

U.S. Fish & Wildlife Service

**Edwin B. Forsythe  
National Wildlife Refuge**

*Comprehensive  
Conservation Plan  
June 2004*



# Edwin B. Forsythe National Wildlife Refuge



## Comprehensive Conservation Plan

June 2004

Prepared by  
U.S. Fish and Wildlife Service  
Region 5

Division of Planning  
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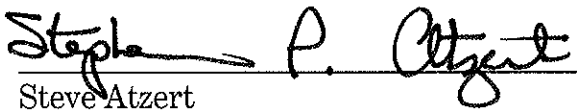
Forsythe National Wildlife Refuge  
P.O. Box 72, Great Creek Road  
Oceanville, NJ 08231

Approved:  \_\_\_\_\_ Date:  \_\_\_\_\_  
Regional Director, Region 5

Implementation of this Comprehensive Conservation Plan and its management actions and programs have been assessed consistent with requirements of the National Environmental Policy Act (42 U.S.C. 4321 et seq.). The Finding of No Significant Impact (FONSI) was signed by Regional Director Mamie Parker on September 30, 2002. Director Steve Williams approved the Land Protection Plan on September 26, 2002. This final printing signifies completion of the administrative record for Edwin B. Forsythe National Wildlife Refuge Comprehensive Conservation Plan.

**Edwin B. Forsythe National Wildlife Refuge  
Comprehensive Conservation Plan Approval  
U.S. Fish and Wildlife Service, Region 5**

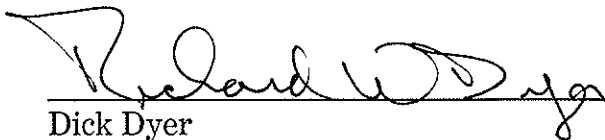
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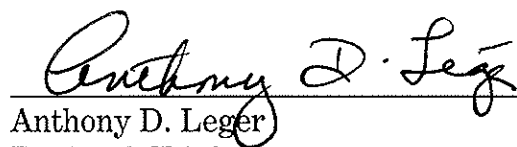
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# Chapter 1. Introduction and Background

## The Purpose of and Need for this Plan

Development of a Comprehensive Conservation Plan (CCP) is vital to the future management of the Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge). The purpose of the CCP is to provide strategic management direction over the next 15 years by:

- a. Providing a clear statement of desired future conditions for habitat, wildlife, visitor services, and facilities;
- b. Providing a clear understanding of the reasons for management actions;
- c. Ensuring Refuge management reflects the policies and goals of the National Wildlife Refuge System (Refuge System) and our other legal mandates;
- d. Ensuring the compatibility of current and future public use;
- e. Providing long-term continuity and direction for Refuge management;
- f. Providing direction for staffing, operations, maintenance, and the development of budget requests.

The need to develop a CCP is two-fold. First, the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act) requires that all National Wildlife Refuges have a CCP in place within 15 years to help fulfill the new mission of the Refuge System.

Second, there is currently no master plan establishing priorities and ensuring consistent and integrated management for Forsythe Refuge. A vision statement and goals, objectives, and management strategies are needed to effectively manage natural resources. Persistent issues related to non-wildlife dependent public use, beach access, wilderness management, and management for threatened and endangered species must be resolved with public and partner involvement.

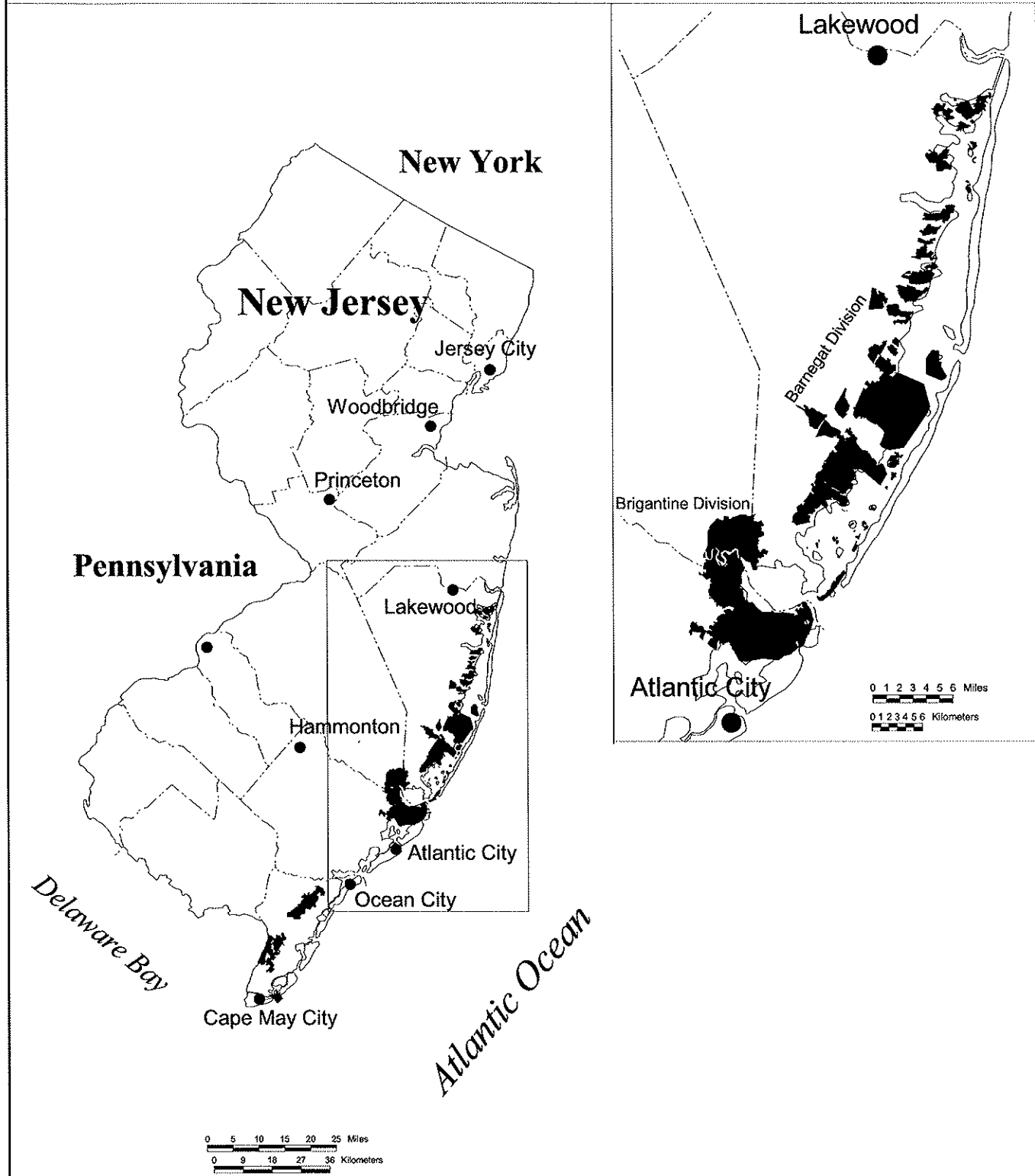
## Forsythe Refuge

Forsythe Refuge is located in Atlantic, Burlington, and Ocean Counties, and consists of two divisions: the Brigantine Division and the Barnegat Division. (See Map 1.) The Refuge extends along more than 50 miles of the coast. This Refuge was renamed in 1984 in memory of the late conservationist Congressman from New Jersey, Edwin B. Forsythe, through a Congressional Joint Resolution (H.J. Res. 537). The resolution combined the Brigantine National Wildlife Refuge and the Barnegat National Wildlife Refuge. Those Refuges were established in 1939 and 1967, respectively, under provisions of the Migratory Bird Conservation Act. The Reedy Creek Unit was established in 1991, and is administered as part of Barnegat Division. The approved acquisition boundary of the Refuge encompasses more than 56,600 acres. As of September 30, 1999, the Service owned or leased 44,302 acres within the approved Refuge acquisition area.

Refuge wetlands are designated as Wetlands of International Importance under the Ramsar Convention. There are only 17 designated Wetlands of International Importance in the United States. Refuge lands and waters provide important resting and feeding habitat for tens of thousands of ducks and geese, wading birds, and shorebirds during their spring and fall migrations.



# Edwin B. Forsythe National Wildlife Refuge



Data Sources:  
USGS 1:100,000 counties.  
USFWS refuge boundaries.

Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
January 2001.  
This map is for planning purposes only

Shading represents both owned land  
and areas approved for acquisition.



Congress designated 6,600 acres of the Refuge as the Brigantine Wilderness on January 3, 1975 (P.L. 93-632) to be managed under the Wilderness Act of 1964 (78 Stat. 890; 16 U.S.C. 1121 (note), 1131-1136). Map 2 shows the Refuge Wilderness Areas. This designation has far-ranging impacts on the management of these portions of the Refuge.

## Purposes of Forsythe Refuge

Lands within the Refuge System are acquired and managed under a variety of authorities. These authorities usually have one or more purposes for which land can be transferred or acquired. Appendix A lists the authorities for acquisition and management of National Wildlife Refuges.

The purposes of Forsythe Refuge are:

- For lands acquired under the Migratory Bird Conservation Act (16 U.S.C. §715-715r), as amended, "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds...." (16 U.S.C. §715d);
- "...the development, advancement, management, conservation, and protection of fish and wildlife resources...." Fish and Wildlife Act of 1956 (16 U.S.C. §742f(a)(4));
- "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations (regarding migratory birds)... " Emergency Wetlands Resources Act of 1986 (16 U.S.C. §3901(b), 100 Stat. 3583);
- "...to secure for the American people of present and future generations the benefits of an enduring resource of wilderness." The Wilderness Act of 1964 (78 Stat. 890;16 U.S.C. 1121 (note), 1131-1136).

## Refuge Vision

The following statement was developed to describe the desired future status of Forsythe Refuge.

*"Edwin B. Forsythe Refuge will continue to contain some of the most important migratory bird habitat in the National Wildlife Refuge System. It will continue to be a focal point for the protection, management, restoration, and enjoyment of migratory birds and other Federal Trust Resources in coastal New Jersey. The Refuge will provide a true wilderness experience on pristine barrier islands and salt marshes, that are premiere examples of these ecological communities and untrammled by man. It will also provide stop-over and wintering habitats of sufficient size and quality to assist in maintaining migrating birds on the Atlantic Flyway.*

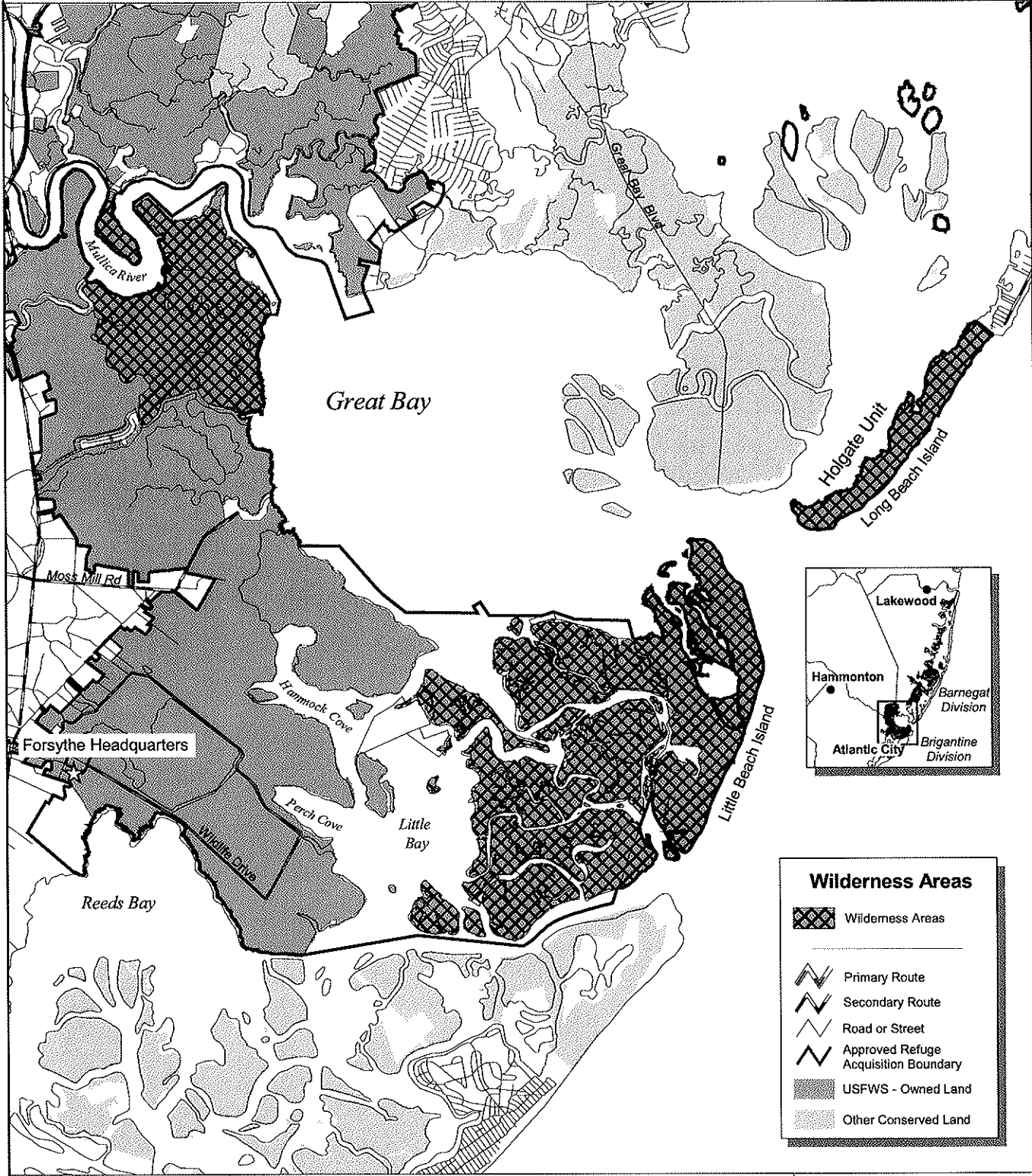
*The Refuge will expand its role in land protection efforts by acquiring additional habitat along the coast and inland watersheds, and working with all interested parties to promote conservation efforts on non-refuge lands. The Refuge will preserve important plant and animal populations, ecological communities, and the integrity of the landscape by protecting lands from development, restoring fire to the upland habitats, and restoring wetlands. It will play a critical role in preserving biodiversity locally, regionally and within the Refuge System.*

*The Refuge will build alliances with State, county and local governments, other organizations and local communities to promote the ecological integrity of the landscape, ecotourism and the historical*

# Brigantine National Wilderness Area

## *Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
 USFWS - refuge boundaries &  
 other refuge information.  
 Map prepared for Jersey Coast Refuges  
 Comprehensive Conservation Plan,  
 January 2001.  
 Not to be used for legal or other purposes.



*and cultural attractions of the region. The Refuge will provide wildlife-dependent recreational opportunities for hunting, fishing, wildlife observation and photography, environmental education and interpretation on Refuge lands. The Refuge will help assure the sustainable economic viability of the area, and supplement and promote the values which attracted people and wildlife to the Jersey Shore in the first place."*

## **National and Regional Mandates**

This section presents hierarchically, from the national-level to the local-level, highlights of legal mandates, Service policy, and existing resource plans which directly influenced development of this CCP.

### **The U.S. Fish and Wildlife Service and its Mission**

National Wildlife Refuges are managed by the Service, part of the Department of the Interior. The mission of the Service is:

*"...working with others, to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people."*

National resources entrusted to the Service for conservation and protection are: migratory birds, endangered species, interjurisdictional fish, wetlands, and certain marine mammals. The Service also manages the Refuge System and national fish hatcheries, enforces federal wildlife laws and international treaties on importing and exporting wildlife, assists with state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

### **The National Wildlife Refuge System and its Mission**

The Refuge System is the world's largest collection of lands and waters set aside specifically for the conservation of wildlife and ecosystem protection. Over 520 National Wildlife Refuges are part of the national network today. Refuges occur in every state and a number of U.S. Territories, encompassing over 92 million acres nationwide. Over 34 million visitors annually hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretive activities on Refuges.

In 1997, the National Wildlife Refuge System Improvement Act (Refuge Improvement Act) was passed. This legislation established a unifying mission for the Refuge System, a new process for determining compatible activities on Refuges, and the requirement to prepare CCPs for each Refuge. The Act states that above all else, wildlife comes first in the National Wildlife Refuge System. The Act does this by establishing that wildlife conservation is the principal mission of the Refuge System; by requiring that we maintain the biological integrity, diversity, and environmental health of each refuge and the Refuge System; and by mandating that we monitor the status and trends of fish, wildlife, and plants on each refuge. The Act further states that the national mission, coupled with the purpose(s) for which each Refuge was established, will provide the principal management direction for each Refuge.

The mission of the Refuge System is:

*"...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57)*

The Refuge Improvement Act declares that all existing or proposed public uses must be "compatible" with the purposes for which each refuge was established. Six wildlife-dependent public uses were highlighted in the legislation as priorities to evaluate in CCPs. The six uses are: hunting, fishing, wildlife observation and photography, environmental education and interpretation. "Compatibility" is determined by the Refuge Manager after evaluating the activities' potential impact on Refuge resources.

### **The Wilderness Act**

The Wilderness Act mandates that certain federal lands be maintained in a natural, undeveloped state in order to "preserve for the American people of present and future generations the benefits of an enduring resource of wilderness." The Act instructs federal agencies to manage Wilderness Areas in a manner which "preserves the wilderness character of the area," and provides "outstanding opportunities for solitude, primitive and unconfined recreation." In 1975, Congress designated 6,600 acres on Forsythe Refuge as the Brigantine National Wilderness Area. (See Map 2 on page 4.)

### **Other Legal and Policy Mandates**

While the Refuge System Mission and the purposes for which each refuge was established provide the foundation for management, National Wildlife Refuges are also governed by other federal laws, executive orders, treaties, interstate compacts, and regulations pertaining to the conservation and protection of natural and cultural resources. Appendix A provides a summary of some of the most important federal laws related to management of National Wildlife Refuges.

Service policies providing guidance on planning and the day-to-day management of a Refuge are contained within the Refuge System Manual and the Service Manual.

### **Fulfilling the Promise, The National Wildlife Refuge System: Visions for Wildlife and Habitat, People, and Leadership**

This report (USFWS, March 1999) resulted from the first-ever Refuge System Conference held in Keystone, Colorado in October 1998, and attended by every Refuge manager in the country, other Service employees, and leading conservation organizations. The report contains 42 recommendations dealing with Wildlife and Habitat, People, and Leadership. This CCP deals with all three of these major topics, and we have looked to the 42 recommendations for guidance throughout its preparation.

### **North American Waterfowl Management Plan: Atlantic Coast Joint Venture**

This Plan (USFWS, 1986) documents the strategy among the United States, Canada, and Mexico to restore waterfowl populations through habitat protection, restoration, and enhancement. The Plan includes ten regional habitat "Joint Ventures" that are partnerships involving federal, state and provincial governments, tribal nations, local businesses, conservation organizations, and individual citizens. Forsythe Refuge lies within the Atlantic Coast Joint Venture. Seven focus areas, totaling more than 90,400 acres, have been identified for protection in New Jersey. Both wetlands and adjacent uplands are part of the focus areas. The 23,400 acre Brigantine-Barneget Wetlands focus area is within the Forsythe Refuge.

The goal for the Atlantic Coast Joint Venture is:

*"Protect and manage priority wetland habitats for migration, wintering, and production of waterfowl, with special consideration to black ducks, and to benefit other wildlife in the joint venture area."*

In addition to the ten regional habitat joint ventures, there are two species joint ventures: Arctic Goose and Black Duck. Since black ducks winter in New Jersey, the goals and objectives of the Black Duck Joint Venture apply to management of the Forsythe Refuge. The coastal salt marsh habitats along the mid-upper Atlantic coast have been identified by the Black Duck Joint Venture as the most important habitat for wintering black duck.

### **Partners In Flight Land Bird Conservation Plan: Mid-Atlantic Coastal Plain (Physiographic Area #44)**

The Partners in Flight Program is developing a plan for the Mid-Atlantic Coastal Plain Physiographic Area (USFWS, April 1999). Habitat loss, land bird population trends, and vulnerability of species and habitats to threats are all factors used in the priority ranking of species. Further, the plan will identify focal species for each habitat type from which population and habitat objectives and conservation actions will be determined. This list of focal species, objectives and conservation actions will help direct land bird management on Forsythe Refuge.

The draft plan ranks species and habitats on the basis of overall conservation priority. The following first tier priority land birds breed on the Refuge:

- piping plover;
- salt marsh sharp-tailed sparrow;
- seaside sparrow;
- American black duck;
- eastern wood-pewee;
- clapper rail;
- American oystercatcher.

The first-tier is "high overall (global) priority," which indicates high vulnerability of a species throughout its range.

Furthermore, more than 15 additional second-tier priority land birds breed on Forsythe Refuge. The second-tier is "high physiographic area priority."

Also, seven of the eight priority habitat types identified in the plan are found currently or historically on the Refuge:

- pine savannah;
- barrier and bay islands;
- salt marsh;
- forested wetland;
- mixed upland forest;

- early succession old field and shrub/scrub;
- fresh/brackish emergent wetland.

## **Regional Wetlands Concept Plan - Emergency Wetlands Resources Act, Northeast Region**

In 1986, Congress enacted the Emergency Wetlands Resources Act to promote the conservation of our nation's wetlands. The Act directed the Department of the Interior to develop a National Wetlands Priority Conservation Plan identifying the location and types of wetlands that should receive priority attention for acquisition by federal and state agencies using Land and Water Conservation Fund appropriations. In 1990, the Service's Northeast Region completed a Regional Wetlands Concept Plan (USFWS, October 1990) to provide more specific information about wetlands resources in the Northeast. The Regional Plan identifies a total of 850 wetland sites that warrant consideration for acquisition, and also identifies wetland values, functions, and potential threats for each site. The Plan identifies three sites within Forsythe Refuge: Brigantine/Barnegat Wetlands, Manahawkin Lake, and Reedy Creek.

### **Trust for Public Land Century Plan**

The Trust for Public Land is a national nonprofit conservation organization dedicated to preserving land of recreational, ecological, and cultural value for public enjoyment. Its primary mission is to protect open space for public benefit. The Trust's Barnegat Bay Initiative is a long-term protection strategy involving land acquisition, public education and scientific research on the regions remaining outstanding natural resources. Its goal is to collaborate with other non-profit and civic groups and local, state and federal government agencies to establish a powerful and united coalition working to preserve the Barnegat Bay watershed. Barnegat Bay is within the National Estuary Program

The Century Plan (Trust for Public Lands, 1995) is a guide for future action to preserve the Barnegat Bay watershed in Ocean County, New Jersey and heighten public awareness about the Bay's landscape and ecological importance. It lists 100 unique conservation and public access sites that are of long-term importance to protecting the Bay as an ecosystem and treasured public resource. Of the 100 sites, approximately 50 percent are currently partially or totally within the approved acquisition boundary for the Forsythe Refuge.

## **Relevant Ecosystem and Species Recovery Plans**

Throughout the last decade, the Service has been putting more emphasis into defining and protecting entire ecosystems. To this end, the Service has initiated new partnerships with private landowners, state and federal agencies, corporations, conservation groups, and volunteers. Implementing an Ecosystem Approach to Fish and Wildlife Conservation is a top national priority for the Service. Fifty-two Ecosystem teams were formed across the country, typically using large river watersheds to define ecosystems. Individual Ecosystem Teams are comprised of both the Service and our partners, who work together to develop goals and priorities for research and management.

Forsythe Refuge lies within the Hudson River/New York Bight Ecosystem.

### **Hudson River/New York Bight Ecosystem Plan**

The following resource priorities from this plan (USFWS, September 1994) are relevant to Forsythe Refuge:

- Protect and restore migratory birds, threatened and endangered species, and species of special concern associated with native grasslands and forest habitats.
- Protect, restore and enhance populations of beach-dependent plants and animals, with emphasis on threatened and endangered species, and species of special concern.
- Increase populations of colonial nesting water birds, shorebirds, waterfowl, and inter-jurisdictional fish requiring shallow water, salt marshes, adjacent uplands, and coastal lagoons and rivers.

### **Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan**

The primary objective of the revised recovery plan (USFWS, May 1996) is to remove the Atlantic coast piping plover population from the List of Endangered and Threatened Wildlife and Plants by:

- Achieving well-distributed increases in numbers and productivity of breeding pairs;
- Providing for long-term protection of breeding and wintering plovers and their habitat.

The Revised Recovery Plan describes detailed "Recovery Tasks" needed to meet the recovery objective. Forsythe Refuge is specifically mentioned in the following task:

- Monitoring to identify limiting factors;
- Control of feral animals and predators;
- Erect exclosures for protection from predators.

### **Northeastern Beach Tiger Beetle (*Cincindela dorsalis dorsalis*), Recovery Plan**

The recovery objective of this plan (USFWS, September 1994) is to remove the Northeastern Beach Tiger Beetle from the List of Endangered and Threatened Wildlife and Plants.

Recovery for the Northeastern beach tiger beetle will require reestablishing the species across its former range along the Atlantic Coast and protecting it within the Chesapeake Bay region. The Plan describes the Holgate Unit as part of the Northeastern beach tiger beetle historical range, and as having "medium restoration potential". According to the Plan, the Holgate Unit would be an excellent restoration site, if off-road vehicles were prohibited from the intertidal zone.

### **Recovery Plans for Other Federally Listed or Recovered Threatened or Endangered Species**

Where the following federally listed threatened or endangered species occur on Forsythe Refuge, we will follow the management goals and strategies laid out in their respective recovery plans: peregrine falcon, bald eagle, seabeach amaranth, and swamp pink. This list will change as new species are listed, delisted, or discovered on Refuge lands.



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## Chapter 2. Planning Process

### The Comprehensive Conservation Planning Process

The effort to prepare a Comprehensive Conservation Plan (CCP) for Forsythe Refuge began in the summer of 1996. It was part of a joint effort including both Forsythe and Cape May National Wildlife Refuges, collectively known as the Jersey Coast Refuges. The Service's action followed President Clinton's signing of Executive Order 12996, on the Management and General Public Use of the National Wildlife Refuge System. In recognition of the Order's four guiding principles, the Service focused its planning efforts on:

- Conserving and enhancing the quality and diversity of fish and wildlife habitat within the Refuges;
- Providing opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife-observation and photography, environmental education and interpretation;
- Establishing partnerships with other Federal agencies, State agencies, tribes, organizations, industry and the general public;
- Increasing opportunities for public involvement in the planning of refuge land protection and management activities.

This effort continued and was enhanced following passage of the Refuge Improvement Act in 1997. The Act states that the Service shall:

- Propose a CCP for each refuge or related complex of refuges;
- Publish a notice of opportunity for public comment in the Federal Register on each proposed CCP;
- Issue a final CCP for each refuge consistent with the provisions of this Act and, to the extent practicable, consistent with fish and wildlife conservation plans of the State in which the refuge is located;
- Not less frequently than 15 years after the date of issuance of a CCP, and every 15 years thereafter, revise the CCP as may be necessary.

Initially, we focused on collecting information on natural resources and public use. In addition, we developed a vision statement and preliminary goals for the Jersey Coast Refuges, as well as the preliminary issues to be addressed in this planning effort. A mailing list of organizations and individuals was also compiled to insure that we were contacting a wide array of interested publics.

In November and December 1996 we held a series of 11 public scoping meetings in:

- Ocean County--the Townships of Brick, Dover, Lacey, Stafford, and the Boroughs of Long Beach and Tuckerton;
- Atlantic County--the Township of Galloway;
- Cape May County--the Townships of Upper, Dennis, Middle, and Lower.

We announced the location, dates, and times for these meetings in local newspapers and through special mailings. We also briefed local members of Congress on the upcoming meetings. More than 280 people attended the meetings, which were held to let people know what the Service was doing to manage the Jersey Coast Refuges, and to elicit their input on topics of interest to them.

We also distributed an "Issues Workbook" to help collect the public's ideas, concerns, and suggestions on important issues associated with managing the Jersey Coast Refuges. We distributed the workbook to everyone on our mailing list, those who attended the public meetings, and anyone who subsequently requested one. Nearly 1,000 copies were distributed. Through the workbook, we asked for public input on the issues and possible action options, the things people valued most about the New Jersey coast, their vision for the future, and the Service's role in helping to conserve, protect, and enhance fish and wildlife and their habitats. More than 150 copies of the workbook were completed and returned.

In February 1997 we distributed a "Planning Update" which summarized the responses received in the "Issues Workbook". Responses from the workbooks and meetings were influential in helping us formulate the issues related to resource protection and public use.

In April 1997 we also held an Alternatives Workshop. Twenty-five individuals, representing local and State conservation agencies and organizations, participated in the daylong workshop. The participants reviewed and discussed the issues and concerns identified in the "Issues Workbook" and were asked to answer three questions:

- 1) What should be done?
- 2) Where should it be done?
- 3) Who should help the Service do it?

Input obtained from the public meetings, workbooks and workshop was used to identify a reasonable range of alternatives and prepare a Draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) in compliance with the National Environmental policy Act of 1969 (NEPA). This Draft CCP/EA was released for 45 days of public review and comment in May 1999. Over 200 people attended the three public meetings held in July 1999 at the following locations: Middle Township Municipal Building in Cape May County; Galloway Township Library in Atlantic County; and Stafford Township Municipal Building in Ocean County.

We also received over 1,600 individual comment letters. There were a great many duplicate comments received, since many people sent copies to both the Forsythe Refuge headquarters in Oceanville, New Jersey and our Regional Office in Hadley, Massachusetts. A summary of the public comments received and the disposition of the concerns expressed in those comments can be found in Appendix B. This summary also notes where we have changed the draft CCP/EA or why we did not make such changes.

On July 2, 2000 a Revised Draft CCP/EA for the Jersey Coast Refuges was released for 30 days of public review and comment. A formal public hearing was held July 19, at the Absegami High School in Galloway Township, Atlantic County, New Jersey. Some 80 people were in attendance. The majority of the speakers, including a legislative staff member representing Congressman Jim Saxton, were opposed to the proposed year-round beach closure to motor vehicles at the Holgate Unit of Forsythe Refuge. Most also spoke in opposition to the proposed seasonal beach closure at the Two Mile Beach Unit of Cape May National Wildlife Refuge.

During the comment period we received over 1,700 written comments. Of these, 1,159 opposed and 543 supported the proposed beach closures. Many of the latter comments also urged that we petition the State

Tidelands Council to close the State owned intertidal area (i.e., the lands below the mean high tide line) on the Holgate Peninsula to motorized vehicle use. Following the 30-day public review period, we compiled and responded to the comments received. A summary of the public comments received and the disposition of the concerns expressed in those comments can be found in Appendix C.

This CCP, reflecting the Service's Proposed Action for Forsythe Refuge found in the Revised Draft CCP/EA, is supported by a Finding of No Significant Impact (FONSI), which may be found in Appendix D. With the signing of this FONSI by our Regional Director in September 2002, implementation of the CCP can begin. This CCP will be monitored annually and revised when necessary.

Figure 1 describes the steps of the Service's CCP process and how it is integrated with the NEPA process.

## **Planning Issues**

Together with the Refuge Vision Statement (page 3), Refuge goals (beginning on page 35), the following key issues for Forsythe Refuge, and the range of options on how to resolve them, formed the basis for the preparation of the Draft CCP/EA.

### **Managing habitats and wildlife populations**

This issue was identified as being very important by the public at our scoping meetings, in the workbook and at the workshop. A number of different management activities were suggested, including: habitat manipulation and restoration (e.g., burning, water level control, planting, mowing), wildlife population management, baseline surveys of wildlife species and ecological communities, population and habitat monitoring, and research. Other activities suggested include working with partners on cooperative efforts for habitat restoration and management on private lands.

Some members of the public requested increased opportunities for furbearer trapping at Forsythe Refuge. They noted that trapping is a necessary and important wildlife management tool. Other people objected to trapping.

Trapping is often used on National Wildlife Refuges to protect endangered and threatened species from predators, to protect refuge infrastructure, and to maintain furbearer populations at levels consistent with refuge objectives.

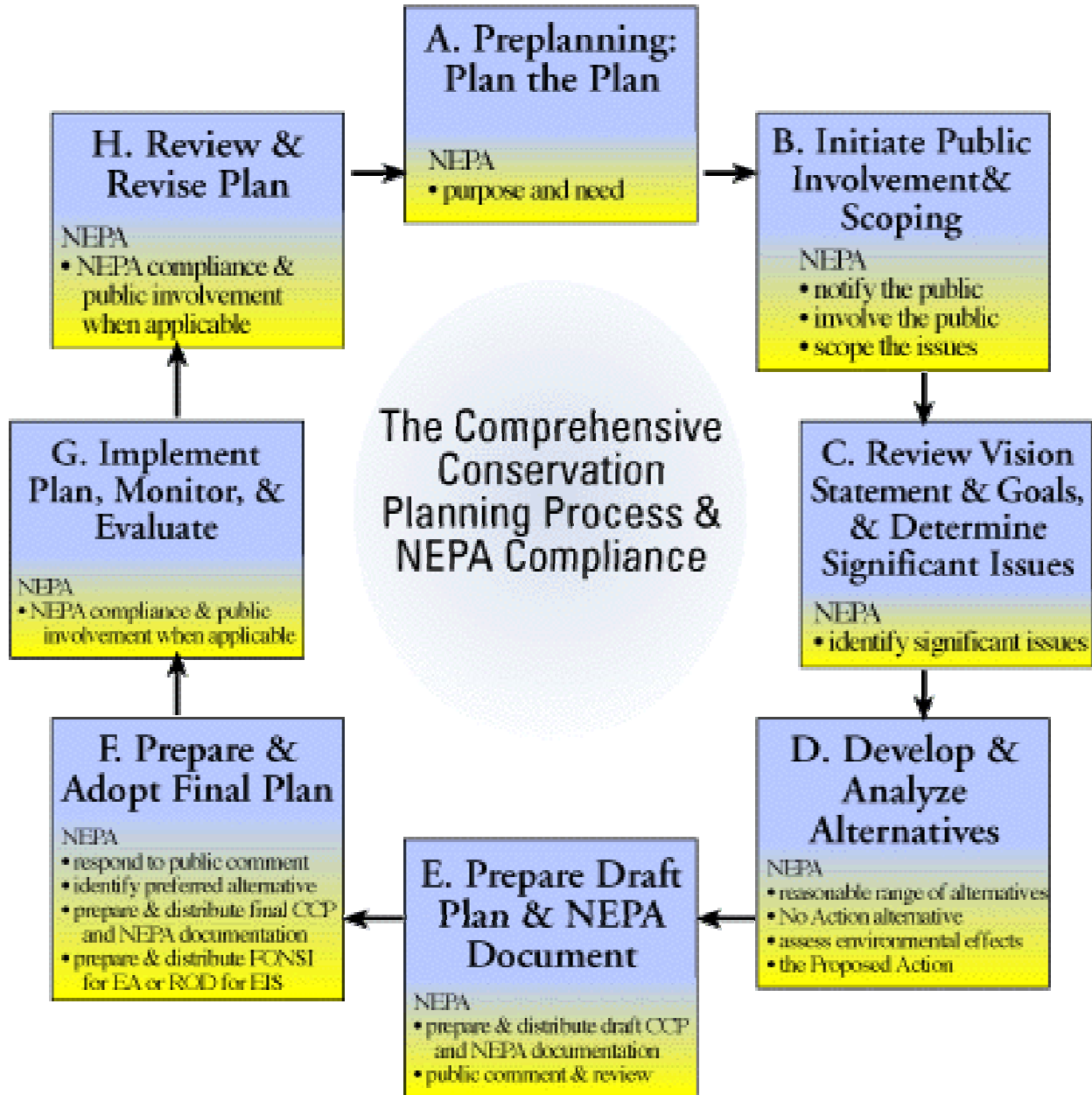
The protection and management of wildlife populations and habitats is the fundamental mission of the Refuge System and Forsythe Refuge. Special emphasis is placed on federal trust resources, including: endangered species, migratory birds, interjurisdictional fish, marine mammals, and wetlands.

