

FINAL Comprehensive Conservation and Management Plan

MAY 2002



PHOTO BY LASZLO SELLY

When the sea is everywhere
from horizon to horizon...
when the salt and blue
fill a circle of horizons...
I swear again how I know
the sea is older than anything else.

--Carl Sandburg, North Atlantic

This document is available on the Barnegat Bay National Estuary Program website:

www.bbep.org

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Treat the earth well;
it was not given to you by your parents,
it was loaned to you by your children.

--Ancient Indian proverb

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BARNEGAT BAY NATIONAL ESTUARY PROGRAM

Mission Statement

In cooperation with our community, the Barnegat Bay National Estuary Program (BBNEP) is committed to action to restore, maintain, protect, and enhance the natural resources of the Barnegat Bay Estuary and contributing watersheds through the 21st century. We are guided by the following principles:

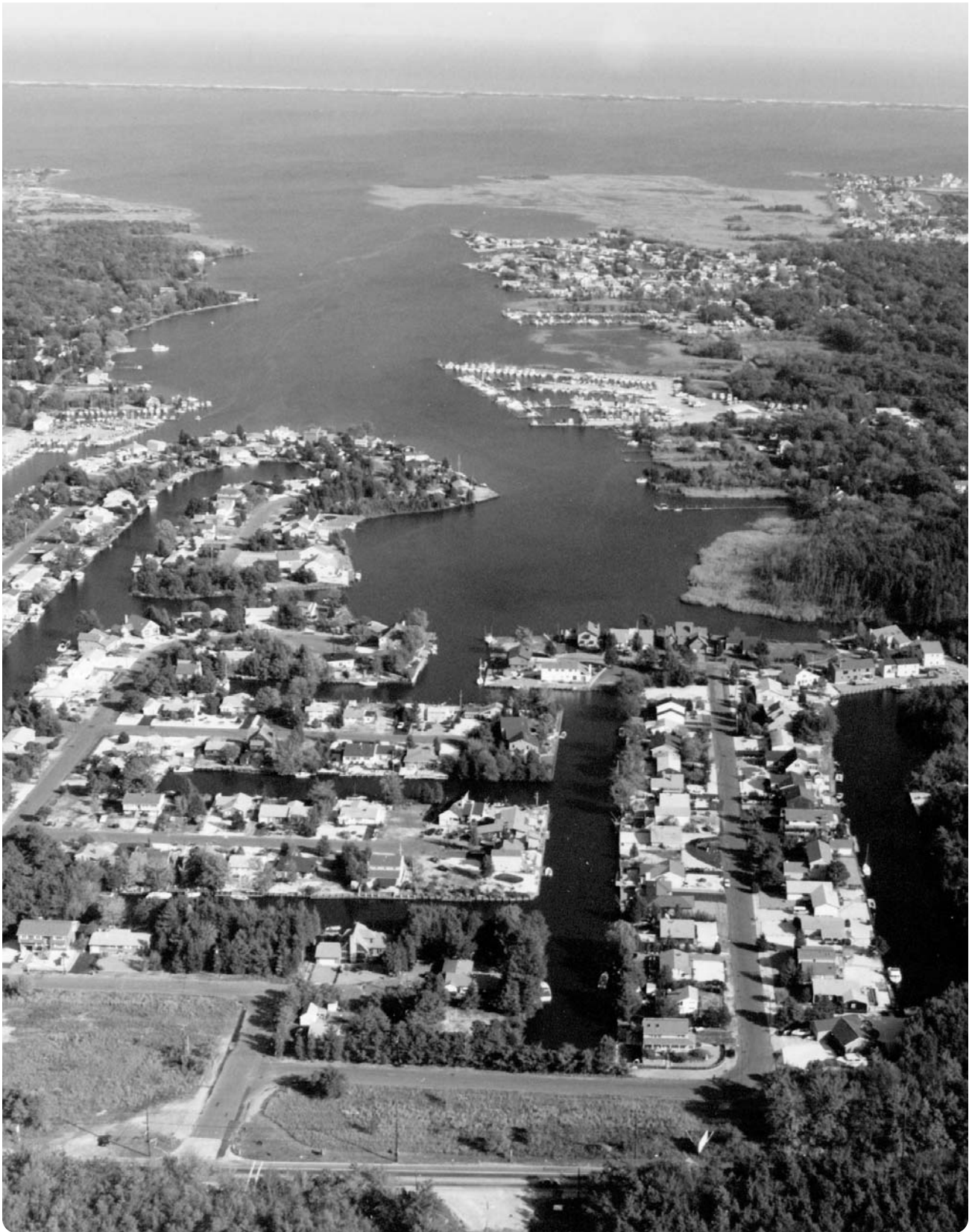
- Encouraging and motivating residents and visitors to maintain an ethic of responsibility for the bay and watershed.
- Educating people about the cultural heritage, historic traditions and natural estuarine resources of the BBNEP region for today.
- Implementing community-based environmental planning for an increased quality of life and economic viability for the region.
- Integrating scientific data to prioritize the focal issues of point and nonpoint sources of pollution, habitat loss/open space, water quality degradation, and the multiple interests in the watershed region.
- Promoting sustainable management of operative efforts of citizens, businesses, local, state, and federal governments and other stakeholders.
- Acknowledging and planning for the rising population and increased uses of ground and surface water.
- Maintaining recreational and commercial fisheries through a healthy watershed.

