhancement Act.'

7 §7602. Center For the Inland Bays.

8 (a) The Center For the Inland Bays is hereby created as a nonprofit
9 organization. The Center shall apply for nonprofit status under the Federal
10 Internal Revenue Service, U.S.C.A. The purpose of the Center shall be to
11 oversee and facilitate the implementation of a long-term approach for the wise
12 use and enhancement of the Inland Bays' Watershed.

13 (b) The Center shall receive federal funds for coordinating implementation
14 of the federal Comprehensive Conservation and Management Plan (CCMP), and
15 shall raise private grant monies to support educational activities,
16 restoration and land acquisition efforts.

17 §7603. Board of Directors.

18 (a) The Center shall be administered by a 7 person Board of Directors
19 consisting of the following members:

20 (1) Secretary of Delaware Dept. of Agriculture;

21 (2) Secretary of Delaware Department of Natural Resources and
22 Environmental Control;

23 (3) Representative from the Sussex Conservation District;

24 (4) Administrator from Sussex County;

25 (5) Representative from Sussex County Association of Towns;

26 (6) Chair of the Inland Bays Scientific and Technical Advisory
27 Committee; and

28 (7) Chair of the Inland Bays Citizens Advisory Committee.

29 (b) The United States Environmental Protection Agency and other federal
30 agencies may serve as non-voting, ex-officio members of the Board. In
31 addition, the President Pro-Tem of the Delaware State Senate and the Speaker

1 of the Delaware State House of Representatives may each designate one
2 non-voting, ex-officio member to the Board, which member shall be a resident
3 of Sussex County.

4 (c) The Inland Bays Estuary Program and the Inland Bays Scientific and
5 Technical Advisory Committee (STAC) and the Citizens Advisory Committee (CAC)
6 shall continue to serve as formal advisory bodies to the Board.

7 §7604. Duties of the Board of Directors.

8 (a) The Board shall be responsible for the procurement and administration
9 of federal and private monies secured to fulfill the responsibilities pursuant
10 to the protection and restoration of the Inland Bays' watershed. The Board
11 shall review and consider recommendations made by the Executive Director
12 concerning priorities for protecting and restoring the Inland Bays' watershed
13 and to oversee fundraising activities and the distribution of monies received.

14 (b) The Board of Directors shall oversee and facilitate the implementation
15 of the CCMP upon its adoption, tracking and monitoring its progress leading to
16 improvements to the Inland Bays, facilitating an ongoing dialogue on issues
17 concerning their protection, educating the public and students about how to
18 protect the Bays, and determining priorities for restoration, enhancement and
19 land acquisition projects.

20 (c) Meetings of the Board of Directors shall be held at least quarterly, or
21 as deemed necessary, and shall be open to the public and advertised according
22 to Delaware law. Experts in various subject matters may be invited to address
23 the Board of Directors as needed and appropriate.

24 (d) Staff support for the Board shall be provided by and Executive Director
25 who will convene its meetings; develop and carry out its agreements; develop
26 grant proposals and fundraising events to supports its educational,
27 restoration, and land acquisition activities; prepare solicitations for
28 proposals and make recommendations for the award of grants for educational and
29 restoration projects; prepare progress reports, work plans, and budgets for
30 the Board's approval; support advisory committees; supervise staff, and
31 perform other duties as assigned by the Board.

1 (e) The Board shall submit a progress report annually to the General
2 Assembly. The General Assembly may order periodic general audits of the Center
3 for the Inland Bays."

SYNOPSIS

Since 1969, the Inland Bays have been studied to determine the causes of their decline and potential remedies to stem their decline and restore them to a viable state.

For the past five years, the Inland Bays Estuary Program has worked to identify the most serious problems adversely affecting Delaware's Inland Bays and to develop a Comprehensive Conservation and Management Plan (CCMP) that includes strategies to address those problems. The results of these investigations point to nutrient overenrichment from specific and diverse sources, including stormwater runoff and contaminated ground water, and to the destruction of valuable habitat as the chief causes of the decline of the Inland Bays.

