

---

**CHAPTER 6**

---

**Habitat and**

---

**Living Resources**

---

**Action Plan**

---

*Cutting Mosquito trenches in the salt marsh. PHOTO COURTESY OCEAN COUNTY HISTORICAL SOCIETY.*

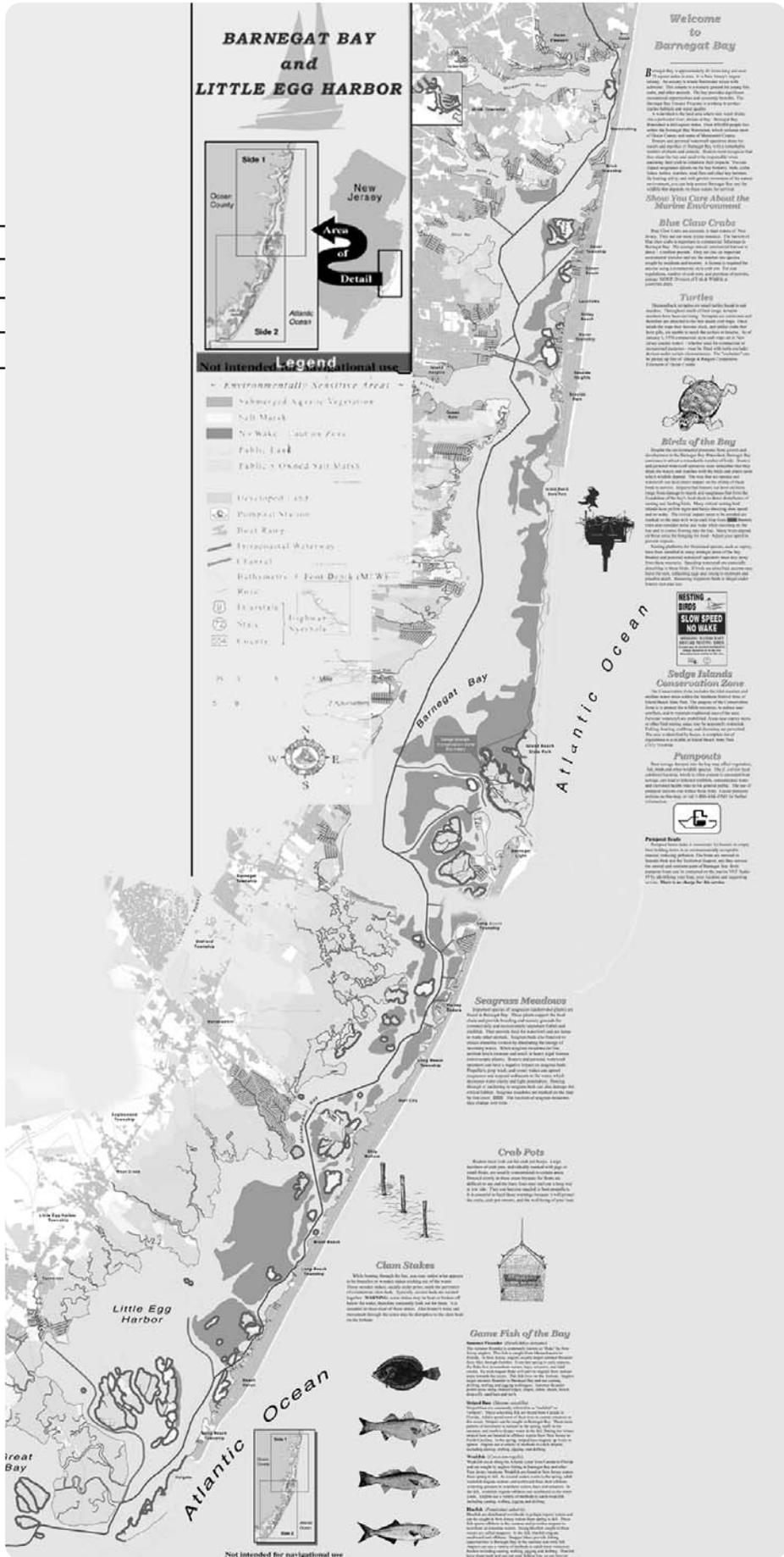
**BARNEGAT  
BAY  
BOATER'S  
GUIDE**

**BARNEGAT BAY  
and  
LITTLE EGG HARBOR**



**Legend**

- Not intended for navigational use
- Environmentally Sensitive Areas
    - Submerged Aquatic Vegetation
    - Salt Marsh
    - No Wake / Caution Zone
    - Public Beach
    - Publicly Owned Salt Marsh
  - Developed Area
  - Pumpout Station
  - Boat Ramp
  - Intermittent Waterway
  - Channel
  - Pathway (Foot Driv. (M.W.))
  - Road
  - Highway
  - State
  - County



**Welcome to Barnegat Bay**

Barnegat Bay is approximately 45 miles long and 10 miles wide. It is a shallow body of water with a maximum depth of 10 feet. The bay is a natural harbor and is a popular destination for boaters. The bay is a natural harbor and is a popular destination for boaters. The bay is a natural harbor and is a popular destination for boaters.

**Blue Claw Crabs**

Blue Claw Crabs are a common sight in Barnegat Bay. They are a large species of crab that is found in the bay. They are a large species of crab that is found in the bay. They are a large species of crab that is found in the bay.

**Turtles**

There are several species of turtles that live in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.

**Birds of the Bay**

There are many species of birds that live in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.

**Sedge Islands Conservation Zone**

The Sedge Islands Conservation Zone is a protected area in Barnegat Bay. It is a protected area in Barnegat Bay. It is a protected area in Barnegat Bay.

**Pumpouts**

Boaters are required to use pumpouts for their sewage. Pumpouts are a common sight in the bay. Pumpouts are a common sight in the bay. Pumpouts are a common sight in the bay.

**Public Boats**

Public boats are a common sight in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.

**Seagrass Meadows**

Seagrass meadows are a common sight in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.

**Crab Pots**

Crab pots are a common sight in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.

**Game Fish of the Bay**

There are many species of game fish that live in Barnegat Bay. They are a common sight in the bay. They are a common sight in the bay. They are a common sight in the bay.