### **Controlling invasive and overabundant species**

Dealing with this issue is not only a national initiative for the Service, but was also deemed very important by the public at our scoping meetings, in the workbook and at the workshop. The methods used to control these species are also of great concern.

Forsythe Refuge has significant problems involving invasive species, which impact native species directly, displacing or killing individuals, destroying habitats, and disrupting ecological communities. Invasive species requiring control are mostly exotics not native to the New Jersey landscape (e.g., Japanese

Figure 1. The Comprehensive Conservation Planning Process and NEPA Compliance.



honeysuckle, European bittersweet, autumn olive).

Wildlife species may be deemed overabundant for various management objectives. Overabundant species (e.g., white-tailed deer), may degrade habitat quality or the overall integrity of an ecological community, or, in the case of species like raccoon, displace or prey upon other species that are actively being restored. Other species (e.g., mosquitos), because of their numbers, may pose a human health risk, (**Mosquito control**, page 18). Overabundant snow geese and resident Canada geese are a management concern for the Refuge and for some landowners. Current goose control activities are discussed under this issue, but more aggressive techniques for goose control will be covered in separate documents (**Control of resident Canada geese**, page 18 and **Control of white geese**, page 19). Deer and furbearer control activities are discussed under **Increased opportunities for hunting**, page 15 and **Managing habitats and wildlife populations**, page 13.

### **The effects of pesticides on fish, wildlife and plants**

The public identified the presence of pesticides and chemicals in the environment as an important issue at our scoping meetings, in the workbook and at the workshop. Chemicals and pesticides from activities taking place on the Refuge or from off-refuge sources may impact fish, wildlife and plants found on Forsythe Refuge. Such chemicals may be transported to the Refuge by wind, water or other mechanisms, or picked up off-refuge by fish and wildlife during their migrations. Many people encouraged us to minimize our use of chemicals and pesticides on the Refuge.

The principle use of pesticides on the Refuge is to control mosquitos and invasive species. For example, during 1999, more than 1,000 pounds of pesticide were used to control mosquitos. Integrated Pest Management (IPM) provides an overall strategy to reduce pesticide use and promote other techniques to control problem species. For mosquitos, this includes Open Marsh Water Management (OMWM) (modifying mosquito breeding habitat to favor mosquito-eating fish). Another technique for suppressing phragmites, an invasive species, would be tidal inundation, instead of using herbicides.

### **Increasing opportunities for hunting**

Many people identified hunting on the Refuge as an important issue during the public scoping meetings, in the workbook and at the workshop. Some voiced concern over the Service's policy of restricting access to lands at the Refuge that were historically available for hunting. Others felt that hunting should not be permitted on the Refuge, often citing safety concerns and impacts on wildlife.

Hunting has long been a traditional activity in coastal New Jersey. Local residents have hunted much of the land within the current and proposed boundaries of the Refuge in the past.

At Forsythe Refuge, deer hunting is allowed in designated areas by permit only. Upland game hunting is not allowed. Migratory game bird hunting is allowed in designated areas. Some people called for additional deer hunting opportunities during the six-day firearm season. Some people called for upland game hunting opportunities on the Refuge. Others called for additional opportunities to hunt migratory game birds on the Refuge, or did not agree with the Refuge's policy of restricting hunting to only 40% of its lands.

Because hunting is one of the six priority general public uses of the Refuge System, it "...shall receive priority consideration in refuge planning and management." (National Wildlife Refuge System Improvement Act). Refuge hunt programs must consider public safety, disturbance and other harm to wildlife, harm to habitat, and conflicts between different user groups.

## **Increasing opportunities for fishing**

Many people identified fishing on the Refuge as an important issue during the public scoping meetings, in the workbook and at the workshop.

While extensive fishing does occur within Refuge boundaries, the Service does not have management or law enforcement authority over fishing from boats in tidal waters within those boundaries. Fishing opportunities on lands managed by the Refuge are limited. At Forsythe Refuge some opportunities are provided at several existing access sites. Refuge beaches below mean high tide are under the jurisdiction of the New Jersey Tidelands Council.

Because fishing is one of the six priority general public uses of the Refuge System, it "...shall receive priority consideration in refuge planning and management." (National Wildlife Refuge System Improvement Act). Refuge fishing programs must consider public safety, disturbance and other harm to wildlife, harm to habitat, and conflicts between user groups.

## **Increasing opportunities for wildlife observation and photography**

There was a great deal of interest expressed in expanding wildlife observation and photography opportunities on the Refuge at the public scoping meetings, in the workbook and at the workshop. This high interest is reflected in the fact that many visitors to the Refuge come to observe the wildlife we manage.

The fact that Forsythe Refuge is a world-renowned destination for bird watchers is reflected in our high number of visitors and the diversity of their hometowns. As hundreds of thousands of migratory birds use the Refuge each year, so tens of thousands of visitors come each month to observe them.

Because wildlife observation and photography are two of the six priority general public uses of the Refuge System, they "...shall receive priority consideration in refuge planning and management." (National Wildlife Refuge System Improvement Act). Refuge wildlife observation and photography programs must consider public safety, disturbance and other harm to wildlife, harm to habitat, and conflicts between different user groups.

## **Increasing opportunities for environmental education and interpretation**

There was more interest in expanding environmental education and interpretation opportunities at the Refuge than any of the other priority public uses. In fact, there was great interest in increasing our outreach efforts to local schools and communities as well. Quite often people expressed an interest in promoting more environmentally friendly recreational activities while expressing concern for minimizing impacts on the resources. Many encouraged us to place special emphasis in our education and interpretation efforts on: the impacts of public use on wildlife and how those impacts can be reduced; how the public can help wildlife both at the Refuge and in their own back yards; and the importance of refuges in conserving wildlife and their habitats.

Because environmental education and interpretation are two of the six priority general public uses of the Refuge System, they "...shall receive priority consideration in refuge planning and management." (National Wildlife Refuge System Improvement Act). Refuge environmental education and interpretation programs must consider public safety, disturbance and other harm to wildlife, harm to habitat, and conflicts between different user groups.

## **Protecting and managing wilderness resources**

In 1975 Congress designated 6,603 acres of the Forsythe Refuge as Wilderness. Undeveloped barrier beaches and dunes at Holgate and on Little Beach Island, and undisturbed salt marshes were included.

There are stringent requirements specified in the Wilderness Act and in Service policy for protecting and managing these areas. These include the highest requirements for clean air, using minimum tools for management, and letting natural processes prevail. The protection and management of Wilderness often includes such actions as monitoring the ecological communities, research, education and outreach, enforcement of Refuge regulations, reviewing the potential impacts of both on- and off-site activities on wilderness values, and the restoration of native species or natural communities. The single most contentious issue associated with the public review of both the Draft and Revised Draft CCP/EA was the use of motorized vehicles for surf fishing at Holgate, in violation of the provisions of the Wilderness Act.

## **Increasing opportunities for land protection**

During the public scoping meetings, in the workbooks and at the workshop, people expressed a great deal of support for the protection of additional fish and wildlife habitat, and suggested that this occur not only through an expanded land acquisition program at the Refuge, but also by working cooperatively with others to protect non-refuge lands as well. There is considerable interest in increasing land protection efforts at the Refuge, especially lands supporting federal trust species.

## **Increasing resource protection and visitor safety**

People identified resource protection and visitor safety as a concern during the public scoping meetings, in the workbook and at the workshop.

New Jersey is the most densely populated state in the nation. In addition, Ocean County was the fastest developing county in the United States during the 1970's and the 1980's. Development in Atlantic County has increased markedly since the birth of the Atlantic City casino industry in the 1980's. As a result, law enforcement incidents encountered on Forsythe Refuge are no longer limited to wildlife related violations. Officers now respond to incidents involving vandalism, assault, breaking and entering, speeding, possession of illegal drugs, and the cultivation of marijuana. The Refuge currently encompasses 43,000 acres, along 50 miles of the New Jersey Shore. Marking the expanding Refuge boundaries remains a constant logistical problem. Total annual public use surpasses 300,000 visitors. It is expected to increase rapidly as more of Atlantic City's 35 million annual visitors and the millions of Jersey Shore summer visitors discover Forsythe Refuge.

The current staffing level of two full-time Park Rangers is insufficient to adequately patrol and enforce Refuge and other federal regulations. These officers find it increasingly difficult to respond to public reports of potential violations.

## **Improving Refuge buildings and facilities**

The existing buildings and facilities at Forsythe Refuge are woefully inadequate and need to be replaced. This is especially important if the Refuge is to adequately accommodate work space for not only current staff, but also any future increases in staffing levels that would be required to implement the actions and strategies in the Refuge CCP. Additional laboratory and equipment storage space is also needed.

New facilities would help increase our visibility in coastal New Jersey and improve our visitor services, including providing opportunities for environmental education and interpretation. The 150,000 people, who



currently use the wildlife drive at Forsythe Refuge, are provided few opportunities to learn about the Service or its programs during their visit to the Refuge.

## **Issues Outside the Scope of the CCP/EA**

These issues did not fall within the scope of The Purpose of and Need for Action and the Decision to be Made in the CCP/EA. Issues within this category were not addressed. The Service will, however, pursue other courses of action, often in cooperation with other interested parties, to resolve them.

### **Protecting sensitive areas from personal water craft use**

Many people expressed concern over the use of personal water craft at the public scoping meetings, in the workbook and at the workshop.

Personal water craft use in the State-managed waters surrounding or adjacent to lands of the Forsythe Refuge has risen dramatically. The Refuge does not have jurisdiction over these activities in these waters.

Personal water craft have made previously inaccessible Refuge areas susceptible to adverse habitat and wildlife impacts. Their use has increased wildlife-human interactions, involving disruption of roosting, foraging, and nesting birds over large areas of the Refuge.

The Service will increase its education and outreach efforts regarding the responsible use of personal water craft, and will work closely with the State to seek solutions for resolving this perplexing problem.

### **Mosquito control**

Several species of mosquitoes found in coastal New Jersey are important vectors of potentially lethal diseases, including Eastern Equine Encephalitis and West Nile Virus. The Service is striving to responsibly address risks to public health and safety and to protect trust resources from mosquito borne diseases and the impacts of pesticides on wildlife and the ecosystem. The Service and the mosquito control agencies in New Jersey and Delaware are working to develop new strategies for mosquito control, with appropriate NEPA compliance. The public will have the opportunity to review and comment on the proposed strategies before they are finalized.

### **Control of resident Canada geese**

Resident Canada geese are having a growing impact on communities across the country. Increasing urban and suburban development in the United States has resulted in the creation of ideal goose habitat conditions including park-like areas with short grass adjacent to small bodies of water.

These habitat conditions have enticed rapidly growing numbers of locally breeding geese to live here year round. These resident goose populations are increasingly coming into conflict with human activities in many parts of the country. Large flocks of resident geese have serious impacts, on both wildlife and people: geese grazing in large numbers cause major habitat destruction, reducing the amount of critical forage available for migratory geese and other waterfowl during migration; high concentrations of goose droppings in lakes can cause excessive algae growth, leading to fish kills; high concentrations of goose droppings can also create health hazards to humans; and resident geese can denude lawns of vegetation.

To help address this problem, the Service issued special Canada goose permits to states in the summer of 1999. The permits are designed to give states greater flexibility and opportunity to design management

programs to control specific resident Canada goose populations. The permit program was designed as a short-term program until a comprehensive long-term management strategy can be developed and implemented.

The Service is preparing an Environmental Impact Statement (EIS) to lay out alternatives for dealing with all the resident Canada goose problems. The EIS will be completed in 2001.

### **Control of white geese**

Populations of white geese – a term that encompasses greater and lesser snow geese and Ross' geese – have increased dramatically in the last 30 years. The species of primary concern in Forsythe Refuge area is the greater snow goose.

Numbers of lesser snow geese and Ross' geese have grown from 300,000 birds in 1969 to more than 3 million birds today. Numbers of greater snow geese have grown from fewer than 50,000 in the late 1960's to about 800,000 today.

As a result, the geese have destroyed and damaged vast areas of their sensitive Arctic breeding grounds as well as local migration stopover areas. This negatively impacts not only the geese, but for all the plants and the other animals in these areas.

The Service is preparing an EIS to lay out alternatives for dealing with all the white goose population problems. The EIS will be completed in May 2001.

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## Chapter 3. Summary Refuge and Resource Description

### Physical Environment

#### Climate

Forsythe National Wildlife Refuge (Forsythe Refuge) is within the New Jersey coastal weather station zone (Sandy Hook, Long Branch, Atlantic City, and Cape May weather stations). The ocean moderates the State's continental climate within the coastal weather zone. The average monthly temperature is 35°F in January, the coldest month of the year, and 75°F in July, the hottest month of the year. The growing season for the Refuge is 245 days. The growing season is the period of the year in which the average temperature is 43°F or more. The average annual precipitation in the coastal zone is 42.6 inches. Precipitation is distributed fairly evenly through the year, with slightly more in July and August, and less in February.

#### Air Quality

New Jersey is the most densely populated State in the country. The State also has the highest densities of roads and traffic. These factors impact air quality. The greatest adverse impact seems to be elevated levels of low-altitude ozone in the State. The ozone levels exceed Environmental Protection Agency (EPA) thresholds set for the State. Investigations at the Brigantine Division of Forsythe Refuge indicate that the low-altitude ozone levels at that site are high, with resultant damage to vegetation (Davis, 1995).

In 1978, Congress designated the Brigantine Wilderness Area (Wilderness Area) as a Class I air quality area, giving it special protection under the Clean Air Act. Congress charged the Service with the responsibility of protecting the air quality and air quality related values (AQRVs) of the area from manmade pollution. AQRVs include vegetation, wildlife, soils, water quality, visibility, odors, and cultural and archaeological resources.

Despite this protection, air pollution is impacting the Wilderness Area. The area lies in a highly industrialized airshed, with air pollution coming from many sources, including industry, automobiles, and power plants. Surveys conducted from 1993 to 1996 indicated that certain plant species exhibited typical symptoms of ozone injury (e.g., stippling and chlorosis).

In addition to these documented effects, there is concern that other effects may be occurring. Rainfall throughout the area is acidic; rainfall pH at sampling locations in New Jersey is often less than 5.0. As is the case in most of the eastern US, visibility in the Wilderness Area is affected by pollution-caused haze. Also, inshore waters of the Wilderness Area may be at risk from atmospheric nitrogen pollution. Research along the Atlantic Coast has demonstrated that atmospheric nitrogen (primarily from power plant and automobile emissions) has contributed to nutrient level increases of inshore waters, with subsequent algae blooms, loss of seagrass beds, and deterioration of fish and wildlife habitat.

The New Jersey Department of Environmental Protection (NJDEP) operates continuous sulfur dioxide and ozone monitors at the Nacote Creek Station at the west side of Forsythe Refuge. The ozone monitor has recorded various violations of the National Air Quality Standards for ozone (the entire State of New Jersey is a "non-attainment area" for ozone).

In addition, the Service monitors air quality at the Wilderness Area through two national programs. The Service monitors atmospheric pollutants in rain as part of the National Atmospheric Deposition Program (NADP; the "acid rain" program). The Service monitors fine particles as part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) Program.

The Service and NJDEP cooperate in the emission permitting process to protect air quality in the Brigantine Wilderness.

## **Geology, Topography and Soils**

The Forsythe Refuge is within the Outer Coastal Plain, which consists of sedimentary deposits dating from the Tertiary period.

Elevations on the Refuge range up to 50 feet above mean sea level. Topography is nearly level to gently sloping. Uplands slope gradually to a wide band of salt marsh to shallow bays. These bays are separated from the ocean by barrier islands or spits.

The major soil series in the Barnegat Division are: Sulfaquents-Sulfihemists association and Manahawkin-Atsion-Berryland association. Major soil series in the Brigantine Division are Tidal Marsh-Coastal Beach association and Downer-Hammonton-Sassafras association.

## **Hydrology**

The major aquifer underlying the Refuge is the Kirkwood-Cohansey system, which dates from the Miocene and Pliocene Epochs. The Kirkwood Formation is chiefly sand, silt, and clay. The Cohansey Sand is chiefly unconsolidated quartz sand with some gravel and many clay beds. This system provides most of the potable water to the area.

Pleistocene and Recent Age deposits overlie the Kirkwood-Cohansey formations and contain sand, gravel, silt, peat, and organic muck. Some shallow wells from these formations may be tapped locally for domestic use. Several aquifers underlie the Kirkwood-Cohansey system and are tapped to a lesser extent for public and domestic supply.

The Refuge has both tidal and non-tidal surface waters. Non-tidal waters include marshes, bogs, ponds, creeks, artificial impoundments, and seasonally flooded forests. Tidal waters include ponds, salt and fresh marshes, creeks and old ditches, coves, bays, river channels, and inlets. Most of the salt marsh is tidally flooded daily, with the greatest inundation occurring at new and full moons.

The Barnegat Division is drained by Reedy Creek, Sloop Creek, Clamming Creek, Maple Creek, Stouts Creek, Bridge Creek, Forked River, Oyster Creek, Double Creek, Gunning River, Cedar Creek, Mill Creek, Cedar Run, Dinner Point Creek, Westecunk Creek, Parker Run, Jesse Run and Salp Creek.

The Brigantine Division is drained by the Mullica River, Roundabout Creek, Ballenger's Creek, Bass River, Nacote Creek, Motts Creek, Oyster Creek, Landing Creek, Rubes Creek, and Doughty Creek.

## **Contaminants**

The Service collected sediments, mummichogs, and fiddler crabs in and adjacent to Forsythe Refuge in 1996 to determine baseline contamination. Sediments were collected at 25 locations; mummichogs and fiddler crabs from 10 of the 25 locations. The samples were analyzed for trace metals, organochlorine pesticides, polychlorinated biphenyls (PCB's), and butyltin compounds (USFWS, 1998).

The Service analyzed the samples for 19 trace metals: aluminum, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, strontium, vanadium, and zinc. All of these trace metals were detected in the sediment samples. None of

the sediment samples contained metal concentrations that exceeded severe toxic effects guidelines for sediment.

Many sediment trace metal concentrations exceeded lower toxic effects guidelines, but these concentrations were not notably greater than background levels within New Jersey. Fiddler crabs contained higher mean metal concentrations than mummichogs for all detected metals except zinc.

There was no strong relationship between the sediment concentrations of metals and those in crabs. Inorganic contaminant concentrations in Refuge biota were not notably greater than reference levels and were less than levels measured in areas known to be polluted. The whole body concentrations of inorganic contaminants in both fish and crabs were not sufficient to cause acute or sublethal effects to piscivorous birds and predatory fish.

Several organic contaminants, dichlorodiphenyl-dichloroethane (DDD), dichlorodiphenyl-dichloroethylene (DDE), total PCB's, and PCB 77, were detected in measurable quantities in all sediment samples. Levels of several organic contaminants, particularly the metabolites of DDT (DDD and DDE) were greater than available reference concentrations from other areas within southern New Jersey. Some of the highest sediment concentrations of these organic contaminants were detected at sampling stations located just downstream of inactive cranberry bogs. One bog yielded a DDD concentration of significant ecotoxicological concern. A few other sampling stations also contained levels of DDE and total chlordane that exceeded severe toxic effect sediment guidelines.

Detectable levels of p,p<sup>1</sup>-DDD, p,p<sup>1</sup>-DDE, dieldrin, heptachlor epoxide, oxychlordane, and total PCB's were found in all crab and fish samples analyzed. Unlike the inorganic contaminant result, crabs did not have higher organic contaminant levels than fish. Organic contaminant concentrations in Refuge biota were not notably greater than reference levels and were less than levels measured in areas known to be polluted. Body burdens of organic contaminants in mummichogs did not indicate that these fish should be suffering physiological impairment. The whole body concentrations of organic contaminants in both fish and crabs were not sufficient to cause acute or sublethal effects to piscivorous birds and predatory fish.

Overall, the contaminant levels in sediment and biota from the Forsythe Refuge, with some exceptions, were found to be low and of little concern with regard to the potential for adverse effects on resident biota or their predators. Exceptions were limited to seven sampling stations where the concentrations of DDD, DDE, or total chlordane exceeded severe toxic effects sediment guidelines. Two of these stations were located at the surface water outfalls of inactive cranberry bogs. Unfortunately, biota were not collected from these two stations. It is reasonable to suspect even greater concentrations of organic contaminants exist inside the cranberry bogs themselves. These inactive cranberry bogs may be a serious threat to Federal trust resources foraging there. In addition, these cranberry bogs may be a risk to Refuge visitors, if the areas were open to the public.

## **Biological Environment**

Forsythe Refuge plant and animal communities are described in "Significant Habitats and Habitat Complexes of the New York Bight Watershed" (USFWS, 1997). The key biological value of the Refuge is the coastal estuaries and associated watershed. The Refuge hosts a number of rare species and communities. Many birds depend upon the habitat during migration and commercial fish species depend on the waters for a portion of their life cycle.

## Threatened, Endangered, Recovered and Rare Species

In and around Forsythe Refuge, there are 14 animal species Federally-listed as endangered, threatened, recovered, or species of concern, formerly called candidate species (Appendix E). We actively manage for the piping plover (*Charadrius melodus*), peregrine falcon (*Falco peregrinus*), and bald eagle (*Haliaeetus leucocephalus*).

Piping plovers nest on the protected Wilderness Areas of the Holgate Unit and on Little Beach Island. Generally 19-37 pairs nest at the two areas. These breeding pairs represent about 29 percent of New Jersey breeding population.

Peregrine falcons use the Forsythe Refuge throughout the year. Two nesting pairs use artificial nesting structures on the Refuge. The peregrine falcon has successfully nested on the Refuge since 1980. The Refuge is also important for wintering peregrines.

Bald eagles regularly use the Refuge wetlands to forage while migrating through or wintering in the area. During the nesting season, most use is along the Mullica River, but occasionally eagles forage over Refuge impoundments and adjacent salt marsh. During the winter eagles regularly forage in the impoundments and salt marshes of the Brigantine Division.

## Vegetation and Habitat Types

About 82% of the Refuge land is wetland, and 18% is upland. Salt marsh makes up about 78% of the Refuge land. This is the largest single land use/habitat type within the Refuge. The dominant salt marsh species are salt marsh cordgrass (*Spartina alterniflora*) and salt-meadow grass (*Spartina patens*). Most of the salt marsh was grid-ditched during the first part of this century for mosquito control. Approximately 6,000 acres of salt marsh is unditched, and was designated as wilderness under the Wilderness Act. The salt marsh is interlaced with small tidal streams, mudflats, and ponds or pannes.

Forested wetlands make up about 4% of the Refuge land. The dominant overstory trees in this habitat are red maple (*Acer rubrum*), oaks (*Quercus* spp.), black gum (*Nyssa sylvatica*), sweetgum (*Liquidambar styraciflua*), and occasional stands of Atlantic white cedar (*Chamaecyparis thyoides*). Bogs and brush-dominated wetlands are interspersed through the forested wetlands. The cedar swamps and bogs are classified as sensitive ecological communities, with several rare plant species (e.g., bog asphodel - *Narthecium americanum* and swamp pink - *Helonias bullata*).

Forested uplands make up about 13% of the Refuge land. Upland forests range from deciduous to coniferous dominated overstory composition, with tree species including: pitch pine (*Pinus rigida*), oaks (e.g., white oak - *Quercus alba*, chestnut oak - *Q. prinus*, black oak - *Q. velutina*, scarlet oak - *Q. coccinea*), black cherry (*Prunus serotina*), and sweet gum (*Liquidambar styraciflua*). Fire played a prominent role in defining the composition and structure of upland plant communities, both historically and prehistorically (Little, 1998). There are still some nearby State lands in the Pine Barrens that receive regular fire treatment (both prescribed and wild), but fire on Refuge lands has been suppressed for decades.

Grassland uplands make up about 3% of the Refuge land. These grasslands contain forbs and grasses interspersed with sassafras (*Sassafras albidum*), eastern red cedar (*Juniperus virginiana*), and winged sumac (*Rhus copalina*). Current grasslands are comprised of both native and exotic species.

Beaches and vegetated dunes make up about 2% of the Refuge land. These habitats are critical for species unique to those communities. Most of the Refuge's shrub/scrub habitat is located on islands. Additional shrub/scrub habitats (upland brush) are found on the mainland, and represent early successional stages of

upland forest. The Holgate Unit and Little Beach Island, which are part of the Brigantine Wilderness Area, represent these community types.

Open water habitat types of the Refuge include bays, streams, rivers and small ponds or reservoirs. These shallow waters are critical elements of the coastal ecosystem. However, only the small ponds and reservoirs are owned by the Refuge. All navigable waterways and inter-tidal areas (between mean high and low tide) fall within the jurisdiction of the State of New Jersey. Ownership notwithstanding, open waterways found throughout the lands owned by the Refuge have a major influence on the ecological functions of those communities.

Three large, managed impoundments are an important feature of the Brigantine Division. The Northwest Pool and the Southwest Pool, about 500 and 300 acres respectively, are fed by Doughty Creek and springs. These two pools are managed as a freshwater impoundment and moist-soil unit. The East Pool (536 acres), receives water from the two west pools and tide gates. This pool is managed as a brackish impoundment.

Other freshwater bodies in the Brigantine Division include: the spring-fed Experimental Pool, Lily Lake (a 22-acre reservoir upstream from the impoundments on Doughty Creek), and two ponds that were former borrow pits. Several freshwater impoundments and one brackish impoundment (totaling about 350 acres) are located in the Barnegat Division.

## Wildlife Resources

**Migratory Birds:** Migratory birds use the Refuge in three different ways. First, many thousands of birds of all kinds use the Refuge as stopover habitat during the spring and fall migrations. Second, a wide variety and, in some cases, very large portions of populations depend upon the Refuge for wintering habitat. Finally, a rich variety and number of birds breed on the Refuge.

The coastal wetlands of New Jersey are of international importance to wintering waterfowl. In 1991, 39% of the Atlantic Flyway American black duck (*Anas rubripes*) population, 67 % of the Atlantic brant (*Branta bernicla*) population, and 34% of the greater snow goose (*Chen caerulescens*) population were recorded in New Jersey during the Service's mid-winter inventory.

The wetlands of the Forsythe Refuge are classified as Wetlands of International Importance under the Ramsar Convention, one of only seventeen sites so designated in the United States. During a December 6, 1991, aerial survey of the Refuge, 85,570 waterfowl were observed. The highest waterfowl concentrations at the Refuge do not occur until late December. Weekly waterfowl counts conducted at the Brigantine Division Impoundments indicate waterfowl populations nearly double from early in the month, so it is possible nearly 180,000 birds use the Refuge during the peak period.

Many marsh and water birds use the Refuge. The most common include great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), black-crowned night heron (*Nycticorax nycticorax*), glossy ibis (*Plegadis falcinellus*) and cattle egret (*Bubulcus ibis*). Herons and egrets nest on or near the Refuge, frequently foraging in the salt marshes, streams, ponds, and impoundments. Until recently, least terns and black skimmers nested in substantial numbers on Holgate and other barrier/bay islands.

Shorebird use of the Refuge peaks during the spring migration. The most common species are: sanderling (*Calidris alba*), semi-palmated sandpiper (*Calidris pusilla*), dunlin (*Calidris alpina*), semi-palmated plovers (*Charadrius semipalmatus*), short-billed dowitcher (*Limnodromus griseus*), willet (*Catoptrophorus semipalmatus*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*Tringa flavipes*), black-bellied plover (*Pluvialis squatarola*), least sandpiper (*Caladris minutilla*), ruddy turnstone (*Arenaria interpres*),



red knot (*Calidris canutus*), whimbrel (*Numenius phaeopus*), spotted sandpiper (*Actitis macularia*) and pectoral sandpiper (*Calidris melanotos*).

Many raptors breed on the Forsythe Refuge, including: red-tailed hawks (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), sharp-shinned hawks (*Accipiter striatus*), broad-winged hawks (*Buteo platypterus*), red-shouldered hawks (*Buteo lineatus*), northern harriers (*Circus cyaneus*), great horned owls (*Bubo virginianus*), common barn owls (*Tyto alba*), barred owls (*Strix varia*), and short-eared owls (*Asio flammeus*). Many other raptors may be seen during migration; some of them winter at the Refuge.

Many songbirds species use the Refuge for nesting and to rest or feed during migration. The most important nesting species are those dependent upon the marshes and coastal island habitats, for example, seaside sparrow (*Ammodramus maritimus*), marsh wren (*Cistothorus palustris*), and sedge wren (*Cistothorus platensis*). A large number of birds nesting on or migrating through the Refuge are Neotropical migrants (wintering in Central and South America). As a group, Neotropical migrants have shown recent population declines due to habitat loss and deterioration in wintering areas and along migration corridors.

**Mammals:** Over 30 species of mammals occur on the Refuge, in assemblages characteristic of the Mid-Atlantic coastal communities. Forest species include red fox (*Vulpes vulpes*), grey fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), short-tailed weasel (*Mustela erminea*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), white-tailed deer (*Odocoileus virginianus*), grey squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), red-backed vole (*Clethrionomys gapperi*), pine vole (*Microtus pinetorum*), masked shrew (*Sorex cinereus*), short-tailed shrew (*Blarina brevicauda*), eastern mole (*Scalopus aquaticus*), and a variety of bat species. Shrubland and grassland species of mammals include the meadow vole (*Microtis pennsylvanicus*), meadow jumping mouse (*Zapus hudsonius*), woodchuck (*Marmota monax*), eastern cottontail (*Sylvilagus floridanus*), and several of the forest and wetland species. Mammals associated with wetlands include mink (*Mustela vison*), river otter (*Lutra canadensis*), muskrat (*Ondatra zibethicus*), meadow vole, southern bog lemming (*Synaptomys cooperi*), and least shrew (*Cryptotis parva*).

Several species of bats occur in forested habitat types during the summer breeding season. Forest openings are common foraging areas for this group. A number of other migrating bat species probably pass through southern New Jersey during migration, while others would use caves for hibernacula (not found locally). Very little research has been done on bats in the vicinity.

Several mammals have substantial impacts on the habitat and populations managed on the Refuge. High densities of white-tailed deer have negatively affected the structure and composition of plant communities. High densities of muskrats, have compromised the integrity of dikes needed to retain and manipulate water in impoundment.

Many species of nesting, migrating, or wintering raptors dependent on the availability of small mammal populations in all cover types.

**Reptiles and Amphibians:** Nineteen species of reptiles and amphibians occur on the Refuge. These species fall into two major groups -- Pine Barrens and coastal estuarine environment. Important species from the Pine Barrens group include wood turtles (*C. insculpta*), Cope's gray and pine barrens treefrog (*Hyla chrysoscelis* and *H. andersonii*), ambystomid salamanders (*Ambystoma* spp.). The most important estuarine environment species is the northern diamondback terrapin (*Malaclemys t. terrapin*).

***Fish:*** The salt marshes, streams, ponds, bays, and rivers that comprise the estuaries of the Refuge are critical to a rich variety of fish, shell fish, and crabs. These species are the foundation for sport and commercial fisheries, as well as food base for many birds and mammals. Most of the species are found in navigable waterways, areas the Service does not own.

***Invertebrates:*** A wide variety and number of invertebrates, both terrestrial and aquatic, are of biological importance. Invertebrates are not well documented from this area, unless they are economically important. Tiger beetles and lepidopterans, some rare, are frequently observed. There is a long history of aggressive mosquito control, which has impacted other species.

## Archaeological and Historical Environment

### Prehistoric Period

Human occupation of the New Jersey coast began with the arrival of Native American hunter-gatherer bands, approximately 10,000 B.C. Only a few archaeological sites earlier than about 5000 B.C. have been found in the area, probably partly due to a major rise in sea level due to Pleistocene glacial melting. The coastline of that time is now lies submerged in the Atlantic Ocean, and former freshwater river valleys are now salt marsh. An artifact collection from the area of Cape May Refuge is one of the few signs of settlement in this period.

Human population on the coast seems to have increased somewhat after 5000 B.C., as the climate became notably warmer. The locations and contents of archaeological sites reflect a more diverse mix of hunting and gathering of upland, wetland, and aquatic resources that varied with the seasons. Sea level change became much more gradual by about 2000 B.C., and the extensive coastal wetlands that developed provided rich hunting, shellfishing, and plant gathering environments. This greater resource reliability supported a larger and more stable human population. Small scale hoe agriculture, pottery, and the bow and arrow are notable developments found at sites dating after about 1000 B.C.

Except for a handful of studies prior to Refuge construction projects, Forsythe Refuge lands have never been surveyed for archaeological sites. Prehistoric site potential is high, but site discovery is complicated by major changes in sea level over the last 12,000 years. Much of the Refuge is tidal marsh, and archaeological sites in this setting are especially difficult to locate and study. In exposed areas, they have often been lost to erosion. The upland portions of the Refuge have generally high potential for prehistoric sites, as much of this land adjoins wetland resources used by their inhabitants.

### Historic Period

Permanent settlement of the Forsythe Refuge area by Euro-Americans began in the second quarter of the 18th century. This was preceded by a long period of contact with Native American Lenape through offshore fishing and the fur trade. By the middle of the century, the Lenape were severely diminished by European diseases and had lost nearly all of their former lands. Many emigrated to northwest New Jersey and the Ohio Valley during this period.

Colonial towns on the New Jersey shore were generally established at estuaries with suitable harbors for fishing and trade, such as the Mullica River. The New York Road linked these communities along the shore. Ore from bogs and charcoal from the pine barrens provided raw materials for an ironworks at Batsto that produced munitions for the American Revolution. A British raid in 1778 burnt the community of Chestnut Neck and all the vessels in the harbor, including some privateers, but did not achieve its secondary goal of destroying the ironworks. Limited by shallow and small harbors, these shore communities experienced slow

economic and population growth during the 19th century. Fishing, shellfishing, and agriculture remained the primary economic activities for most families. The later development of Atlantic City, Cape May, and other resorts had little effect on the surrounding areas without beachfront. This factor has done much to preserve the rural character of the Refuge vicinity.

Upland areas on Forsythe Refuge generally consist of former farmland associated with historic period settlement. Much of the Brigantine Division, for example, was part of a large early 19th century farm based on Brigantine Island. Therefore, historic period archaeological resources are unlikely except in a few settings, such as present or former landing areas. Some remains of wharves for these landings, and possibly sunken small craft, may exist in the marshes. A lifesaving station site near Brigantine City is one of the few documented historic archaeological sites at the Refuge.

There are currently no standing historic structures on the Refuge, but the Forked River Game Farm, proposed for acquisition from the New Jersey Division of Fish and Wildlife, has several structures that will require review of their eligibility for inclusion in the National Register of Historic Places.

## **Socioeconomic Environment**

The Forsythe Refuge receives over 300,000 visitors per year. The predominant public uses of the Refuge are hunting, fishing, clamming, crabbing, wildlife observation, environmental education, and boating. The dikes surrounding the impoundments at the Brigantine Division serve as an 8-mile auto tour for the public. The Brigantine impoundment area accounts for about one-half of the Refuge visitors. The impoundment area is renowned as one of the premier birding sites in North America. A recent study shows that birders alone, who make up about 75% of the auto tour visitors, annually add about \$4.01 million to the local economy (Kerlinger, 1995).

Wildlife-dependent public use at the Refuge is consistent with the primary industry for the region—tourism. The New Jersey shore has long been a major tourist destination. Boating, fishing, hunting, shellfishing, and beach-related pursuits are typical for tourists. Most of the tourists come from major nearby metropolitan centers: Philadelphia, Newark, and New York City.

Over the last 20 years, the development of casinos and related industries has created a large influx of people. This has spurred the rapid construction of housing and support infrastructure (e.g., roads, malls, plazas, utility towers and corridors). The increase in human density and associated uses have caused considerable strains on the ecosystem from the following factors:

1. Habitat loss - direct conversion of natural habitat types to developed types.
2. Habitat fragmentation - conversion of large contiguous tracts of natural habitat types to a mosaic of discontinuous, smaller habitat type relicts; or erecting barriers that cause direct lethal impacts to fish, wildlife and plants (e.g., roads, towers, dams).
3. Habitat degradation - partial deterioration of habitat due to pollution (siltation, nutrients, pesticides, metals), exotic and pest species (phragmites, house cats), incompatible uses (all-terrain vehicles, personal watercraft).
4. Water consumption - reducing subsurface and surface waters due to irrigation, home consumption, and industrial applications.