As part of this effort, a major educational and outreach program involved hundreds of citizens. It was determined that the vast majority of Sussex County participating citizens heartily support the CCMP as an approach to saving the Bays. A significant action recommended by the public calls for enacting an Inland Bays Watershed Enhancement Act to help protect and restore the Inland Bays' watershed. Through this Act, all State agencies, Sussex County, and local municipalities shall work together to protect and enhance the Inland Bays' watershed, including the waters of the Bays, their tributaries, living resources and habitat, and to take actions that are consistent with the CCMP.

The primary purposes of this legislation are to establish a Center for the Inland Bays that will receive and distribute funds to support Inland Bays' watershed wise use and enhancement efforts;

To educate users of the Inland Bays to promote stewardship of the Bays and bolster support for voluntary actions that include encouraging farmers to use Best Management Practices that reduce nutrient discharges to the Bays, asking developers to follow environmentally sensitive development principles, alerting boaters to the potential for wake and propeller damage, and encouraging all users of the Bays to respect sensitive natural resource areas; and

To encourage restoration and land acquisition efforts in priority areas of the Inland Bays' watershed.

(The passage of the Inland Bays' Watershed Enhancement Act in June 1994 has superseded this consideration of optional structures)

Attachment 2

FOUR OPTIONAL MANAGEMENT STRUCTURES for Implementation of the CCMP

1. Department of Natural Resources and Environmental Control Lead

The DNREC Division of Water Resources would continue its current responsibility for staffing the development of the CCMP, taking on an additional role of overseeing CCMP implementation and executing a series of agreements.

Pros:

- ! DNREC is the only agency with the the expertise and experience, as well as the State authority, to manage CCMP implementation.
- ! Since State law supersedes local town ordinances, a State agency would have authority over local actions.
- ! DNREC is less politicized relative to local issues because State agency staffs are civil servants, immune from political influence.
- ! DNREC has the ideological bent to manage environmental matters. The agency maintains relationships with EPA and other federal, State, County, and municipal agencies and has established channels of communication.
- ! DNREC might be able to use authority under the Land Use Planning Act.

Cons:

- ! DNREC does not have broad authority for all areas covered by the CCMP; for instance, forestry, agriculture, and roads are not covered under DNREC.
- ! The top managers of DNREC are political appointees.
- ! The State Legislature controls its funding and oversees its regulations; therefore, DNREC is not completely independent.
- ! A regulatory agency, such as DNREC, might be viewed negatively by some who bear the costs of regulation and others who think federal and State agencies are inaccessible.
- ! State agencies have too many responsibilities to focus closely on the needs of Sussex County.

2. Sussex County Lead

The County Council would manage CCMP implementation through its Planning and Zoning Commission, an appointed body. Because of its interest in controlling land-use decisions in Sussex County, the County would be favorably inclined to manage the full range of implementation actions using agreements with other agencies.

Pros:

- ! Since the entire land area of the Inland Bays is within Sussex County, it is the governmental body closest to the people.
- ! The County Council represents the citizens of the County and should know their constituents' concerns best.
- ! Delaware has a history of strong local government.

Cons:

- ! The County Council is made up of elected officials responsive to all constituents.
- ! Only one Councilmanic district lies entirely within the Inland Bays area.
- ! The County has no authority over town ordinances.
- ! The County lacks sufficient staff with experience and expertise to manage CCMP implementation.
- ! Sussex County has not shown environmental sensitivity or "visionary" planning approaches, although good planning techniques and ordinances are now being developed.

3. Public/Private Group Lead

A public/private group would consist of both government and citizen representatives with funding from a mixture of government grants and private sources. There are many models for public/private management of environmental resources; however, this concept would be new in Delaware and would require further study.

Pros:

- ! Such an entity could receive private grants as well as government funds.
- ! It might be more effective for a private organization to influence potential polluters.
- ! This kind of organization would be apolitical in the sense that it would not be subject to elections or political appointments.

Cons:

- ! There is no existing organization that could manage responsibility on the scale of the CCMP; a new organization would have to be created.
- ! The Citizen Advisory Committee is not equipped to manage this effort.
- ! Most nonprofit groups are better suited to public education, advocacy, or acting as a "watchdog."
- ! It might require Governor or Legislative authority to establish such an undertaking.