**BBNEP GOALS THAT ARE SUPPORTED THROUGH THIS ACTION PLAN**

**PRIMARY:** The Barnegat Bay Estuary and its watershed will provide a healthy and naturally diverse habitat for fish and shellfish.

**SECONDARY:** 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.

Water quality in the estuary and watershed will support recreational bathing, direct shellfish harvesting, and the integrity of the freshwater and tidal benthic communities.

**6.1 INTRODUCTION**

Increased demands for housing in the Barnegat Bay watershed and a corresponding increased recreational use of Barnegat Bay have had negative impacts on environmentally sensitive natural habitats. Declines in fish and wildlife populations have resulted from fragmentation and loss of habitats and ecosystems, pollution and decreased water quality, and over-exploitation of resources. The same areas that often attract human development also provide essential food, cover, migratory corridors, and breeding/nursery areas for coastal and marine organisms. In addition, these habitats also perform other important functions, such as water quality and flood protection, and water storage.

Ecosystems can be degraded through loss of habitat or through a change or degradation in habitat structure, function, or composition. Threats to habitat in the Barnegat Bay watershed include conversion of open land and forest to residential and commercial development, highway construction, marinas, dredging and filling, and bulkheading. Proper management of public lands, such as the Lakehurst Naval Air Station, is also a concern. Development activities in the watershed result not only in direct loss of habitat, but also in habitat degradation due to increased runoff of sediments, nutrients, and chemicals.

The distribution and abundance of estuarine fish and wildlife depend on factors such as light, turbidity, nutrient availability, temperature, salinity, and habitat, and food availability. Human-induced activities that disturb or change environmental conditions affect the distribution and abundance of estuarine species.

Barnegat Bay has historically supported a major commercial hard clam shellfishery; since 1990, however, there has been a substantial decline in the commercial landings of this species. Landings from 1991 to 1996 dropped approximately 75 percent, to 110 metric tons. A growing fraction of the meat yield in recent years has originated from aquaculture operations and relay and depuration programs, with catch statistics derived from natural beds diminishing dramatically. Overharvesting of hard clam beds, together with the lack of successful recruitment, appears to have contributed to the reduced catch. Barnegat Bay also has supported major commercial and recreational fisheries for winter flounder, American eel, and blue crab, but little recent data exist with which to assess the health of those stocks. There are serious concerns regarding the impact of harvesting and pollution on finfish and benthic communities in the estuary. One of the priority management initiatives for the Barnegat Bay Estuary Program is to

# HABITAT and LIVING RESOURCES ACTION PLAN

design a study to examine this issue. This chapter does not specify individual actions to address the issue of harvestable fishery resources within Barnegat Bay since the data are lacking to support such actions; but it is noted that Action 7.10 does recommend that a shellfish resource survey of the Bay be conducted to examine the possible causes of stock decline in hard shell clams. When implemented, this action would be a first step in the collection of data essential to fisheries management. Assessment data is also necessary for an accurate characterization of the health of other stocks. Additional studies to assess the magnitude of Barnegat Bay fishery resources are necessary for the development of a strategic approach to fisheries management, and will be discussed in Chapter 11.

The continued health and biodiversity of marine and estuarine systems depends on the maintenance of high-quality habitat. The BBNEP has developed specific action items (Table 6-1) to protect habitat and living resources, which are detailed in the following sec-

## BBNEP HABITAT and LIVING RESOURCES

### ACTION PLAN OBJECTIVES

- Maintain on a landscape level the natural environment of the watershed.
- Protect existing habitat categories within the Barnegat Bay watershed to preserve and improve native wildlife populations and regional biodiversity.

TABLE 6-2 and FIGURE 6-1 detail the measures to be used to determine the achievement of these objectives, the programs that will be used for monitoring, and a time chart for the anticipated completion of the action item.

**BBNEP'S  
2002 POSTER:  
"Waterfront  
Residents"**

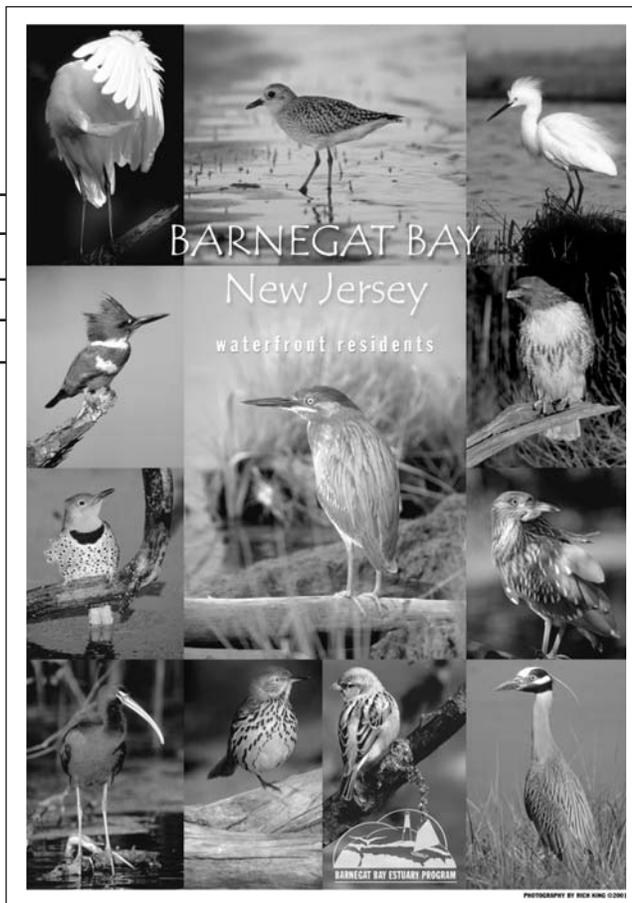


TABLE 6-1. Habitat and Living Resources Action Items.