When we walk upon
Mother Earth, we always plant
our feet carefully because
we know the faces of future
generations are looking up
at us from beneath the
ground.

—Coren Lyons, *Ondaga Nation*



PHOTO: Richard King



Cedar Creek leading into Barnegat Bay. PHOTO BY STUDIO NINE, WARETOWN, NJ

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LIST OF ACRONYMS

ALO.....	Alliance for a Living Ocean
AMNET.....	Ambient Biomonitoring Network
ANJEC.....	Association of New Jersey Environmental Commissions
ANJEE.....	Alliance for NJ Environmental Educators
APDP.....	Action Plan Demonstration Project
BBDBM.....	Barnegat Bay Decoy and Baymen’s Museum
BBNEP.....	Barnegat Bay National Estuary Program
BBPWCTF.....	Barnegat Bay Personal Watercraft Taskforce
BBWA.....	Barnegat Bay Watershed Association
BBWEF.....	Barnegat Bay Watershed and Estuary Foundation
BMP.....	Best Management Practices
CAC.....	Citizen Advisory Committee
CAFRA.....	Coastal Area Facilities Review Act
CCMP.....	Comprehensive Conservation and Management Plan
CEHA.....	County Environmental Health Act
CMP.....	Coastal Management Plan
CPP.....	Continuing Planning Process
CRSSA.....	Center for Remote Sensing & Spatial Analysis, Rutgers University
CVA.....	Clean Vessel Act
CWA.....	Clean Water Act
CWSRF.....	Clean Water State Revolving Fund
CZARA.....	Coastal Zone Act Reauthorization Amendment
CZMA.....	Coastal Zone Management Act
d.....	day
DMUA.....	Dover Township Municipal Utilities Authority
DOH.....	Division of Health
ELC.....	Environmental Learning Center
EMAP.....	Environmental Monitoring & Assessment Program
EMP.....	Environmental Monitoring Plan
EO.....	Executive Order
ERS.....	Ecoregion Reference Station
FMP.....	Fishery Management Plan

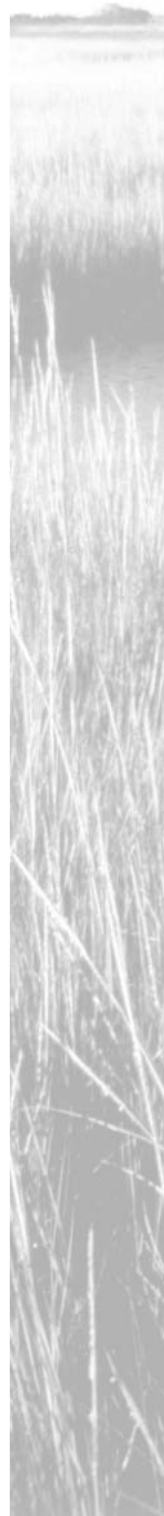


LIST OF ACRONYMS

FREC	Forest Resource Education Center
FTP	File Transfer Protocol
gal	gallon
GIS	Geographic Information System
GPS	Global Positioning System
H*A*S	Home*A*Syst
HSHW	Healthy Soil/Healthy Watershed
IMCS	Institute of Marine and Coastal Sciences
IPM	Integrated Pest Management
JCNERR	Jacques Cousteau National Estuarine Research Reserve
kg	kilograms
l	liter
lb	pound
LGC	Local Government Committee
MAFPE	Mid-Atlantic Federal Partners for the Environment
MARE	Marine Activities Resources and Education
mg	milligram
ml	milliliter
MLUL	Municipal Land Use Law
MOA	Memorandum of Agreement
MSD	Marine Sanitation Device
MTBE	methyl tert-butyl ether
MW	Megawatt
NEMO	Nonpoint Education for Municipal Officials
NEP	National Estuary Program
NEPA	National Environmental Policy Act
NEPPS	National Environmental Performance Partnership System
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJFS	New Jersey Forestry Services
NJMSC	New Jersey Marine Sciences Consortium
NJPDES	New Jersey Pollutant Discharge Elimination System
NJPC	New Jersey Pinelands Commission