4. Implementation Council Lead

The Implementation Council would take over the functions of the Executive Council and the Implementation Committee of the current Management Conference for the Inland Bays when the CCMP moves into its implementation phase. Membership would consist of agency heads and their designees with implementation responsibilities as stated in the CCMP. Meetings of this Council would be open to the public. The Citizens Advisory and Scientific and Technical Advisory Committees' chairs would also serve on the Implementation Council. The functions of Sussex County Technical Advisory Committee (TAC) and a representative of the TAC would be included as part of the Scientific and Technical Advisory Committee. The Council would be chaired on a rotating basis or as otherwise determined by Council members.

Under this scenario, both the existing Citizens Advisory Committee and Scientific and Technical Advisory Committee would continue their current roles.

The Implementation Council would provide for staff — the Implementation Work Group — to carry out its recommendations. The Council would be responsible for providing support for this Work Group, such as office space and a budget.

Pros:

- ! In this scenario, there is no need for debate over State vs. County vs. public/private sector lead.

- ! Because there are different leads for different tactical action plans, all lead and supporting organizations will need to work cooperatively under any governing plan.
- ! An Implementation Council lead might be more effective in facilitating interagency Memoranda of Understanding.

Cons:

- ! One Council chair and his/her organization will need to take some form of leadership; revolving leadership could be difficult.
- ! It would be disruptive and impractical to move staff among shifting lead agencies.
- ! Leadership by committee could be cumbersome.
- ! Providing staff and support funding could be problematic unless the post-CCMP funding that is available from EPA can be awarded for this purpose to this Council.

INLAND BAYS
COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN (CCMP)
IMPLEMENTATION AGREEMENT

Preface

The following Agreement is the culmination of more than five years of planning, collaboration, evaluation, and consensus-building by the Inland Bays Management Conference. Members of the Conference and the public heartily support the CCMP and the tactical action plans that are designed to reduce both nutrient contamination and habitat loss in the Inland Bays watershed. Each of the signatory agencies and organizations to this Agreement is pledged to actively support the CCMP in its policy, regulatory, and funding determinations and to vigorously implement, to the extent practicable, those tactics for which it has a Lead or Support role.

Whereas, the deterioration of water quality and the loss of natural habitat threaten public health and the environment, the viability of the economic base, and the quality of life around Delaware's Inland Bays; and

Whereas, the Inland Bays watershed is affected by actions in many communities, by activities of many individuals, and by decisions made by many agencies and organizations; and

Whereas, since 1969, Federal, State, and Local officials, scientists, organizations, and citizens have worked to identify the most significant environmental problems affecting the Inland Bays, to investigate the causes of these problems, and to consent on the strategy for solving these problems; and

Whereas, participants in the Inland Bays Management Conference have targeted nutrient overenrichment and habitat loss as priority environmental problems; and

Whereas, the Management Conference has developed the Comprehensive Conservation and Management Plan (CCMP) to mitigate these priority problems; and

Whereas, commitments from Federal, State, and Local agencies and organizations responsible for the implementation of the CCMP are critical to its success;

Therefore, The Undersigned hereby resolve to support the Center for the Inland Bays as it oversees CCMP implementation; to endorse the CCMP and its implementation; and to work diligently, to the extent practicable, to implement the tactical action plans for which their agency or organization is responsible.

Attachment 4

SIGNATORIES TO IMPLEMENTATION AGREEMENT

Citizens Advisory Committee

Department of Agriculture

Department of Natural Resources and Environmental Control

Scientific and Technical Advisory Committee

Sussex Conservation District

Sussex County Association of Towns

Sussex County Council

Table 3. Implementation Timeline

EXPLANATION OF IMPLEMENTATION TIMELINE TABLE CODING

Tactics/Activities Reference Codes:

| TACTICS OF THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN | |
|--|--|
| Education and Outreach Action Plan | ED A Implement the comprehensive public participation and education plan |
| Agricultural Source Action Plan | AG A Continue conservation planning through the Sussex Conservation District |
| | AG B Develop nutrient utilization and distribution alternatives |
| | AG C Manage and plant forested/vegetative buffers |
| | AG D Continue and enhance a tracking system for the implementation of conservation plans and Best Management Practices |
| | AG E Continue research to determine relationship between nutrient movement and poultry houses |
| Industrial, Municipal, and Septic System Action Plan | IMS A Meet the nutrient reduction goals of the Pollution Control Strategy |
| | IMS B Tie new and certain existing development to appropriate sewage treatment infrastructure |
| Land-Use Action Plan | LU A Review and meet land-use goals in the Coastal Sussex Land-Use Plan |
| | LU B Require environmentally-sensitive development |
| Habitat Protection Action Plan | HP A Create a Resource Protection Area management plan |
| | HP B Develop Sussex County habitat protection ordinances |
| | HP C Establish an Inland Bays Water-Use Plan |
| | HP D Establish a shoreline building-setback line |
| | HP E Expand public land acquisition, protection and access |
| | HP F Promote natural alternatives to bulkheading |
| | HP G Review, update and codify the Inland Bays Dredge Plan |
| PROJECTS DEMONSTRATING IMPLEMENTATION OF THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN | |
| Education and Outreach Action Plan | D1 Demonstrate various public education and outreach activities to instill greater appreciation and stewardship |
| Agricultural Action Plan | D2 Continue implementing agricultural Best Management Practices (BMP) demonstration projects |

Table 3. Implementation Timeline

| | | |
|--|-------|--|
| | D3 | Demonstrate the feasibility of implementing a market-based exchange for the cost-effective utilization of poultry manure |
| Land-Use Action Plan | D4 | Focus farmland preservation activities in the Inland Bays Watershed |
| Habitat Protection Action Plan | D5 | Demonstrate the feasibility of re-establishing submerged aquatic vegetation (eelgrass) |
| Governance | D6 | Issue annual progress report on the Center for the Inland Bays activities |
| | D7 | Hire Executive Director and staff to manage the Center for the Inland Bays demonstration projects |
| STRATEGIC PLAN AND FUNDING STRATEGY OF THE CENTER FOR THE INLAND BAYS | | |
| Governance | CIB A | Establish the Center for the Inland Bays as a charitable nonprofit organization that can accept tax-exempt contributions and government and private grants |
| | CIB B | Facilitate implementation of the Comprehensive Conservation and Management Plan (CCMP) and its tactical action plans |
| | CIB C | Issue an annual Inland Bays "Report Card" that reflects progress toward meeting goals of the CCMP - coordinated with the annual report to the Delaware General Assembly |
| | CIB D | Sponsor an annual public forum |
| | CIB E | Hold workshops on specific areas of conflict or concern with key audiences |
| | CIB F | Develop grant proposals, fundraising efforts, and other fund solicitations to support public education and restoration activities recommended and approved by the Board of Directors |
| | CIB G | Prepare and/or update a detailed 5-year programmatic strategy that includes public education and restoration activities and a complementary financial strategy that includes funding needs, sources and an implementation plan |
| | CIB H | Implement outreach/media campaign |
| | CIB I | Develop/implement target audience program |
| | CIB J | Support all public education and PPE Plan |

Table 3. Implementation Timeline

Lead Codes:

- CIB = Center for the Inland Bays
- DDA = Delaware Department of Agriculture
- DNREC= Delaware Department of Natural Resources and Environmental Control
- GOV = Governor
- NRCS = United States Natural Resources Conservation Service
- OSPC = Office of State Planning Coordination
- SC = Sussex County
- SCD = Sussex Conservation District
- UD = University of Delaware

Start/Completion Date Codes:

- (c) Completion of Full Implementation
- (s) Start of Implementation

Cost is for Total of First Five Years (in Thousands of Dollars)

Bar Chart Fill Codes:

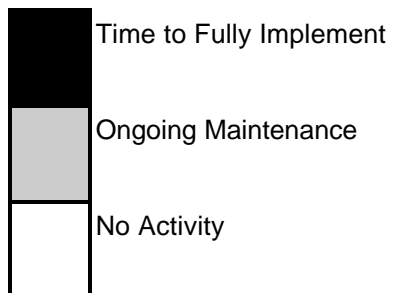


Table 3. Implementation Timeline

| Action Plan | Ref | Tactics/Activities | Lead | Start/Compl Date | Cost \$K | CY 95 | CY 96 | CY 97 | CY 98 | CY 99 | CY 00 |
|------------------------|-------|---|------|----------------------------|-------------------------|-------|-------|-------|-------|-------|-------|
| Education and Outreach | ED A | Hire an outreach coordinator to implement the Public Participation and Education (PPE) Plan | CIB | 10/1995(c) | 250.0 | | | | | | |
| | D1 | Demonstrate various public education and outreach activities to instill greater appreciation and stewardship | CIB | 7/1995(s) 9/1996(c) | 25.2 | | | | | | |
| | CIB H | Implement outreach/media campaign | CIB | 2/1996(s) | See ED A & D1 | | | | | | |
| | CIB I | Develop/implement target audience program | CIB | 1/1997(s) | See ED A & D1 | | | | | | |
| | CIB J | Support all public education and PPE Plan | CIB | 12/1995(s) | See ED A & D1 | | | | | | |
| Agricultural Source | AG A | Develop/implement/update conservation plans for all farms | SCD | 7/1995(s) | 807.5 Incl one below | | | | | | |
| | AG A | Monitor implementation of conservation planning and evaluate successes (field monitoring) | SCD | 7/1995(s) | See one above | | | | | | |
| | D2 | Continue implementing agricultural Best Management Practices (BMP) demonstration projects | SCD | 7/1995(s) | 807.5 | | | | | | |
| | AG B | Continue research into viable options for nutrient utilization and distribution | UD | 7/1995(s) | Not avail yet | | | | | | |
| | AG B | Develop education, BMP's, and assistance when appropriate to implement nutrient utilization and distribution alternatives | SCD | 12/1996(s) | Not avail yet | | | | | | |
| | D3 | Demonstrate the feasibility of implementing a market-based exchange for the cost-effective utilization of poultry manure | SCD | 7/1995(s) 9/1996(c) | 26.1 | | | | | | |

Table 3. Implementation Timeline

| Action Plan | Ref | Tactics/Activities | Lead | Start/Compl Date | Cost \$K | CY 95 | CY 96 | CY 97 | CY 98 | CY 99 | CY 00 |
|--|-------|---|-------|-----------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|
| | AG C | Educate landowners about management of forested/vegetated land | DDA | 12/1996(s) | 250.0 Incl one below | | | | | | |
| | AG C | Develop management plans for and plant new acreage of forests | DDA | 12/1997(s) | see one above | | | | | | |
| | AG D | Complete developing Inland Bays baseline information in a tracking system on the implementation of conservation plans and BMP's | NRCS | 12/1998(c) | 125.0 Incl one below | | | | | | |
| | AG D | Continue monitoring implementation of conservation plans and BMP's under the tracking system (computer monitoring) | NRCS | 12/1998(s) | See one above | | | | | | |
| | AG E | Continue research to determine relationship between nutrient movement and poultry houses | UD | 10/1995(s) 9/1998(c) | Not avail yet | | | | | | |
| Industrial, Municipal, and Septic System | IMS A | Adopt Phase I of the Pollution Control Strategy | DNREC | 12/1995(c) | 3,762.5 Incl three below | | | | | | |
| | IMS A | Adopt Phase II of the Pollution Control Strategy | DNREC | 12/1999(c) | See one above | | | | | | |
| | IMS A | Reduce nutrients discharged by 50% from 1989 levels | DNREC | 12/1996(c) | See two above | | | | | | |
| | IMS A | Reduce nutrients discharged by 90% from 1989 levels | DNREC | 12/1998(c) | See three above | | | | | | |
| | IMS B | Continue construction projects and enforcement to tie new and certain existing development to appropriate sewage treatment infrastructure | SC | 7/1995(s) | 19,607.0 | | | | | | |
| Land-Use | LU A | Complete review/update of the Coastal Sussex Land-Use Plan and develop/adopt ordinances | SC | 12/1996(c) | 203.8 | | | | | | |