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
6.1	Protect & improve vegetated buffer zones adjacent to coastal wetlands & freshwater tributaries to maintain continuous riparian corridors, for habitat protection and low-impact recreational pursuits. - PC	H	NJDEP	Ongoing	Enhanced program cost, \$25,000-\$50,000 per year over 5 years	Water Quality/ Water Supply	NJDEP Base Program Funding and Other Sources
6.2	Conduct a Barnegat Bay ecosystem restoration feasibility study. - C	H	USACE & NJDEP	Oct. 10, 1997 - 2003	\$2.5 million		Eligible Federal and State Funding. See Chapter 12
6.3	Control erosion in threatened shoreline areas. - R	L	NJDEP	Upon availability of funds	The costs are site and project dependent; an individual small project may cost \$50,000 - \$150,000		Eligible Federal Funding and Local Cost Share
6.4	Manage tidal wetlands to preserve unditched wetlands & to rehabilitate wetlands that have been ditched or otherwise altered. - R	L	USFWS	Initiation within two years upon availability of funds	\$10,000-\$20,000 per acre of salt marsh		See Chapter 12

Status:  
 R = Recommendation  
 C = Commitment  
 PC = Partial Commitment

Priority:  
 H = High  
 M = Medium  
 L = Low

# HABITAT and LIVING RESOURCES ACTION PLAN

TABLE 6-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
6.5	Maintain intact large blocks of Pinelands habitat within state parks & forests & other publicly owned lands. - R	M	NJDEP	Initiation within two years upon availability of funds. ONLM and NJFS estimate five years for the completion of their recommendation	\$25,000 per year for five years.		Eligible State Funding
6.6	Implement more effective enforcement of current regulations regarding sensitive coastal habitats. - R	M	State & Federal Enforcement Authorities	Within two years of availability of funds	\$50,000 over 2 years	Public Participation & Education	Eligible Federal and State Funding
6.7	Coordinate and integrate management of federal lands for natural habitat values. - R	M	USDOD	Memoranda of Agreement within two years of MAFPE approval	Enhanced program funding, \$50,000 over 2 years		See Chapter 12
6.8	Facilitate partnerships for habitat protection and restoration projects. - C	H	Federal, state and local authorities, and private organizations	Ongoing, with framework developed within two years of CCMP approval	Existing program funds; no additional cost		None Required
6.9	Revise municipal master plans to encourage sub-watershed planning to minimize impervious coverage & maintain natural habitat and landscape values. - PC	H	Local municipalities	Coordinate with municipal master plan review process	\$15,000-\$25,000 per year over 5 years	Water Quality & Water Supply	NJDEP Base Program Funding

Status:  
 R = Recommendation  
 C = Commitment  
 PC = Partial Commitment

Priority:  
 H = High  
 M = Medium  
 L = Low

TABLE 6-1. (continued)

Action Item No.	Action Item Title and Status	Priority	Lead	Tentative Schedule	Approx. Cost	Other Action Plan Supported	Funding Source
6.10	Assess the effectiveness of CAFRA II regulations within the Barnegat Bay Coastal Zone Boundary. - C	H	NJDEP Division of Watershed Management	Assessment within five years after implementation	Completed using base program funding	Water Quality/ Water Supply	NJDEP Base Program Funding
6.11	Identify and manage impaired sub-watersheds through local government cooperation to address water resource issues that cross municipal boundaries. - R	M	USEPA	Implement pilot projects within two years of funding availability	\$50,000 for small plot project	Water Quality/ Water Supply	See Chapter 12
6.12	Develop a cooperative approach among the Pinelands Commission, state parks, state wildlife management areas, state forests, and other state agencies to coordinate watershed protection on state lands. - R	M	NJDEP	Ongoing; implementation within 2 years of CCMP implementation	\$50,000		Eligible State Funding

Status: Priority:

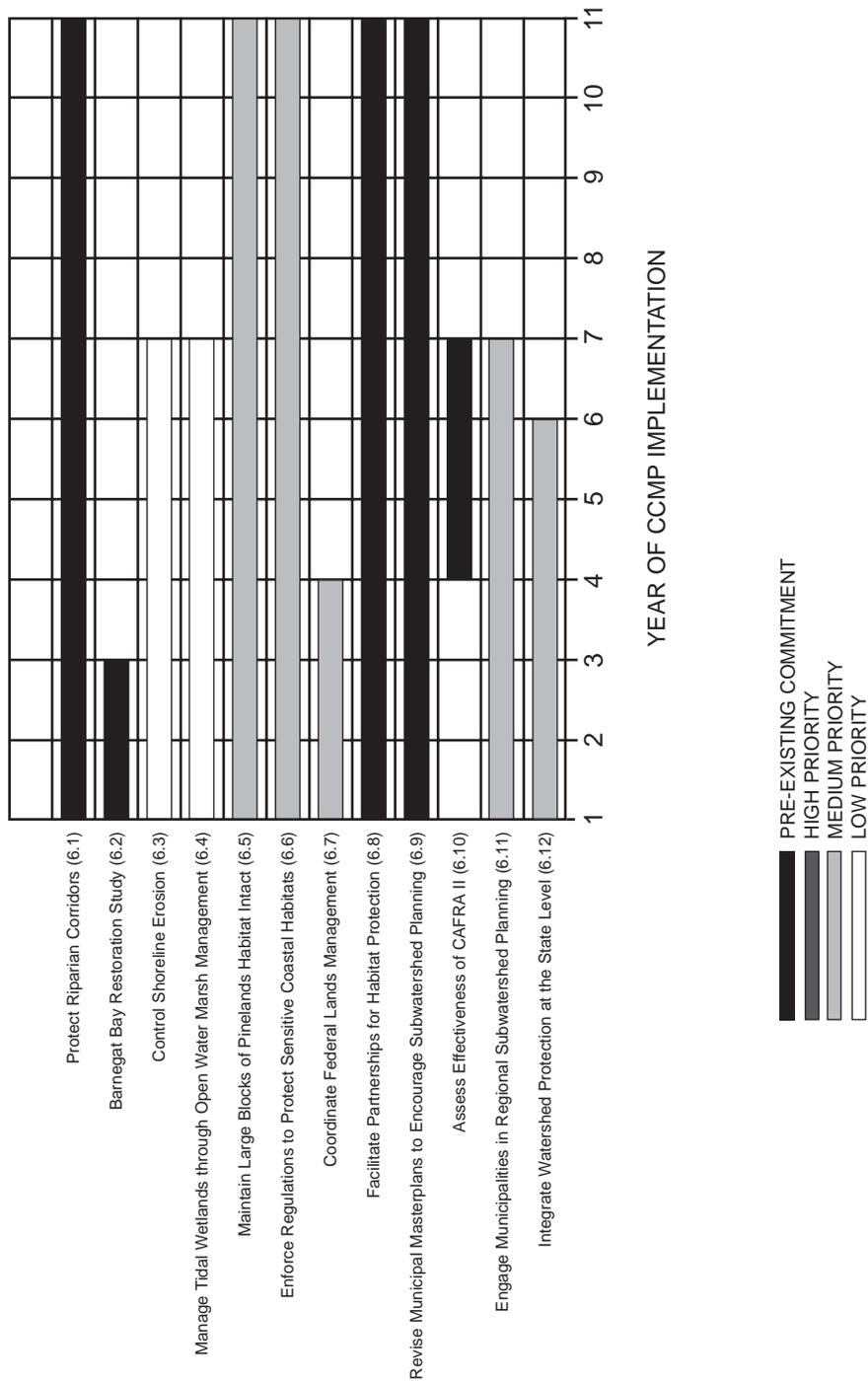
- R = Recommendation
- C = Commitment
- PC = Partial Commitment
- H = High
- M = Medium
- L = Low