LIST OF ACRONYMS

NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NPS	Nonpoint Source Pollution
NRCS	US Department of Agriculture, Natural Resource Conservation Service
NRI	Natural Resources Inventory
NSSP	National Shellfish Sanitation Program
OCADB	Ocean County Agricultural Development Board
OCED	Ocean County Engineering Department
OCHD	Ocean County Health Department
OCNGS	Oyster Creek Nuclear Generating Station
OCPD	Ocean County Planning Department
OCUA	Ocean County Utilities Authority
OCSCD	Ocean County Soil Conservation District
OCVTS	Ocean County Vocational-Technical School
OMWM	Open Marsh Water Management
ONLM	Office of Natural Lands Management
PRM	Potomac-Raritan-Magothy
PSA	Public Service Announcement
PSU	Primary Sampling Units
PWC	personal watercraft
RBP	Rapid Bioassessment Protocol
RCD	Resource Conservation and Development
RCE	Rutgers Cooperative Extension of Ocean County
R-EMAP	Regional Environmental Monitoring & Assessment Program
RISE	Resource Information Serving Everyone
SARA	Superfund Amendments and Reauthorization Act
SAV	submerged aquatic vegetation
SDCG	Sustainable Development Challenge Grant
STAC	Scientific and Technical Advisory Committee
SWAP	Source Water Assessment Program
TMDL	total maximum daily load
TPL	Trust for Public Land