Table 3. Implementation Timeline

| Action Plan | Ref | Tactics/Activities | Lead | Start/Compl Date | Cost \$K | CY 95 | CY 96 | CY 97 | CY 98 | CY 99 | CY 00 |
|--------------------|------|--|-------------|-----------------------------|---------------------------|-------|-------|-------|-------|-------|-------|
| | LU B | Establish Office of State Planning Coordination (OSPC) | GOV | 2/1995(c) | 2,100.0 Incl two below | | | | | | |
| | LU B | Administer Development Advisory Service | OSPC | 1/1996(s) | See one above | | | | | | |
| | LU B | Develop/implement open space conservation plan | OSPC | 12/1998(s) | See two above | | | | | | |
| | D4 | Focus farmland preservation activities in the Inland Bays Watershed | DDA OSPC | 7/1995(s) 9/1996(c) | 28.0 | | | | | | |
| Habitat Protection | HP A | Complete data gathering for a Resource Protection Area (RPA) Management Plan | DNREC | 12/1996(c) | 468.6 Incl two below | | | | | | |
| | HP A | Select RPA's | DNREC | 12/1997(c) | See one above | | | | | | |
| | HP A | Enhance RPA's at rate of one per year | DNREC | 12/1998(s) | See two above | | | | | | |
| | D5 | Demonstrate the feasibility of re-establishing submerged aquatic vegetation (eelgrass) | DNREC | 7/1995(s) 9/1996(c) | 26.7 | | | | | | |
| | HP B | Develop, adopt and implement ordinances to protect habitat | SC | 1/1997(s) 12/1998(c) | 162.7 | | | | | | |
| | HP C | Develop a Water-Use Plan | DNREC | 12/1997(c) | 264.6 Incl two below | | | | | | |
| | HP C | Obtain public input on a Water-Use Plan | DNREC | 12/1998(c) | See one above | | | | | | |

Table 3. Implementation Timeline

| Action Plan | Ref | Tactics/Activities | Lead | Start/Compl Date | Cost \$K | CY 95 | CY 96 | CY 97 | CY 98 | CY 99 | CY 00 |
|-------------|-------|--|------------|-----------------------------|---------------------------|-------|-------|-------|-------|-------|-------|
| | HP C | Implement a Water-Use Plan | DNREC | 6/1999(s) | See two above | | | | | | |
| | HP D | Develop/implement an education program for shoreline building setbacks | CIB | 12/1997(c) | 190.0 Incl one below | | | | | | |
| | HP D | Establish ordinances based on State criteria for shoreline building setbacks | SC OSPC | 12/1997(c) | See one above | | | | | | |
| | HP E | Expand public-private efforts in land acquisition, protection, and access | DNREC | 7/1995(s) | 9,405.2 Incl one below | | | | | | |
| | HP E | Acquire additional land in watershed | DNREC | 7/1995(s) | See one above | | | | | | |
| | HP F | Promote educational efforts for alternatives to bulkheading | DNREC | 7/1995(s) | 606.0 Incl one below | | | | | | |
| | HP F | Establish incentives, cost shares, retrofit opportunities, and planting of vegetation for alternatives to bulkheading | DNREC | 7/1995(s) | See one above | | | | | | |
| | HP G | Review, update, and codify the Inland Bays Dredge Plan | DNREC | 7/1995(s) 12/1996(c) | 50.0 | | | | | | |
| Governance | CIB A | Establish the Center for the Inland Bays as a charitable nonprofit organization that can accept tax-exempt contributions and government and private grants | CIB | 7/1995(c) | 89.5 | | | | | | |
| | D7 | Hire Executive Director and staff to manage the Center for the Inland Bays demonstration projects | CIB | 11/1995(c) | 117.5 | | | | | | |
| | CIB B | Facilitate implementation of the Comprehensive Conservation and Management Plan (CCMP) and its tactical action plans | CIB | 7/1995(s) | See CIB A & D7 | | | | | | |

Chapter 5. FUTURE NEEDS

During federal fiscal year 1996, implementation of the CCMP will be well under way. Yet a few tactics, such as those awaiting research results, additional data gathering and mapping, or funding, may follow in 1997 or 1998. Many elements of the CCMP will be completed before 2000; others are longer-term commitments.