There is a substantial commercial fishing industry in southern New Jersey. Important species include: finned fish, clams, mussels, and crabs. There is an increase in shellfish aquaculture, especially oysters. Bait fish, eel, and horseshoe crabs are also a major component of the industry.

In addition to the above more apparent environmental economic connections, there are others. A study conducted in Minnesota determined that there is a statistically significant positive relationship between the amount of wetland acres in an area and residential property values (Lupi, et al., 1991). The authors were not able to identify which values were captured (i.e., open space, view, habitat, etc). A study conducted in Maine outlines the economic benefits of open space to local communities (American Farmland Trust, 1992).

Beyond the economic factors in land use planning there are ethical considerations. Is the land a commodity that belongs to us? Or is land a community to which we belong? Are we the masters of the land or are we stewards of the land?

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## Chapter 4. Management Direction

### Refuge Management Policies and Guidelines

#### Compatibility Determinations

Federal law, regulation and policy provide the direction and planning framework to protect the National Wildlife Refuge System (Refuge System) from incompatible or harmful human activities and to insure that current and future Americans can enjoy Refuge System lands and waters. The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act), is the key legislation on managing public uses and compatibility.

Before activities or uses are allowed on a National Wildlife Refuge, the uses must be found to be a "compatible use." A compatible use is a use, "...that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." "Wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety. Except for consideration of consistency with State laws and regulations as provided for in section (m), no other determinations or findings are required to be made by the refuge official under this Act or the Refuge Recreation Act for wildlife-dependent recreation to occur." (Refuge Improvement Act)

A number of compatibility determinations have been prepared over the years covering a variety of uses currently taking place on Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge). These compatibility determinations remain in effect and are being re-certified as part of this effort to prepare a Comprehensive Conservation Plan (CCP) for the Refuge.

#### Pre-acquisition Compatibility Determinations

A pre-acquisition compatibility determination assesses the compatibility of an existing priority general public use during the period from the time we first acquires a parcel of land to when a formal long-term management plan for the parcel is prepared and adopted. Pre-acquisition compatibility determinations for Forsythe Refuge have been completed for the six priority general public uses of the System listed in the Refuge Improvement Act, hunting, fishing, wildlife observation and photography, environmental education and interpretation. (See Table 1.) The pre-acquisition compatibility determination for Forsythe Refuge may be found in Appendix F. The Act defines these six priority general public uses as "wildlife-dependent recreation" and "wildlife-dependent recreational use."

The pre-acquisition compatibility determinations for Forsythe Refuge cover the existing priority general public uses occurring within the Land Protection Focus Areas (Focus Areas) described in this CCP. (See **Land Protection Focus Areas** on page 33 and Maps 3a, b, c, and d beginning on page 51.) These Focus Areas are lands that have been added to the approved Refuge acquisition boundary.

Several of the six priority general public uses occur on lands within these Focus Areas. The current levels of hunting, fishing, wildlife observation and photography, environmental education and interpretation taking place on these lands do not seem to be negatively impacting fish, wildlife, or plant resources.

Current levels of the six priority general public uses occurring within these Focus Areas would be compatible with the mission of the Refuge System and the purposes for which Forsythe Refuge was established. The Focus Areas have little estuarine habitat important to the Atlantic Brant, black ducks or rails, or important estuarine feeding and resting habitat for ducks or brant. The Refuges would allow the

Table 1. *Pre-acquisition Compatibility for Wildlife-dependent Recreational Activities at Forsythe Refuge.*

Wildlife-dependent Recreational Activities	Existing Use?	Compatible Use?	Use Allowed?
Hunting	Yes	Yes	Yes
Fishing from bank	Yes	Yes	Yes
Fishing from boat	Yes	Yes	Yes
Wildlife Observation	Yes	Yes	Yes
Wildlife Photography	Yes	Yes	Yes
Environmental Education	No	Yes	Yes
Interpretation	No	Yes	Yes

current levels of hunting, fishing, wildlife observation and wildlife photography to continue in the interim. We would monitor impacts of these uses and adjust levels and locations as appropriate through the adoption of long-term management plans.

Walking, hiking and bicycling done for exercise and enjoyment of the outdoors occur on lands within these Focus Areas. To eliminate conflicts between user groups, we would terminate bicycling on property within the Focus Areas as soon as the Service acquired and posted a property within these areas. Walking and hiking would be allowed to continue at their current levels in the interim. We would monitor impacts of these uses and adjust levels and locations as appropriate through the adoption of long-term management plans.

All terrain vehicle (ATV), dirt bike, and mountain bike riding occurs on some lands in these Focus Areas. These activities negatively impact physical and biological resources, and are therefore not compatible with the purposes for which Forsythe Refuge was established. To eliminate negative impacts, we would terminate these activities on property within the Focus Areas as soon as the Service acquired and posted a property within these areas.

### **Potential Land Protection Methods**

We will focus our land protection efforts on lands adjacent to Service-owned lands within existing Refuge boundaries, and also to larger contiguous tracts. Funding for land acquisition will come from the Land and Water Conservation Fund and the Migratory Bird Conservation Fund. Known hazardous waste sites or contaminated areas will be excluded from consideration. All land transactions are subject to contaminant surveys.

The Service's land acquisition policy is to obtain the minimum interest necessary to satisfy Refuge objectives. Conservation easements can sometimes be used in this context, when they can be shown to be a cost-effective method of protection. In general, any conservation easement must preclude destruction or degradation of habitat, and allow Refuge staff to adequately manage uses of the area for the benefit of wildlife. Because development rights must be included, the cost of purchasing conservation easements often approaches that of fee title purchase, thus rendering this method less practical. Nevertheless, donations of easements or voluntary deed restrictions prohibiting habitat destruction would be encouraged. In addition, the Service could negotiate management agreements with local and State agencies, and accept conservation easements on upland tracts.

## **Land Acquisition Areas**

We have identified 3,348 acres for acquisition to provide long-term protection to the numerous species of shorebirds, neotropical migratory landbirds, waterfowl, long-legged waders, raptors, finfish and shellfish, and threatened and endangered species. (See Maps 3a, b, c, and d beginning on page 51 and Appendix M on page 165.) Our objectives are to protect:

- Known sites of threatened or endangered species and communities;
- Areas important to the ecological health of lands already owned (ensure intact ecosystem processes, such as, protecting the quality and quantity of water for wetlands, providing habitat corridors between existing conservation lands, or sufficient size of contiguous areas to protect viable populations);
- Areas important for priority wildlife species (e.g., critical stopover habitat for migrating birds);
- Areas identified as priority sites for protection by other conservation organizations;
- Areas still viable for conservation protection (i.e., not already developed).

## **Property Taxes, Refuge Revenue Sharing, Relocation, and Landowner Rights**

The Refuge Revenue Sharing Act of June 15, 1935, as amended, provides annual payments to taxing authorities, based on acreage and value of Refuge lands located within their jurisdiction. In 2000, the Service paid, \$106,651 to Ocean County communities, \$8,049 to Burlington County communities, and \$74,335 to Atlantic County communities.

Money for these payments comes from the sale of oil and gas leases, timber sales, grazing fees, and the sale of other Refuge System resources and from Congressional appropriations. The Congressional appropriations are intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local taxing authorities. The actual Refuge Revenue Sharing Payment does vary from year to year, because Congress may or may not appropriate sufficient funds to make full payment. The actual payments made in 2000 were 57.9% of full payment.

The Refuge Revenue Sharing Payments are based on one of three different formulas, whichever results in the highest payment to the local taxing authority. In New Jersey, the payments are based on three-quarters of one percent of the appraised fair market value. The purchase price of a property is considered its fair market value until the property is reappraised. The Service reappraises the value of Refuge lands every five years.

On wetlands and formerly farmland-assessed properties in New Jersey, the full entitlement Refuge Revenue Sharing Payments sometimes exceed the real estate tax. However, Refuge Revenue Sharing payments are more often less than the real estate tax.

The fact that Refuges put little demand on the infrastructure of a municipality, must be considered in assessing the financial impact on the municipality. For example, there is no extra demand placed on the school system, roads, utilities, police and fire protection, etc. There is a substantial body of literature that shows that development, especially residential development, actually costs a community more in schools, roads, sewers and other services than the tax revenue generated by the development (Land Trust Alliance, 1994).



The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, provides certain relocation benefits to home owners, businessmen, and farm operators who are displaced as a result of Federal land acquisition. The law provides benefits to eligible owners and tenants for reimbursement of reasonable moving expenses, replacement of housing payments under certain conditions, relocation assistance services, and reimbursement of certain expenses incurred in selling real property to the Government.

The owner of land adjacent to Refuge land or within an approved Refuge acquisition boundary or a Refuge Focus Area, retains any and all the rights, privileges, and responsibilities of private land ownership. This includes the right of access, hunting, vehicle use, control of trespass, right to sell to any party, and the obligation to pay real estate taxes. The Refuge controls uses only on the properties it owns.

### **Ecosystem Services**

Refuge lands provide substantial value to society through ecosystem services. These services (e.g., nutrient cycling, erosion control and sediment retention, water supply) represent benefits human populations derive, directly or indirectly, from ecosystem functions. Ecosystem services consist of the flow of material and energy from natural capital stocks (i.e., vegetation, minerals, the atmosphere) which combine with manufactured and human capital services to produce human welfare. Ecosystem services and the natural capital stocks that produce them are critical to the functioning of the earth's life support system. Appendix G lists 17 ecosystem services, the related ecosystem functions, and examples of how society benefits from them.

### **Accessibility**

Forsythe Refuge will operate its programs or activities so that when viewed in its entirety, it is readily accessible to and useable by disabled persons. The Rehabilitation Act of 1973, as amended, requires that programs and facilities be, to the highest degree feasible, readily accessible to and useable by all persons who have a disability.

### **Protection and Management of Cultural Resources**

The Service has a legal responsibility to consider the effects its actions have on archeological and historic resources. In implementing this CCP, the Service will comply with Section 106 of the National Historic Preservation Act before conducting any ground disturbing activities. Compliance may require any or all of the following: State Historic Preservation Records survey, literature survey, or field survey.

## **The Comprehensive Conservation Plan**

### **Summary Statement**

Under this CCP, all lands above mean high tide in the Holgate Unit of the Brigantine Wilderness Area are closed to motor vehicle use year-round in compliance with the provisions of the Wilderness Act. We are also initiating efforts to establish a seasonal boat concession to ferry anglers and other Refuge visitors to the southern tip of the Holgate Peninsula.

We will seek to increase Refuge staffing and funding levels and initiate new wildlife population, habitat, and ecosystem management activities; provide new compatible wildlife-dependent recreational opportunities; increase our land protection efforts; and construct new office and visitor facilities to support the goals and objectives of the Refuge.

We will place special emphasis on the six priority general public uses defined in the Refuge Improvement Act, i.e., hunting, fishing, wildlife observation and photography, environmental education and interpretation. Public use surveys, along with wildlife and habitat monitoring, will help us estimate the volume and impacts of public use, and adapt our management strategies for that use.

## **Refuge Goals, Objectives and Strategies**

This section presents long-term guidance for the Refuge in the form of goals, objectives and strategies. Refuge goals are qualitative statements that define what the Refuge must be to satisfy the Refuge purposes, legal mandates, and the needs of citizens and agencies having a vital interest in what and how the Refuge performs. These goals highlight specific elements of our vision statement which will be emphasized in future management. Objectives provide quantitative bench marks that indicate progress toward achieving Refuge purposes and goals. Strategies are specific actions or projects that will lead to the accomplishment of our objectives.

### **Goal 1. Protect and enhance Federal trust resources and other species and habitats of special concern.**

Objective 1. Continue managing the Refuge to support 25 nesting pairs of piping plovers at Holgate and 25 nesting pairs at Little Beach Island (total of 50 nesting pairs).

Strategies

- a. Continue closing all of the Holgate Peninsula and Little Beach Island, above and below the mean high tide line, to all public access during the piping plover breeding season (April through August). The piping plover is Federally-listed as threatened and State-listed as endangered. The southern tip of the Holgate may also be closed beyond September 1, to protect late-nesting black skimmers.
- b. Protect and monitor the piping plover (Federally listed threatened species).
- c. Continue management activities including:
  - identifying nests;
  - establishing exclosures to protect nests;
  - trapping mammalian predators in piping plover areas (e.g., raccoon, red fox and feral cats) (Map 4d on page 58);
  - monitoring plover numbers on a regular basis.

Objective 2. Manage the Refuge to protect the swamp pink, a Federally listed threatened species.

Strategies

- a. Protect and monitor the swamp pink.
- b. Implement management techniques to improve habitat quality or increase population size or vigor.

Objective 3. Expand our efforts to protect other endangered and threatened species on the Refuge.

Strategies

- a. Survey all Refuge lands for currently and potentially occurring threatened and endangered species (Federal and State-listed).

- b. Protect and manage any newly discovered occurrences to maintain or expand those populations.
- c. Conduct a feasibility assessment for sites where a listed species does not currently occur, but could potentially be restored. Attempt to restore species at restoration sites with a reasonable chance for success.

Objective 4. Manage the Brigantine Wilderness Area so as to protect and preserve its wilderness values. (See Map 2 on page 4.)

- Strategies
- a. By October 1, 2002, close all lands above mean high tide in the Holgate Unit to motor vehicle (also referred to as off-road vehicles or ORVs) use year-round.
  - b. Seasonal motor vehicle use (September through March) would continue under State law, only in the adjacent State-owned riparian lands, below mean high tide. The riparian lands are not part of the Refuge or the Wilderness Area.
  - c. Given the fact that the mean high tide line is difficult to identify on the ground, we will use the berm crest and/or wet sand/dry sand lines, which are more readily identifiable, as proxies on the beach at the Holgate Unit for the Wilderness boundary. All motorized vehicles will need to stay below the berm crest and wet sand/dry sand lines while they are on the Holgate Unit to avoid violating the Brigantine Wilderness Area. Educational efforts to familiarize anglers and refuge visitors with this new policy will be implemented beginning October 1, 2002.
  - d. Encourage greater use of the Wilderness Area by other Refuge visitors, in appropriate seasons and locations, through guided tours or Refuge special use permits. Restrict access to highly sensitive areas.
  - e. Scrutinize all planned management actions to determine if they are necessary to protect wilderness resources and determine the "minimum tool" needed to carry them out. We would not use a tool simply because it is the most comfortable, convenient, or least expensive.
  - f. Continue National Atmospheric Monitoring Program (NADP) and Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring programs. In addition, we would add air-borne mercury monitoring in partnership with the New Jersey Department of Environmental Protection (NJDEP), and provide technical assistance to local communities on air quality issues and Class I air space.
  - g. Develop a detailed step-down Wilderness Management Plan for the existing Brigantine Wilderness Area by 2005.
  - h. By 2010 conduct a Wilderness Review of all lands acquired since 1972 to determine what additional lands, if any, should be recommended for designation as part of the National Wilderness Preservation System.

Objective 5. Inventory, map and monitor Refuge wildlife and habitats.

- Strategies
- a. Conduct comprehensive baseline flora and fauna surveys of plants, invertebrates, fish, amphibians, reptiles, birds, and mammals.

- b. From the baseline surveys (including song bird point counts, frog call surveys, and Monitoring Avian Production and Survivorship banding stations), establish a long-term monitoring program (e.g., sample a group for five years, every 15 years).
- c. Implement species monitoring before and after major habitat management projects, and expand use of Geography Information Systems (GIS) to document and model species and habitat.
- d. Develop a computer archive of data and publications to ensure access to information for staff, partners, and the public.
- e. Use the results of baseline surveys, project evaluation surveys, and monitoring to develop, evaluate, and revise management objectives for wildlife populations, habitat, and public use.
- f. Set aside Little Beach Island and adjacent salt marshes as a representative natural barrier island complex. A study would be undertaken to determine what species should be represented on the Island, yet are absent because of past human disturbance. Those plant and animal species would then be restored so that the Island could act as a colonizing source to New Jersey's other barrier islands. Research would also be conducted to determine the impact of beach use on beach/dune dynamics, comparing Holgate and Little Beach Island.
- g. Encourage research not only by identifying needs, but in co-developing research proposals and pursuing funding through Service and non-Service sources. New research would include the:
  - impact of mosquito control techniques, such as pesticide applications and Open Marsh Water Management (OMWM), on habitat and wildlife;
  - impact of different kinds and levels of public use on habitat and wildlife;
  - impact of public use on the dynamics of beach and shoreline environment;
  - impact of watershed development on water quality/quantity and wetland resources;
  - impact of restoring pre-colonial ecology of the southern New Jersey coastal landscape (e.g., role of fire, plant and animal community composition);
  - assessment of ecological integrity of the landscape based upon proposed land protection and management.

Objective 6. Expand efforts to protect and enhance other species and habitats of special concern.

Strategies a. Provide technical assistance to local communities and partners, on wildlife-related issues (e.g., wildlife and habitat monitoring; contaminant spill planning/response).

- b. Initiate efforts to restore colonial nesting birds to barrier and bay islands. Initiate research, if necessary, to determine limiting factors to successful restoration of bird colonies.
- c. Initiate efforts to identify and manage critical habitat on the Refuge for interjurisdictional fish. This would be covered in a step-down Wildlife Population Management Plan.
- d. Continue current trapping efforts under contract and Refuge special use permits (Maps 4a, b, c and d, beginning on page 55) to:
  - protect Refuge infrastructure (e.g., muskrats that burrow in Refuge dikes);
  - maintain furbearer populations at levels consistent with objectives for Refuge and surrounding habitat would be continued.
- e. Expand public trapping opportunities for raccoon, fox, muskrat, coyote and beaver, under Refuge special use permits (Maps 4a, b, and c beginning on page 55), to better manage furbearer populations in the:
  - Reedy Creek area in Brick Township;
  - Stouts Creek area in Lacey Township;
  - Four Mile Branch Bogs area in Stafford Township.

**Goal 2. Maintain and/or restore natural ecological communities to promote healthy, functioning ecosystems.**

Objective 1. Complete the revision of the step-down Habitat Management Plan for the Refuge by 2002.

- Strategies
- a. Use existing preliminary habitat prescriptions for all currently owned Refuge lands as the basis for the step-down plan. These prescriptions were developed to provide habitat management objectives that characterize a desired physiognomic condition (major vegetative structure, e.g., forest, grassland, brush, marsh) and hydrologic regime (e.g., upland, tidal wetland, non-tidal wetland). (See Maps 5a, b, c and d beginning on page 59.)
  - b. Consider habitat requirements for endangered or other high priority trust resources (e.g., piping plover) and ecological communities with special emphasis (e.g., Atlantic white cedar swamps) in establishing site specific prescriptions.
  - c. Implement the following guiding principles in developing specific habitat prescriptions:
    - restore salt marshes to pre-grid-ditched hydrology;
    - maximize grasslands or fields for open land character;

- maximize forests for interior character;
- maintain scrub/shrub between forest and grassland to create soft boundaries;
- buffer sensitive areas;
- use only native plant species and local genotypes in restoration projects;
- favor low maintenance habitat strategies, taking advantage of driving systems processes;
- use pre-colonial baseline to define native species, community composition, and landscape configuration;
- use natural regeneration to convert or restore habitat types, unless there are no seed sources, there are threats from exotic species, or physical stabilization is required.

d. Develop and implement a private lands habitat restoration plan in cooperation with other agencies and organizations that have private lands programs, such as the Service's Ecological Services Division, and the U.S. Department of Agriculture's Natural Resource Conservation Service and Forest Service.

- Objective 2. Manage 27,956 acres as Salt Marsh by maintaining 5,547 acres of existing pristine unditched marsh that is part of the Brigantine Wilderness Area, restoring 22,388 acres of parallel grid-ditched marsh to pre-ditching hydrology, and restoring 12 acres of Dredged Lagoon, three acres of Developed land, and two acres of Upland Brush.
- Objective 3. Manage 5,659 acres of Upland Forest by maintaining 4,841 acres of existing Upland Forest, converting 733 acres from Upland Brush and 30 acres from Crop-Pasture by allowing them to regrow, and restoring 49 acres of Developed land, three acres of Dredged Lagoon, and a three acre Sand-Gravel Pit.
- Objective 4. Maintain 1,685 acres of existing marsh in the Brigantine and Barnegat Impoundment Systems. Actively manipulate water levels and flow throughout the year to produce mud flats, deep water (with submerged aquatic vegetation), moist soil (with annual wetland plants), and salt marsh. Obtain additional resources needed to replace obsolete water control structures and continue rehabilitation of the dikes.
- Objective 5. Maintain 589 acres as barrier island Dune-Beach habitat; the actual acreage would vary based on the highly dynamic shoreline changes. Most of the acreage lies within the Brigantine Wilderness Area (Holgate Unit and Little Beach Island), and, with the exception of control for exotic species, would be left largely to natural processes. Create 11 acres of barrier island Dune-Beach habitat from a Dredge Spoil site.
- Objective 6. Maintain 581 acres of existing Wetland Forests and restore 2 acres from a Sand-Gravel Pit. Additional research may support Atlantic White Cedar restoration in current Wetland Forest sites.

- Objective 7. Maintain 197 acres of existing Wetland/Bog Brush, generally in a complex with Cedar Swamp Forests. Restore one 36 acre site, Cedar Run Bog, a former diked cranberry bog, to its pre-diked shoreline and open fish passage.
- Objective 8. Manage 196 acres of early succession Brushy Uplands by maintaining 112 acres in a brushy state through use of mechanical or fire techniques, converting 34 acres of Crop-Pasture or Developed Land to brush by allowing it to regrow, and setting back 50 acres of Upland Forest to a brushy state.
- Objective 9. Manage 178 acres of Grassland habitat (native grasses and forbs) by restoring 139 acres of Developed Lands (includes dikes of impoundments), 24 acres of Crop-Pasture, 15 acres of Dredge Spoil Site, and 15 acres of Upland Brush. Actively restore areas currently covered with grasses and forbs that are dominated by exotic and invasive species, to native species.
- Objective 10. Maintain 118 acres in salt marshes and bays of the estuary as Forest Island, and rehabilitate 93 acres of Dredge Spoil sites.
- Objective 11. Maintain 96 acres as Open Fresh Water, with a priority to remove any fish passage obstructions. Monitor non-Refuge navigable waters for water quality and fish and wildlife use in cooperation with the State.
- Objective 12. Maintain 45 acres of existing Fresh Non-tidal Marsh.
- Objective 13. Maintain 24 acres of existing Pitch-Pine Lowland Forest.
- Objective 14. Maintain 239 acres of existing Cedar Swamp Forest and restore 20 acres of Sand-Gravel Pit.
- Objective 15. Seventeen acres associated with offices and other Refuge facilities would remain Developed Land. Landscape these areas with native plants to support Refuge activities and reduce negative impacts on wildlife.
- Objective 16. Maintain 15 acres of existing Dredged Lagoon unless further study indicates that it could be converted to another cover type, such as Salt Marsh, in a legal and ecologically sound manner.
- Objective 17. Complete the revision of the step-down Fire Management Plan and Burn Prescriptions in 2001 and apply prescribed fire to all of the upland habitats.
- Strategies
- a. Upland Forest - burn once every 8-15 years to reduce hazardous fuel, overstory stand density, and understory density, increase heath or grass/forb density, and control invasive species.
  - b. Upland Brush - burn once every 5-15 years to reduce hazardous fuel, set back succession, and control invasive species.
  - c. Grassland - burn once every 1-3 years to reduce hazardous fuel, set back succession (woody growth), and control invasive species.
  - d. Refine burn frequency and prescriptions through research and monitoring.

Objective 18. Develop and implement an Integrated Pest Management (IPM) program with control strategies for phragmites and at least six other problem species by 2003.

- Strategies
- a. Continue a combination of herbicide use, prescribed burning, mowing and water level management to remove approximately 150 acres of phragmites per year in Refuge impoundments.
  - b. Survey invasive and overabundant species on the Refuge.
  - c. Establish a monitoring program, in concert with habitat monitoring, to assess progress and identify additional problem species.
  - d. Research alternative methods of controlling certain species.
  - e. Offer technical assistance and support on invasive species control efforts on nearby public and private lands.
  - f. Continue public hunting to control populations of snow geese and resident Canada geese. Continue nest disruption efforts on the Refuge to limit production of resident Canada geese. Continue these activities until further planning prescribes other actions.

Objective 19. Reduce use of pesticides on the Refuge.

- Strategies
- a. Continue current levels of pesticide use for phragmites and mosquito control, which largely follow an Integrated Pest Management (IPM) approach, until acceptable substitutes are identified.
  - b. Complete renegotiation of the Cooperative Agreement with county mosquito control agencies and the State regarding mosquito control activities on the Refuge.
  - c. Aggressively pursue alternatives to pesticide use.
  - d. Offer technical assistance on IPM strategies to local communities for controlling common problem species.

**Goal 3. Establish a land protection program to support species, habitat and ecosystem goals.**

Objective 1. Acquire the remaining 12,300 acres of privately owned land within the currently approved 56,600 acre Refuge acquisition boundary. The approved Refuge acquisition area includes the 535-acre New Jersey Division of Fish and Wildlife's Forked River State Game Farm in Lacey Township. (See Maps 3a, b, c and d beginning on page 51.)

- Strategies
- a. Continue buying from willing sellers and focusing our land acquisition efforts on developable upland properties first.
  - b. Obtain the \$19.7 million in funding needed to acquire the remaining 12,300 acres of land within the approved Refuge acquisition area (average cost of \$1,600 per acre). (The average annual Land and Water Conservation appropriation for this Refuge, based on the five-year period, FY-1995/1999, is \$1,700,000.)



- c. Maintain the present level of participation in off-Refuge land use planning efforts with governmental and private partners (e.g., the Barnegat Bay National Estuary Program and the Jacques Cousteau National Estuarine Research Reserve).

Objective 2. Work to protect 3,348 acres of wildlife habitat essential to the long-term ecological integrity of the Refuge. (See Maps 3a, b, c and d beginning on page 51 and Appendix M on page 165.)

- Strategies
- a. Acquire 3,348 acres, which were defined in cooperation with the State, local municipalities and our conservation partners.
  - b. Obtain the \$11 million in funding needed to acquire all 3,348 acres (average cost of \$3,300 per acre). (This would require increasing the average annual Land and Water Conservation Fund appropriation for Forsythe Refuge by about \$800,000 for the next fifteen years. For the five-year period, FY-1995/1999, the average annual Land and Water Conservation funding for this Refuge was about \$1.7 million.)
  - c. Expand our land planning efforts with municipalities, counties, and the State.
  - d. Expand our efforts to work with public and private landowners to implement wildlife habitat protection and restoration off Service-owned land.

**Goal 4. Provide opportunities for high-quality compatible, wildlife-dependent public use.**

Objective 1. Continue to provide compatible deer hunting opportunities, by permit, in the following Deer Management Zones (DMZs) ( Maps 6a, b, and c beginning on page 63.):

- a. DMZ 56 in Atlantic County, south of Stoney Hill Road (20 permits for shotgun season);
- b. DMZ 57 in Atlantic County, north of Stoney Hill Road (35 permits for shotgun season, 35 permits for bow season, and 35 permits for muzzle loader season);
- c. DMZ 58 in Burlington and Ocean Counties (50 permits for shotgun season, 35 permits for bow season, and 40 permits for muzzle loader season).

Objective 2. Expand compatible big game hunting opportunities on the Refuge by 2003. (See Maps 6a, b, and c beginning on page 63.)

- Strategies
- a. Initiate a universally accessible hunt in DMZ 56 during the permit shotgun or permit muzzle loader seasons.
  - b. Expand deer hunting opportunities in DMZ 58 to include:
    - Forked River Game Farm, Lacey Township;
    - Former AT&T property, Lacey Township;

- Selected properties east of US Route 9, Eagleswood, Stafford, and Barnegat Townships;
  - Middle Branch of Forked River, Lacey Township (permit bow season only);
  - Cedar Run Creek between the Garden State Parkway and Route 9, in Stafford Township (permit bow season only).
- c. Weigh the following factors in expanding big game hunting opportunities:
- the size and configuration of new Refuge-owned properties;
  - the availability of public access;
  - safety considerations including the State mandated 450-foot safety zone around buildings and playgrounds.
- d. Reduce big game hunting activities if we determine that incompatible levels of use are occurring.

Objective 3. Provide compatible game hunting opportunities on the Refuge by 2005.

- Strategies
- a. Initiate the Refuge's first upland game hunting opportunities in the Oak Island Unit of the Brigantine Division, Bass River Township, Ocean County. (See Map 7 on page 66.)
  - b. Establish a parking and sign-in area at the old McDonald house site, located on Route 9 in New Gretna.
  - c. Weigh the following factors in expanding upland game hunting opportunities:
    - the size and configuration of new Refuge-owned properties;
    - the availability of public access;
    - safety considerations including the State mandated 450-foot safety zone around buildings and playgrounds.
  - d. Reduce upland game hunting activities if we determine that incompatible levels of use are occurring.

Objective 4. Continue to provide compatible migratory bird hunting opportunities on the Refuge.

- Strategies
- a. Continue current waterfowl, rail and moorhen hunting opportunities in designated hunt units on about 40% of Refuge lands. (See Maps 8a, b, c, and d beginning on page 67.)
  - b. Continue to allow migratory game bird hunting in salt marshes that are in designated migratory game bird hunt units within the Brigantine Wilderness Area.

- c. Make the following changes in current migratory game bird hunting opportunities:
  - allow foot access to Brigantine Division Unit 5, Little Egg Harbor Township;
  - allow jump shooting in Barnegat Division Unit A, from Jeremy Point in Little Egg Harbor Township to Cedar Run Creek in Eagleswood Township;
  - eliminate foot access and jump shooting in part of Barnegat Division Unit A from Cedar Run Creek in Eagleswood Township, to Beach Haven West in Stafford Township;
  - allow jump shooting and eliminate site requirements in the Barnegat Division Unit C, Clam Island.
- d. Make detailed maps of the migratory game bird hunting units available at Refuge headquarters.

Objective 5. Expand compatible migratory game bird hunting opportunities on the Refuge by 2003.

- Strategies
- a. Open additional areas for waterfowl hunting within the following areas (Maps 8a, b, c and d beginning on page 67):
    - Reedy Creek in Brick Township;
    - Stouts Creek property in Lacey Township;
    - Forked River Game Farm in Lacey Township;
    - Former AT&T property, in Lacey Township;
    - Cedar Run Creek, between Route 9 and the Garden State Parkway, in Stafford Township.
  - b. Weigh the following factors in expanding migratory game bird hunting opportunities
    - the size and configuration of new Refuge-owned properties;
    - the availability of public access;
    - safety considerations including the State mandated 450-foot safety zone around buildings and playgrounds.
  - c. Reduce migratory bird hunting activities if we determine that incompatible levels of use are occurring.

Objective 6. Continue to provide compatible fishing opportunities on the Refuge. (See Maps 9a and b beginning on page 71.)

- Strategies
- a. Operate the boat launching ramp and car parking at Scotts Landing (Atlantic County, Galloway Township).
  - b. Provide freshwater fishing opportunities at Lilly Lake (Atlantic County, Galloway Township), including bank fishing from the south shore and boat fishing. Boats may not have internal combustion engines.
  - c. Upgrade saltwater fishing and crabbing opportunities at:
    - Cedar Creek, Stafford Avenue, Stafford Township, Ocean County;
    - Cedar Run, Cedar Run Dock Road, Eagleswood Township, Ocean County;
    - Parker Run, Dock Street, Little Egg Harbor Township, Ocean County.
  - d. Motorized vehicles are not permitted beyond designated parking areas at any of these locations.

Objective 7. Expand compatible fishing opportunities on the Refuge. (See Maps 9a and b beginning on page 71.)

- Strategies
- a. Provide the following new fishing opportunities:
    - universally accessible saltwater fishing and crabbing opportunities on the Mullica River (Atlantic County, City of Port Republic) off U. S. Route 9 by 2005;
    - upgrade the saltwater fishing & crabbing opportunities at Cedar Creek, Cedar Run Creek and Parker Run by 2006;
    - a universally accessible freshwater fishing pier at Cedar Run Bog (Ocean County, Stafford Township) west of U. S. Route 9 by 2007.
  - b. Develop a Refuge fishing guide.
  - c. We will investigate the possibility of establishing an experimental shuttle service which would take anglers and other refuge visitors from a convenient location to the tip of the Holgate Unit from September through mid-November.
  - d. Open Little Beach Island (Atlantic County, Galloway Township) through Refuge special use permits to seasonal (September through March) surf fishing. Use these special use permits to limit the numbers and impacts of visitors to the island. Seasonal surf fishing at Little Beach Island is authorized under the Code of Federal Regulations (CFR) 50, section 32.49.
  - e. Offer seasonal saltwater surf fishing opportunities within the Brigantine Wilderness Area at the Holgate Unit when the beach is open to public access from September through March. Access either by foot, both above and below mean high tide, or by motorized vehicle driving only below mean high tide.
  - f. Reduce fishing activities if we determine that incompatible levels of use are occurring.

Objective 8. Continue to provide compatible wildlife observation and photography opportunities on the Refuge. (See Maps 10a, b, c and d beginning on page 73.)

Strategies

- a. Visitors would continue to be able to observe and photograph wildlife:
  - along the Wildlife Drive and from its two observation towers and associated foot trails;
  - on the newly developed trail at Reedy Creek in Brick Township;
  - from the observation deck at the Barnegat impoundments;
  - seasonally (from September through March) at the Holgate Unit of the Brigantine Wilderness Area.
- b. Allow Refuge visitors to bicycle and walk on the Wildlife Drive.
- c. Monitor and periodically review these activities to determine if they are negatively impacting wildlife resources or create conflicts with other users. Curtail these activities if it is determined that impacts or conflicts are occurring.

Objective 9. Expand compatible wildlife observation and photography opportunities on the Refuge. (See Maps 10a, b, c and d beginning on page 73.)

- a. Open new foot trails, with appropriate parking areas, entrance kiosks, and interpretive wayside signs at the following locations:
  - Four Mile Branch Bogs, Stafford Township by 2005;
  - Stouts Creek (Murray Grove), Lacy Township by 2008;
  - Cedar Run Bog, Stafford Township by 2010;
  - Collinstown Road, Barnegat Township by 2014.
- b. Provide new wildlife observation and photography opportunities as follows:
  - complete the existing trail and add an observation platform at the Reedy Creek Trail in Brick Township by 2007;
  - construct universally accessible observation platforms, with appropriate parking areas, at Bonnet Island, Stafford Township by 2006, & off the Wildlife Drive, overlooking the Experimental Pool by 2003;
  - develop parking sites & kiosks for canoeists & kayakers at Westecunk Creek by 2008 & Cedar Run Creek by 2012.
- c. Offer seasonal wildlife observation and photography opportunities at the Holgate Unit of the Brigantine Wilderness Area, when the beach is open for public access from September through March. Access would be either by foot or motorized vehicles driving below mean high tide.

- d. Open Little Beach Island (Atlantic County, Galloway Township) through Refuge special use permits to seasonal (September through March) wildlife observation and photography. We would use these special use permits to limit the numbers and impacts of visitors to the island.
- e. Reduce wildlife observation and photography activities if we determine that incompatible levels of use are occurring.

Objective 10. Continue to provide compatible environmental education and interpretation opportunities both on and off the Refuge. (See Maps 10a, b, c and d beginning on page 73.)

- Strategies
- a. Complete the renovation of the Refuge auditorium, and installation of new displays.
  - b. Provide class visit planning and informational assistance as needed.
  - c. Provide Refuge special use permits to environmental education classes for such activities as seining or collecting soil, water, or vegetation samples.
  - d. The newly developed Friends of Forsythe would give occasional group tours of the wildlife drive, when requested in advance.
  - e. Maintain the interpretive signs and provide Refuge brochures at all of our existing Refuge public use sites.