# HABITAT and LIVING RESOURCES ACTION PLAN

**TABLE 6-2. Indicators and Monitoring Programs for Measuring Progress Toward Habitat and Living Resources Action Plan Objectives.**

Habitat and Living Resource Objectives of the Barnegat Bay Estuary Program	Environmental Indicators of the BBEP	Monitoring Programs for Indicators
<p>Maintain on a landscape level the natural environment of the watershed.</p>	<p>A measure of success of this objective will be a reduction in the rate of fragmentation of watershed habitats as depicted in Land Use Land Cover maps developed by Rutgers researchers. Historical trends data have been compiled for 1984-1997. Maintaining the functional landscape of watershed habitats will be instrumental to the long-term success of protecting environmental resources and water quality in the Barnegat Bay watershed. A second indicator may be the measure of stream base flow in Barnegat Bay watershed tributaries. Maintaining the natural seasonal flows of freshwater streams will be integral to perpetuating the ecosystem integrity of the Bay, estuary, and watershed.</p>	<p>In order to measure success in protecting the Barnegat Bay landscape, a commitment to updating, on a regular basis, the I and Use/I and Cover maps that have been developed will be secured. Whether through the NJDEP or through research institutions in the State, there is a need to develop a framework for updating land use information and for analyzing it to assess continuing trends within the watershed. Stream flow will be monitored by the USGS's stream flow monitoring network. Under NEPPS, the NJDEP has agreed to monitor trends of forest acreage by watershed.</p>
<p>Protect existing habitat categories within the Barnegat Bay watershed to preserve and improve regional biodiversity.</p>	<p>This objective will be met first by a status and trends analysis of the condition of selected habitat types or wildlife populations within the estuary and watershed. Indicators will be selected during a Program workshop based on existing biological survey data. Ultimately, the measurement of success will be an improving trend in the condition of habitat types.</p>	<p>A framework for status and trends analysis of biological indicators has already been provided by the National Environmental Performance Partnership System, which is a cooperative effort of USEPA and NJDEP. Selection of appropriate indicators for Barnegat Bay trends analysis will be one of the early actions of CCMP implementation. Under the NEPPS agreement between USEPA and NJDEP, the State will monitor the following:</p> <ul style="list-style-type: none"> <li>• Status and Trends in Wetlands Acreage;</li> <li>• Status and Trends of Tree Species Populations, Distribution, Growth Rate and Mortality; and Status of Endangered Plant Species Populations.</li> </ul>

FIGURE 6-1. Habitat and Living Resources Actions.



# HABITAT and LIVING RESOURCES ACTION PLAN

## 6.2 HABITAT AND LIVING RESOURCES ACTION ITEMS

### ACTION 6.1

Protect and improve vegetated buffer zones adjacent to coastal wetlands and freshwater tributaries to maintain continuous riparian corridors for habitat protection and low-impact recreational pursuits.

**SIGNIFICANCE OF ACTION:** Riparian areas have a major impact on water quality by filtering pollutants and reducing stream temperature. They also serve as a transition zone between aquatic and terrestrial habitats. The corridors formed by these riparian buffers help to maintain the integrity of the watershed ecosystem by functioning as continuous habitat links between extensive areas of Pinelands in the interior and coastal wetlands and bayshores. In addition, they offer opportunities for canoeing and other low-impact recreation. Of special note, some headwater areas of the Toms and Metedeconk Rivers support seasonal trout fisheries.

Existing regulatory programs administered by the NJDEP now protect stream channels and wetlands, including designated buffer zones around them, but practices that occurred prior to regulatory review often degraded riparian corridors. A re-examination of the current condition of riparian buffers and the strategic measures necessary to ensure their protection are vital to meeting the goals of water quality and habitat protection within the Barnegat Bay watershed.

**STATUS AND PRIORITY:** Partial Commitment, High Priority.

**WHO:** NJDEP Land Use Regulation Program (Lead), through administration of its Wetlands Law. Other participating agencies include OCSCD, NRCS, N.J. Forest Service (NJFS), and OCPD.

**HOW:** Implementation of this action will entail a two-part effort to identify and rehabilitate degraded riparian buffers and to protect buffer zones that remain intact.

- A. An NJFS model uses soil and stream data to assess areas for riparian improvements. The participating agencies would apply the model and integrate the data with the Natural Resource Inventory (NRI) land use data using GIS technology to prioritize potential sites based on impact and land ownership. The first step will be to select one sub-watershed in which to implement demonstration projects, and follow up with additional sub-watersheds. The OCSCD would participate by working with landowners to implement selected projects using technical and financial assistance incentives.
- B. For areas that will be affected by future development activities, the NJDEP will apply its regulatory authority in combination with appropriate incentive measures to protect streams and wetlands and to maintain the water quality and habitat integrity of riparian buffer zones.

**WHEN:** Ongoing regulatory program. Supplemental rehabilitation actions to commence in 2002.

**WHERE:** Actions to be taken along coastal boundaries and in riparian zones, with a special emphasis on the Metedeconk and Toms River sub-watersheds.

**MEASUREMENT OF EFFECTIVENESS:** The extent of stream corridors with adequate buffers will be measured biannually, and trends in such habitats will be established. Any negative trends should be reversed, and stream segments with adequate buffers should increase by five percent per decade. Loss of existing vegetated stream buffers should be negligible. A program target is to infiltrate 90 percent of the runoff from one- to two-year storms to recharge aquifers and maintain stream base flow.