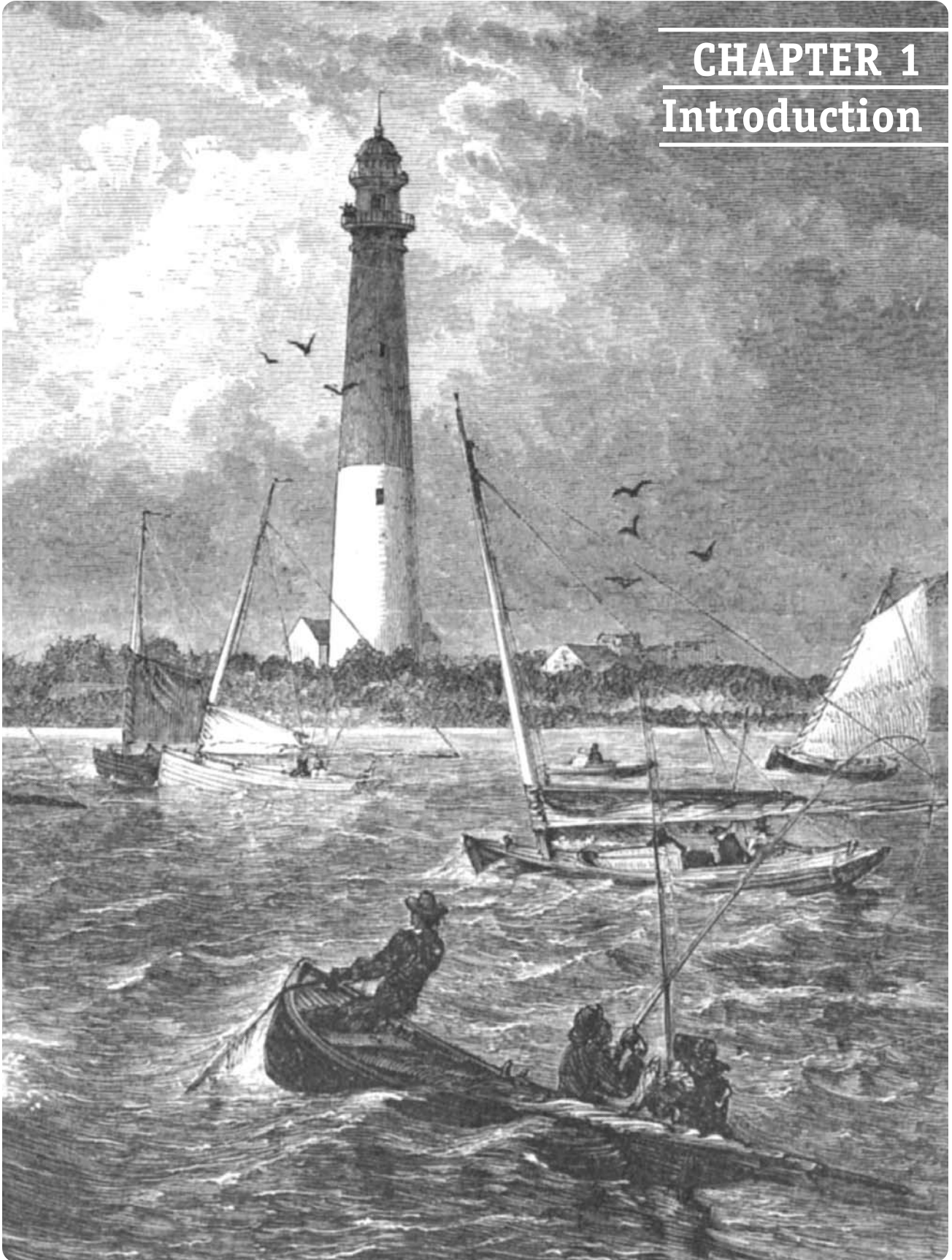
LIST OF ACRONYMS



TSS	total suspended solids
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound
WHIP	Wildlife Habitat Incentives Program
WMP	water management plan
WQM	water quality management
WRAS	Watershed Restoration Action Coalition
YES	Youth Environmental Society
yr	year
µm	micron

CHAPTER 1

Introduction



Fishing off Barnegat Lighthouse, FROM APPLETON'S JOURNAL, 1871

The earth does not belong to us,
we belong to the earth.
We did not weave the web of life;
we are merely a strand in it.
Whatever we do to the web,
we do to ourselves.

--Chief Seattle, 1854

1.1 BARNEGAT BAY

The Barnegat Bay – Little Egg Harbor Estuary is located along the central New Jersey coastline within the Atlantic Coastal Plain physiographic province. Its watershed encompasses most of the 33 municipalities in Ocean County, as well as four municipalities in Monmouth County. Although long recognized for its great aesthetic, economic, and recreational value, this backbay system is now affected by an array of human impacts that potentially threaten its ecological integrity.

Historically, the arrival of European settlers in Ocean County first affected the environment through changes in land use and the creation of colonial industries. As extractive natural resources were depleted, the colonial industries (e.g., lumbering and sawmills, bog iron manufacture, and charcoal manufacture) disappeared. Some people left Ocean County with the demise of the main industries, but the people who remained in the colonial settlements endured and survived by farming, hunting, fishing, and berry harvesting. In the last half of the 19th century, the recreational tourist industry began to expand, and this industry helped to produce the tremendous growth experienced in Ocean County during the last half of the 20th century.

Today, many residents of Ocean County rely upon Barnegat Bay and its resources for the livelihood of their families. Commercial and recreational fishing, tourism, and other water-dependent recreation generate many jobs, as do other industries based in or near the estuary.

1.2 ESTUARIES & WATERSHEDS

1.2.1 ESTUARIES

An estuary is a partially enclosed body of water formed where fresh water from rivers, streams, and groundwater flows to the ocean, mixing with the salty seawater. Although influenced by the winds and tides, an estuary is protected from the full force of ocean waves, winds, and

storms by the barrier islands, or fingers of land, mud, or sand that define an estuary's seaward boundary.

Estuaries come in all shapes and sizes and go by many different names. They are often known as bays, lagoons, harbors, inlets, or sounds. Whatever the name or type, estuaries provide valuable functions. They are among the most productive habitats on earth and are vital spawning, nursery, and feeding grounds for fish and shellfish. They are critical to the survival of tens of thousands of birds, fish, and other wildlife. Many different habitat types are found in and around estuaries, including shallow open waters, freshwater and salt marshes, sandy beaches, mud and sand flats, tidal pools, sea grass beds, and wooded swamps.

The wetlands bordering many estuaries perform valuable functions, including water quality, flood protection and water storage. Many upland areas drain to fresh and salt marshes that act as filters, removing pollutants from runoff. Wetland plants and soils also act as a natural buffer between the land and the ocean, absorbing floodwaters and dissipating storm surges. Salt marsh grasses and other estuarine plants also prevent erosion and stabilize the shoreline.

An estuary is a source of recreational, educational, commercial, and aesthetic value. Boating, fishing, swimming, windsurfing, and bird watching are just a few of the many activities people enjoy in an estuarine area. Estuaries serve as nursery grounds for commercially important fish and shellfish, supporting populations from a much wider range of inshore and offshore waters. They are among the most productive ecosystems in the world, comparable in biomass production to tropical rain forests. They are also home to ports and marinas that support various maritime activities.