Objective 11. Expand compatible environmental education and interpretation opportunities both on and off the Refuge. (See Maps 10a, b, c and d beginning on page 73.)

- Strategies
- a. Increase our participation in local environmental education and outreach events.
  - b. Develop and initiate outreach to groups and organizations with which the Service has not typically interacted.
  - c. Stress the importance of conservation for maintaining all citizens' quality of life, and emphasize the positive and negative impacts of people on wildlife, including the impacts of personal water craft in our outreach efforts and environmental education.
  - d. Increase the availability of interpretive opportunities and information:
    - in new and existing public use areas;
    - develop two outdoor classroom sites along the Wildlife Drive;
    - provide teacher workshops;
    - develop a Refuge video;
    - develop wildlife learning materials for children;
    - develop materials focusing on hunters and anglers;

- develop five new Refuge brochures;
  - increase involvement and partnership with the educational community;
  - add scheduled seasonal nature tours at the Wildlife Drive, the Holgate Unit of the Brigantine Wilderness Area, and Reedy Creek (with the help of partners such as Friends of Forsythe).
- e. Develop partnerships with the New Jersey Department of Environmental Protection, local chambers of commerce, and others to emphasize the values of wilderness and:
- increase the public's understanding and appreciation of the Brigantine Wilderness Area;
  - identify new compatible uses for the area;
  - identify other alternatives to enhance the Wilderness quality and value to local communities of the Brigantine Wilderness Area.
- f. Conduct outreach to increase awareness of the Brigantine Wilderness Area, using TV, calendars, posters, presentations, etc..
- g. Reduce environmental education and interpretation activities if we determine that incompatible levels of use are occurring.

Objective 12. Increase our resource protection and visitor safety efforts on the Refuge.

Strategies a. Hire three new full-time Park Rangers, in addition to our current law enforcement staff, to better protect resources and visitors.

Objective 13. Provide new headquarters and visitor facilities on the Refuge. (See Maps 11a, b, and c beginning on page 77.)

Strategies a. Construct new Refuge headquarters office and visitor center building(s) at the Brigantine Division by 2008. Provide office space for Refuge employees, as well as for the Service's New Jersey Field Office and Law Enforcement employees. Consider providing office space for personnel from our conservation partners (e.g., National Oceanic and Atmospheric Administration, National Marine Fisheries Service, New Jersey Division of Fish and Wildlife, etc.).

- b. Conduct a Site Requirement Analysis. We have identified several potential sites for the new facility at the Brigantine Division (see Map 11c on page 79), including:
- the current headquarters area in Galloway Township;
  - the Arboretum Tract area in Galloway Township;
  - the King's Highway area in Galloway Township;
  - the Nacote Creek/Chestnut Neck area in Port Republic;

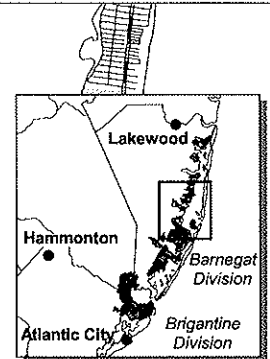
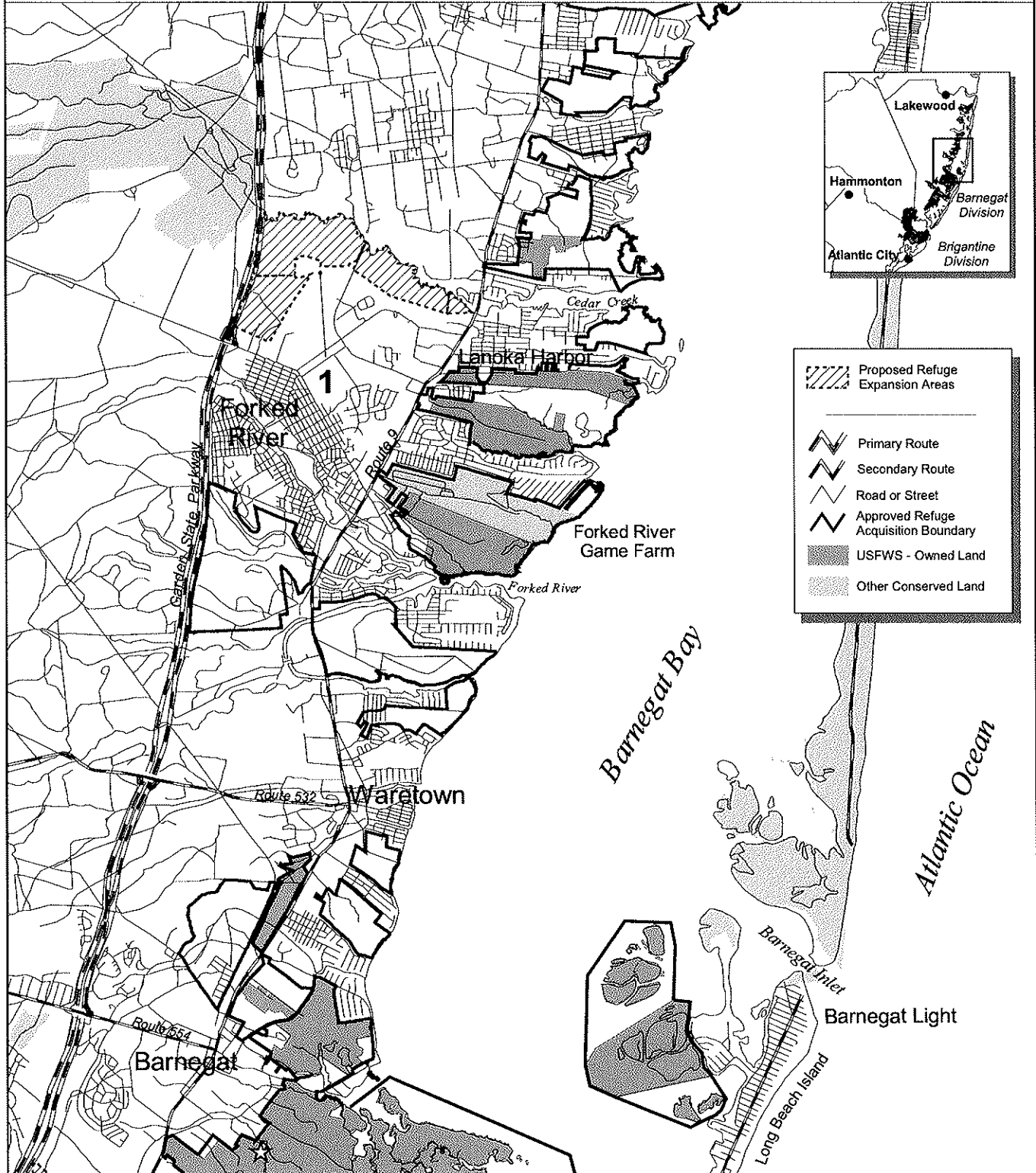
- the Sim's Mansion area in Bass River Township;
  - the Werbler Tract area in Little Egg Harbor Township.
- c. The final decision on the location and construction of a new headquarters office and visitor center building(s) will be evaluated in a separate NEPA document at a later date. Criteria for site selection include:
- buildable area;
  - wetland buffers;
  - buffers to neighbors;
  - impact on open space;
  - existing sewer and water service;
  - proximity to major road;
  - site impacts of building or parking areas;
  - changes to the neighborhood;
  - view and access to trails and other visitor resources.
- d. Construct a new office and visitor contact building for the Barnegat Division along U.S. Route 9 in Ocean Township, Ocean County by 2008. The proposed site for the new facility is shown in Map 11b on page 78.



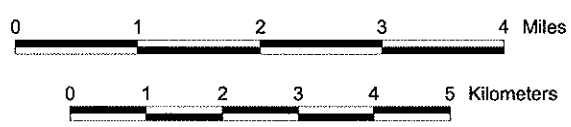
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# Proposed Refuge Expansion Areas

*Edwin B. Forsythe National Wildlife Refuge  
Barnegat Division, Ocean County, New Jersey, Group A*



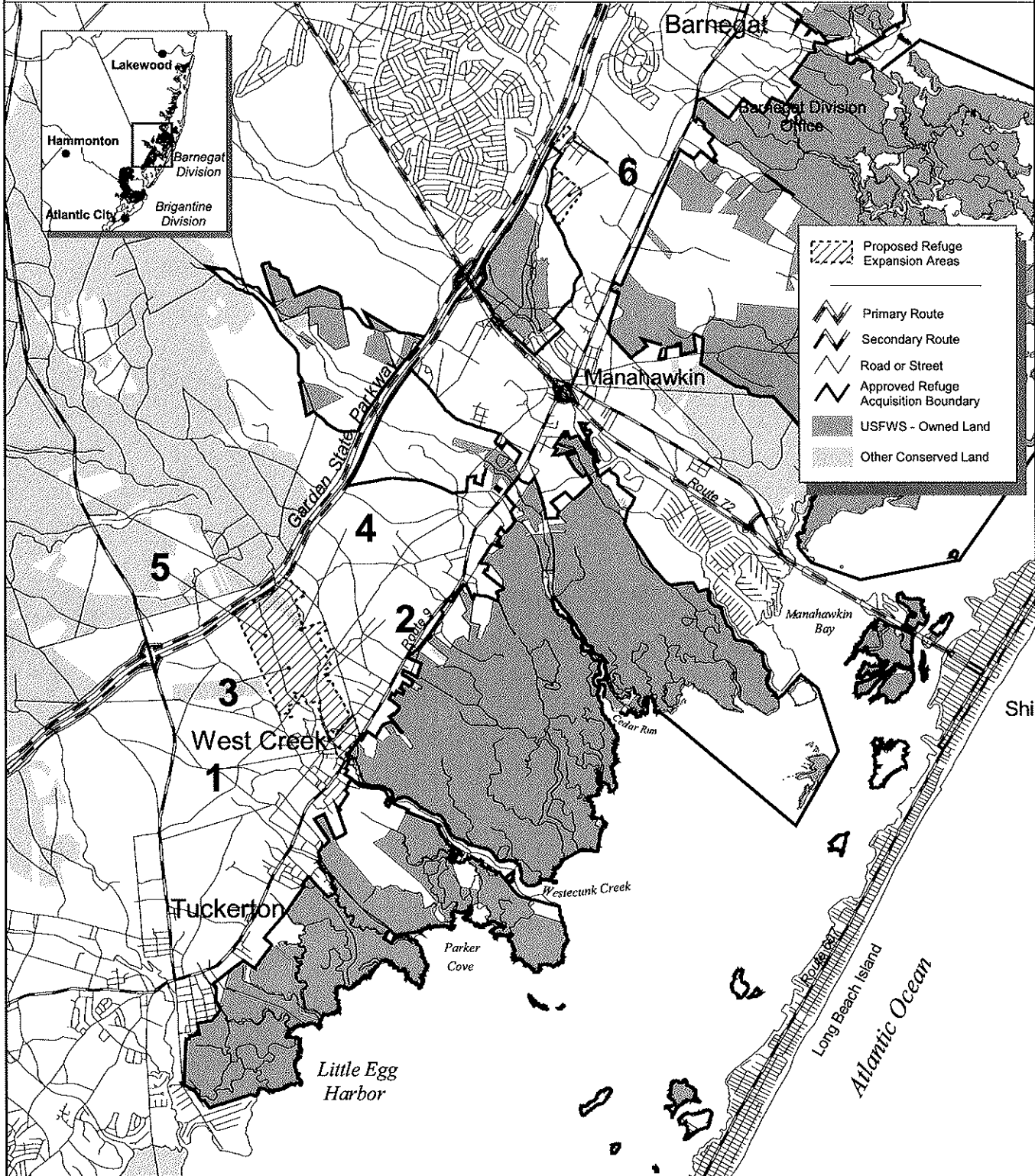
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 USFWS - refuge boundaries &  
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 Map prepared for Jersey Coast Refuges  
 Comprehensive Conservation Plan,  
 November 2001.  
 This map is for planning purposes only.



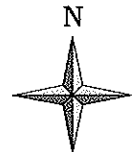
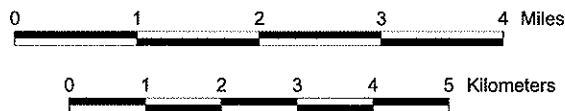
# Proposed Refuge Expansion Areas

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey, Group B*



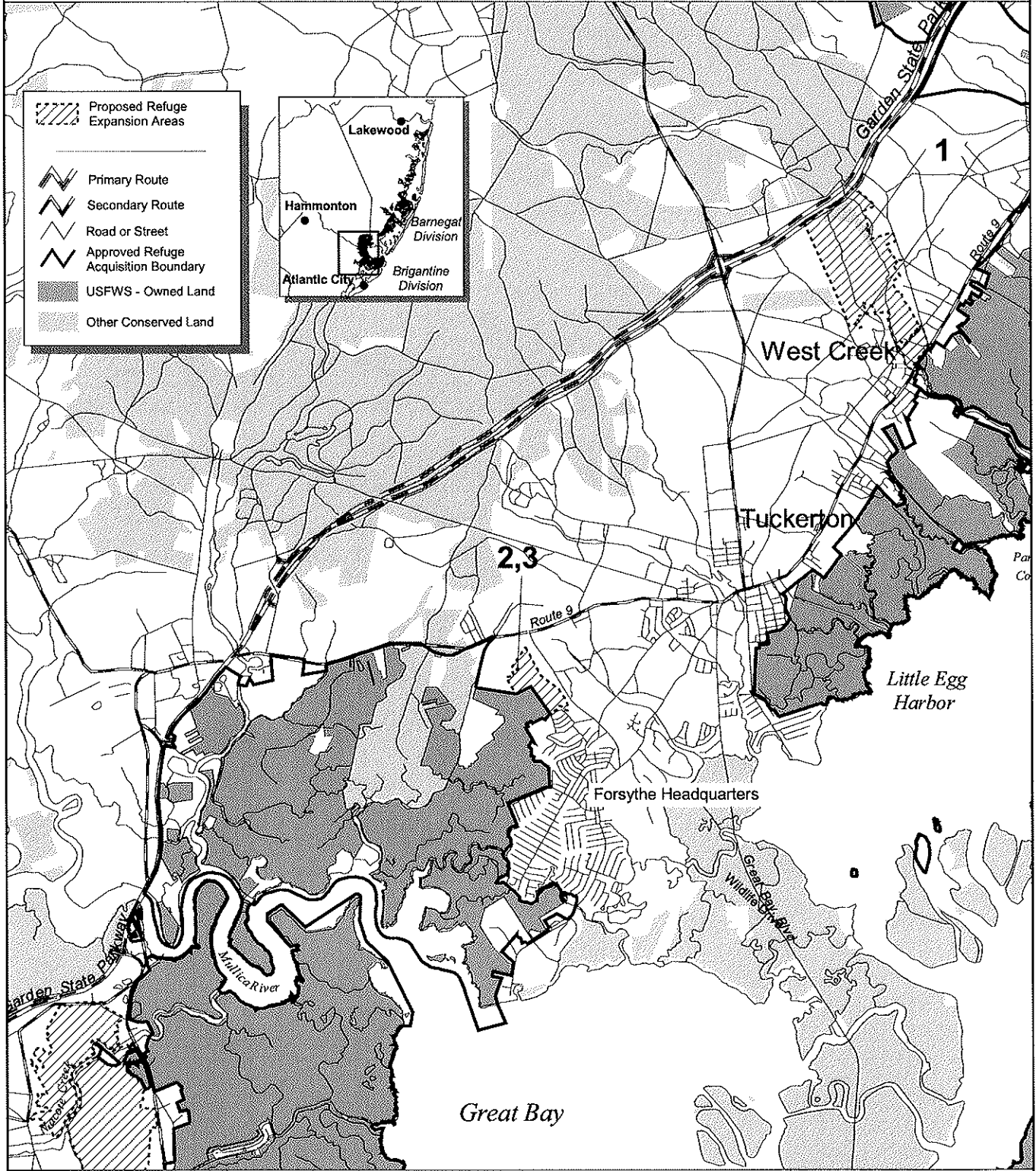
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# Proposed Refuge Expansion Areas

## Edwin B. Forsythe National Wildlife Refuge

Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey, Group C

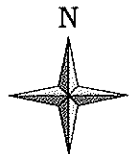


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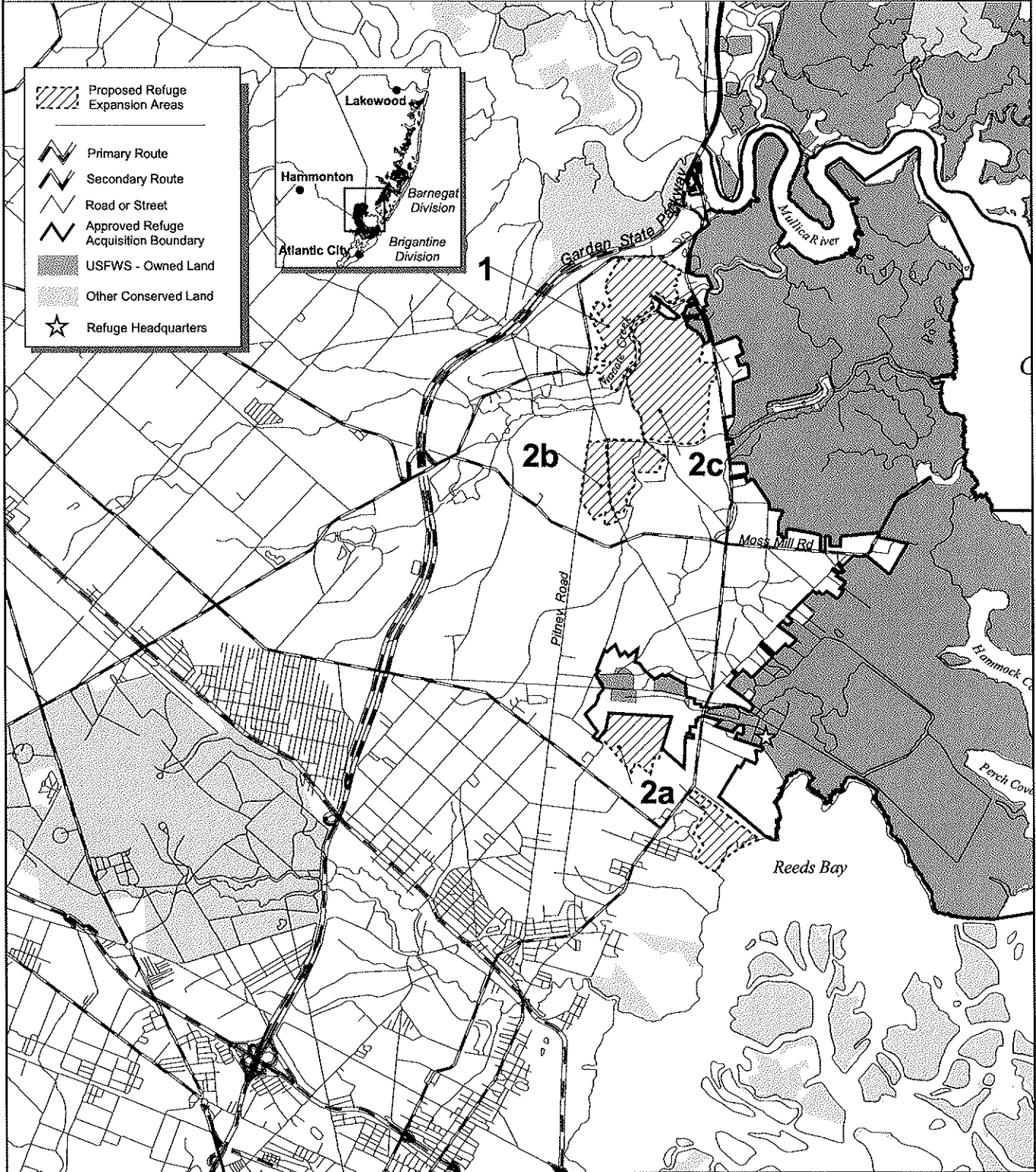
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# Proposed Refuge Expansion Areas

## *Edwin B. Forsythe National Wildlife Refuge*

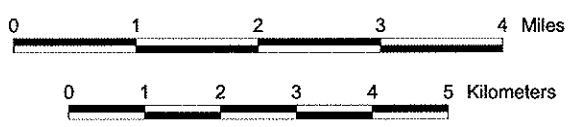
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**Proposed Refuge Expansion Areas**

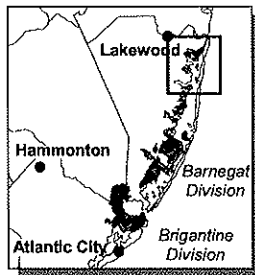
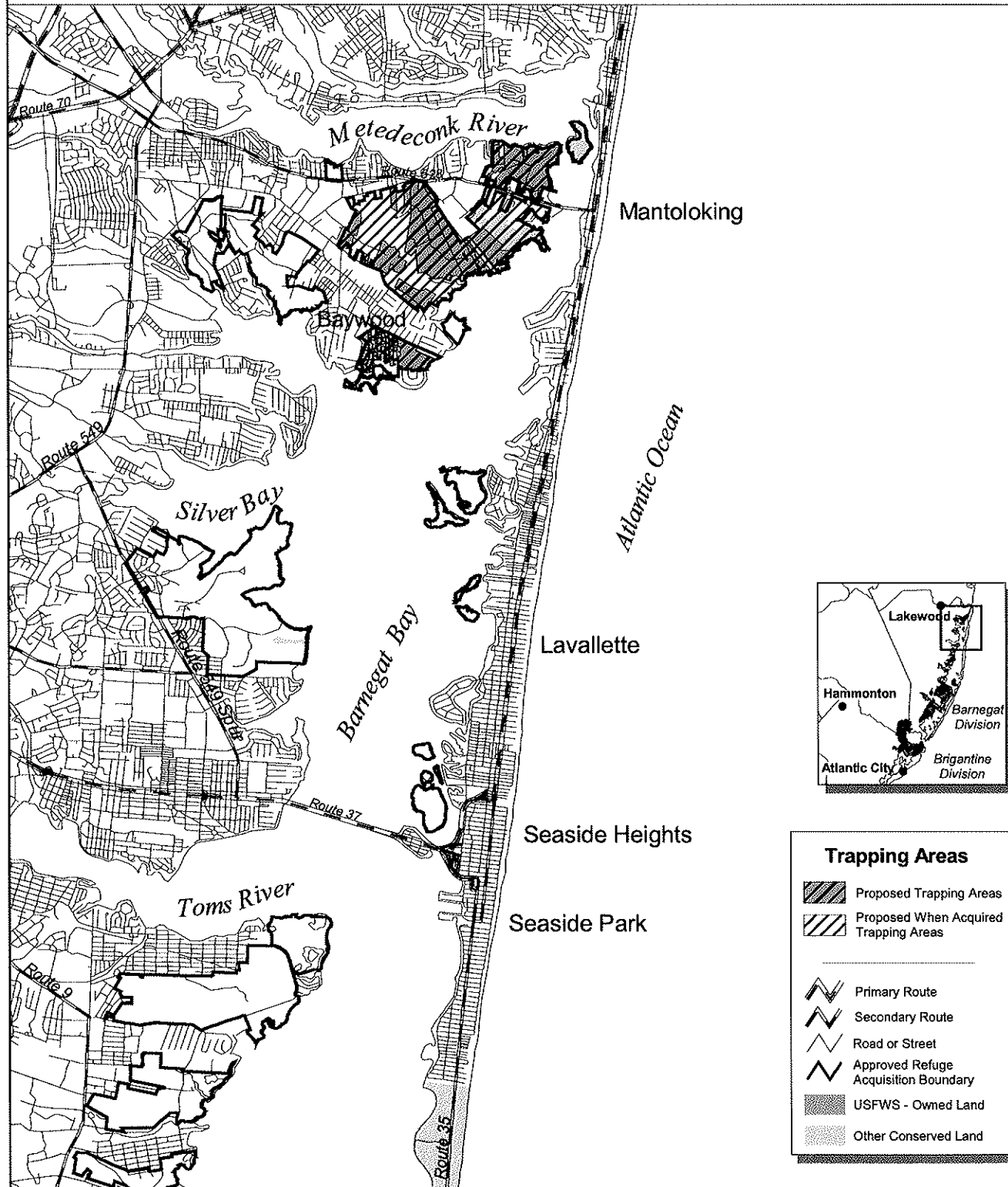
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- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land
- Refuge Headquarters

Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
 USFWS - refuge boundaries &  
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# Trapping Areas

*Edwin B. Forsythe National Wildlife Refuge  
Barnegat Division, Ocean County, New Jersey*



**Trapping Areas**

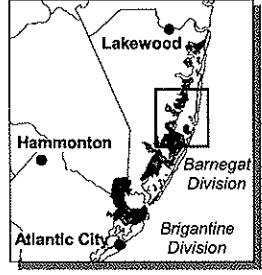
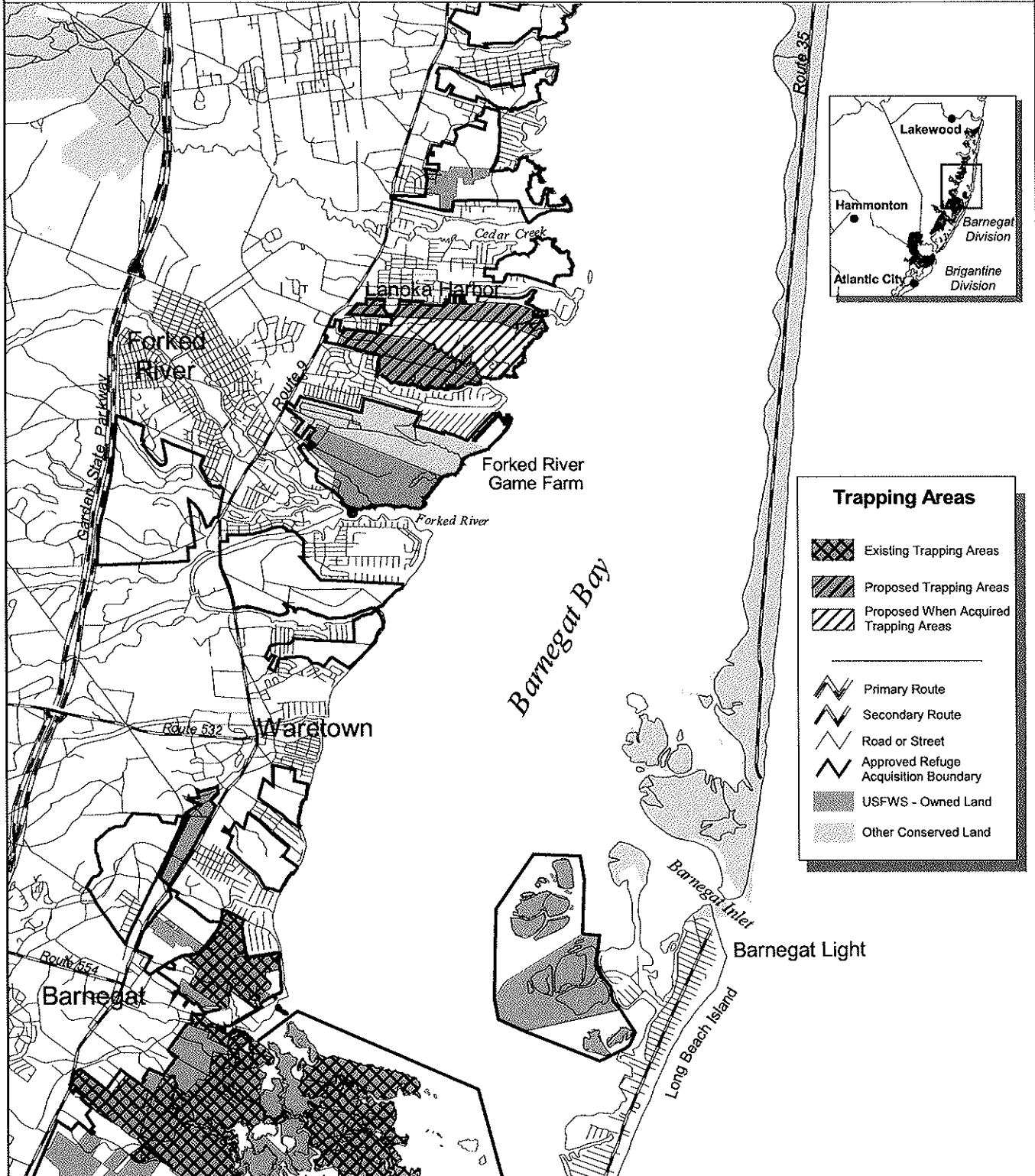
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- Proposed When Acquired Trapping Areas
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land

Data Sources:  
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# Trapping Areas

*Edwin B. Forsythe National Wildlife Refuge  
Barnegat Division, Ocean County, New Jersey*



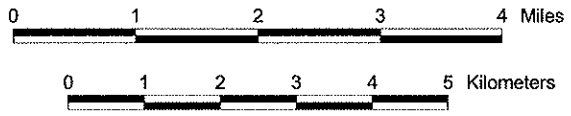
**Trapping Areas**

- Existing Trapping Areas
- Proposed Trapping Areas
- Proposed When Acquired Trapping Areas

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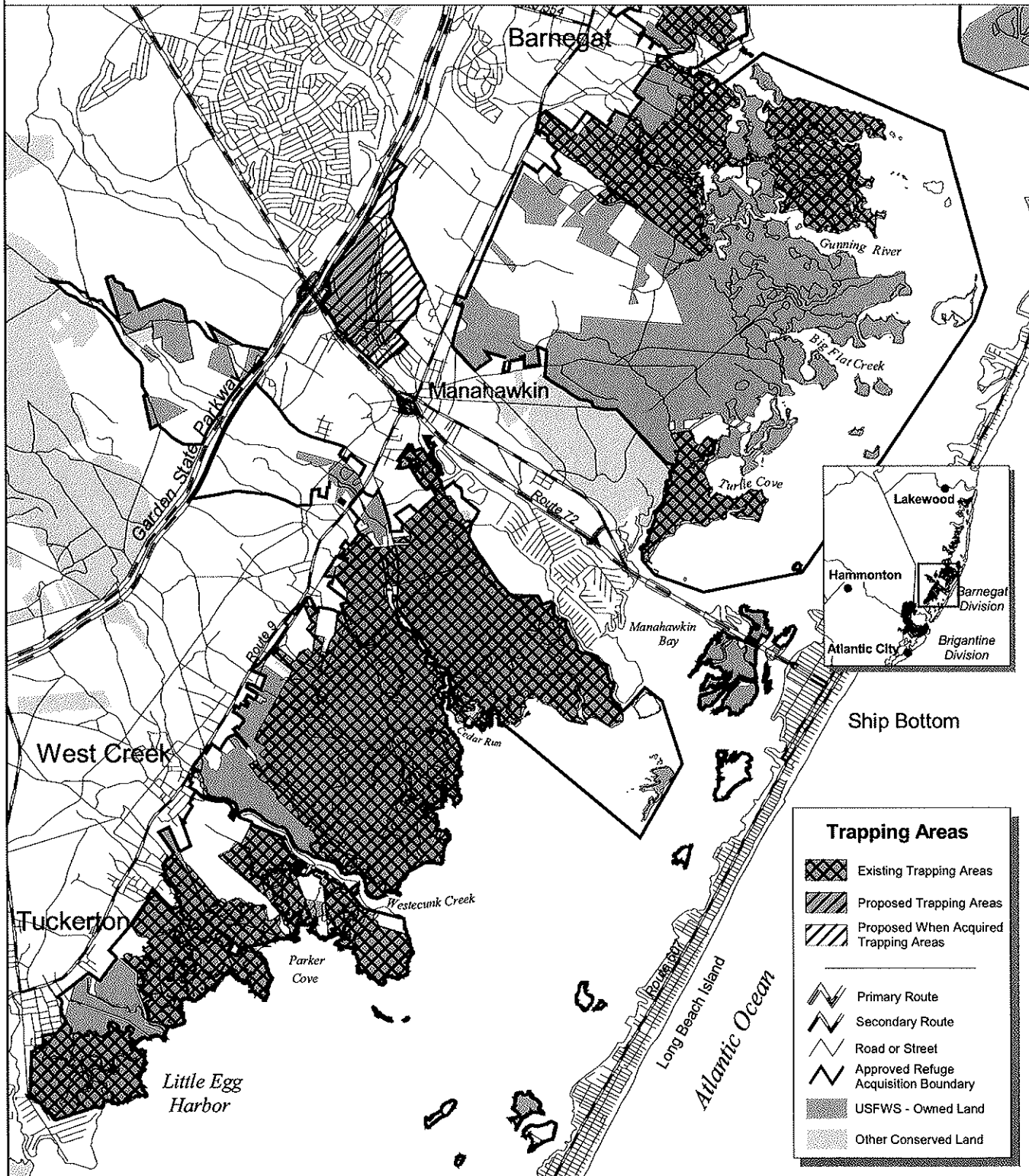
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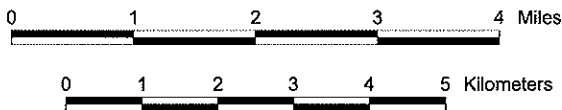


# Trapping Areas

*Edwin B. Forsythe National Wildlife Refuge*  
 Barnegat Division, Ocean County, New Jersey



Data Sources:  
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**Trapping Areas**

- Existing Trapping Areas
- Proposed Trapping Areas
- Proposed When Acquired Trapping Areas

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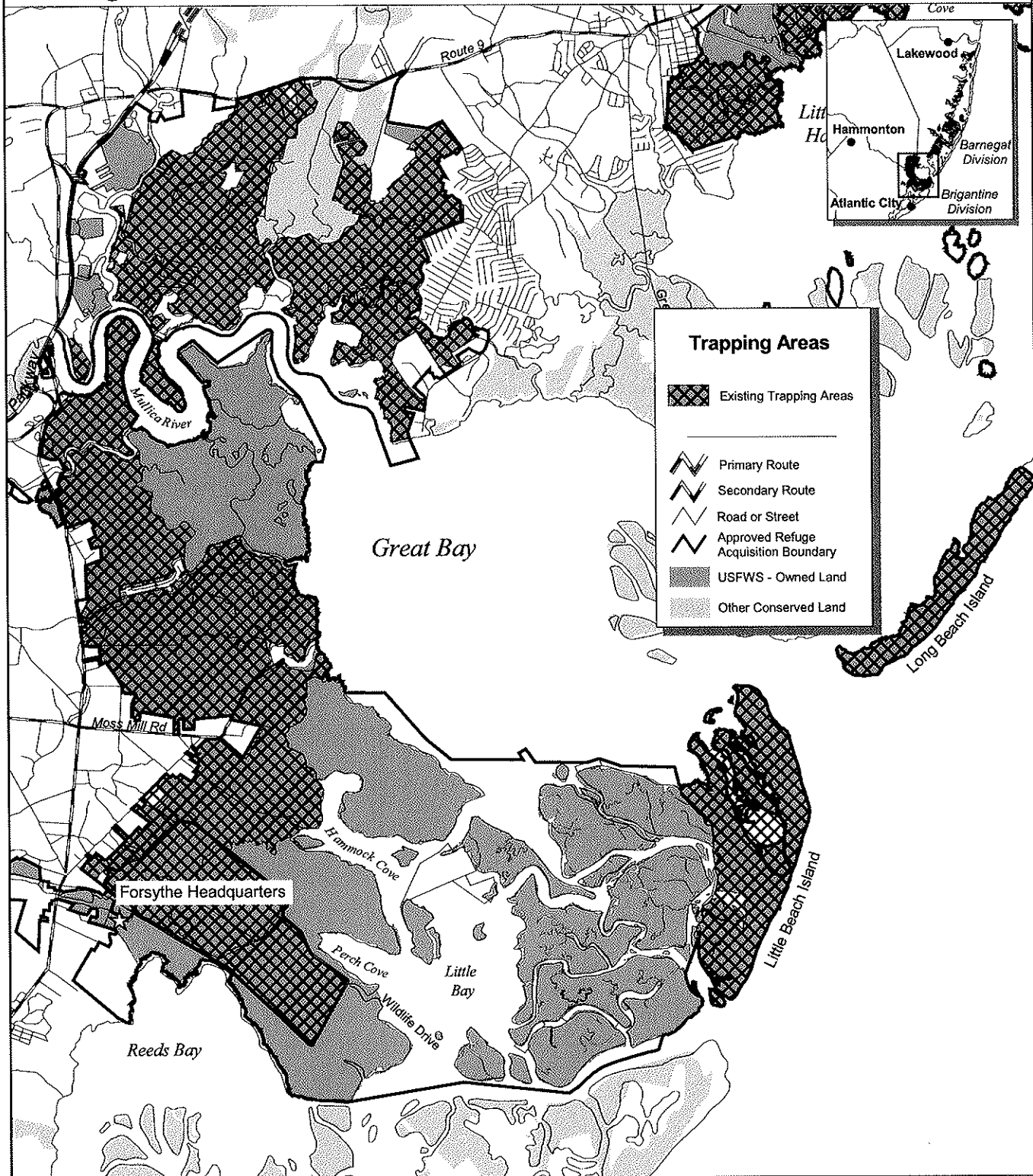
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land