Early in the CCMP-development process, the Citizens Advisory Committee (CAC) established goals and objectives for the well-being of the Inland Bays watershed. Since then, the CAC has reviewed the original goals and objectives to see if the CCMP adequately addresses them. The CAC found that all of the goals and objectives were addressed, some directly and others indirectly, with the exception of Goal 8: Coordinate Inland Bays management with existing solid waste, air pollution, and toxic substances programs. Table 3. *Goals and Objectives/Tactics Matrix* presents the goals, objectives, and tactics assessed by the CAC.

The Management Conference, as part of its problem identification and priority-setting process, agreed that nutrient overenrichment and habitat loss/modification would be addressed first and other goals which were thought to be of lower priority, including Goal 8, would be taken up as a future agenda.

Three areas of future effort were recommended by 1993 Vision Workshop participants:

1. Consider phosphate reductions as a possible cost-effective means of reducing nutrient levels. Phosphorus load reductions are being addressed in the Pollution Control Strategy and further action, such as limits on phosphorus-containing laundry products, is being considered.
2. Establish a proper facility for disposing of toxic materials, and address leakage at closed landfills. This will be taken up by the Center for the Inland Bays.
3. Establish "portable potty" and boat pumpout facilities at selected boat launching ramps. This is being addressed as part of Habitat Action Plan C. *Establish an Inland Bays Water-Use Plan.*

Another initiative should be considered, according to scientists working on restoration projects in the Bays: an Inland Bays mitigation policy. As part of such a policy, a mitigation bank would be established with fines set for environmental damages to be used for restoration work.

As part of the long-term oversight and facilitation role of the Center for the Inland Bays, the CCMP will be revisited and re-evaluated to determine the success of each of its elements. The long-term tracking and monitoring programs put into place under the CCMP will assist this effort. As new information is brought to bear, new issues and concerns will no doubt arise. For example, are a rise in sea level and the increased rate of ocean water entering the Bays through the Indian River Inlet causes for concern or alarm? The Center for the Inland Bays will address these new concerns and determine whether additional tactics are needed in the CCMP or whether some existing tactics need to be modified.

In the near term, it is expected that the new legislation, including the *Inland Bays Watershed Enhancement Act*, regulations, best management practices, ordinances, and offices recommended by the Management Conference and agreed to by the implementing agencies will be carried out and that substantial progress will be made toward protecting and restoring Delaware's invaluable Inland Bays.

Table 4. Goals and Objectives/Tactics Matrix

This Goals & Objectives/Tactics Matrix was used by the Citizen Advisory Committee's CCMP Writing and Development Subcommittee at their meeting on March 4, 1993 to determine how well the original goals and objectives, developed by citizens at a public workshop on March 18, 1989, are being met by the current tactical action plans, as stated in the Preliminary Draft CCMP, dated September 1992.

| Tactics to a Cleaner Inland Bays (key to matrix column headings) | |
|---|---|
| ED A | Implement the comprehensive public participation and education plan |
| AG A | Continue conservation planning through the Sussex Conservation District |
| AG B | Develop nutrient utilization and distribution alternatives |
| AG C | Manage and plant forested/vegetative buffers |
| AG D | Continue and enhance a tracking system for the implementation of conservation plans and Best Management Practices |
| AG E | Continue research to determine relationship between nutrient movement and poultry houses |
| IMS A | Meet the nutrient reduction goals of the Pollution Control Strategy |
| IMS B | Tie new and certain existing development to appropriate sewage treatment infrastructure |
| LU A | Review and meet land-use goals in the Coastal Sussex Land-Use Plan |
| LU B | Require environmentally-sensitive development |
| HP A | Create a Resource Protection Area management plan |
| HP B | Develop Sussex County habitat protection ordinances |
| HP C | Establish an Inland Bays Water-Use Plan |
| HP D | Establish a shoreline building-setback line |
| HP E | Expand public land acquisition, protection and access |
| HP F | Promote natural alternatives to bulkheading |
| HP G | Review, update and codify the Inland Bays Dredge Plan |

Key to Matrix Box Codes:

Y = Tactic Meets the Goal or Objective

P = Tactic Meets the Goal or Objective to Some Degree, but Unsure How Significant