INTRODUCTION

1.2.2 WATERSHEDS

A watershed is a geographic land area that drains to a common surface water body. Groundwater recharge areas are also part of a watershed. Because all watersheds are defined by natural hydrology and ultimately drain to coastal waters, they are good focal points for managing coastal resources.

A watershed has several components. It originates at the headwaters of the streams and rivers that ultimately drain into coastal waters. Headwaters include wetlands, which often are adjacent to the flowing waters of rivers or streams. As the streams and rivers flow to coastal waters, they are influenced by land and water uses, such as farming, housing, businesses, recreation, and conservation. Upon reaching the coastal areas, the rivers empty into estuaries. Near-shore waters, the areas directly offshore from the beach, are part of the coastal watershed because they are influenced by the

activities going on along the shoreline and by pollutants coming from the land.

1.2.3 INTERACTIONS

Since a watershed is made up of several components that are interrelated, it is important to remember that what happens on the land affects the water. For example, a river or stream that flows through a residential development can pick up lawn fertilizer and pesticides, pet waste, improperly disposed-of household chemicals, untreated sewage from failing septic tanks, petroleum hydrocarbons from automobiles and runoff from impervious surfaces like parking lots, agricultural operations,

TABLE 1-1. Nonpoint Source Pollutants and Their Impacts

Pollutant Type	Sources	Impacts
Soil	<ul style="list-style-type: none"> • Construction sites • Farms • Exposed Dirt 	<ul style="list-style-type: none"> • Muddy waters that smother bottom-dwelling organisms • Decreased light reaching the sea grass beds • Sediments clog fish gills • Transport to coastal waters of pollutants bound to sediments
Nutrients	<ul style="list-style-type: none"> • Lawn fertilizers • Pet and farm animal waste • Decaying plant material • Failing septic tanks • Atmospheric deposition • Small, inefficient sewage treatment plants 	<ul style="list-style-type: none"> • Excessive growth of algae (microscopic plants) • Decreased light reaching sea grass beds • Oxygen depletion from decay of algae • Some algae (including <i>Pfiesteria piscicida</i> and those causing harmful algal blooms (red tides) can kill fish or shellfish and be harmful or fatal to humans
Toxics	<ul style="list-style-type: none"> • Pesticide from lawns, gardens, farms • Lead, oils, greases from roadways • Industrial plants • Small wastewater treatment plants 	<ul style="list-style-type: none"> • Fish kills • Loss of recreational and commercial uses
Pathogens (microscopic organisms like bacteria and viruses)	<ul style="list-style-type: none"> • Untreated or poorly treated sewage • Pet and farm animal waste 	<ul style="list-style-type: none"> • Fecal coliform bacteria can result in beach closures, shellfish bed closures, fish kills, human health problems

and sediment from construction sites. These pollutants run off the land into nearby streams and storm drains.

Upon reaching the coastal area, streams or rivers can be affected by commercial and recreational boating, discharges from industrial and municipal facilities, and recreational activities on beaches. All of these pollutant discharges, called nonpoint source pollutants, can have an adverse impact on the estuarine resources (Table 1-1).

1.2.4 HUMAN IMPACTS

Estuaries are unique and highly productive waters that are critical to the nation's ecological and economic vitality. Yet, despite their value, almost every estuary in the United States is experiencing tremendous stress from pollution, development, and rapid population growth in coastal cities and counties.

Human activities in the watershed can adversely affect a variety of marine and freshwater resources. Pollutant discharges, as well as structural alterations, can lead to loss of breeding and feeding grounds of fish, other aquatic animals and birds, as well as loss of recreational uses. Both surface and groundwater can serve as a transport mechanism to deliver pollutants to an estuary and its tributaries.

1.3 UNDERSTANDING BARNEGAT BAY

The Barnegat Bay Estuary is a 75-square-mile environmentally sensitive estuarine system, consisting of aquatic vegetation, shellfish beds, finfish habitats, waterfowl nesting grounds, and spectacular vistas. Its 660-square-mile watershed is now home for approximately 500,000 people, a population which more than doubles during the summer season. Municipalities on the barrier islands bordering the bay on the east may experience a ten-fold increase in population. Moreover, the entire watershed has undergone dramatic growth since 1950. During the 1990s the municipalities surrounding the bay reported population expansions that on average exceeded 20 percent. The development accompanying the increasing population growth has resulted in land use changing from

principally undeveloped and agricultural to suburban. Boat traffic, including personal watercraft, has also significantly grown on the bay, raising concerns with respect to both use conflicts and the cumulative impacts on the bay's water quality.