**COST ESTIMATE:** Enhanced program cost, \$25,000–\$50,000 above base program funding per year over five years.

**FUNDING SOURCES:** Base program funding will support NJDEP regulatory programs. Funding for riparian improvement projects and incentive measures may come from a number of potential sources, identified in Chapter 12, but no firm commitments have been made to date. See Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None currently identified but implementation of incentive measures may require formal agreements between NJDEP and other participating authorities.

### **ACTION 6.2**

Conduct a Barnegat Bay ecosystem restoration feasibility study.

**SIGNIFICANCE OF ACTION:** The purpose of this feasibility study, which is phase two in a two-part U.S. Army Corps of Engineers (USACE) planning process, is to develop various ecosystem restoration projects for the Barnegat Bay estuary. These projects will help preserve and improve habitats for numerous species of plants and animals. The feasibility study will document and provide background data and support for the implementation of future restoration projects. The feasibility study will consider the following areas for restoration: fresh-water wetlands, salt marshes, abandoned lagoons, submerged aquatic vegetation, fisheries habitat, and waterfowl habitat (geese and ducks).

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** The feasibility study is a joint project between the USACE and the NJDEP.

**HOW:** The study began with the formation of a study team to conduct intensive site investigations for fast-track implementation opportunities. Existing conditions were characterized through data collection and structuring, and data have been entered into a comprehensive GIS database as appropriate.

Plan formulation will follow with the identification and screening of potential alternatives, and the evaluation of detailed plans that addresses the documented problems. The purpose of the formulation analysis is to identify plans that are publicly acceptable, implementable, and feasible from environmental, engineering, and socioeconomic standpoints.

By analyzing the alternative solutions in this manner, the solution that best fits the planning objectives and constraints can be formulated in a logical and efficient manner. An incremental analysis will be performed to optimize the solutions. Environmental quality benefits will be determined utilizing the Habitat Evaluation Procedure. When both the USACE and the non-federal sponsor are satisfied with the optimized plan, a draft feasibility report and a draft National Environmental Policy Act (NEPA) document will be produced. After a period of agency and public review, a final report will be issued. If the final report recommends a construction project and funding is in place, the project will proceed to pre-construction, engineering and design, and then construction.

**WHEN:** October 1997 to December 2003. Potential fast-track restoration projects, including fish ladders on coastal tributaries and restoring habitat in deep dredged holes are nearing completion of preliminary planning.

**WHERE:** The feasibility study focuses on the Barnegat Bay, including Little Egg Harbor and adjacent lands.

**MEASUREMENT OF EFFECTIVENESS:** Recommendations for actions contained in the feasibility report will include specific monitoring plans to assess project performance.

**COST ESTIMATE:** \$2.5 million for the feasibility study.

**FUNDING SOURCES:** On September 15, 1995, the U.S. House of Representatives Committee on Transportation and Infrastructure requested that the USACE conduct a study of the Barnegat Bay estuary and surrounding areas to identify possible improvements in ecosystem restoration and protection. The Conference report, which accompanied the Fiscal Year 1998 Energy and Water Development Appropriations Act, contains feasibility phase funds for this project. The Barnegat Bay Ecosystem Restoration Study is budgeted to receive a total of \$1.25 million in federal funds during the study period, which is well under way. Section 105 of the Water Resources Development Act of 1986 specifies the cost-sharing requirements applicable to the study. The State of New Jersey has agreed to provide \$1.25 million

# HUMAN ACTIVITIES and COMPETING USES ACTION PLAN

during the study period, which will serve as the required match.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None currently identified.

## ACTION 6.3

Control erosion in threatened shoreline areas.

**SIGNIFICANCE OF ACTION:** Perturbations in tidal ranges and circulation within the Barnegat Bay have led in some areas to persistent erosion of natural or unstabilized shorelines. This is a problem because up to 75 percent of the Barnegat Bay shoreline has already undergone some level of modification. Since they are integral to the overall health of the estuary, natural shorelines are a resource that needs focused attention.

**STATUS AND PRIORITY:** Recommendation, Low Priority.

**WHO:** NJDEP (Lead). Potential non-federal sponsors (e.g., NJDEP Engineering and Construction Division) can contact the Special Studies Section of the USACE, Philadelphia District, to request federal involvement.

**HOW:** Under Section 103, Rivers and Harbors Act of 1962, as amended, the USACE may construct small beach restoration and protection projects not specifically authorized by Congress. The project must not be dependent on additional improvements for successful completion.



*Each project must meet certain criteria:*

- The project must be complete within itself and not commit the USACE to further construction;
- The project must be economically justified; that is, the benefits must exceed the costs, including project operation and maintenance;
- The project must be environmentally acceptable; and where applicable, will include further consultation with the US Fish and Wildlife Service to accommodate the habitat needs of such shoreline-dwelling species as piping plover and seabeach amaranth;
- The sponsor of the project must be willing to assist with the project by fulfilling non-federal responsibilities, such as providing lands, easements, or rights-of-way, and must agree to operate and maintain the project.

In addition, NJDEP Division of Engineering and Construction staff can work with communities to explore shore protection projects that address erosion in threatened shoreline areas.

**WHEN:** The target date for initiation of action is 2004.

**WHERE:** Projects will be undertaken along actively eroding shorelines within the Barnegat Bay proper.

**MEASUREMENT OF EFFECTIVENESS:** Completed projects will be assessed to determine the extent to which they protect natural shoreline areas threatened by erosion.

**COST ESTIMATE:** The costs are site- and project-dependent; an individual small project may cost between \$50,000 and \$150,000.

**FUNDING SOURCES:** Funds are provided to the USACE annually. Study costs: First \$100,000 – 100 percent federal funds; amount over \$100,000 – 50 percent federal/50 percent non-federal funds. Potential non-federal sources would be state, county, or municipal funding.

**PROJECT COSTS:** 65 percent/35 percent, federal/non-federal; \$2 million maximum federal contribution.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None currently identified.

### **ACTION 6.4**

Manage tidal wetlands to preserve unditched wetlands and to rehabilitate wetlands that have been ditched or otherwise altered (e.g., through Open Marsh Water Management).