I = Goal or Objective Already Met by Some Action Not Tied to a Specific Tactic

| | | Tactics to a Cleaner Inland Bays | | | | | | | | | | | | | | | | |
|--|--|----------------------------------|----|----|----|----|----|-----|-----|----|----|----|----|----|----|----|----|---|
| Goals and Objectives (in ranked order) | | ED | AG | AG | AG | AG | AG | IMS | IMS | LU | LU | HP | HP | HP | HP | HP | HP | |
| | | A | A | B | C | D | E | A | B | A | B | A | B | C | D | E | F | G |
| G3D | Examine and improve existing regulations and enforcement | | P | | P | P | | Y | P | Y | Y | P | P | P | Y | | | |
| G3E | Ensure accountability for implementation | | P | P | | P | | Y | P | Y | Y | P | P | P | Y | | | |
| G4: | Establish and implement a comprehensive wastewater management program | | | | | | | Y | Y | P | P | P | P | P | | | | |
| G4A | Establish wastewater management priorities | | | | | | | Y | Y | P | P | | P | P | | | | |
| G4B | Encourage centralized sewer systems, public and/or private | | | | | | | P | Y | P | P | P | P | P | | | | |
| G4C | Strive to reduce point source discharges to zero | | | | | | | Y | P | | P | Y | P | Y | | | | |
| G4D | Address soaps, detergents, petroleum products, and household chemicals | | | | | | | | | | | | P | | | | | |
| G4E | Explore financing alternatives for implementation | | | | | | | P | | | | | | | | | | |
| G5: | Develop and implement a groundwater management program that protects and improves drinking water supplies | | P | P | P | P | P | P | P | P | Y | | | | | P | | |
| G5A | Address saltwater intrusion | | | | | | | | | | Y | | | | | | | |
| G5B | Promote water conservation | | | | | | | | | | Y | | | | | | | |
| G5C | Protect groundwater recharge areas | | | | | | | | | | Y | | | | | Y | | |
| G5D | Address nitrates and other contaminants | | P | P | P | P | P | P | P | | Y | | | | | | | |
| G6: | Develop and implement a water use plan | | | | | | | P | | | P | Y | Y | Y | P | P | P | P |
| G6A | Identify existing use patterns and develop preferred use areas | | | | | | | P | | | | Y | | Y | Y | P | P | P |
| G6B | Achieve maximum use attainability | | | | | | | P | | | | Y | | Y | P | | | |
| G6C | Coordinate land uses with marine related activities | | | | | | | P | | P | P | P | P | Y | Y | P | P | |
| G6D | Determine use capacities based on public safety and environmental concerns | | | | | | | P | | P | P | P | | Y | Y | | | P |
| G6E | Strengthen marine related activity enforcement | | | | | | | | | | | Y | | Y | | | | |
| G6F | Develop and implement marina design criteria to minimize environmental impacts; promote dry stack storage and boat ramps as potential alternatives | | | | | | | | | P | P | P | P | Y | P | P | P | P |
| G6G | Implement an aggressive program to acquire public access lands | | | | | | | | | | | P | Y | P | | Y | | |
| G6H | Explore financing management strategies with user fees and other innovative methods | | | | | | | | | | | | | P | | Y | | |
| G7: | Establish and implement a shoreline protection program which addresses both natural processes and human activities | | | | Y | | | | | P | Y | P | Y | Y | Y | P | Y | |

| | Tactics to a Cleaner Inland Bays | | | | | | | | | | | | | | | | |
|--|---|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Goals and Objectives (in ranked order) | ED A | AG A | AG B | AG C | AG D | AG E | IMS A | IMS B | LU A | LU B | HP A | HP B | HP C | HP D | HP E | HP F | HP G |
| G9C Develop programs involving senior citizens and other special interest groups | | Y | Y | Y | P | | Y | Y | P | Y | Y | Y | Y | Y | Y | Y | Y |
| G9D Provide education programs statewide | | Y | Y | Y | P | | Y | P | | P | P | P | P | P | P | P | P |
| G9E Emphasize programs in the public schools | | Y | | Y | | | | | | | P | P | P | | P | | |
| G9F Promote education of out-of-state users and visitors | | P | | Y | | | | P | P | P | Y | Y | Y | Y | P | Y | Y |
| G9G Utilize and build on Monitoring Committee (citizens advisory) strategies | | | | Y | | | Y | P | P | Y | Y | Y | Y | Y | P | | |



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