The magnitude and intensity of different land uses in the Barnegat Bay watershed are having significant and often degrading effects. Surface and groundwater quality in the watershed are being degraded by nonpoint sources of pollution. The relationship between land use and water quality and quantity has been clearly established. It is generally recognized that the increase in impervious surfaces associated with development exacerbates this situation by reducing the opportunities for infiltration of water into the ground. Development also impacts the estuary's fisheries and other biological resources through nonpoint source pollution and habitat loss.

It is the cumulative impacts of everyday activities in the Barnegat Bay watershed that are slowly degrading the environmental quality of this sensitive ecosystem. An assessment of the estuary, presented in Chapter Two, indicates that human activities in the watershed and estuary have led to measurable degradation of water quality, destruction of natural habitats, and reduction of living resources in the system.

1.4 THE BARNEGAT BAY NATIONAL ESTUARY PROGRAM (BBNEP)

1.4.1 STATEMENT OF PURPOSE

Barnegat Bay is a productive estuarine resource, rich in native fish and wildlife populations and supporting both recreational and commercial water-dependent activities. The economy of many coastal areas in Ocean County relies on the natural beauty and bounty of the Barnegat Bay Estuary. When those natural resources are imperiled, so are the livelihoods of the many people who live and work along the coast. Therefore, protecting these resources is critical to the future sustainability of the Barnegat Bay area.

INTRODUCTION

1.4.2 BBNEP HISTORY

In response to growing concerns about the impacts that extensive development was imposing on Barnegat Bay, the New Jersey Legislature passed an act in 1987 requiring a study of the nature and extent of the impacts that development was causing on the bay. The Act, P.L. 1987, Chapter 397, created the Barnegat Bay Study Group and mandated a study of the bay and its watershed.

The planning process that resulted from the Barnegat Bay Study Act involved significant coordination and public participation with citizens who live, work, and recreate in the bay area. A citizens advisory group was formed to identify the issues and objectives of most concern to the citizens of the Barnegat Bay watershed and define the focus of the plan. The work of the Study Group resulted in a three-part study of Barnegat Bay:

- *Profile of the Barnegat Bay* was a characterization of conditions and trends in bay water quality, ecosystem vitality, and human activities that rely on or affect the bay.
- *Management Recommendations for the Barnegat Bay* was an assessment of alternatives for managing the bay. It was based on the above publication as well as issues of importance to the public.
- *A Watershed Management Plan for the Bay* defined a multi-objective management approach directed at achieving meaningful and measurable improvements to the quality of life and resources in the bay area.

After release of the third and final report, members of a citizens advisory committee formed the Barnegat Bay Watershed Association (BBWA). This led the Governor of New Jersey to petition the U.S. Environmental Protection Agency (USEPA) to nominate Barnegat Bay into the National Estuary Program (NEP). The USEPA accepted the nomination of the Barnegat Bay Estuary into the NEP on July 6, 1995.

1.4.3 NATIONAL ESTUARY PROGRAM

Congress recognized the importance of preserving and enhancing coastal environments with the establishment of the NEP in the federal Clean Water Act Amendments of 1987. Congress clearly stated that it was in the national

interest to maintain the ecological integrity of estuaries through the long-term planning and management program set forth under Section 320 of the Act.

The purpose of the NEP, which is managed by the USEPA, is to address the many complex issues, including the increase in coastal population and the resulting demands for development that can contribute to the deterioration of the major estuaries in the United States. The program's goals include the protection and improvement of surface and groundwater quality, as well as the protection and enhancement of living resources.

The USEPA is required to identify "nationally significant" estuaries and oversee development of Comprehensive Conservation and Management Plans (CCMP) for each estuary. Governors nominate individual estuaries in their states to the NEP. The USEPA Administrator then reviews the nominations and accepts estuaries into the program on the basis of the following factors:

- The ecological significance of the estuary;
- The biological productivity of the estuary and its contribution to commercial and recreational fish and wildlife resources;
- The impact of commercial, residential, recreational, or industrial activities on the health of the estuary; and
- The degree to which comprehensive planning management may contribute to the ecological integrity of the estuary.

Since its formation, the NEP has expanded from six estuaries to its current list of 28, all of which are now in the process of implementing their management plans.

1.4.4 THE CCMP

The USEPA is required to coordinate the development of CCMPs to restore and protect the ecological health and biological integrity and diversity of the NEP estuaries. The development of a CCMP is a complex process focused on identifying priority problems and their solutions, and maintaining consensus among all stakeholders throughout the process.

The CCMP is built from the results of a number of preliminary planning activities. These include: a base program analysis; technical characterizations of the water quality and environmental resources of the watershed; and a series of pilot projects known as Action Plan/Demonstration Projects.