**SIGNIFICANCE OF ACTION:** Tidal wetlands are crucial to the biological productivity of Barnegat Bay. Perhaps one-third of the historical wetlands bordering the bay has been lost to human development or alteration. Mosquito ditching and other human alterations have impacted most of the remaining wetlands. Protecting currently unmodified tidal wetlands in Barnegat Bay should be a top priority. Additionally, remedial measures should be taken to restore ditched and other altered tidal wetlands to a more productive condition, while satisfying the need for mosquito control.

**STATUS AND PRIORITY:** Recommendation, Low Priority.

**WHO:** USFWS (Lead), NJDEP, and other authorities with responsibility to manage wetlands acreage.

**HOW:** Open Marsh Water Management (OMWM) is a technique developed to address the concern about nuisance mosquitoes while minimizing adverse impacts to the biological productivity of tidal wetlands. By adopting OMWM as a standard practice, wetlands management authorities can address public concerns about mosquitoes while improving wetlands productivity and value.

**WHEN:** Initiate action by 2003.

**WHERE:** This action will occur in ditched salt marsh areas within the Forsythe National Wildlife Refuge.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness

will be measured by the increase in wetlands under active management that receive more sensitive management treatment, and the growth in the number of acres of unaltered tidal wetlands that are preserved.

**COST ESTIMATE:** \$10,000–\$20,000 per acre of salt marsh.

**FUNDING SOURCES:** No firm commitments. See discussion of potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No formal administrative changes required.

### **ACTION 6.5**

Maintain intact large blocks of Pinelands habitat within state parks and forests and other publicly-owned lands.

**SIGNIFICANCE OF ACTION:** The upland areas of the Barnegat Bay watershed lie primarily in the Pinelands region of the state, which is characterized by high water tables yet drought-like soil conditions due to the sandy nature of the soil. The dominant vegetative type is pitch pine forest; associated species include a wealth of rare, unique, and endangered flora and fauna. The pitch pine forest is maintained by the natural occurrence of wildfires, which perpetuates the open-canopy conditions favored by many of the more unusual species. Human development within this environment leads to fire suppression measures that interrupt the natural fire cycle and lead ultimately to closed-canopy forests and the loss of rare fire-adapted species. Maintenance of large tracts of the native pitch pine forest is essential in order to allow space for some measure of natural or managed fire regeneration that will sustain the native forest and its associated species.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

## HUMAN ACTIVITIES and COMPETING USES ACTION PLAN

**WHO:** NJDEP (Lead), state parks, and state forests; N.J. Pinelands Commission (NJPC), Office of Natural Lands Management (ONLM), NJFS, and TPL.

**HOW:** Using existing authorities, responsible agencies can ensure that their management practices will benefit Pinelands habitats sufficiently to maintain the full complement of rare and local species that are currently found in those habitats.

Much of the information required to identify and manage such large tracts within portions of Ocean County for native forest types and rare species is now available or is under development by staff of the ONLM. Detailed mapping of all vegetation has been completed in the Barnegat Bay watershed south of Cedar Creek. More mapping work is needed northward to the Toms River. Extensive fieldwork has been used to separate pine plains, pitch pine-shrub oak barrens, pine-oak woodland, and pine-oak/oak-pine forest types, each of which has different fire management needs.

Wildfire records from the NJFS have been compiled for Ocean County dating back to the 1920s, but gaps in the fire record and mapping inaccuracies are still being corrected with aerial photography and information from other sources. A database summarizing each fire of this wildfire-prone region has been initiated, and there are plans to digitize all fire perimeters into a GIS and link each record to the database.

**WHEN:** The target date for initiation of action is 2003. ONLM and NJFS estimate five years for the completion of their recommendations.

**WHERE:** This action will occur in the upland and tributary areas of the Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be gauged by the number of areas purchased or improved.

**COST ESTIMATE:** Enhanced program cost for information gathering: \$25,000 per year over five years.

**FUNDING SOURCES:** Potential funding sources include those available to NJDEP on an annual basis. See Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Managing authorities may need to address the maintenance of appropriately sized habitat blocks within their management policies.

### ACTION 6.6

Implement more effective enforcement of current regulations regarding sensitive coastal habitats.

**SIGNIFICANCE OF ACTION:** In the coastal bay, colonial nesting shorebirds and waders are dependent on ever fewer undisturbed sandy islands and coastal thickets for nesting, feeding, and loafing. Federal and state-listed threatened and endangered species are prominent among the populations found within and around the Barnegat Bay region. Human activity on these islands and coastal habitats must be restricted to successfully protect these populations of colonial nesting birds.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** State and federal enforcement authorities.

**HOW:** Improved enforcement and focused public education with regard to illegal trespassing at sensitive sites in the bay are important parts of this effort. A follow-up commitment by enforcement authorities to reduce human disturbance to these habitats will also be necessary. "The Boater's Guide to Barnegat Bay and Little Egg Harbor" serves as a public education tool for this action.

**WHEN:** An enhanced program will be developed within two years, now targeted for 2003, following availability of funds.

**WHERE:** This action will focus on undeveloped islands and coastal habitats in Barnegat Bay.

**MEASUREMENT OF EFFECTIVENESS:** Average annual increases in populations and nesting locations for targeted species will be used to measure the effectiveness of this action.

**COST ESTIMATE:** \$50,000 over two years for staff and other costs.

**FUNDING SOURCES:** Potential funding sources would include available federal and state funding programs.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No new ordinances are anticipated; however, commitment to improve state enforcement of existing regulations is necessary for the effective protection of sensitive nesting sites.

### ACTION 6.7

Coordinate and integrate management of federal lands for natural habitat values.

**SIGNIFICANCE OF ACTION:** Much of the area that lies within the Barnegat Bay watershed is publicly owned at the federal, state, or local level. This places much of the burden for ensuring the continued ecological integrity of the watershed on the public sector. Major federal land holdings are managed by the U.S. Department of Defense (Lakehurst Naval Air Station, Fort Dix Military Reservation) and the USFWS (Forsythe National Wildlife Refuge). In addition, management of the Pinelands National Reserve and the Coastal Heritage Trail are a cooperative effort between the federal government and the State of New Jersey (public and private lands). While these properties have different attributes and are managed under very different mandates, each plays a role in the unique ecological makeup of the Barnegat Bay watershed.

The USFWS areas are primarily coastal marshlands, while the Pinelands and military reservations contain a wealth of sensitive Pinelands habitats, with associated rare and endangered species. Airstrips at the military reservations paradoxically harbor some of the region's few populations of nesting grassland bird species.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** U.S. Department of Defense (USDOD) (Lead), USFWS, National Park Service, USEPA.