# Trapping Areas

*Edwin B. Forsythe National Wildlife Refuge*  
 Brigantine Division, Atlantic, Burlington, and Ocean Counties, New Jersey



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 January 2001.  
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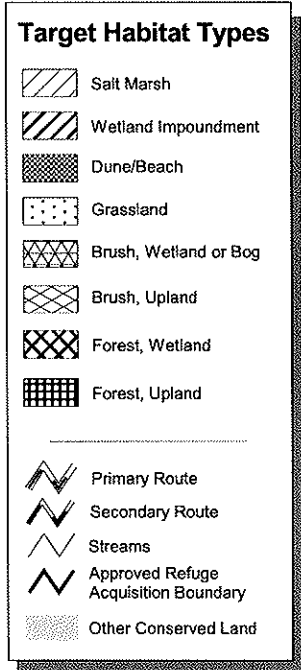
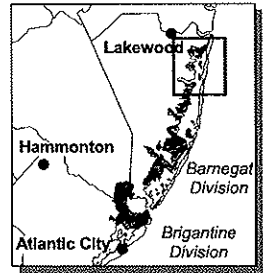
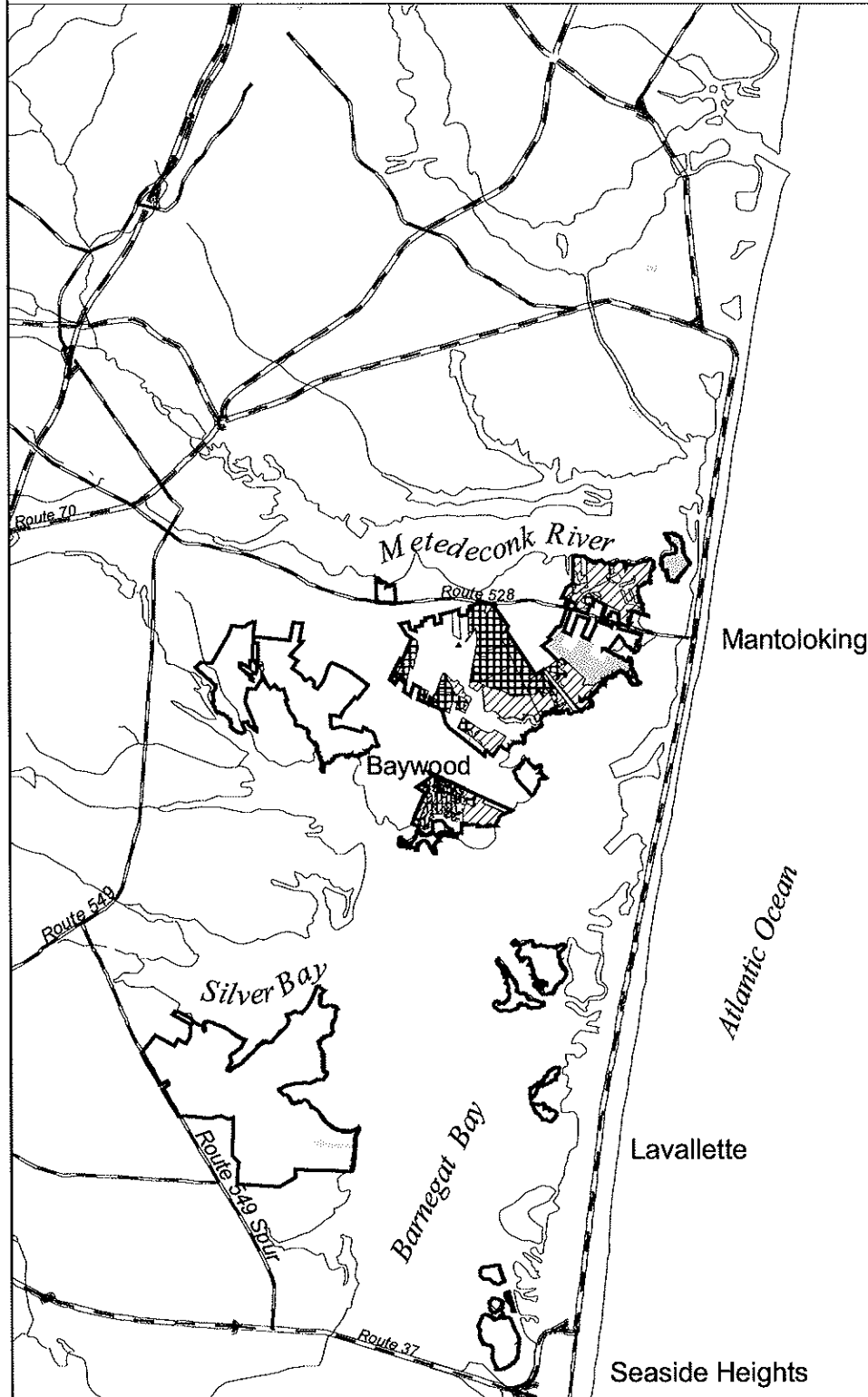
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# Habitat Management

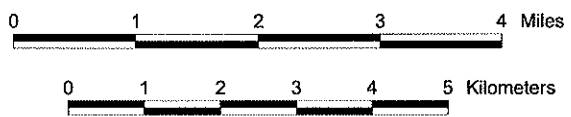
## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
 USFWS - refuge boundaries &  
 other refuge information.

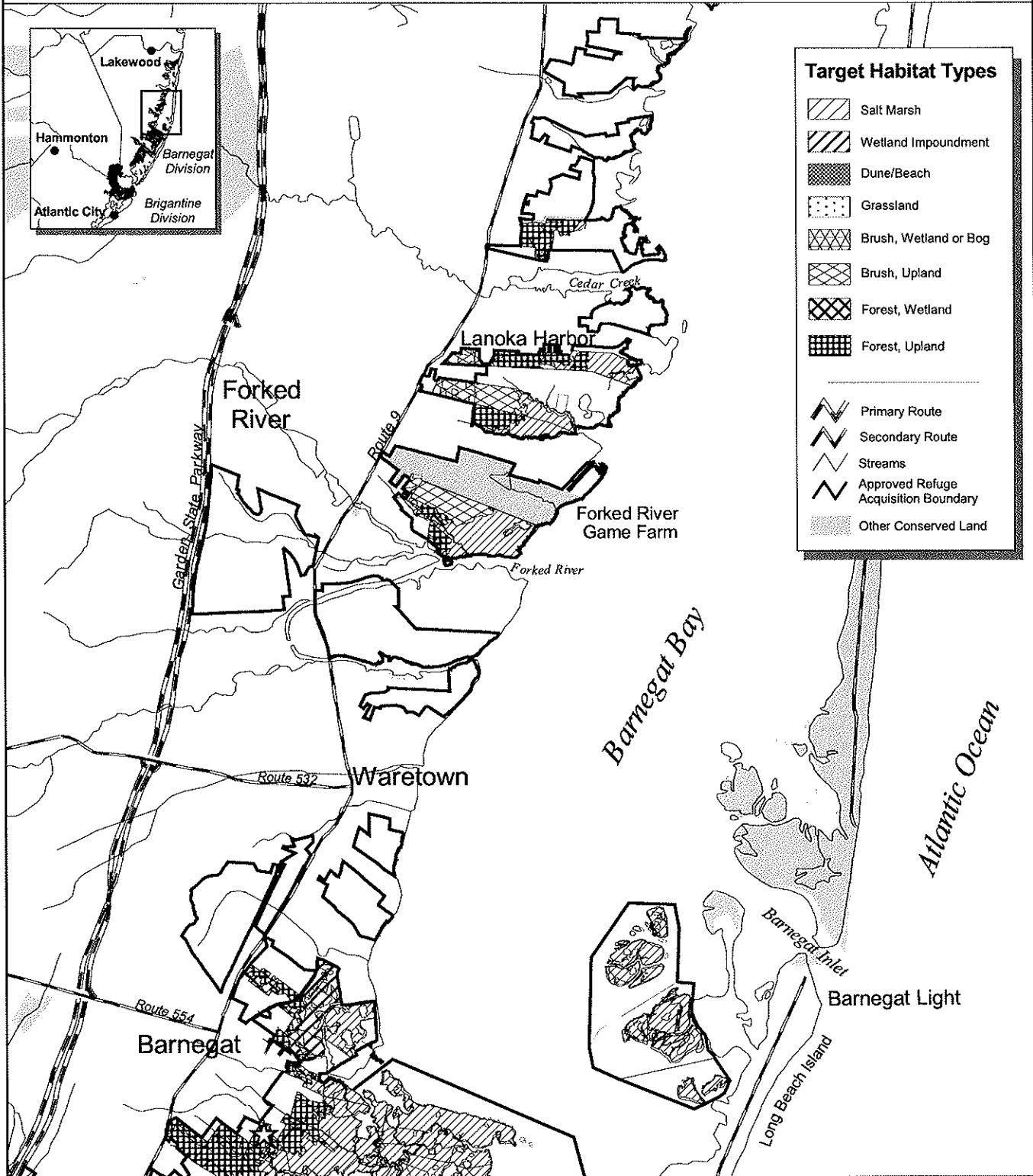
Map prepared for Jersey Coast Refuges  
 Comprehensive Conservation Plan,  
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







# Habitat Management

## *Edwin B. Forsythe National Wildlife Refuge*






*Barnegat Division, Ocean County, New Jersey*



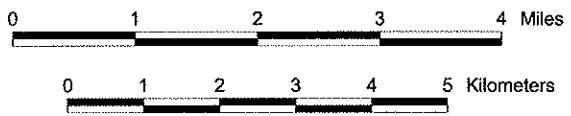
**Target Habitat Types**

-  Salt Marsh
-  Wetland Impoundment
-  Dune/Beach
-  Grassland
-  Brush, Wetland or Bog
-  Brush, Upland
-  Forest, Wetland
-  Forest, Upland

-----

-  Primary Route
-  Secondary Route
-  Streams
-  Approved Refuge Acquisition Boundary
-  Other Conserved Land

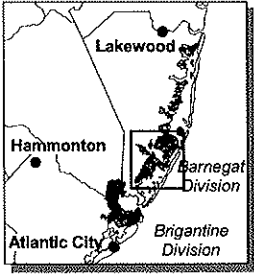
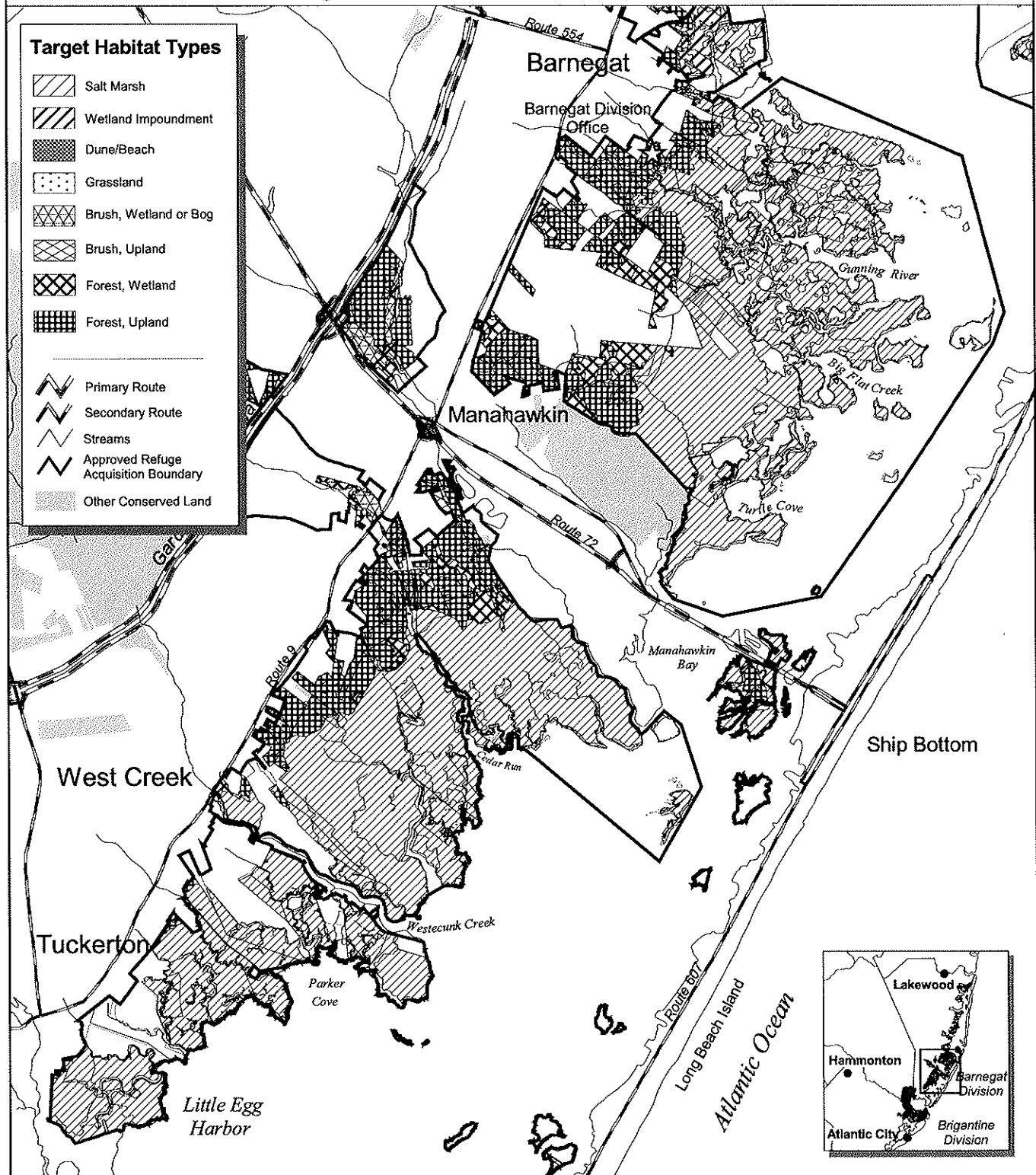
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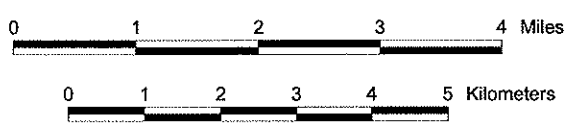
# Habitat Management

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



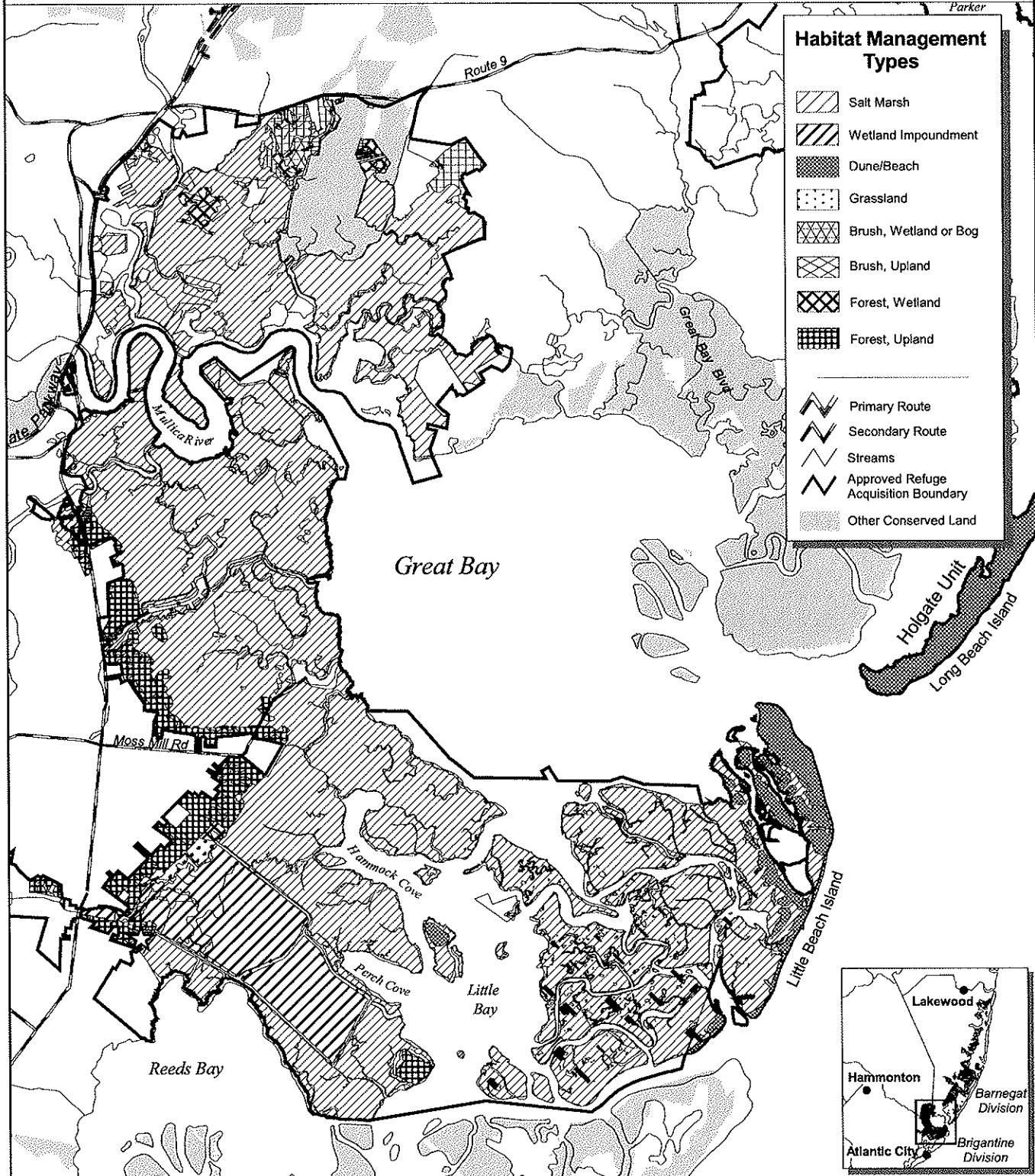
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# Habitat Management

## Edwin B. Forsythe National Wildlife Refuge

Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey



**Habitat Management Types**

- Salt Marsh
- Wetland Impoundment
- Dune/Beach
- Grassland
- Brush, Wetland or Bog
- Brush, Upland
- Forest, Wetland
- Forest, Upland

--- Primary Route

--- Secondary Route

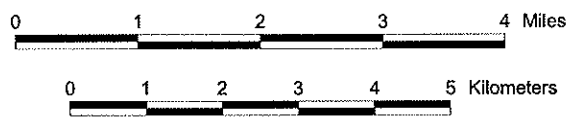
--- Streams

--- Approved Refuge Acquisition Boundary

--- Other Conserved Land

Data Sources:  
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 New Jersey - other protected land.  
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 other refuge information.

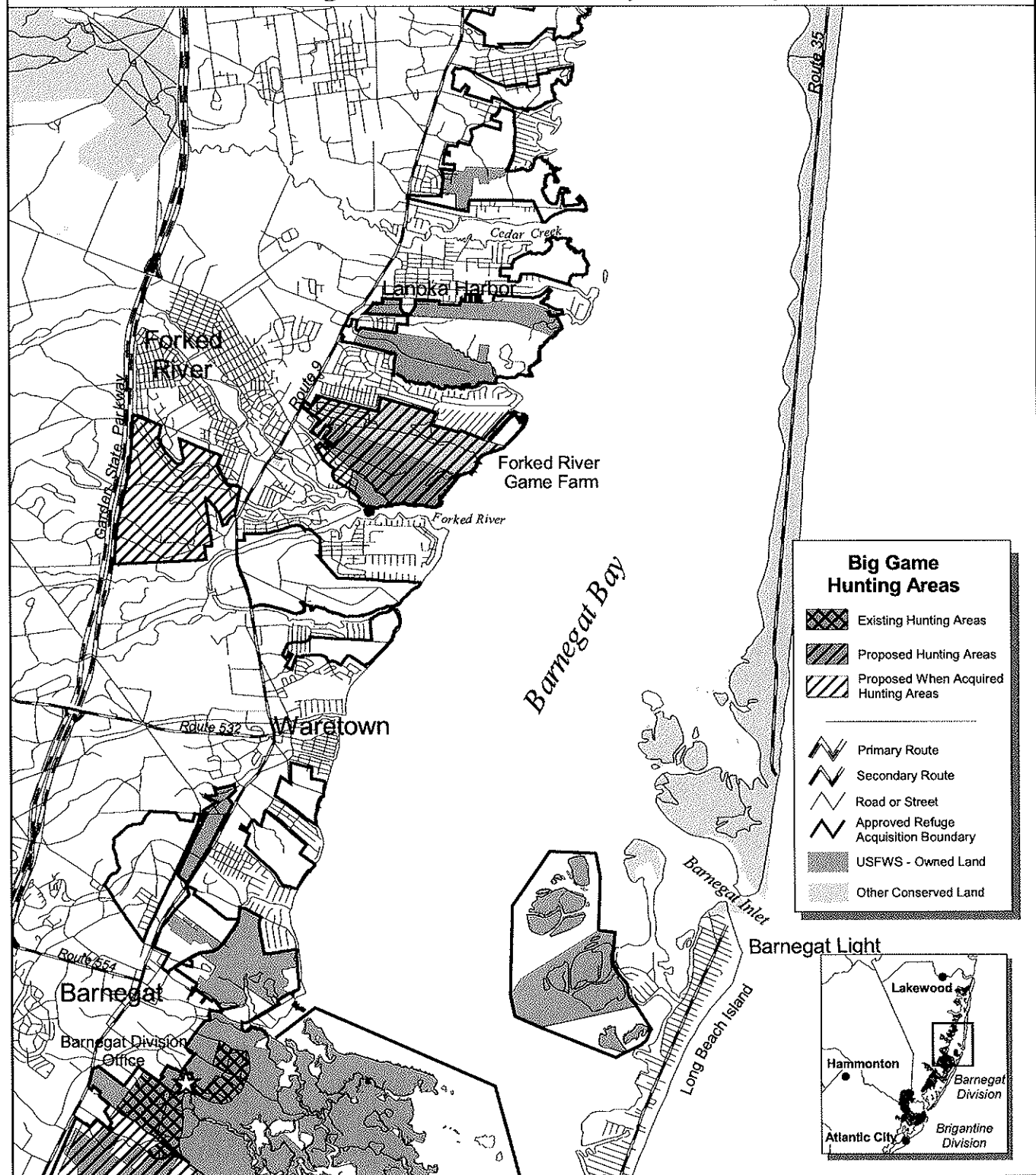
Map prepared for Jersey Coast Refuges  
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# Big Game Hunting Areas

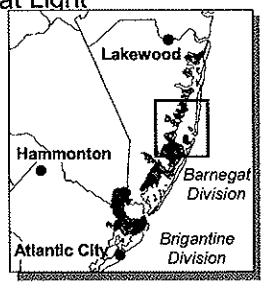
## Edwin B. Forsythe National Wildlife Refuge

### Barnegat Division, Ocean County, New Jersey



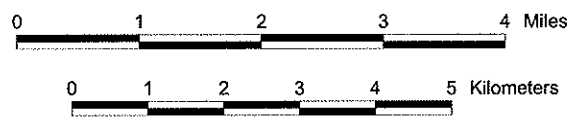
**Big Game Hunting Areas**

- Existing Hunting Areas
- Proposed Hunting Areas
- Proposed When Acquired Hunting Areas
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land



Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
 USFWS - refuge boundaries &  
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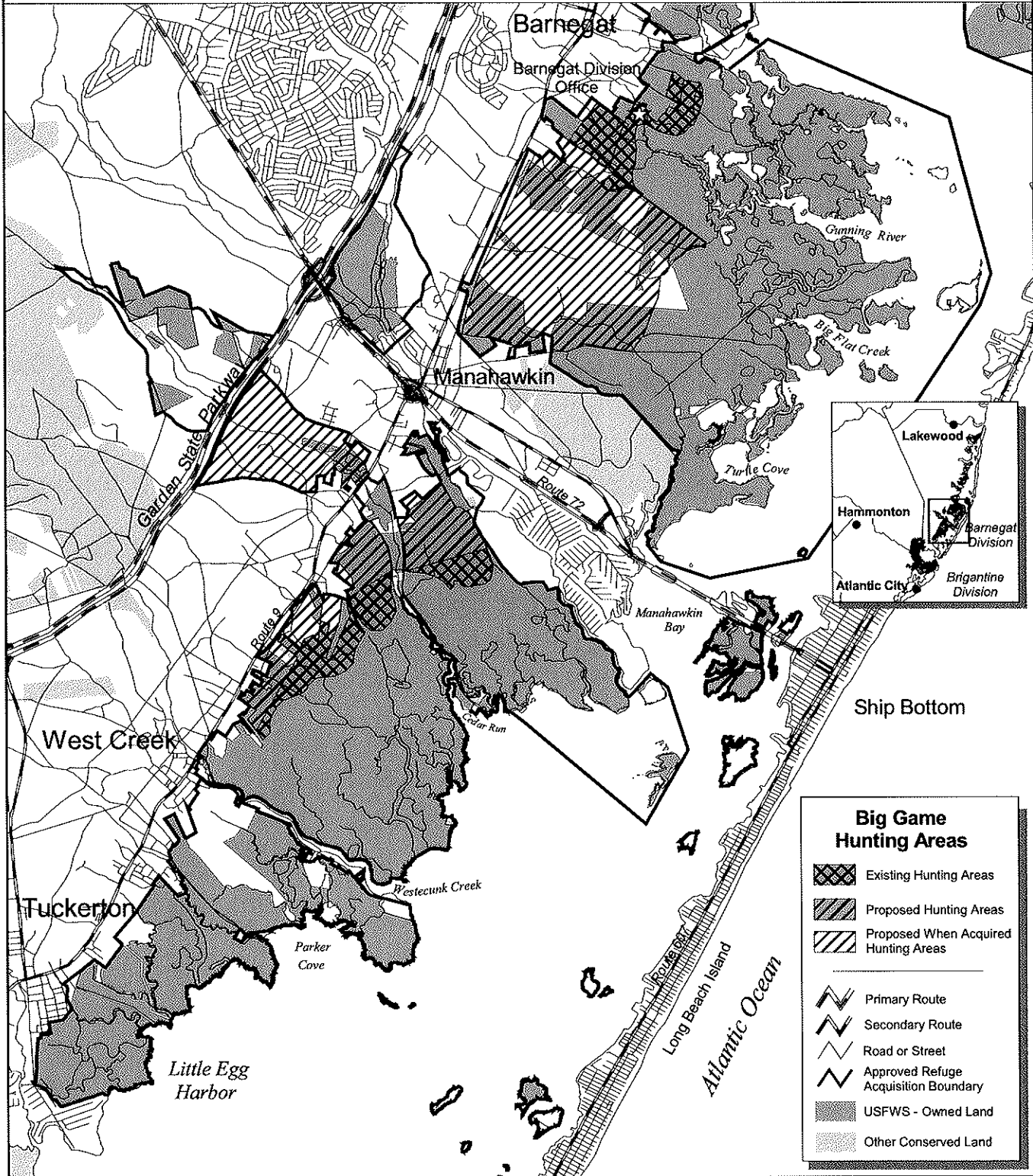
Map prepared for Jersey Coast Refuges  
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# Big Game Hunting Areas

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



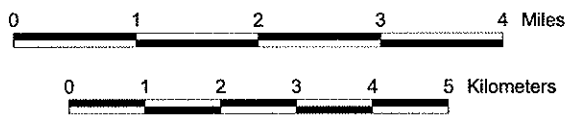
**Big Game Hunting Areas**

- Existing Hunting Areas
- Proposed Hunting Areas
- Proposed When Acquired Hunting Areas

---

- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land

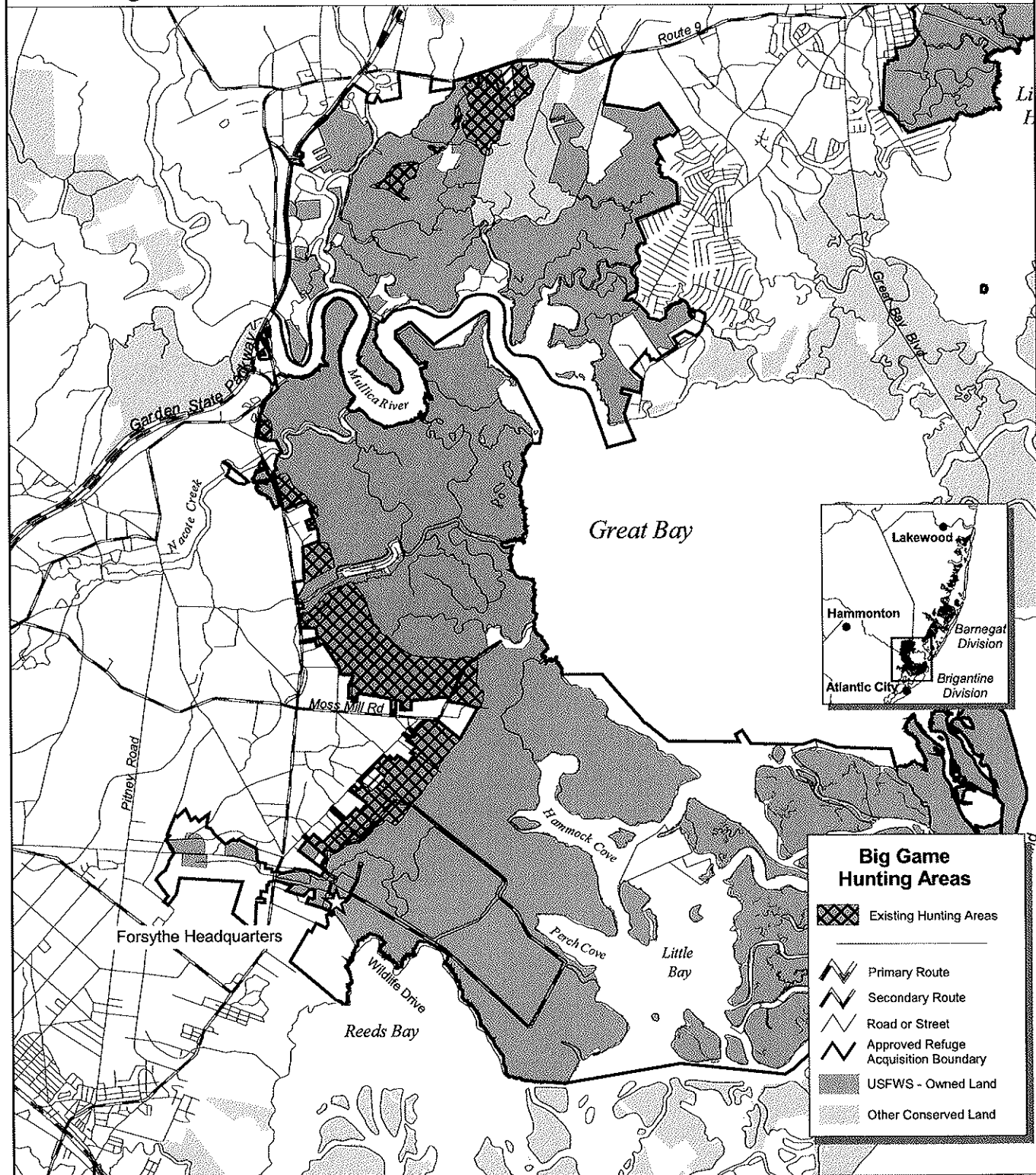
Data Sources:  
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# Big Game Hunting Areas

*Edwin B. Forsythe National Wildlife Refuge*

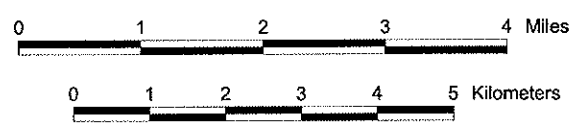
*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



**Big Game Hunting Areas**

-  Existing Hunting Areas
-  Primary Route
-  Secondary Route
-  Road or Street
-  Approved Refuge Acquisition Boundary
-  USFWS - Owned Land
-  Other Conserved Land

Data Sources:  
 USGS - 1:100,000 roads & hydro.  
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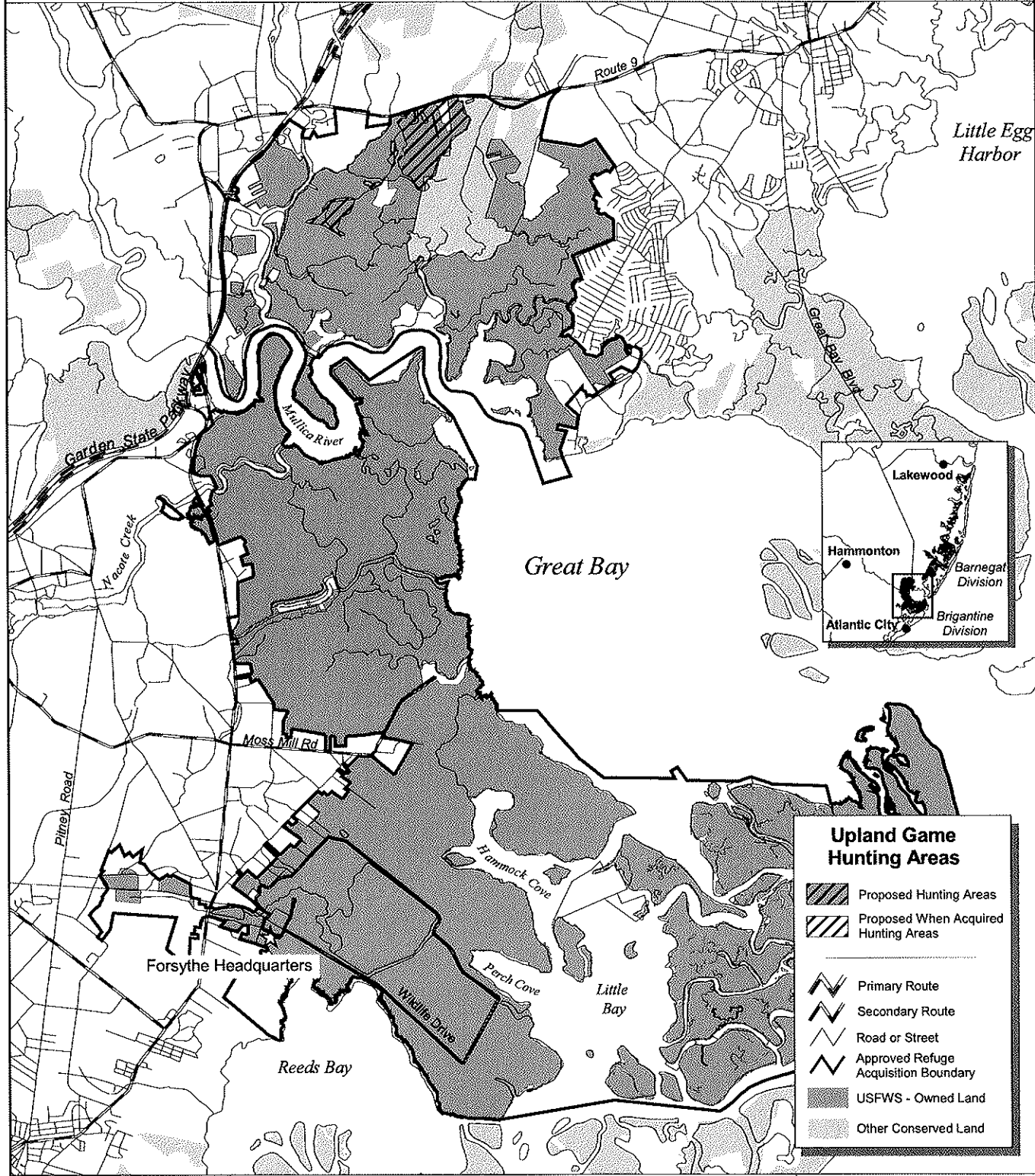




# Upland Game Hunting Areas

*Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



**Upland Game Hunting Areas**

- Proposed Hunting Areas
- Proposed When Acquired Hunting Areas
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land

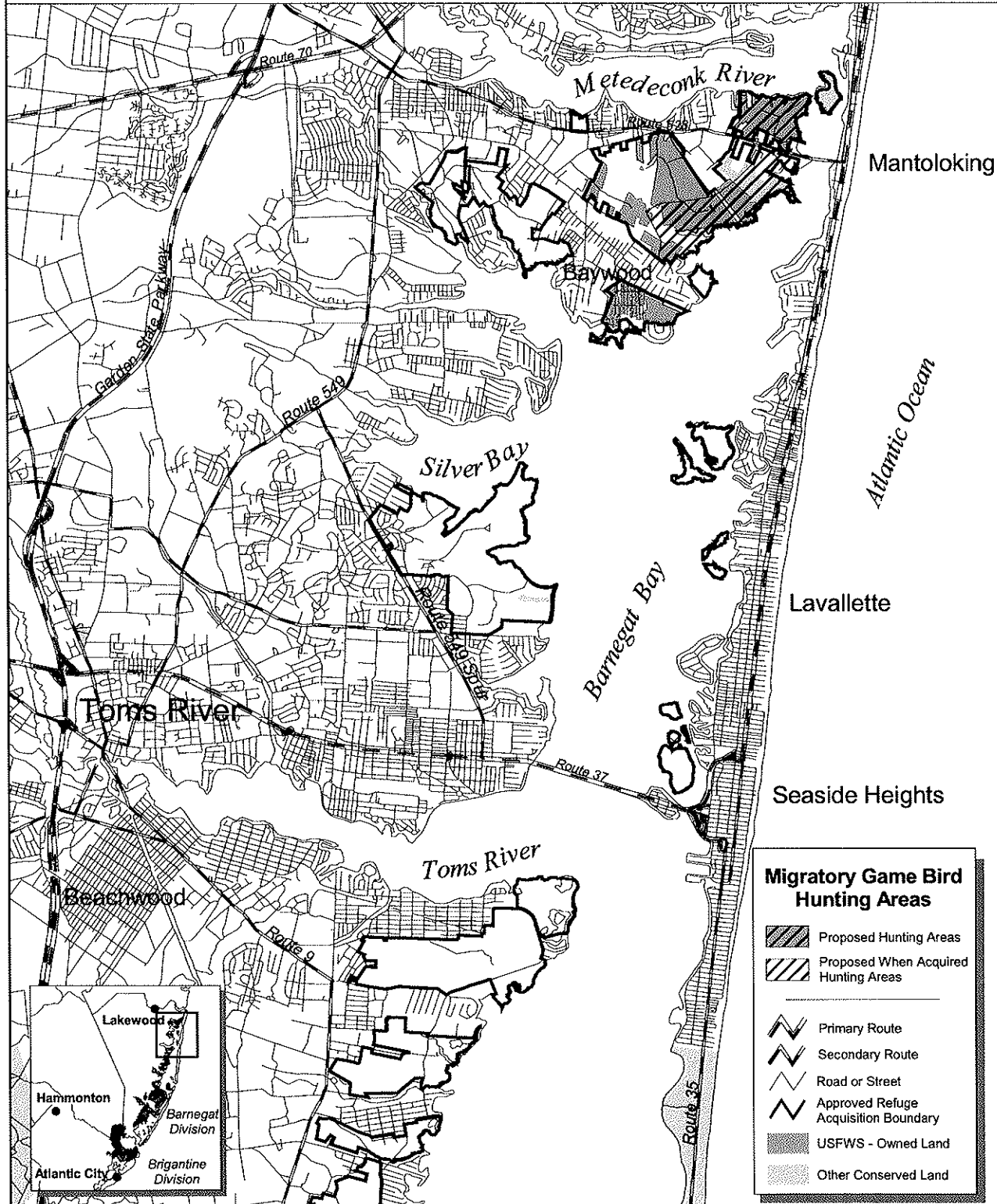
Data Sources:  
 USGS - 1:100,000 roads & hydro.  
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 USFWS - refuge boundaries &  
 other refuge information.  
 Map prepared for Jersey Coast Refuges  
 Comprehensive Conservation Plan,  
 January 2001.  
 This map is for planning purposes only.