A CCMP is intended to address all uses affecting the restoration and maintenance of the chemical, physical, and biological integrity of the estuary. The plans include recommended actions on a full range of issues, such as habitat protection, polluted runoff controls, stormwater pollution, resource management, protection of ground and surface water supplies and land-use planning. The challenges will, in some cases, take decades to accomplish. Therefore, a high level of local government and citizen participation is critical in order to maintain long-term community support and commitment to implementation of the actions recommended in the CCMP.

1.4.5 BBNEP STRUCTURE

Shortly after Barnegat Bay's acceptance into the NEP, the USEPA and the State of New Jersey negotiated a Conference Agreement and convened a Management Conference responsible for the development of Barnegat Bay's CCMP. The purpose of the Management Conference is to assure full participation by federal, state, and local agencies, educational institutions, affected industries, various user groups, and the general public. The Management Conference was charged with identifying the environmental problems facing the estuary, recommending interim corrective actions, outlining compliance schedules to address the pollution problems, and ultimately constructing a CCMP that will receive approval of the Governor of New Jersey and the USEPA Administrator.

One of the first responsibilities of the Management Conference was to set up a management structure for developing the CCMP. The following committees were created:

- **Policy Committee** provides overall direction and sets priorities for the BBNEP, defines Management Committee membership, and selects the Program Director. It is comprised of municipal, county, state,

and federal leaders, as well as a member representing the Citizens Action Committee and the Scientific and Technical Advisory Committee.

- **Management Committee** refines the definitions of watershed problems and develops strategies to solve them, provides oversight to the scientific characterization of the watershed, prepares action plans for the CCMP, and plans programs to implement the CCMP. It is comprised of representatives from federal, state, and county agencies and the chairs of the Citizens Advisory Committee, Scientific and Technical Advisory Committee, Local Government Committee, and the BBWA, now the BBWEF.

- **Scientific and Technical Advisory Committee** guides the environmental characterization of the Barnegat Bay watershed and provides oversight of technical activities. It also produces text, provides research recommendations, reviews findings and results, and works to clarify sources of problems and identify practical solutions. It is composed of scientists, engineers, environmental professionals, planners, citizen interest groups, representatives from federal, state, and local governments, and individuals from academia and industry.

- **Citizens Advisory Committee**, drawn from citizen leaders, works to inform the public and develop strategies to involve all citizens in the decision-making process. It develops educational programs and conducts public meetings and forums to solicit public input.

- **Local Government Committee**, represented by the Ocean County Mayor's Association, meets monthly and provides the BBNEP with a forum to interact with Ocean County municipalities.

- **Financial Planning Committee** is represented by state, county, legislative, and private interests with expertise in financial planning, grant making, and fund raising.

1.5 WATERSHED APPROACH

The resources and problems of the Barnegat Bay region were assessed through a scientific characterization describing existing technical data and other relevant information. As discussed in Chapter Two, this characterization indicates that the priority problems in the Barnegat Bay watershed are:

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- Water supply and water quality, including the issues of contaminated stormwater and polluted runoff, nutrient loading, pathogen contamination, groundwater contamination, and future water supply deficits;
- Habitat loss and alteration;
- Fisheries decline; and
- Human activities and competing uses.

The broad scope of environmental issues associated with the Barnegat Bay region and the actions necessary to address them provide an opportunity for watershed-based planning and management. A watershed protection approach has as its premise that many water quality and ecosystem problems are best solved at the watershed level rather than by the political subdivision or through uniform regulatory standards. Major features of a watershed approach are:

- Target priority problems and geographic areas of concern;
- Promote a high-level of stakeholder involvement;
- Use the expertise/authority of multiple agencies; and
- Measure success through monitoring and other data collection.

This approach recognizes the holistic nature of environmental problems in the Barnegat Bay watershed. In other words, the priority problems are intimately linked to one another and share a common cause: population growth and its accompanying development of the watershed.

The BBNEP recognizes that management of individual actions, both on land and on the water, is the only way to prevent cumulative impacts to Barnegat Bay and its watershed. Correction of ongoing problems must receive a high priority if trends in degradation of the watershed's resources are to be reversed. A multi-faceted approach, involving stakeholders from the federal, state, county, municipal, industrial, and private sectors, must commit to working together to ensure the future protection and restoration of the Barnegat Bay watershed and its valuable resources. This will involve control of existing pollution sources and prevention of new sources, as well as protection against depletion of resources necessary to maintain

the future economic and recreational vitality of the communities of Ocean County. The Action Plans in this CCMP outline the actions and commitments that will help assure successful achievement of these goals.