**HOW:** The Mid-Atlantic Federal Partners for the Environment (MAFPE), which include each of the

participating agencies in this action, would oversee an effort by resource managers from the agencies to develop a memorandum of agreement or other appropriate vehicle establishing the cooperative management of federal public lands for the protection of natural habitat and resource values within agency mandates. Opportunities to cooperate with state and local land managers should also be explored.

**WHEN:** Memoranda of Agreement within two years of MAFPE approval to be completed by 2003.

**WHERE:** This action would encompass federal land holdings and areas of management authority within the Barnegat Bay watershed (e.g., Forsythe National Wildlife Refuge).

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured by the number of agreements concluded among federal participants and the number of actions taken cooperatively to protect, enhance, and restore habitat quality.

**COST ESTIMATE:** Enhanced program funding, \$50,000 over two years for staff support.

**FUNDING SOURCES:** No firm commitments. The federal partners will need to secure the required funding.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Memoranda of Agreement or other appropriate authority will be needed to ensure that the respective federal agencies cooperate in the conservation and management of natural resources and habitats under their control.

### ACTION 6.8

Facilitate partnerships for habitat protection and restoration projects.

**SIGNIFICANCE OF ACTION:** Cooperative partnerships can be developed between and among land management authorities at various government levels and between government agencies and private organizations. An ongoing arrangement between the State of New Jersey and the TPL resulted in the publication of a report ("The Century Plan") documenting threatened sensitive natural areas,

## HUMAN ACTIVITIES and COMPETING USES ACTION PLAN

and it continues with land acquisition and protection efforts. Additional constructive efforts of this nature should be explored and pursued.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** BBNEP Program Office will facilitate partnerships among federal, state, and local authorities, and private organizations.

**HOW:** Where a funding source has been established, a cooperative approach can be pursued whereby two agencies or an agency and a private organization can join forces to implement effective habitat protection. Often the partners of the agreement bring different capacities that result in accomplishment of goals that may be unattainable by either partner individually.

For example, the ONLM has partnered with natural area superintendents and the NRCS, which provides a cost share on wildlife habitat restoration projects. Projects funded under the NRCS's Wildlife Habitat Incentives Program (WHIP) include limited-scale and demonstration projects for control of invasive plants in State Natural Areas administered by the NJDEP, Division of Parks and Forestry. The ONLM is working with Island Beach State Park to control Asiatic sand sedge on the primary dunes of the Island Beach Southern Natural Area. The BBNEP will facilitate the formation of similar partnerships through the Program office and the Barnegat Bay Watershed & Estuary Foundation.

**WHEN:** Ongoing. New partnerships will be developed within two years of final approval of the CCMP, or by 2003.

**WHERE:** Partnerships will be developed anywhere within the Barnegat Bay watershed.

**MEASUREMENT OF EFFECTIVENESS:** The measure of success will be determined based on the objectives of each individual partnership. Overall, the number of successful partnerships will serve as one measure of effectiveness.

**COST ESTIMATE:** The BBNEP Program Office will act as facilitator using its annual budgeting; no additional costs are anticipated.

**FUNDING SOURCES:** None required

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No regulatory changes are required.

### ACTION 6.9

Revise municipal master plans to encourage sub-watershed planning to minimize impervious coverage and maintain natural habitat and landscape values.

**SIGNIFICANCE OF ACTION:** Municipalities are responsible for planning for growth and development as authorized by the NJ Municipal Land Use Law (MLUL) (*NJSA 40:55D -1, et seq.*) Municipal master plans contain elements allowed by the MLUL that could enhance municipalities' ability to accommodate growth while protecting the natural environment of the Barnegat Bay watershed. These elements include:

- Conservation;
- Historic preservation;
- Stormwater management; and
- Land use (including environmental impacts to wetlands, topographic features, floodplains, and soils).

In order to address more regional issues of watershed protection, however, municipalities need to consider their role in, and contribution to, problems and potential solutions. Future iterations of municipal master plans throughout the entire watershed should incorporate a regional watershed approach.

County planning departments prepare county master plans that serve as guidance for development. The OCPD has a number of resources available to assist municipalities in planning for the protection of natural resource values as regional development continues.

**STATUS AND PRIORITY:** Partial Commitment, High Priority.

**WHO:** Local municipalities (Lead) in Ocean County will individually revise municipal master plans to improve natural resource protection. The OCPD will provide guidance and technical information to municipalities in order to facilitate appropriate changes to local master plans.

**HOW:** The MLUL calls for reassessments of municipal master plans every six years, guided by the respective county master plans. As reviews become due, the municipalities will coordinate with the OCPD to improve natural resource protection in their master plans. During the master plan review process, municipalities should rely on input from their environmental commissions (where applicable), the Coastal Decision Makers Institute, Ocean County Environmental Health Agency, OCPD, Office of State Planning, and the NJPC (where applicable).

**WHEN:** This action should occur during the cross-acceptance review process of the State Development and Re-Development Plan, and during the Municipal Master Plan review process as required by the Municipal Land Use Law. The review schedules for municipal plans are staggered so that the county acts on several plans every year.

**WHERE:** This action is applicable to all municipalities within Ocean County.

**MEASUREMENT OF EFFECTIVENESS:** The effectiveness of this action will be measured in two ways: 1) by the number of municipal master plans that are reviewed and amended over time; and 2) by the natural resource protection afforded by the amended master plans.

**COST ESTIMATE:** Review and revision of municipal master plans will require levels of effort from each municipality that cannot be easily quantified. For the 33 municipalities of Ocean County, an annual supplement totaling \$15,000 to \$25,000 may be required. This will cover the five to six municipalities undergoing review every year, since the reviews are staggered over six years.

County review of municipal master plans is an ongoing effort of the OCPD, and would be conducted through its

base program funding. Guidance and technical support for the municipalities may require additional county effort.

**FUNDING SOURCES:** State support to the county and municipalities may be available through base program operations of the NJDEP.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** No changes are required at the state or county level. This action would entail revisions in municipal master plans.

NJDEP coastal zone management policies guide municipalities working to develop appropriate local ordinances. In addition, model ordinances adopted by some municipalities in the county serve as useful examples for others. Also, under the State Development and Re-Development Plan, the land-use plan of each community is reviewed as part of the cross-acceptance process, which is coordinated by the OCPD.