# Migratory Game Bird Hunting Areas

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*

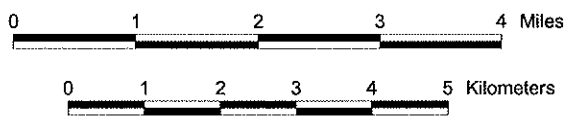


**Migratory Game Bird Hunting Areas**

- Proposed Hunting Areas
- Proposed When Acquired Hunting Areas
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land

Data Sources:  
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 New Jersey - other protected land.  
 USFWS - refuge boundaries & other refuge information.

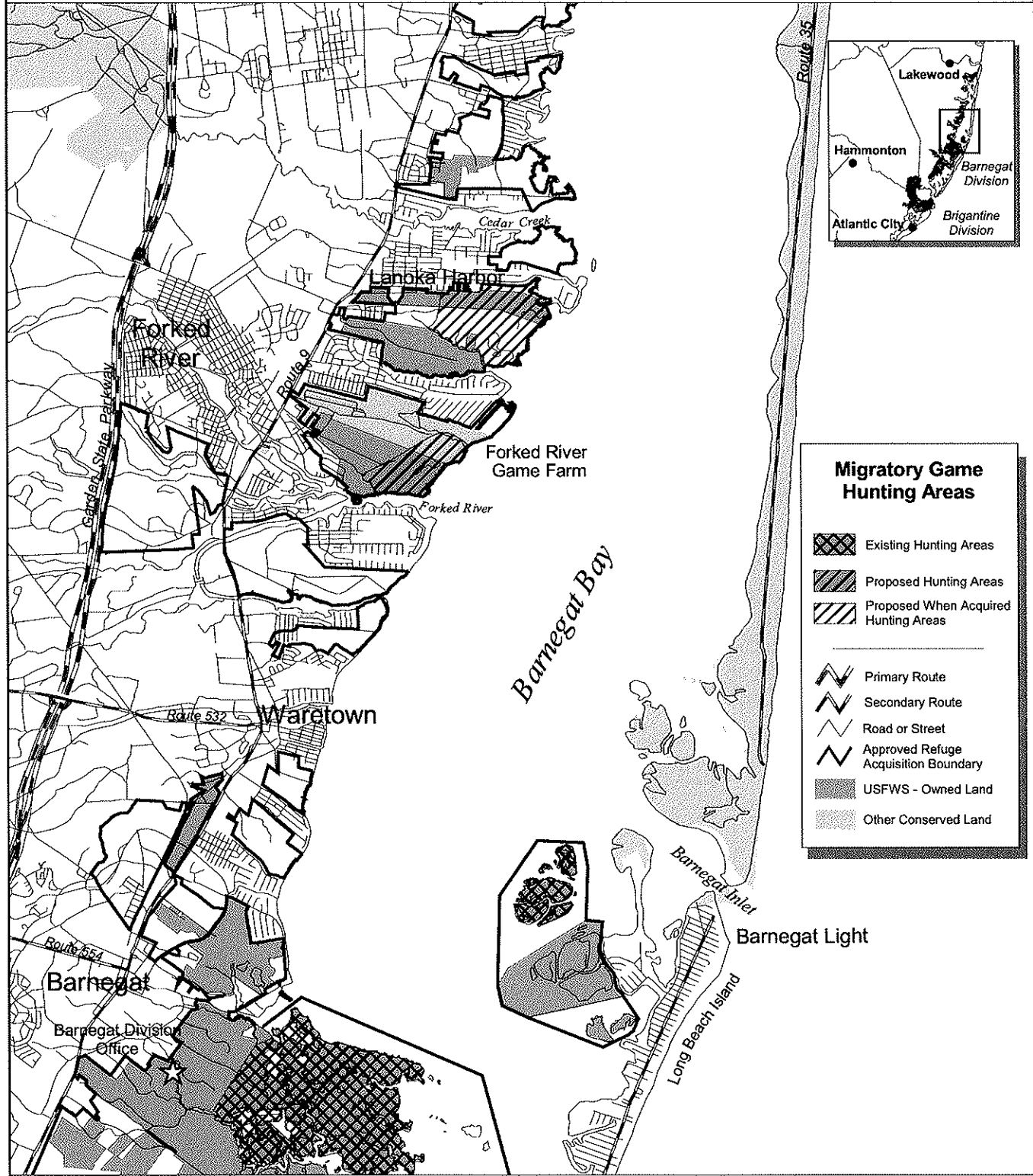
Map prepared for Jersey Coast Refuges Comprehensive Conservation Plan, January 2001.  
 This map is for planning purposes only.



# Migratory Game Bird Hunting Areas

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



**Migratory Game Hunting Areas**

- Existing Hunting Areas
- Proposed Hunting Areas
- Proposed When Acquired Hunting Areas

---

- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land

Data Sources:  
 USGS - 1:100,000 roads & hydro.  
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 USFWS - refuge boundaries &  
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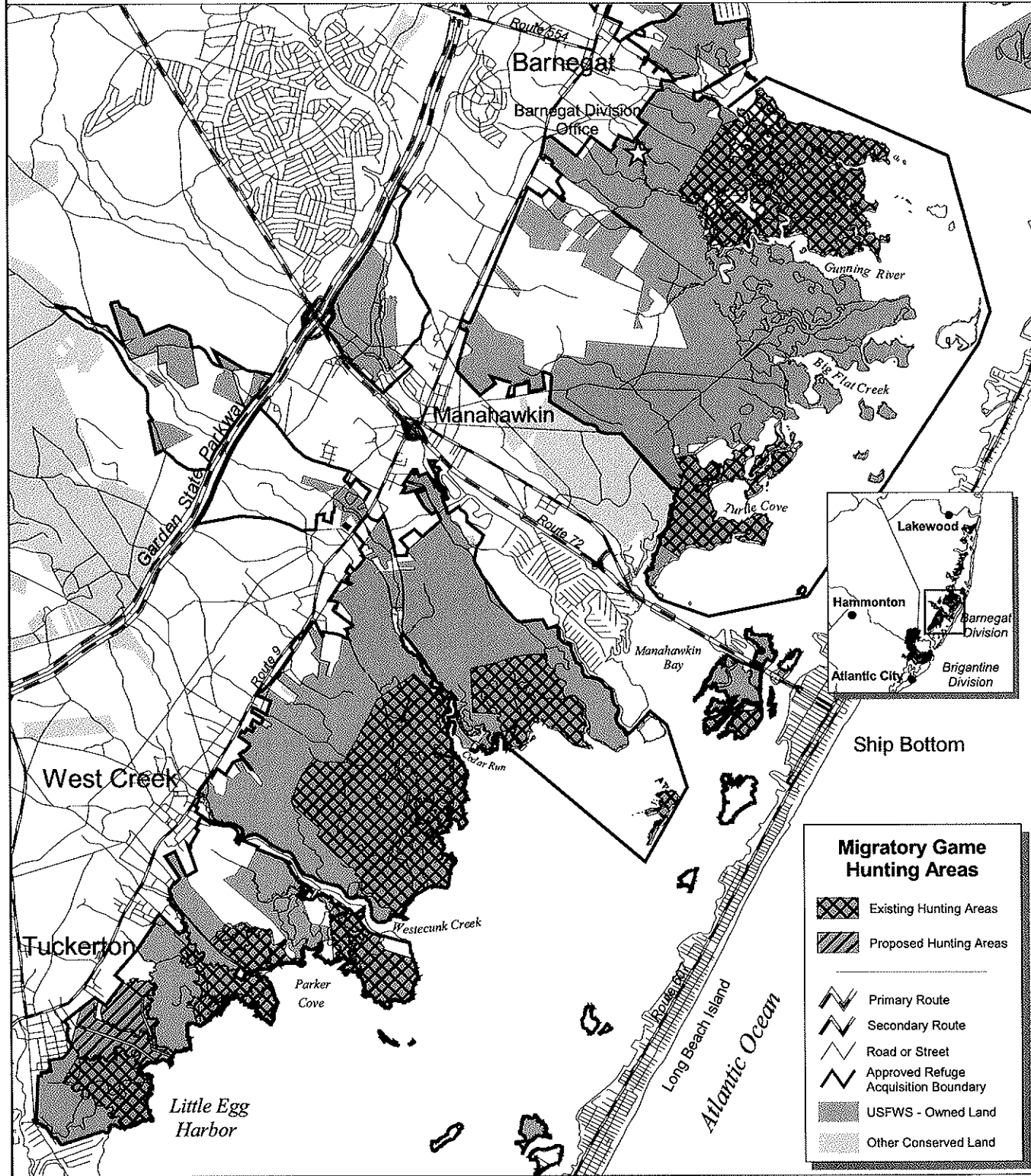
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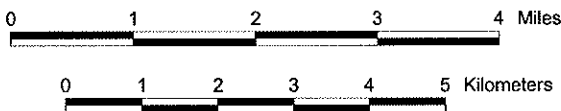
# Migratory Game Bird Hunting Areas

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
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**Migratory Game Hunting Areas**

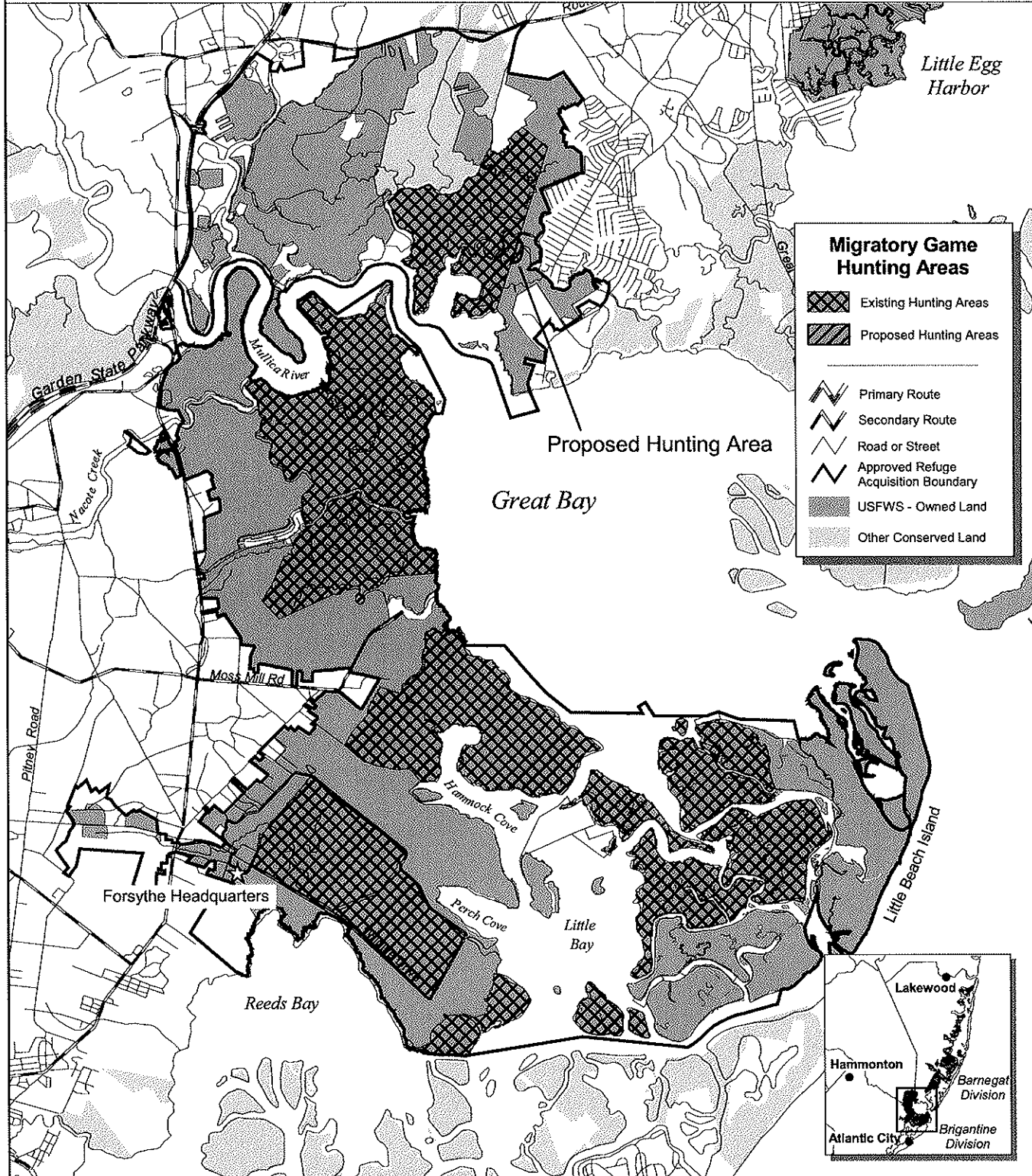
- Existing Hunting Areas
- Proposed Hunting Areas
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land



# Migratory Game Bird Hunting Areas

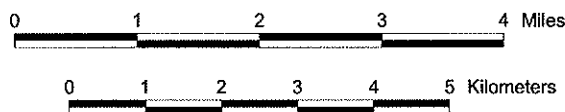
## *Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



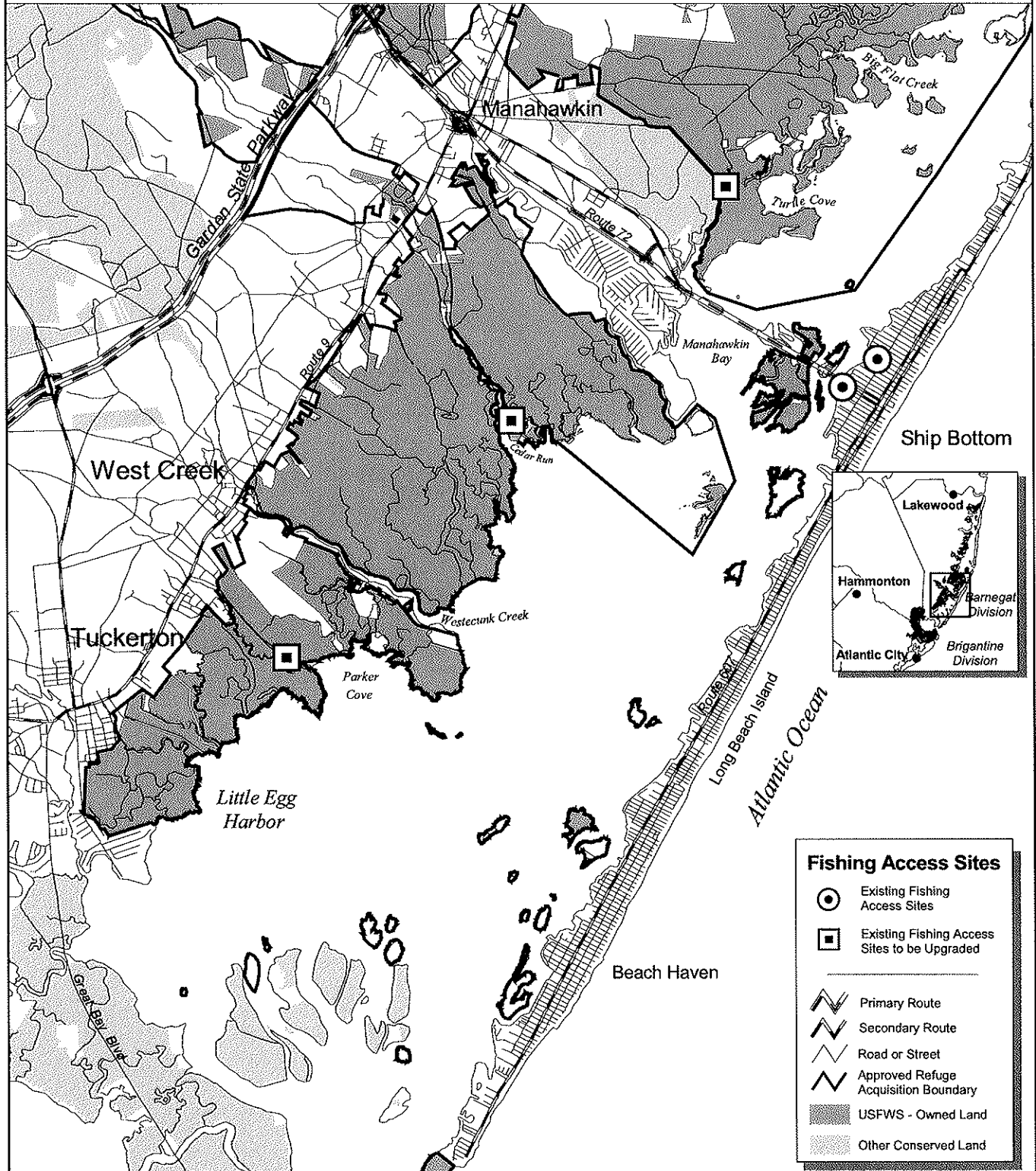
Data Sources:  
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 USFWS - refuge boundaries &  
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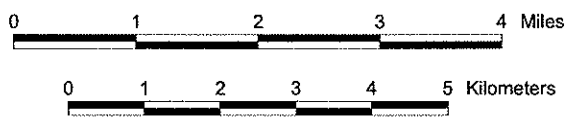


# Fishing Access Sites

*Edwin B. Forsythe National Wildlife Refuge  
Barnegat Division, Ocean County, New Jersey*



Data Sources:  
USGS - 1:100,000 roads & hydro.  
New Jersey - other protected land.  
USFWS - refuge boundaries &  
other refuge information.  
  
Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
January 2001.  
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**Fishing Access Sites**

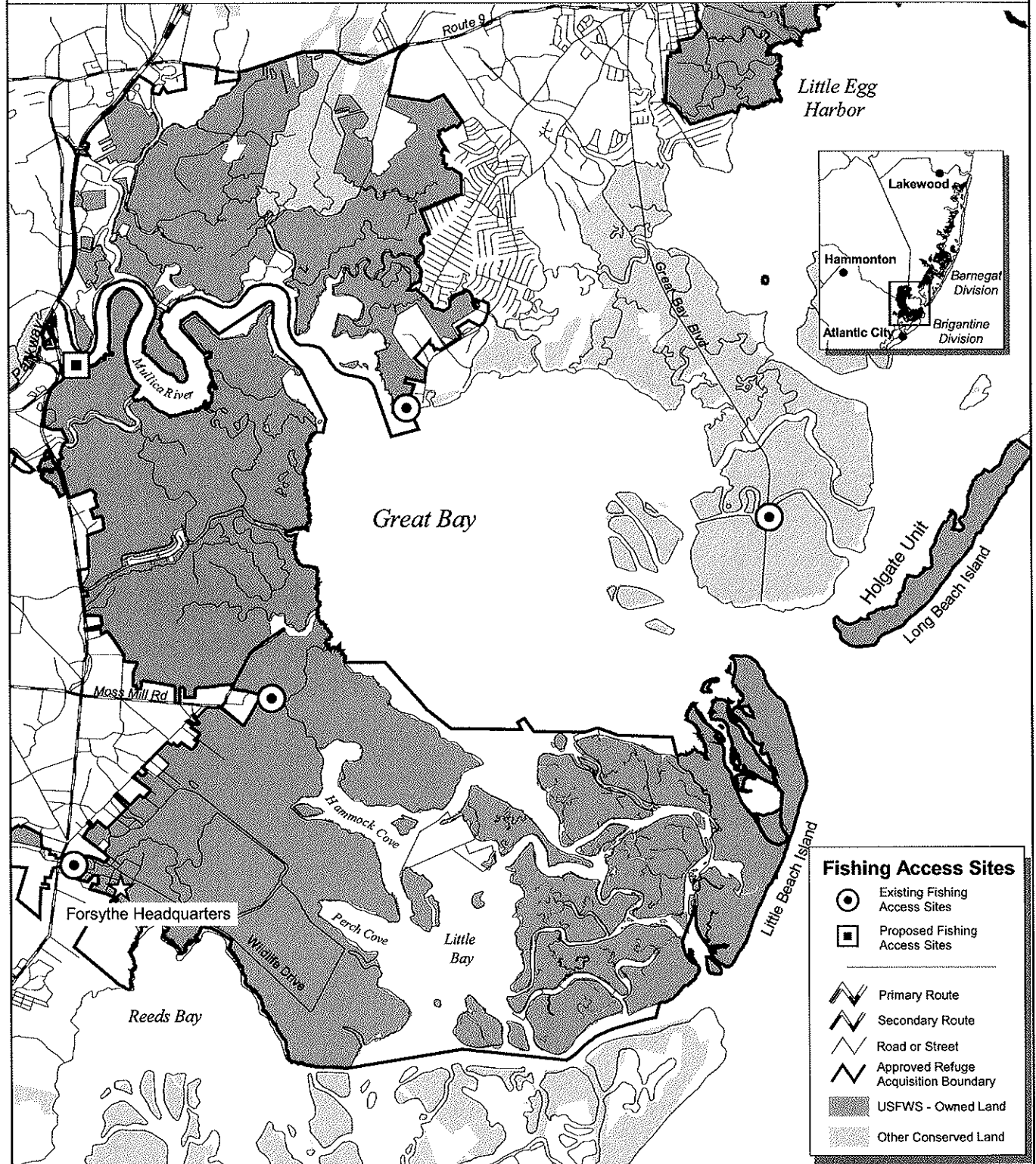
- Existing Fishing Access Sites
- Existing Fishing Access Sites to be Upgraded
- Primary Route
- Secondary Route
- Road or Street
- Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- Other Conserved Land



# Fishing Access Sites

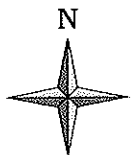
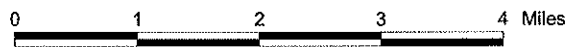
*Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
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 other refuge information.

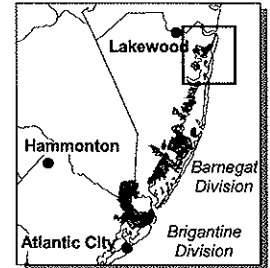
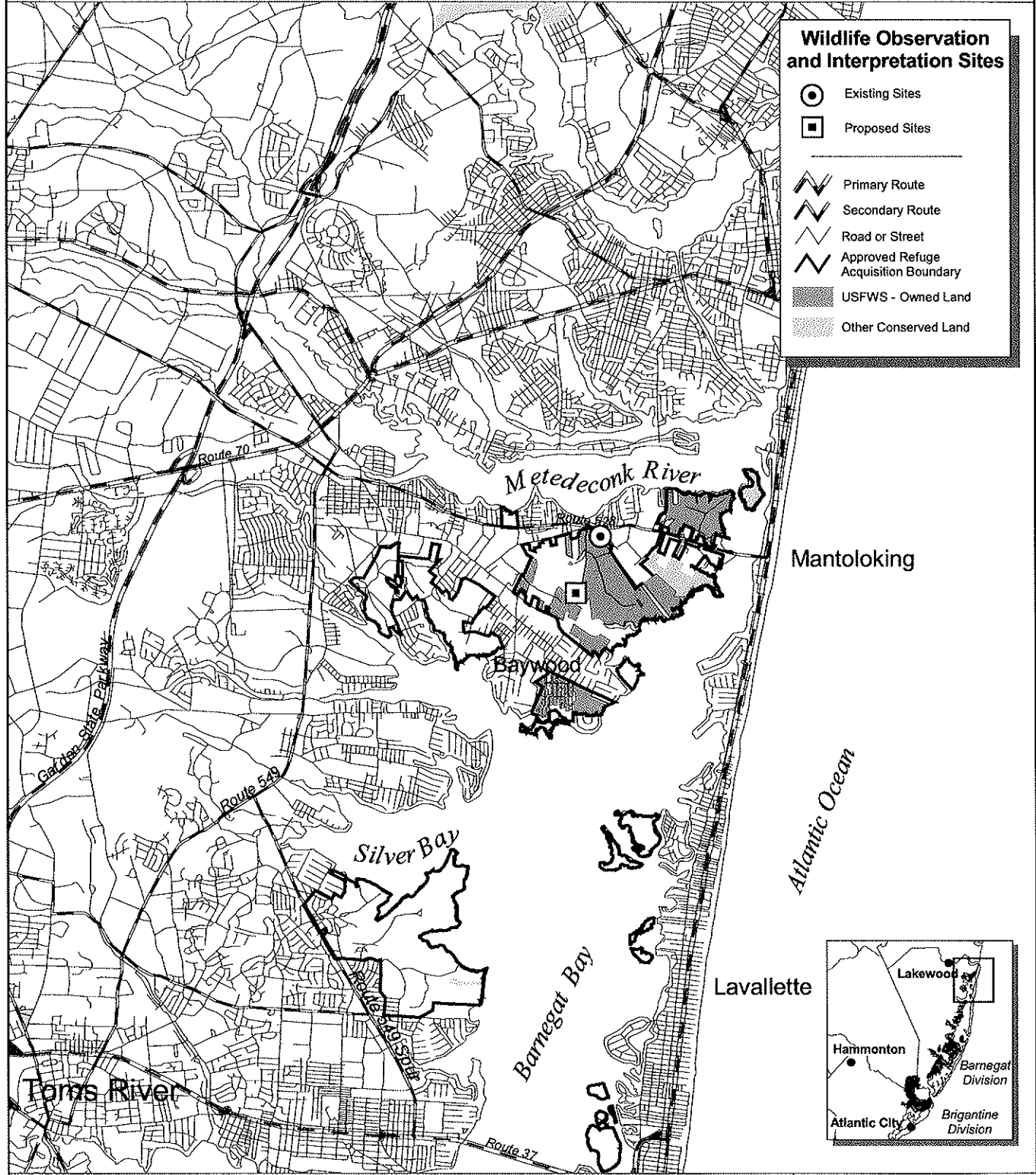
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# Wildlife Observation and Interpretation Sites

*Edwin B. Forsythe National Wildlife Refuge*

*Barnegat Division, Ocean County, New Jersey*



Data Sources:  
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Map prepared for Jersey Coast Refuges Comprehensive Conservation Plan, January 2001.  
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0 1 2 3 4 Miles

0 1 2 3 4 5 Kilometers

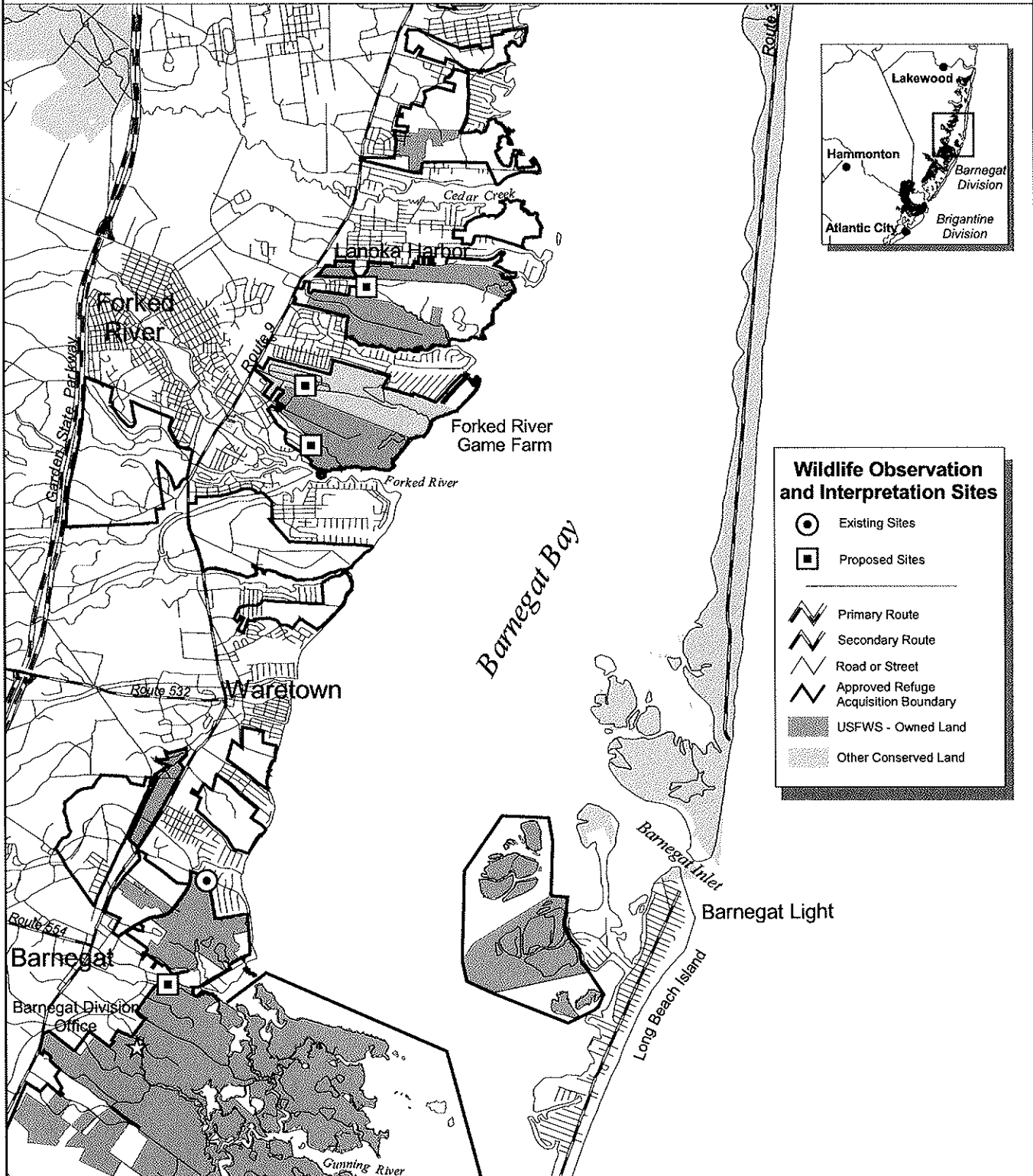




# Wildlife Observation and Interpretation Sites

*Edwin B. Forsythe National Wildlife Refuge*

*Barnegat Division, Ocean County, New Jersey*



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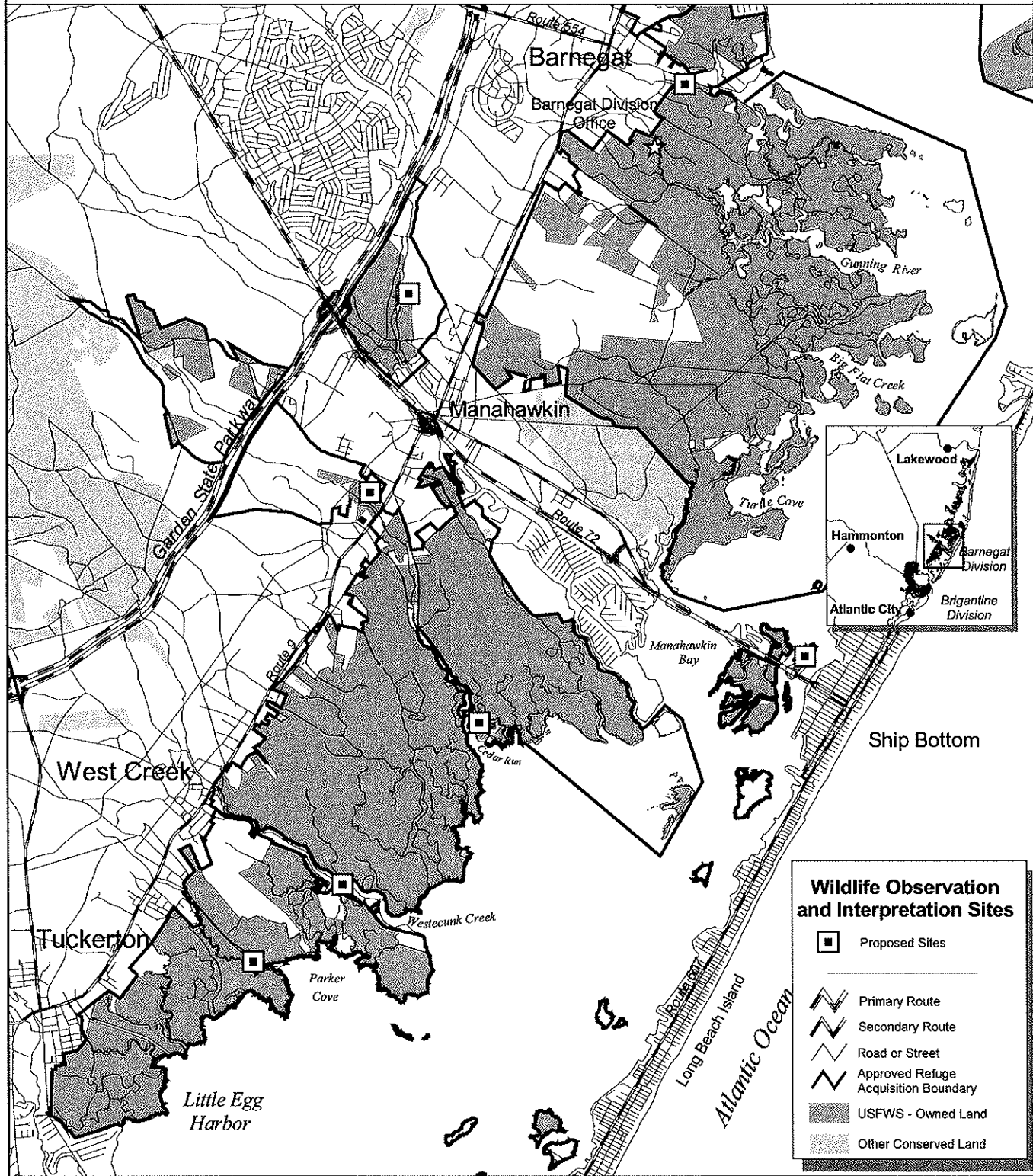
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# Wildlife Observation and Interpretation Sites