Since the environmental issues in the Barnegat Bay watershed are confined primarily to Ocean County, the 33 municipalities should be prepared to address many of these concerns. The BBNEP is committed to assisting Ocean County and its municipalities in planning and implementing environmental management actions designed to protect and restore the natural resources of the Barnegat Bay watershed. It is recognized that the municipalities continue to have primary authority to establish land-use policy that affects both the type and rate of development.

1.6 VISION FOR THE FUTURE

Many of the activities and processes that occur in the Barnegat Bay Estuary and its watershed are inevitably connected to environmental disturbance and degradation of natural resources. Proper use of management techniques will contribute to the economic and environmental vitality of the Barnegat Bay watershed. Appropriate land and water management practices can be selected to guide short- and long-term activities in the watershed.

The Barnegat Bay CCMP provides an opportunity to make enlightened and informed watershed-based decisions grounded in sound scientific data. The CCMP allows for the development and implementation of specific actions directed towards the protection of the natural resources of Barnegat Bay and its watershed. The challenge is to initiate and maintain public support for future conservation and protection of all Barnegat Bay resources, while recognizing the need to protect the rights of all citizens to use and enjoy the vast resources of the bay and its watershed. The involvement, cooperation, and commitment of all stakeholders are key to the success of the CCMP.

This vision should include participation by all levels of government in coordination with a broad base of stakeholders in the watershed to encourage environmentally sound stewardship of land and water resources. Environmentally sensitive areas need to be protected while ensuring that personal property rights are

STATEMENT OF GOALS

During the last six years, the BBNEP has instituted a public participation effort with citizens and other watershed stakeholders who live, work, and recreate in the bay area. The goals and objectives obtained from this process are:

1. The Barnegat Bay estuary and its watershed will provide a healthy and naturally diverse habitat for fish and wildlife.
2. The natural water cycle will be balanced to: a) protect the quantity and quality of public water supplies; and b) maintain or restore ecological conditions to support living aquatic resources in the estuary and watershed.
3. Water quality in the estuary and watershed will support recreational bathing, direct shellfish harvesting, and the integrity of the freshwater and tidal benthic communities.
4. Municipalities in the watershed will provide public access to waterways or shorelines to support multi-use recreation where appropriate.
5. All citizens and visitors will understand how they influence the natural resources of the estuary, its watershed, and the water cycle within it, and their role in its conservation and improvement.
6. The diverse users of the estuary and watershed will cooperate in the stewardship of the resources.



respected. All citizens of the Barnegat Bay watershed should have adequate access to the bayshore in order to enjoy fishing, picnicking, boating, and other water-based recreation. Those who swim, fish, and enjoy boating should also be able to use the bay with a sense of safety. All residents and visitors to Ocean County need to be made aware of the valuable natural resources of the Barnegat Bay watershed, its sensitive ecosystem, and how they can contribute to protecting and restoring its health. Stewardship of Barnegat Bay and its watershed should become the ethic of each citizen.

1.7 ORGANIZATION OF THE CCMP

This CCMP is a comprehensive environmental management plan for the Barnegat Bay watershed that identifies priority environmental problems and issues of concern, management actions to deal with the priority problems, agencies and organizations responsible for implementing the action plans, resources to carry out implementation, and institutional alternatives. The CCMP will be used by the implementing organizations and stakeholders as a blueprint for long-term actions and measurement of success.

The CCMP is organized as follows:

Chapter One introduces the Barnegat Bay Estuary and the BBNEP.

Chapter Two summarizes the state of the watershed. It addresses biological and hydrological resources, the impacts of human activities on the watershed, and current status and trends.

Chapter Three describes ongoing activities and initiatives that are furthering the goals of the BBNEP.

Chapter Four lays out the framework and strategies for the Action Plans to be implemented. This includes Action Plan objectives, action priorities, and measurable end points.

Chapters Five through Ten describe various action items for each of the priority areas discussed in Chapter 2. These chapters represent the essence of the CCMP, as they describe a systematic approach to reach the BBNEP goals.

Chapter Eleven discusses unfinished agenda addressing issues relating to water quality, habitat and living resources, human activities, monitoring, and future environmental issues and other areas of concern.

Chapter Twelve summarizes the implementation and funding strategies of the CCMP.

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The Appendices contain:

- References;
- Early Action Results and Summaries;
- Public Outreach Early Accomplishments;
- Management Conference Members;
- The Federal Consistency Review;
- Base Program Analysis;
- Public Responsiveness Document; and
- Glossary.

In addition, a comprehensive Characterization Report, which has helped to develop Program priorities and action plans, is a supporting document to this CCMP.