### ACTION 6.10

Assess the effectiveness of the new Coastal Area Facilities Review Act (CAFRA II) regulations within the Barnegat Bay Coastal Zone Boundary.

**SIGNIFICANCE OF ACTION:** The Coastal Zone Management Program regulates development in the coastal zone and seeks to conserve coastal natural resources. CAFRA II is the most recent revision to the state's program, and the new, revised regulations meant to address shortcomings in the original regulations have only recently been promulgated. Moreover, they help to integrate state guidance, in the form of the NJ State Development and Redevelopment Plan, into the coastal management program. The guidance is designed to direct development and redevelopment towards areas with existing adequate infrastructure and to promote conservation of the state's natural resources.

**STATUS AND PRIORITY:** Commitment, High Priority.

**WHO:** NJDEP, Division of Watershed Management, Land Use Regulation Program (Lead).

## HUMAN ACTIVITIES and COMPETING USES ACTION PLAN

**HOW:** Through administration of the newly revised regulatory program, the NJDEP will be making incremental improvements to the protection of coastal resources. According to standard procedure for Department Rules, the NJDEP will assess the success of limiting the growth in development in the coastal zone, concentrating new development and redevelopment in existing development centers, and restricting the increase in impervious cover in the coastal watershed.

**WHEN:** NJDEP will assess the effects of its new regulatory program five years after the start of implementation, or by 2006.

**WHERE:** This action applies to the CAFRA coastal zone area in New Jersey, including Ocean County and the Barnegat Bay Watershed. Most or all of the 33 municipalities lie, at least in part, within the CAFRA region.

**MEASUREMENT OF EFFECTIVENESS:** A program assessment will be conducted after five years, allowing NJDEP to measure the change in resource protection (area of impervious cover reduced, coastal resources conserved) relative to the increase in coastal development.

**COST ESTIMATE:** This assessment will be completed using base program funding of the NJDEP.

**FUNDING SOURCES:** State funding of NJDEP base programs.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** None—changes have already been effected.

### ACTION 6.11

Identify and manage impaired sub-watersheds through local government cooperation to address water resource issues that cross municipal boundaries.

**SIGNIFICANCE OF ACTION:** Existing regulatory programs help to minimize the environmental impacts of ongoing development, and help to preserve important environmental values. In many cases, however, previous development practices and inconsistencies in municipal land-use plans among neighboring townships and boroughs have led to serious and long-standing adverse impacts to the local environment. To accommodate continued growth within a framework of environmental protection for the Barnegat Bay watershed, previous environmental damage must be addressed and steps must be taken to rectify those abuses. This action also contains a significant water quality component.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** USEPA, Barnegat Bay Watershed and Estuary Foundation (BBWEF), Science and Technical Advisory Committee (STAC), NJDEP, and county and local agencies.

**HOW:** Identify sub-watersheds that lie in more than one local jurisdiction and that suffer from poor water quality, altered hydrology, excessive sedimentation, or other habitat or water quality impairment; determine the appropriate remedial measures to address the impairment; and schedule actions to reduce or eliminate the long-term consequences of the impairment. This action will be supported by the Natural Resources Inventory (Action 5.2).

**WHEN:** Implement two pilot projects within two years upon availability of funds. Schedule appropriate comprehensive remediation measures to be completed within 10 to 20 years.



**WHERE:** Impaired sub-watersheds throughout Ocean County.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured by the increase in the number of waterways meeting water quality standards and the reduction in pollutants reaching the Barnegat Bay.

**COST ESTIMATE:** Approximately \$50,000 for completing a pilot project for a small sub-watershed.

**FUNDING SOURCES:** No firm commitments. See discussion of potential funding sources in Chapter 12, Section 12.8.1.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Responsible agencies will need to make a commitment to address environmental degradation that may lie beyond the reach of regulatory authority. The stimulus to encourage participation might include financial incentives to municipalities or the offer of technical expertise to address locally recognized environmental problems.

### ACTION 6.12

Develop a cooperative approach among the Pinelands Commission, state parks, state wildlife management areas, state forests, and other state agencies to coordinate watershed protection on state lands.

**SIGNIFICANCE OF ACTION:** The State of New Jersey is a large landowner within Ocean County. Tens of thousands of acres of state parks, state forests, and state wildlife management areas are distributed around the county, largely concentrated in the Pinelands region of the inland watershed. Optimal management of these areas for maintaining environmental values would entail a cooperative approach among the various state agencies that oversee these lands.

**STATUS AND PRIORITY:** Recommendation, Medium Priority.

**WHO:** NJDEP (Lead); state parks and state forests; NJDEP, Division of Fish and Wildlife; NJ Pinelands Commission.

**HOW:** Within their existing authorities, responsible state agencies can more actively cooperate to ensure the optimal protection of the natural resource values of these lands. For example, the NJDEP is implementing a plan for the long-term protection of rare species in New Jersey known as the Landscape Project. This effort focuses on the relationships between organisms and their environment, emphasizing the larger region, or landscape, in which these communities exist. This effort recognizes the current weaknesses in long-term preservation of rare species such as fragmentation of habitats and lack of coordinated land management among government agencies. The Division of Fish and Wildlife's Non-Game Program can provide data from the Landscape Project to identify areas for state acquisition.

**WHEN:** Ongoing, with implementation within two years of final approval of the CCMP, or by 2003.

**WHERE:** This action will take place at state-owned management areas throughout Ocean County.

**MEASUREMENT OF EFFECTIVENESS:** Effectiveness will be measured by the number of successful collaborative efforts to foster long-term ecosystem protection.

**COST ESTIMATE:** Approximately \$50,000 for staff support and other costs.

**FUNDING SOURCES:** Potential funding sources would include those available to NJDEP on an annual basis.

**REQUIRED REGULATORY, ORDINANCE, OR POLICY CHANGES:** Policy commitment for cooperation among state land management authorities will be needed.



---

I do not see a delegation of the four-footed.  
I see no seat for the eagles.  
We forget and we consider ourselves superior,  
but we are after all a mere part of Creation.

*—Oren Lyons,  
Faithkeeper of the Turtle Clan of the Onandaga Nation,  
addressing the United Nations assembly*

---