## *Edwin B. Forsythe National Wildlife Refuge*

### *Barnegat Division, Ocean County, New Jersey*



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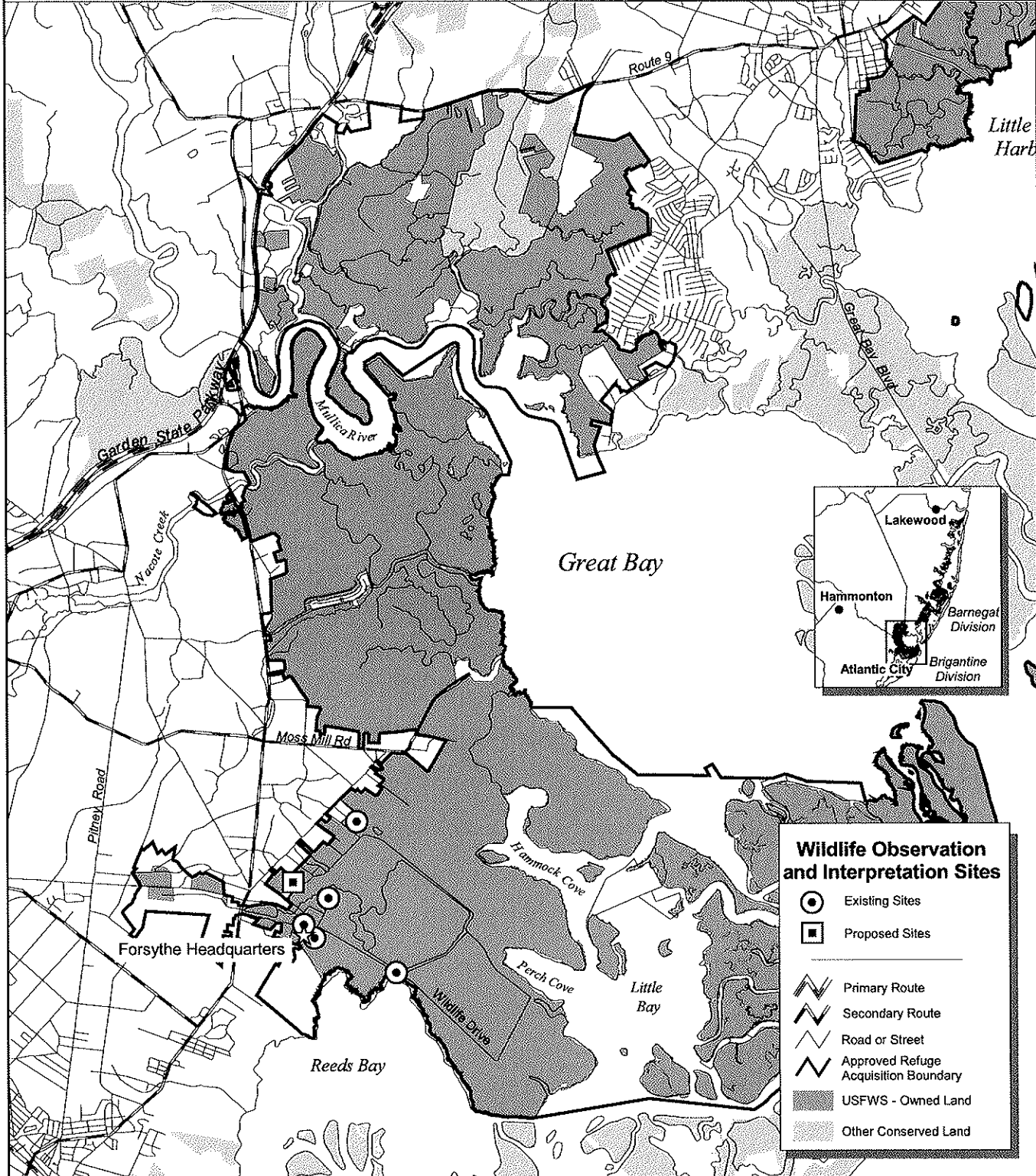
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# Wildlife Observation and Interpretation Sites

*Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



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0 1 2 3 4 Miles

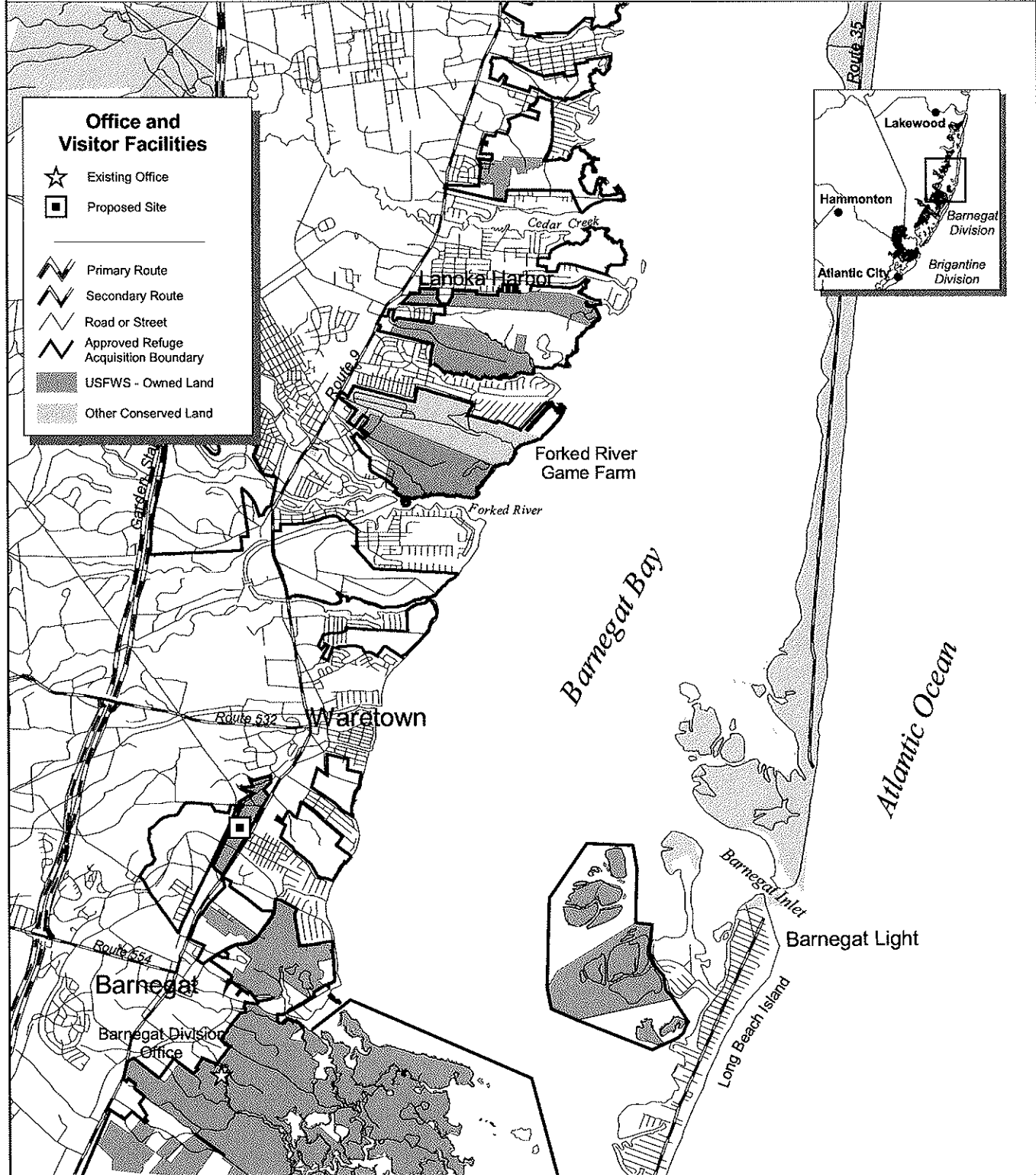
0 1 2 3 4 5 Kilometers



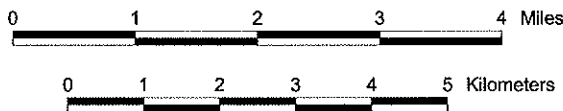


# Office and Visitor Facilities

*Edwin B. Forsythe National Wildlife Refuge*  
*Barnegat Division, Ocean County, New Jersey*



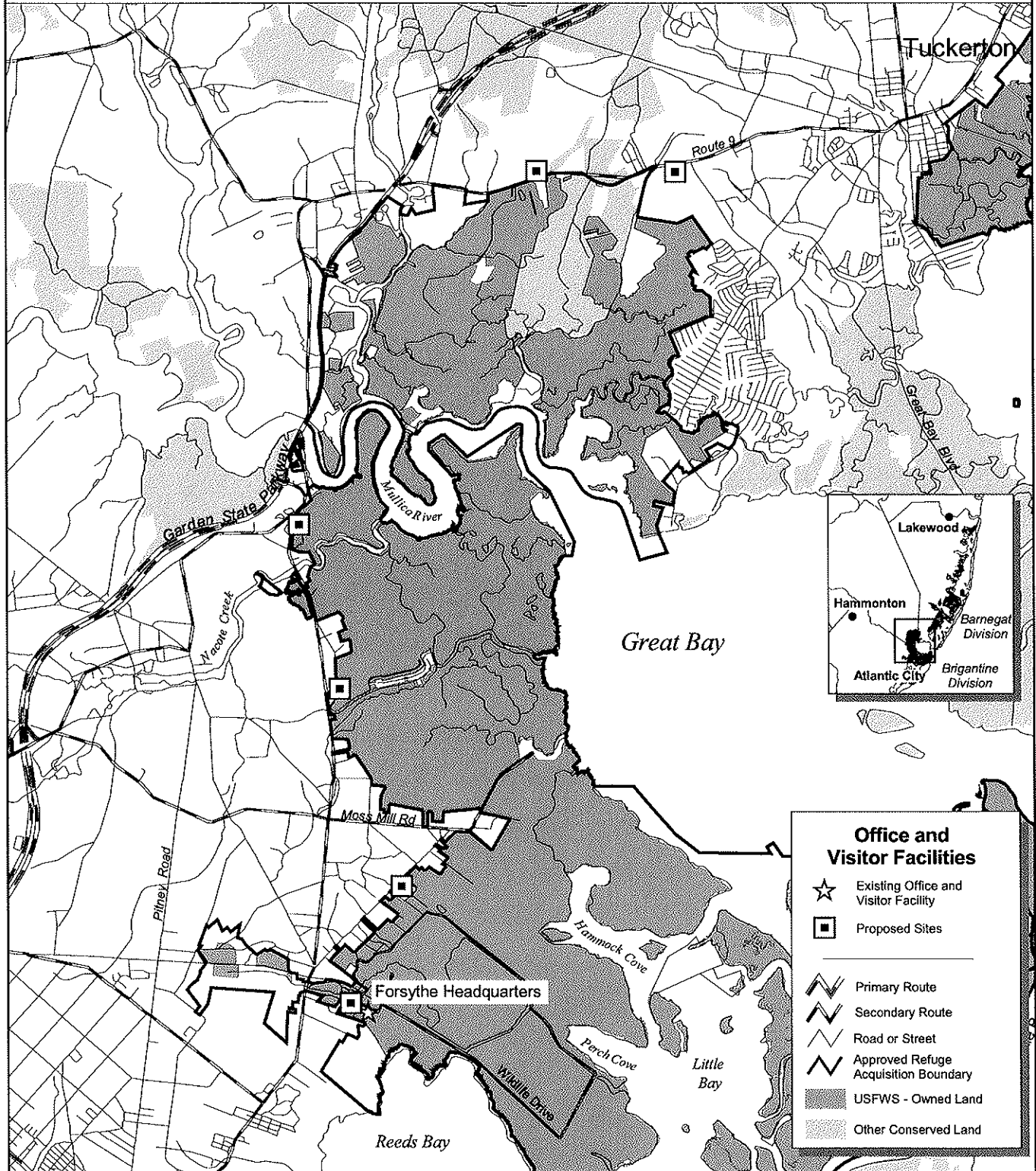
Data Sources:  
 USGS - 1:100,000 roads & hydro.  
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# Office and Visitor Facilities

## *Edwin B. Forsythe National Wildlife Refuge*

*Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey*



**Office and Visitor Facilities**

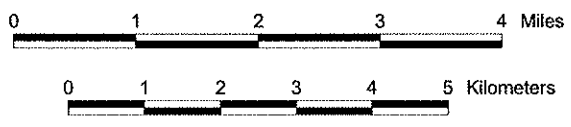
- ☆ Existing Office and Visitor Facility
- Proposed Sites

---

- ▬ Primary Route
- ▬ Secondary Route
- ▬ Road or Street
- ▬ Approved Refuge Acquisition Boundary
- USFWS - Owned Land
- ▨ Other Conserved Land

Data Sources:  
 USGS - 1:100,000 roads & hydro.  
 New Jersey - other protected land.  
 USFWS - refuge boundaries &  
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# Chapter 5. Implementation and Monitoring

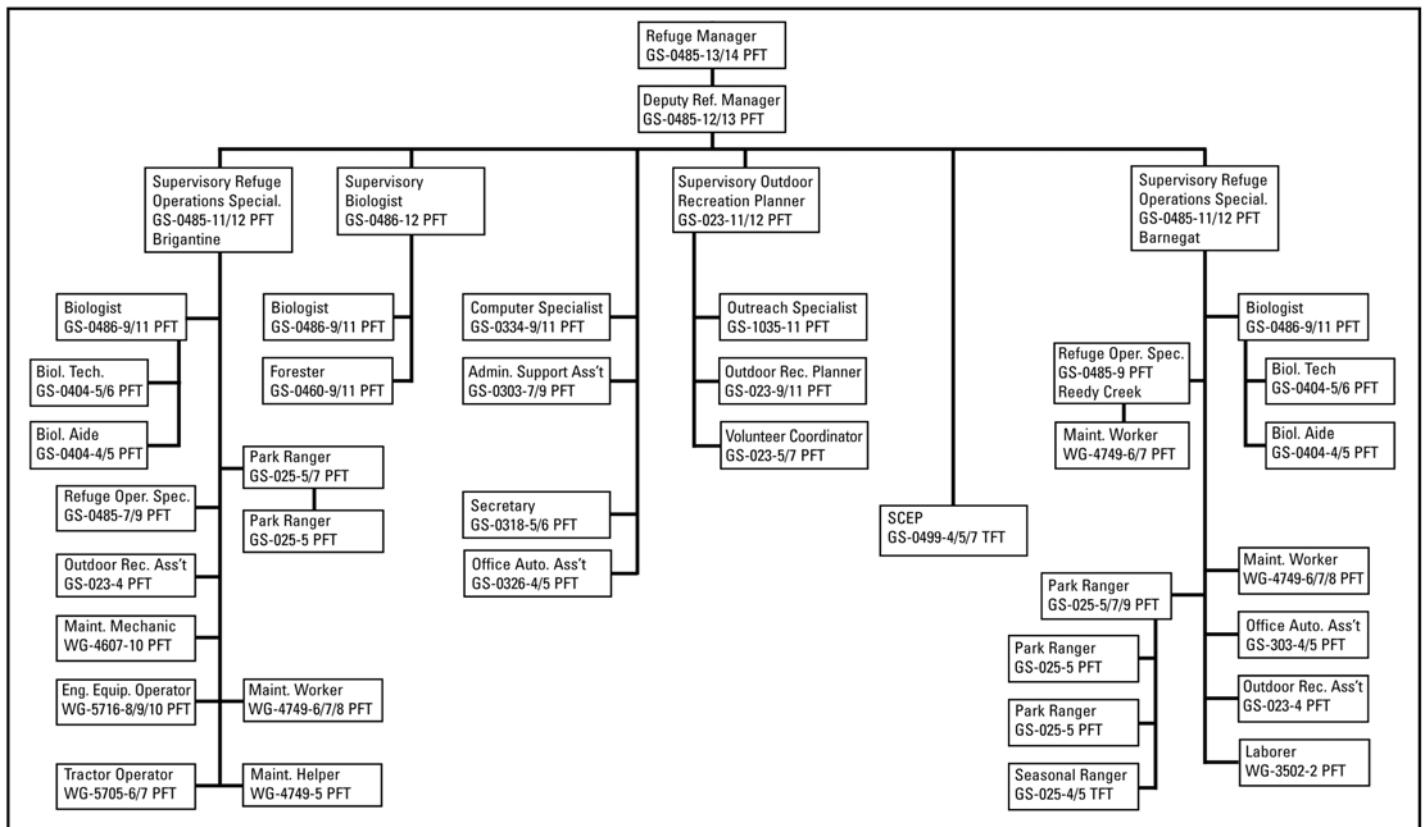
## Funding and Staffing

A staff of 16 full time equivalents (FTEs) currently operates Forsythe Refuge. This includes:

- Project Leader;
- Deputy Project Leader;
- Supervisory Refuge Operations Specialist;
- Refuge Operations Specialist;
- two Biologists;
- Outdoor Recreation Planner;
- two Maintenance Workers;
- Lead Administrative Office Assistant;
- Office Automation Assistant;
- two Park Rangers;
- Seasonal Park Ranger;
- Volunteer Coordinator;
- SCEP (Student Career Experience Program).

To fully implement the extensive program of wildlife conservation and compatible wildlife-dependent recreation found in this CCP, a staffing plan of 41 FTEs will be required (see Figure 2). This staffing plan,

Figure 2. Staffing plan for Forsythe Refuge





together with funding for our land protection efforts, will allow us to achieve the objectives and strategies set forth in this CCP. Full funding of the CCP over the next 15 years will require;

- \$54.2 million for staffing and projects;
- \$30.7 million for land protection.

Projects required to implement the CCP are listed in the Appendices. Appendix H contains the Refuge Operation Needs System (RONS) which documents requests to Congress for funding and staffing needed to carry out projects above the existing base budget. Amounts shown include a start-up cost for the first year, the recurring cost for following years, and a 15-year total cost. Staffing is shown in FTEs (one FTE is one person working full time for one year). Appendix I contains the Maintenance Management System (MMS) which documents the equipment, buildings, and other existing property that require repair or replacement.

The rate at which the Refuge achieves its full potential of contributing locally, regionally, and nationally to wildlife conservation and providing opportunities for compatible wildlife-dependent recreation is totally dependent upon receiving adequate funding and staffing.

## **Step-down Management Plans**

Step-down management planning is the formulation of detailed plans for meeting goals and objectives identified in the CCP. These plans describe the specific strategies and implementation schedules we are to follow, “stepping down” from general goals and objectives. They may be addressed in detail during preparation of the CCP, or prepared following completion of the CCP. The preparation of new step-down management plans or substantial changes to existing plans typically require further National Environmental Policy Act (NEPA) compliance and an opportunity for public review.

The Refuge System Manual, Part 4, Chapter 3, lists over 25 specific management plans that are generally required on every Refuge. Some plans require annual revisions, others are on a 5 to 10 year revision schedule.

The following step-down management plans are currently being revised:

- Habitat Management Plan (to be completed in 2005).

The following step-down management plans are either in need of revision or do not exist:

- Wildlife Population Management Plan, including trapping (scheduled for 2006);
- Integrated Pest Management Plan, including chapters for each problem species (scheduled for 2006);
- Wilderness Management Plan (scheduled for 2005);
- Priority Wildlife-Dependent Recreation Plan, including hunting and fishing (scheduled for 2005), wildlife observation and photography (scheduled for 2005), environmental education and interpretation (scheduled for 2005).

## Monitoring and Adaptive Management

This CCP covers a 15-year period, through 2015. Periodic review of the CCP will be required to ensure that established goals and objectives are being met and that the Plan is being implemented as scheduled. To assist this review process, a monitoring and evaluation program will be implemented, focusing on issues involving public use activities, and wildlife habitat and population management.

Monitoring of public use programs would involve the continued collection and compilation of visitation figures and activity levels. In addition, research and monitoring programs will be established to assess the impacts of public use activities on wildlife and wildlife habitat, conflicts between Refuge users, and identify compatible levels of public use activities. We will reduce these activities if we determine that incompatible levels of public use were occurring.

Collection of baseline data on all wildlife populations and habitats will be implemented. This data will update existing records of wildlife species using the Refuge, their habitat requirements, and seasonal use patterns. This data will also be used to evaluate the effects of public use and habitat management programs on wildlife populations.

Refuge habitat management programs will be continually monitored for positive and negative impacts on wildlife habitat and populations and the ecological integrity of the ecosystem, and to determine if these management activities are helping to meet Refuge goals and objectives. Information resulting from monitoring will allow staff to set more specific and better management objectives, more rigorously evaluate management objectives, and ultimately, make better management decisions.

## Volunteer Opportunities and Educational Programs

As Forsythe Refuge continues to contribute to the quality of life on the New Jersey coast, strong support in the community and the region will continue to contribute to their success. Helping hands are needed for program development, data gathering, and other opportunities discussed in the CCP. Only with this type of assistance can the Refuge achieve its goals and objectives, support the mission of the Service, and help meet the needs of the community.

The volunteer program at Forsythe Refuge has been growing steadily. In 1990, volunteers provided more than 2,300 hours of assistance to the Refuge. In 1999, volunteers provided about 3,900 hours of volunteer service.

Much of this volunteer work was done by 60 core volunteers, five active Friends Group members, three schools who brought groups to work on specific problems and two Eagle scouts working on their projects.

In addition, 65 one-time volunteers provided 756 hours of service for a “Community Tree Planting project” and another 90 onetime volunteers gave 360 hours of service on “Make a Difference Day”.

Volunteers are essential to the ongoing and planned operation and maintenance of Forsythe Refuge. We are deeply indebted to all of our volunteers for their dedication and services rendered for the betterment of our nation’s natural resources.

Volunteers participate in a wide variety of activities. These include wildlife and wildlands photography, interpretation, providing information, observation and surveys of endangered species, such as, peregrine falcons and piping plovers, botanical surveys, fabrication of wood duck and bluebird boxes, waterfowl surveys and research assistance, litter pickup, trail clearing and maintenance, sign rehabilitation, and other

maintenance projects.

## **Plan Amendment and Revision**

Periodic review of the CCP will be required to ensure that objectives are being met and strategies are being implemented. Ongoing monitoring and evaluation will be an important part of this process.

The Plan will be reviewed annually to determine the need for revision. A revision would occur if significant new information were to become available, ecological conditions changed, major Refuge expansion occurs, or we identify the need to do so during Plan review. This should occur every 15 years or sooner, if necessary. Revisions to the Plan will be subject to additional NEPA compliance and an opportunity for public review and comment.

## Appendices

- A. Relevant Legal Mandates.
- B. Summarized Public Comments, July 1999.
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- D. NEPA Compliance.
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# Appendix A

## Relevant Legal Mandates and Land Acquisition Legislation

### Emergency Wetland Resources Act of 1986

This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act also requires the Secretary to establish a National Wetlands Priority Conservation Plan, requires the States to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amount equal to import duties on arms and ammunition.

### Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended

Public Law 93-205, approved December 28, 1973, repealed the Endangered Species Conservation Act of December 5, 1969 (P.L. 91-135, 83 Stat. 275). The 1969 act had amended the Endangered Species Preservation Act of October 15, 1966 (P.L. 89-669, 80 Stat. 926). The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through Federal action and by encouraging the establishment of State programs. The Act:

- Authorizes the determination and listing of species as endangered and threatened;
- Prohibits unauthorized taking, possession, sale, and transport of endangered species;
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds;
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants;
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations;
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act or any regulation issued thereunder.

### Environmental Education Act of 1990 (20 U.S.C. 5501-5510; 104 Stat. 3325)

Public Law 101-619, signed November 16, 1990, established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal environmental education program.

Responsibilities of the Office include developing and supporting programs to improve understanding of the natural and developed environment, and the relationships between humans and their environment; supporting the dissemination of educational materials; developing and supporting training programs and environmental education seminars; managing a Federal grant program; and administering an environmental internship and fellowship program. The Office is required to develop and support environmental programs in consultation with other Federal natural resource management agencies, including the Fish and Wildlife Service.

## **Executive Order 11988, Floodplain Management**

The purpose of this Executive Order, signed May 24, 1977, is to prevent Federal agencies from contributing to the “adverse impacts associated with occupancy and modification of floodplains” and the “direct or indirect support of floodplain development.” In the course of fulfilling their respective authorities, Federal agencies “shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

## **Fish and Wildlife Improvement Act of 1978** (16 U.S.C. 7421, 92 Stat. 3110)

This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.

## **Historic Preservation Acts**

There are various laws for the preservation of historic sites and objects.

***Antiquities Act*** (16 U.S.C. 431 - 433): The Act of June 8, 1906, (34 Stat. 225) authorizes the President to designate as National Monuments objects or areas of historic or scientific interest on lands owned or controlled by the United States. The Act required that a permit be obtained for examination of ruins, excavation of archaeological sites and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

***Archaeological Resources Protection Act*** (16 U.S.C. 470aa - 470ll): Public Law 96-95, approved October 31, 1979, (93 Stat. 721) largely supplanted the resource protection provisions of the Antiquities Act for archaeological items.

This Act established detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from Federal or Indian lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from Federal or Indian land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported or received in violation of any State or local law.

Public Law 100-588, approved November 3, 1988, (102 Stat. 2983) lowered the threshold value of artifacts triggering the felony provisions of the Act from \$5,000 to \$500, made attempting to commit an action prohibited by the Act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

***Archeological and Historic Preservation Act*** (16 U.S.C. 469-469c): Public Law 86-523, approved June 27, 1960, (74 Stat. 220) as amended by Public Law 93-291, approved May 24, 1974, (88 Stat. 174) to carry out the policy established by the Historic Sites Act (see below), directed Federal agencies to notify the Secretary of the Interior whenever they find a Federal or Federally assisted, licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. The Act authorized use of appropriated, donated and/or transferred funds for the recovery, protection and preservation of such data.

***Historic Sites, Buildings and Antiquities Act*** (16 U.S.C. 461-462, 464-467): The Act of August 21, 1935, (49 Stat. 666) popularly known as the Historic Sites Act, as amended by Public Law 89-249, approved October 9, 1965, (79 Stat. 971) declared it a national policy to preserve historic sites and objects of national significance,

including those located on refuges. It provided procedures for designation, acquisition, administration and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January, 1989, 31 national wildlife refuges contained such sites.

***National Historic Preservation Act of 1966*** (16 U.S.C. 470-470b, 470c-470n): Public Law 89-665, approved October 15, 1966, (80 Stat. 915) and repeatedly amended, provided for preservation of significant historical features (buildings, objects and sites) through a grant-in-aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d).

The Act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94-422, approved September 28, 1976 (90 Stat. 1319). That Act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.

As of January, 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

### **Land and Water Conservation Fund Act of 1964**

Public Law 88-578, approved September 3, 1964 (78 Stat. 897), provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources of for land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.

### **Migratory Bird Conservation Act of 1929** (16 U.S.C. 715-715d, 715e, 715f-715r)

This Act established the Migratory Bird Conservation Commission which consists of the Secretaries of the Interior (chairman), Agriculture, and Transportation, two members from the House of Representatives, and an ex-officio member from the state in which a project is located. The Commission approves acquisition of land and water, or interests therein, and sets the priorities for acquisition of lands by the Secretary for sanctuaries or for other management purposes. Under this Act, to acquire lands, or interests therein, the state concerned must consent to such acquisition by legislation. Such legislation has been enacted by most states.

### **Migratory Bird Hunting and Conservation Stamp Act** (16 U.S.C. 718-718j, 48 Stat. 452), as amended

The "Duck Stamp Act," as this March 16, 1934, authority is commonly called, requires each waterfowl hunter 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

### **National and Community Service Act of 1990** (42 U.S.C. 12401; 104 Stat. 3127)

Public Law 101-610, signed November 16, 1990, authorizes several programs to engage citizens of the U.S. in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Several provisions are of particular interest to the U.S. Fish and Wildlife Service.

**American Conservation and Youth Service Corps** – As a Federal grant program established under Subtitle C of the law, the Corps offers an opportunity for young adults between the ages of 16-25, or in the



case of summer programs, 15-21, to engage in approved human and natural resources projects which benefit the public or are carried out on Federal or Indian lands.

To be eligible for assistance, natural resources programs will focus on improvement of wildlife habitat and recreational areas, fish culture, fishery assistance, erosion, wetlands protection, pollution control and similar projects. A stipend of not more than 100 percent of the poverty level will be paid to participants. A Commission established to administer the Youth Service Corps will make grants to States, the Secretaries of Agriculture and Interior and the Director of ACTION to carry out these responsibilities.

**National and Community Service Act** – Will make grants to States for the creation of full-time and/or part-time programs for citizens over 17 years of age. Programs must be designed to fill unmet educational, human, environmental, and public safety needs. Initially, participants will receive post-employment benefits of up to \$1000 per year for part-time and \$2500 for full-time participants.

**National Environmental Policy Act of 1969** (P.L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852) as amended by P.L. 94-52, July 3, 1975, 89 Stat. 258, and P.L. 94-83, August 9, 1975, 89 Stat. 424).

Title I of the 1969 National Environmental Policy Act (NEPA) requires that all Federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

The 1969 statute stipulated the factors to be considered in environmental impact statements, and required that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations.

Title II of this statute requires annual reports on environmental quality from the President to the Congress, and established a Council on Environmental Quality in the Executive Office of the President with specific duties and functions.

**National Wildlife Refuge System Administration Act of 1966** (16 U.S.C. 668dd-668ee) as amended

This Act defines the National Wildlife Refuge System as including wildlife refuges, areas for protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase consideration for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40% of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40% of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except (1) lands acquired with Migratory Bird Conservation Commission funds, and (2) lands can be removed from the system by land exchange, or if brought into the system by a cooperative agreement, then pursuant to the terms of the agreement.

**National Wildlife Refuge System Improvement Act of 1997**

Public Law 105-57, amends the National Wildlife System Act of 1966 (16 U.S.C. 668dd-ee), providing guidance for management and public use of the Refuge System. The Act mandates that the Refuge System

be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management.

The Act establishes priorities for recreational uses of the Refuge System. Six wildlife-dependent uses are specifically named in the Act: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. These activities are to be promoted on the Refuge System, while all non-wildlife dependant uses are subject to compatibility determinations. A compatible use is one which, in the sound professional judgement of the Refuge Manger, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s).

As stated in the Act, “The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The Act also requires development of a comprehensive conservation plan for each refuge and management of each refuge consistent with the plan. When writing CCP, planning for expanded or new refuges, and when making management decisions, the Act requires effective coordination with other Federal agencies, state fish and wildlife or conservation agencies, and refuge neighbors. A refuge must also provide opportunities for public involvement when making a compatibility determination or developing a CCP.

#### **North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 4401-4412)**

Public Law 101-233, enacted December 13, 1989, provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, U.S. and Mexico. The Act converts the Pittman-Robertson account into a trust fund, with the interest available without appropriation through the year 2006 to carry out the programs authorized by the Act, along with an authorization for annual appropriation of \$15 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act.

Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment not to exceed 50 percent of the United States share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on Federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

#### **Public Law 98-293 - approved May 22, 1984 (98. Stat. 207)**

Renamed the Brigantine National Wildlife Refuge and Barnegat National Wildlife Refuge, collectively, as the Edwin B. Forsythe National Wildlife Refuge, in memory of the late Congressman Forsythe of New jersey, ranking member of the House Merchant Marine and Fisheries Committee for many years.

#### **Refuge Recreation Act of 1962 (16 U.S.C. 460K-4; 76 Stat. 653)**

This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area’s primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

#### **Refuge Revenue Sharing Act (16 U.S.C. 715s)**

Section 401 of the Act of June 15, 1935, (49 Stat. 383) provided for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges.

Public Law 88-523, approved August 30, 1964, (78 Stat. 701) made major revisions by requiring that all revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, be deposited in a special Treasury account and net receipts distributed to counties for public schools and roads.

Public Law 93-509, approved December 3, 1974, (88 Stat. 1603) required that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act.

Public Law 95-469, approved October 17, 1978, (92 Stat. 1319) expanded the revenue sharing system to include National Fish Hatcheries and Service research stations. It also included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as:

- 1) on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and
- 2) on land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94-565 (31 U.S.C. 1601-1607, 90 Stat. 2662), payment in lieu of taxes on public lands.

This amendment also authorized appropriations to make up any difference between the amount in the Fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other units of local government within the county which suffer losses in revenues due to the establishment of Service areas.

#### **Rehabilitation Act of 1973 (29 U.S.C. 794 )as amended**

Title 5 of P.L. 93-112 (87 Stat. 355), signed October 1, 1973, prohibits discrimination on the basis of handicap under any program or activity receiving Federal financial assistance.

#### **Transfer of Certain Real Property for Wildlife Conservation purposes Act of 1948**

This Act provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

#### **Wilderness Act of 1964 (16 U.S.C. 1131-1136, 78 Stat. 890)**

Public Law 88-577, approved September 3, 1964, directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems for inclusion in the National Wilderness Preservation System.

## Appendix B

### Summary of Public Comments Received on the Draft CCP/EA and Their Disposition

The draft CCP/EA was released for 45 days of public review and comment in June 1999. Over 170 people attended the three public meetings held in July at the following location: Middle Township Building in Cape May County; Galloway Township Library in Atlantic County; and Stafford Township Municipal Building in Ocean County. We also received over 1,600 individual comment letters. There were a great many duplicate comments received, since many people sent copies to both the Forsythe Refuge headquarters in Oceanville, New Jersey and our Regional Office in Hadley, Massachusetts. A summary of the public comments received and the disposition of the concerns expressed in those comments follows.

*Comment:* Most commenters thought that the proposed closure of Holgate beach to motorized vehicles was outside our authority. They questioned whether we had the authority to close the beach based upon the States ownership and jurisdiction of riparian lands below the mean high tide line.

*Response:* The Holgate Peninsula above mean high tide has been owned by the Service since June 30, 1960, and was designated part of the Brigantine Wilderness Area under Public Law 93-632 on January 3, 1975. We not only have the authority to close Holgate beach above mean high tide to motorized vehicles, but are specifically directed to do so by the Wilderness Act of 1964.

The land below mean high tide in New Jersey is owned by the State. In the Draft CCP/EA, we proposed coordinating the closure with the New Jersey Tidelands Council. During the three public meetings held on the Draft document, we specifically stated that it was our intent to request a license from the Tidelands Council to close Holgate beach below the mean high tide line as well. This request has been dropped from Alternative B, our Proposed Action in the Revised Draft CCP/EA.

*Comment:* Several commenters questioned whether we had the authority to close Holgate beach to motorized vehicles under the provisions of the Wilderness Act. Others stated that the original designation of Holgate as a Wilderness Area was inconsistent with the mandate and intent of the Act. They believed the high volume of boat traffic and close proximity of Holgate to a major urban area like Atlantic City would make it difficult, if not impossible, for Refuge visitors to obtain a “wilderness experience,” as defined by the Act.

*Response:* We not only have the authority to close the Wilderness Area at Holgate, including all the land above mean high tide, to motorized vehicles, but we are specifically directed to do so by the Wilderness Act of 1964. When Congress designated our lands on Holgate Peninsula as part of the Brigantine Wilderness Area, they determined that this designation was consistent with the mandate and intent of the Wilderness Act of 1964. While circumstances in the vicinity may make it difficult, if not impossible, for Refuge visitors to obtain a “wilderness experience,” as defined by the Act, this does not give us the authority to disregard the Act’s specific prohibition against motorized vehicle use within wilderness areas.

*Comment:* Many commenters also noted that closing Holgate beach to motorized vehicles would significantly reduce fishing opportunities on Forsythe Refuge. They felt this action would be inconsistent with our mandates under the National Wildlife Refuge System Improvement Act of 1997, which identifies

fishing as one of six wildlife-dependent priority public uses of the Refuge System that should be given priority consideration over other uses of refuges.

*Response:* While closing the area above mean high tide to motorized vehicles will reduce the fishing opportunities currently available on the Holgate Peninsula, it will not close the area to fishing. Those interested in fishing the Peninsula would still be able to do so on foot or by driving and parking their motorized vehicles below the mean high tide line. In fact, the potential introduction of a water ferry to the tip of the Peninsula, as included in Alternative B, our Proposed Action in the Revised Draft CCP/EA, would provide new opportunities to fish the Holgate for those who do not own suitable motorized vehicles or boats.

*Comment:* Other commenters supported the closure of Holgate beach to motorized vehicles. They were primarily concerned that the current vehicular use of the beach caused water, air and noise pollution. Furthermore, they believed that motorized uses were not appropriate in designated Wilderness Areas.

*Response:* We agree, and have included the proposed year-round closure of the Holgate Peninsula above mean high tide to motorized vehicles in Alternative B, our Proposed Action in the revised Draft CCP/EA.

*Comment:* Many commenters requested that both Forsythe and Cape May Refuges provide more environmental education opportunities and improve public access by providing additional interpretive trails. They also requested that additional user-friendly maps and signs be placed throughout the Refuges.

*Response:* We agree. In Alternative B, our Proposed Action in the Revised Draft CCP/EA, we have substantially expanded our environmental education offerings and increased the amount of interpretation that we would provide, including additional interpretative trails and signage.

*Comment:* Several commenters were concerned that the proposed location of the new Barnegat Division office and visitor contact station would not provide the public with a suitable wildlife-oriented experience because of the commercial nature of the area.

*Response:* While we concur with those commenter's observations regarding the commercial nature of the area in question, we selected this site along U.S. Route 9 because we own the land and wished to keep our new structure within an area that was already developed and had good access to a major traffic corridor. This will allow us to protect the habitats within the Refuge from further fragmentation, while allowing us better access to a larger segment of the public. From this location we will be able to direct our visitors to the many trails and other facilities found in more remote parts of the Refuge.

*Comment:* Many commenters requested that at-large or Refuge-wide hunting be allowed at both Forsythe and Cape May Refuges in all areas deemed appropriate. They were concerned about the diminishing number of areas around the Refuges that provided hunting opportunities for the public. In particular, several people requested that upland game hunting opportunities be provided. They referenced the National Wildlife Refuge System Improvement Act of 1997, which includes hunting as one of six wildlife-dependent priority public uses of the Refuge System that should be given priority consideration over other uses of the refuges. A few people commented that hunting was not an appropriate use on a National Wildlife Refuge.

*Response:* In response to the concerns of these commenters, we added a third alternative, Alternative C, in the Revised Draft CCP/EA. This Alternative would provide opportunities for Refuge-wide hunting at both Refuges. At Forsythe we would expand deer hunting opportunities by including the State fall and winter

bow and regular six-day firearms seasons, and open most of the Refuge to both upland game and migratory game bird hunting. At Cape May we would provide opportunities for upland game and migratory game bird hunting Refuge-wide. The entire Refuge is already open for deer hunting. Additional opportunities for hunting would also be provided on newly acquired lands at both Refuges.

Alternative B, our Proposed Action in the revised Draft CCP/EA, while not providing Refuge-wide hunting, would significantly increase hunting opportunities at both Refuges. At Forsythe we would expand the area currently opened to permit deer hunting and initiate a universally accessible permit deer hunt, initiate upland game hunting in the Oak Island Unit of the Brigantine Division, and expand the area open to migratory game bird hunting. At Cape May we would open about 45% of the Refuge to upland game hunting and expand the current migratory game bird hunting area into that same 45% of the Refuge. The entire Refuge is already open for deer hunting. Additional opportunities for hunting would also be provided on newly acquired lands at both Refuges.

While hunting must be given priority consideration over other public uses, it does not take priority over the other five wildlife-dependent priority public uses (fishing, wildlife observation and photography, environmental education and interpretation) identified in the Improvement Act. We believe that Alternative B, our Proposed Action in the Revised Draft CCP/EA, would help us best achieve Refuge purposes, vision and goals; fulfill the Refuge System mission; maintain and, where appropriate, restore the biological integrity, diversity and environmental health of both Refuges and the System; address the key issues and mandates; and is consistent with the principles of sound fish and wildlife management.

*Comment:* The State of New Jersey, Division of Fish and Wildlife, requested that additional acreage within both Forsythe and Cape May Refuges be opened up to provide opportunities for hunting. They believed the Service's safety concerns could be addressed by requiring that all hunters be in compliance with State fish and game regulations.

*Response:* Alternative B, our Proposed Action in the Revised Draft CCP/EA, would significantly increase hunting opportunities at both Refuges. At Forsythe we would expand the area currently opened to permit deer hunting and initiate a universally accessible permit deer hunt, initiate upland game hunting in the Oak Island Unit of the Brigantine Division, and expand the area open to migratory game bird hunting. At Cape May we would open about 45% of the Refuge to upland game hunting and expand the current migratory game bird hunting area into that same 45% of the Refuge. The entire Refuge is already open for deer hunting. Additional opportunities for hunting would also be provided on newly acquired lands at both Refuges.

*Comment:* Other commenters requested additional trapping opportunities at both Forsythe and Cape May Refuges. They identified trapping as a necessary and important wildlife management tool.

*Response:* We agree that trapping is an important wildlife management tool. It is often used on refuges to control predators and to manage populations of small mammals that impact refuge habitats and facilities such as dikes. Alternative B, our Proposed Action in the Revised Draft CCP/EA, includes additional opportunities for trapping at both Forsythe and Cape May Refuges. At Forsythe we would expand the areas open to trapping and at Cape May we would open about 25% of the Refuge to trapping of muskrat, raccoon and fox.

*Comment:* Many commenters supported our land protection proposals and wanted us to continue to acquire additional properties located near or around both Forsythe and Cape May Refuges. They supported our efforts to both increase habitat protection and provide additional public use opportunities.

*Response:* Under Alternative B, our Proposed Action in the Revised Draft CCP/EA, we would acquire 12,300 acres of privately owned lands within our currently approved acquisition boundaries at Forsythe Refuge, and 7,600 acres of privately owned lands within our currently approved acquisition boundaries at Cape May Refuge. We also have identified 17,000 acres of focus areas at Forsythe Refuge, 11,500 acres of which we are proposing to acquire, and 4,900 acres of focus areas at Cape May Refuge, 3,600 acres of which we are proposing to acquire. These lands are located outside our current approved Refuge acquisition boundaries and represent lands with habitats that are important to a number of federal trust species. They also encompass watersheds that are important to protect from future development to ensure that we have adequate water quantity and quality for Refuge wetlands and provide habitat corridors for the movement of wildlife between various state, local and federal conservation lands.

*Comment:* Several commenters thought that the proposed two-year beach closure during the nesting season at the new Two Mile Beach Unit was unnecessary. They were concerned that the closure threatened their long-standing use of the beach, including being able to walk the beach to reach Cape May Inlet. Several suggested that fencing could be placed above the mean high tide line as a protective measure and that the proposed beach closure should only be enforced if birds actually began to nest at the site.

*Response:* In light of our mandates as a Federal Land Management Agency, we believe it is important that the beach be available for undisturbed breeding, nesting, feeding, preening, and loafing by an assortment of migratory birds. Under the provisions of the National Wildlife Refuge System Improvement Act of 1997, compatible wildlife-dependent recreational use and all other compatible uses are secondary to the "... conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitat..." We do not believe that placing fencing above the mean high tide line will adequately protect these birds, as the adults and young do much of their feeding at the wrack, or daily high tide line. Nor do we believe that closing the beach only if birds actually began to nest at the site is adequate.

The U.S. Coast Guard LORAN Support Unit is prepared to follow our lead on closing that portion of the beach still under their jurisdiction. They also are prepared to close public access to the jetty on the north side of the Cape May Inlet.

Under Alternative B, our Proposed Action in the Revised Draft CCP/EA, we would allow pedestrian access to the beach from about October 1 through March 31 each year. No vehicles would be allowed on the beach at any time. We would also allow pedestrian access to other parts of the Two Mile Beach Unit all year.

*Comment:* Several commenters expressed a desire to see the existing buildings at the new Two Mile Beach Unit used for a variety of purposes such as housing for researchers or as a fishing clubhouse. Others commented that we should demolish all the existing buildings and then restore the land to native vegetation.

*Response:* Under Alternative B, our Proposed Action in the Revised Draft CCP/EA, we would maintain two existing buildings for Refuge office, storage and maintenance purposes, and one for use as a visitor center with displays, exhibits, and regular programs. We would remove all other buildings on the site, all of which are located within the one hundred year floodplain, in compliance with the directives of Executive Order 11988, Floodplain Management. This will allow us to restore the heart of the upland habitat at the Two Mile Beach Unit, in compliance with our mandate under the National Wildlife Refuge System Improvement Act of 1997, which calls for the "... conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitat..."

## Appendix C

### Summary of Public Comments Received on the Revised Draft CCP/EA and Their Disposition

Comments received during the public review period for the Revised Draft Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) were considered during preparation of the Decision Document, a Finding of No Significant Impact (FONSI). Comments were received from elected officials, Federal agencies, State and local governments, national conservation and recreation organizations, regional and State organizations, and local residents, as well as out-of-state residents.

The Revised Draft CCP/EA was released for 30 days of public review and comment July 5 through August 4, 2000. A formal public hearing was held July 19, at the Absegami High School in Galloway Township, Atlantic County, New Jersey. Some 80 people were in attendance. The majority of the speakers, including a legislative staff member representing Congressman Jim Saxton, were opposed to the proposed year-round beach closure to motor vehicles at the Holgate Unit of Forsythe National Wildlife Refuge. Most also spoke in opposition to the proposed seasonal beach closure at the Two Mile Beach Unit of Cape May National Wildlife Refuge.

During the comment period we received over 1,700 written comments on the document. Of these, 1,159 opposed and 543 supported the proposed beach closures. Many of the latter comments also urged that we petition the State Tidelands Council to close the State owned intertidal area (i.e., the lands below the mean high tide line) on the Holgate Peninsula to motorized vehicle use.

Those opposed to the proposed beach closures included:

- New Jersey Division of Fish and Wildlife;
- County of Ocean Board of Chosen Freeholders;
- Township of Lower;
- Township of Long Beach;
- Township of Manchester;
- Borough of Beach Haven;
- Chamber of Commerce of Southern Ocean County;
- Atlantic Surfers;
- Eastern Surfing Association/New Jersey District;
- Mid-Island Surfcasters;
- New Jersey Anglers Association;
- Jersey Coast Shark Anglers;
- Recreational Fishing Alliance;
- New Jersey State Federation of Sportsmen's Clubs;
- United Mobile Sportfishermen.

Those supporting the proposed beach closures included:

- New Jersey Chapter of the Sierra Club;
- Atlantic Audubon Society;
- New Jersey Audubon Society;
- New Jersey Conservation Foundation;
- Wetlands Institute;



Coalition Against Toxics;  
Northwest Ecosystem Alliance;  
Wilderness Watch;  
Lower Township Environmental Commission.

Others commenting on the document included:

New Jersey Trappers Association;  
New Jersey Environmental Federation;  
Animal Protection Institute;  
New Jersey Waterfowlers Association;  
Middle Township Beach Association;  
Alliance for a Living Ocean.

A summary of the public comments received and the disposition of the concerns expressed in those comments follows.

*Comment:* The Army Corps of Engineers commented that proposed activities in navigable waters will require a Department of Army permit pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

*Response:* The Service will comply with the Acts, and submit the required permit application(s) and environmental documents prior to any actual construction work.

*Comment:* The New Jersey Division of Fish and Wildlife (NJDFW), while supportive of our plans to promote piping plover breeding at the Two Mile Beach Unit, does not believe that there is sufficient justification to extend this closure through the shorebird migration season. They believe an April 1-August 15 closure would be sufficient to safeguard piping plover breeding.

*Response:* The Service funded a research study by the New Jersey Audubon Society's Cape May Bird Observatory in fiscal year 2000 to look at all shorebirds use of the entire beach area. Observations were made twice a week along predetermined transects from mid-August to mid-October on three adjoining beaches, the United States Coast Guard (USCG) LORAN Support Unit, the Service Two Mile Beach Unit, both closed to all public use, and the private property to the north which was open to public use. Our current beach closure through September 31, accommodates late nesting birds, such as, the black skimmer and least tern, as well as migrating shorebirds. Based on the results of the study the Service will make a decision on whether to reduce or maintain our closure period.

*Comment:* The NJDFW also encouraged us to allow access to the jetty for fishing utilizing the existing parking facilities. This has been permitted in the past by the Coast Guard and will not jeopardize beach nesting birds.

*Response:* Jetty access is controlled by the Coast Guard and the Service has no authority on Coast Guard land.

*Comment:* The NJDFW also emphasized that prohibitions on deer hunting at Forsythe make it difficult to adequately manage deer herds on this area without resulting negative impacts on a variety of habitats, particularly Atlantic white cedar swamp.

*Response:* A substantial portion of Forsythe Refuge is currently open to deer hunting in Deer Management Zones 56, 57, and 58. We work cooperatively with the Division’s deer management program staff to ensure a healthy herd, to protect critical habitat, and to provide a quality hunt experience. Annual meetings are held between Refuge and Division representatives.

*Comment:* The NJDFW also noted that when converting to GIS, the boundary of Deer Management Zone 57 was changed, eliminating some salt marsh areas. They recommend that the original boundary be restored.

*Response:* Deer Management Zone 57 will include all the salt marsh area that was previously included.

*Comment:* The NJDFW also strongly urged that opportunities to harvest resident Canada and snow goose be expanded to the maximum extent practicable to reduce the negative habitat and societal impacts resulting from the current overabundance of these species. They also proposed an annual review of waterfowl hunting areas with Division staff and sportsmen representatives to discuss boundary issues, the 40% prohibition on pre-1978 acquisition, addition of new refuge lands and other waterfowl related issues.

*Response:* Over the past four years we have expanded opportunities to hunt resident Canada and snow geese to the maximum. Opening no more than 40% of a refuge, established as an inviolate sanctuary, to waterfowl hunt is a provision of the Migratory Bird Conservation Act. It applies to all the refuge property within the pre-1978 approved acquisition boundary. We can open more than 40 percent of the refuge property within the pre-1978 approved refuge boundary, only if the Secretary determines that such an action would be beneficial to the species hunted. The 40 percent limitation is intended to ensure that sufficient undisturbed area is available for waterfowl species can carry out their life cycles and sustain their population numbers.

*Comment:* A majority of commenters, including the State and local governments and many organizations, opposed our proposal to restrict year-round motorized vehicle access above the mean high tide line on the Holgate Unit of Forsythe Refuge.

*Response:* We are mandated to comply with the provisions of the Wilderness Act. The Act clearly states in Section 4(c) that, “Except as specifically provided for in this Act.....there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structures or installations within any such area.” There is an exception in Section 4(d)(1) of the Act which states that “Within wilderness areas designated by this Act the use of aircraft or motorboats (emphasis added), where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary ..... deems desirable.” There is no exception to permit the continuation of previously established motor vehicle use. We simply do not have the authority to be more liberal than the law itself.

*Comment:* The Southern Ocean County Chamber of Commerce noted that without beach buggy access, older anglers and those with disabilities would not be able to participate in the sport of surf fishing. A “seasonal boat concession,” promised as part of the Alternative B and C proposals, might at least begin to address this concern, but only if the ferry service is in place and operational before the access ban is implemented, and only if “seasonal” includes late fall, and only if the ferry service was operated from predawn to late nights, when—as any angler knows—the fish are biting. To run a shuttle service from nine-to-five is pretty much useless.

*Response:* The Wilderness Act prohibits the use of “mechanical means of transport”. However, the Americans with Disabilities Act states in Section 507(c)(1) that “In General—Congress reaffirms that nothing in the Wilderness Act is to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual whose disability requires use of a wheelchair and consistent with the Wilderness Act no agency is required to provide any form of special treatment or accommodation or to construct any facilities or modify any conditions of lands within wilderness to facilitate such use.” We believe that our proposed “seasonal boat concession” will help make the Holgate Unit more accessible to those with disabilities, including those using wheelchairs, and all other users as well. Once a final decision has been made, we plan to pursue efforts to provide a concession, assuming it is still part of our final decision. If so, we would work to have the concession in place by the fall of 2001. Once in place, the concession would respond to market demands in terms of its operations.

*Comment:* The Chamber also stated that it fervently believed that the state-owned portion of the beach--below the mean high tide line--should remain open to beach buggies when nesting migratory birds are not present.

*Response:* During the fall and winter, control of motor vehicle access in the state-owned riparian zone below mean high tide at Holgate is determined by the State Tidelands Council under all three alternatives in the Comprehensive Conservation Plan..

*Comment:* Numerous commenters expressed concern that our proposed closure of the beach above mean high tide at the Holgate Unit to motorized vehicles would seriously impact the Chamber’s entire six-week Surf Fishing Tournament, which along with the Chowderfest and Beach Wheels festival, enlivens the Island’s economy after the traditional vacation season has ended.

*Response:* We acknowledge that our proposed beach closure may have some impact on the tournament. While we encourage fishing, one of our six priority public uses, the Wilderness Act does not allow us to permit the use of motorized vehicles in wilderness areas, including in support of fishing. We believe that our proposed “seasonal ferry concession” would be able to continue to provide Tournament anglers access to the tip of the Holgate Peninsula.

*Comment:* A number of commenters questioned the availability of scientific data to prove that the seasonal beach closure at the Two Mile Beach Unit of Cape May Refuge would benefit the piping plover.

*Response:* It is well documented in scientific literature that if human disturbance or presence is eliminated, birds will recolonize/reclaim habitat. There are studies that show that birds respond negatively to human walkers. These studies also note that disturbance by humans and pets often reduces the functional stability of habitat and causes direct and indirect mortality of eggs and chicks. Predation has also been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites, and substantial evidence shows that human activities are affecting types, numbers, and activity patterns of predators, thereby exacerbating natural predation. This past summer, after Service closed the Two Mile Beach Unit and the USCG closed the adjoining LORAN Support Unit, plovers nested for the first time since 1994. Least terns nested for the first time since 1988. American oystercatchers also nested. These nests were all located on the Coast Guard LORAN Support Unit beach, where the nesting habitat is better. Our portion of the beach did provide undisturbed critical feeding areas for significant numbers of shorebirds. Piping plover also fed on our beach. There was frequent activity by up to eight adult plovers observed early in the season, but they did not actually nest on the Refuge.

*Comment:* The Mayor of the Township of Lower stated that the Two Mile Beach Unit of Cape May Refuge did have walking activities, sunbathing activities, fishing activities before becoming a National Wildlife Refuge. Very little concern was given to the piping plover however the plover allegedly nested there.

*Response:* Lt. Cmdr. Charles Schue III, the Coast Guard base commander, is quoted as stating (Atlantic City Press, July 2, 2000, Richard Degener, Reporter) that “it always has been illegal to walk on the Coast Guard beach or jetty.” He said “We didn’t have enough security to enforce it. This is a closed base with no public access.” The Two Mile Beach Unit was part of the USCG LORAN Support Unit until October 1999. No piping plover nesting occurred on the Coast Guard property after 1994.

*Comment:* The Mayor also believed that the coexistence of the piping plover and the needs of recreational users can be met as they are within the Township of Lower at the Cape May Meadows project administered by the Nature Conservancy. Sunbathing, fishing, and walking on the beach area is permitted while the piping plover continues to exist in this area.

*Response:* Although piping plovers do nest at the Nature Conservancy’s Cape May Meadows, the fledging rate per nesting pairs the last three years, 1998, 1999 and 2000, has been 0.43, 0.25, and 0.25, respectively. Population modeling for the piping plovers show that the fledging rate per nesting pair needs to be at least 1.50 for the species to avoid extinction. This indicates that the Cape May Meadows is not providing the habitat the piping plover needs to continue to exist.

*Comment:* The Mayor also asked if the Fish and Wildlife Service performed a compatibility study in the Cape May Meadows, or on the newly acquired Cape May Refuge.

*Response:* The Service has no jurisdiction over the Cape May Meadows Preserve. Compatibility determinations are prepared only for lands that are part of the National Wildlife Refuge System. The National Wildlife Refuge Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997, states in Section (d)(3)(A)(i) that “On lands added to the System after March 25, 1996, the Secretary shall identify, prior to acquisition, withdrawal, transfer, reclassification, or donation of any such lands, existing compatible wildlife-dependent recreational uses (emphasis added) that the Secretary determines shall be permitted to continue on an interim basis pending completion of the comprehensive conservation plan for the refuge.” Section 5(2) of the Act states that “The terms wildlife-dependent recreation and wildlife-dependent recreational use mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.” The Act also states that “The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats (emphasis added) within the United States for the benefit of present and future generations of Americans.” This basic “wildlife first” tenant of the Act takes precedence over the six priority wildlife-dependent recreational uses. The formal transfer of the Two Mile Beach Unit from the Coast Guard to the Service occurred during the preparation of our Revised Draft CCP/EA. In the Revised Draft we are in effect determining that fishing, wildlife observation and photography, environmental education and interpretation are indeed compatible uses on the Unit, subject to our proposed seasonal beach closure.

*Comment:* The Mayor also noted that he was informed when attempting to procure one of the existing buildings at the Two Mile Beach Unit for fire protection that all the buildings would be, with the exception of one or two, demolished. This does not make sense to him.

*Response:* The maintenance and upkeep of these buildings represent a significant cost and those not required for the management and operation of the Unit would be demolished in our Proposed Action,

## Alternative B.

*Comment:* Several commenters, including the Animal Protection Institute, opposed providing trapping opportunities on Forsythe and Cape May Refuges. The Animal Protection Institute believes that trapping is an ineffective “management tool” that does not “control” populations. While they strongly support our efforts to protect threatened and endangered species, they believe we have relied too heavily on lethal predator removal as the primary method of addressing threatened and endangered species recovery efforts on refuges. They argue that protection of these species can, and should be, accomplished using effective, long-term management strategies that are both humane and socially acceptable.

*Response:* We believe that trapping is an important wildlife management tool. It is used on refuges to control predators and to manage populations of small mammals that impact refuge habitats and facilities such as dikes. Alternative B, our Proposed Action, includes additional opportunities for trapping at both Forsythe and Cape May Refuges. At Forsythe we would expand the areas open to trapping and at Cape May we would open about 25% of the Refuge to trapping of muskrat, raccoon and fox. All trapping is by refuge issued special use permit only. On average, only six trapping permits are issued each year at Forsythe Refuge. We use Department of Agriculture Animal Damage Control trappers at both the Holgate Unit of Forsythe Refuge and the Two Mile Beach Unit of Cape May Refuge to help control predators in our piping plover recovery efforts. Predation has been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites. We also use fencing for exclosures, which has generally proved to be successful. However, on occasion we have documented cases where predators, especially fox, have learned to key in on fenced exclosures, dig under them, and destroy the nests they were intended to protect. Any feral animals that are caught are turned over to township animal damage control officials. Our trapping program complies with State law and we believe that trapped animals are humanely dealt with. The relocation of any predatory wildlife is illegal in New Jersey.

*Comment:* Several commenters, including the New Jersey Trappers Association and the New Jersey Federation of Sportsmen’s Clubs, asked us to consider providing more trapping opportunities on these public lands.

*Response:* Alternative B, our Proposed Action, includes additional opportunities for trapping at both Forsythe and Cape May Refuges. At Forsythe we would expand the areas open to trapping and at Cape May we would open about 25% of the Refuge to trapping of muskrat, raccoon and fox. There are currently 16 trapping units at Forsythe Refuge. On average, only two thirds of these are trapped under refuge special use permit.

*Comment:* The Wetlands Institute strongly encouraged us to develop collaborative research and management programs on the Jersey Coast Refuges to assist in our conservation efforts. The New Jersey Chapter of the Sierra Club also requested that the final CCP contain a detailed analysis of the best available data regarding the refuge and relevant nearby areas.

*Response:* Our Proposed Action, Alternative B, includes actions involving baseline surveys and monitoring of Refuge resources, expanded use of geographic information systems to document and model species and habitats, increased on-site support for current research efforts and initiating new research on both Forsythe and Cape May Refuges.

*Comment:* Many commenters, including the Atlantic Audubon Society, New Jersey Audubon Society, New Jersey Conservation Foundation, and Coalition Against Toxics, supported our efforts to impose a year-

round motorized vehicle closure, above mean high tide, at the Holgate Unit. Many also encouraged us to proceed with efforts to petition the State Tidelands Council to close the state-owned riparian lands adjacent to the wilderness area as well.

*Response:* We have decided not to petition the State Tidelands Council to close the state-owned riparian lands to motorized vehicle use during the fall and winter. Should the State ever decide to exercise its right to do so, we would certainly applaud and support that decision.

*Comment:* A number of commenters, including New Jersey Audubon Society and the New Jersey Environmental Federation, supported our efforts to develop Integrated Pest Management Plans for both Forsythe and Cape May Refuges. They often expressed concern over the possible use of chemicals to control mosquitos and invasive species, such as phragmites.

*Response:* Through the use of an Integrated Pest Management Plan we hope to significantly reduce our use of pesticides and herbicides.

*Comment:* The New Jersey Audubon Society recommended that we consider the expansion of the Cape May Refuge by purchasing 100 acres of critical wildlife habitat located immediately south of the former Coast Guard Electronics base and across the Cape May Inlet (known as East Cape May or Sewell Point).

*Response:* We believe that it would be more appropriate for the New Jersey State Department of Environmental Protection to protect this property. They have been actively involved with this property for a number of years.

*Comment:* A number of commenters, including the Animal Protection Institute, were opposed to providing opportunities for hunting on the Jersey Coast Refuges.

*Response:* Hunting is one of the six priority public uses of National Wildlife Refuges identified in the National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997. In the Act Congress clearly instructed us to “ensure that opportunities are provided within the System for compatible wildlife-dependent recreational uses” and “ensure that priority general public uses of the System receive enhanced consideration over other general public uses in planning and management within the System”. The Act further states that we are to “provide increased opportunities for families to experience compatible wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as fishing and hunting”. The State Division of Fish and Wildlife regularly conducts studies of resident game species and establishes bag limits and season lengths that ensure sustainability of the species. We, in cooperation with the States, Canada and Mexico, monitor migratory bird populations in order to make management decisions on seasons and bag limits. In the case of over abundant species such as white-tailed deer, resident Canada and snow geese, the damage these species do to habitat is well documented. The complaints from the public on the impacts of resident geese to private property have been increasing in recent years and involves not only a question of habitat destruction, but public health and safety as well. In these particular cases we believe hunting is an important management tool.

*Comment:* The New Jersey Waterfowlers Association expressed a hope for expanded opportunities to hunt waterfowl on the Refuges. They also seek increased use, not only for the hunter, but also for birdwatchers, fishermen, boaters and photographers.

*Response:* Our Proposed Action, Alternative B, greatly expands opportunities for hunting, including waterfowl hunting, at both Forsythe and Cape May Refuges. It also expands opportunities for fishing, wildlife observation and photography, environmental education and interpretation at both Refuges. These are the six priority public uses of the National Wildlife System identified in the National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997.

*Comment:* A number of commenters believed that surfing should be established as a compatible use and permitted to the same extent as the six priority public uses established in the National Wildlife Refuge System Improvement Act.

*Response:* Surfing was not identified as a wildlife-dependent use in that Act; therefore, it cannot be given the same priority as hunting, fishing, wildlife observation and photography, environmental education and interpretation, the six priority public uses identified in the Act. We believe there are other areas along the Jersey Coast which can accommodate this recreational activity. We do intend to conduct a compatibility review of surfing as soon as our current Draft Policy on Compatibility is finalized.

*Comment:* Numerous commenters stated that they would like us to pursue acquisition of the remainder of the Two Mile Beach parcel should the U.S. Coast Guard ever decide to pull out.

*Response:* Under our Proposed Action, Alternative B, we have stated that “Should the Coast Guard’s LORAN Support Unit (adjacent to the Two Mile Beach Unit), become excess to its needs, we would work to acquire the site.”

*Comment:* The Mid-Island Surfcasters noted that despite the fact that E.O. 12962 directed the U.S. Fish & Wildlife Service to work aggressively to minimize conflicts between recreational fisheries and the Endangered Species Act, there has been no effort by the Service to make accommodation for fishermen’s needs at Holgate.

*Response:* Our proposed seasonal closure to motorized vehicles above mean high tide at the Holgate Unit is solely based on the authority of the Wilderness Act, not the Endangered Species Act. While we encourage fishing, one of our six priority public uses, the Wilderness Act does not allow us to permit the use of motorized vehicles in wilderness areas, including in support of fishing. Anglers on foot would still have seasonal access to the beach at the Holgate Unit from September through March. We believe that our proposed “seasonal ferry concession” would also continue to provide anglers access to the tip of the Holgate Peninsula.

*Comment:* The Surfcasters also stated that the “Guidelines for Managing Recreational Activities in Piping Plover Breeding habitat on the Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act” (dated April 15, 1994) issued by the Service is ignored. The Guidelines required beach closure to vehicles only when the plover chicks have hatched, not the entire period from April through September. They consider this a hostile act of no benefit to the birds and an unnecessary sacrifice by the sport fisherman.

*Response:* Our proposed seasonal closure to motorized vehicles above mean high tide at the Holgate Unit is solely based on the authority of the Wilderness Act, not the Endangered Species Act. The summer closure of the Holgate Unit from April through August, which has been in place to protect the piping plover since 1988, would not be effected by this action and would remain in place. Anglers on foot would still have seasonal access to the beach at the Holgate Unit from September through March. We believe that our

proposed “seasonal ferry concession” would also continue to provide anglers access to the tip of the Holgate Peninsula.

*Comment:* The Surfcasters also noted that Alternatives B and C triple the refuge staff, more than triple the budget, propose to acquire all the remainder of land within the legislated boundary of the refuges and more outside the boundary and propose excessive construction of facilities which they deemed boondoggles in order to substantiate the need for bloated staff.

*Response:* The proposed actions under Alternatives B and C reflect the comments and issues raised during the public scoping meetings which focused on the need for additional public recreational opportunities. In order to provide these opportunities additional facilities, staffing, and related funding is required. Not only has the public requested additional opportunities for hunting, fishing, wildlife observation and photography, environmental education and interpretation, but the National Wildlife Refuge Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997 instructs us to provide additional opportunities as well. Section (a)(4)(H) of the Act tells us to “Provide increased opportunities for families to experience compatible wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as fishing and hunting.”

*Comment:* The Surfcasters also noted that we said that we are directed by the Wilderness Act that existing vehicle use at Holgate is in violation of the Act. They believe this is a false claim for Holgate as the use pre-existed Holgate wilderness.

*Response:* Section 4(c) of the Wilderness Act specifically prohibits certain uses in designated wilderness areas such as the Holgate Unit. It states that “...there shall be no temporary roads, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanized transport, and no structure or installation within such area.” Section 4(d)(1) further states that “Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary .... deems desirable.” There are no provisions in the Act that would allow for the use of motor vehicles by the public, whether the use was a pre-existing one or not. The Service cannot be less restrictive than the law itself.

*Comment:* The Surfcasters also felt that Appendix A (the summary of public comment) fails to explain why the provision of 50CFR35.5 (b) is ignored and is suspiciously silent concerning it. Clearly, they noted, the omission is intended to bolster the false claim that the U.S. Fish & Wildlife Service is required by the Act to end the vehicle access at Holgate.

*Response:* The Regulation, 50CFR35 Subpart A 35.5 is in error. Section 4(c) of the Wilderness Act specifically prohibits certain uses in designated wilderness areas such as the Holgate Unit. It states that “...there shall be no temporary roads, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanized transport, and no structure or installation within such area.” Section 4(d)(1) further states that “Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary .... deems desirable.” There are no provisions in the Act that would allow for the use of motor vehicles by the public, whether the use was a pre-existing one or not. The Service cannot be less restrictive than the law itself. We are taking steps to see that this regulation is amended and the error corrected.

*Comment:* The Mid-Island Surfcasters and other commenters felt that the idea of a possible concession



ferry to transport fishermen to the Holgate Unit point was not a viable alternative.

*Response:* We can cite several examples of highly successful ferry system concessions in use at several Atlantic Coast National Wildlife Refuges to access Wilderness Areas, including Cape Romain Refuge in South Carolina and Monomoy Refuge in Massachusetts. The ferry system at Monomoy supports a very successful striped bass and bluefish sport fishery, as well as very popular access for birders. We believe that such a system could be established to serve the Holgate Unit as well. Once a final decision has been made, we plan to pursue efforts to provide a concession, assuming it is still part of our final decision. If so, we would work to have the concession in place by the fall of 2001. Once in place, the concession would respond to market demands in terms of its operations.

*Comment:* A number of commenters felt there was a disparity between the alternatives regarding beach access at the Two Mile Beach Unit. This was especially true regarding Alternative C, which called for a year-round beach closure at the Holgate Unit, while allowing year-round public access at the Two Mile Beach Unit. Alternative A called for continued seasonal access at the Holgate Unit, while keeping the beach at the Two Mile Beach Unit closed year-round. They believed we were unfairly limiting their choices to opening one beach while closing the other beach. Some felt that we were deliberately trying to divide the public in this respect.

*Response:* This is not true. Alternative A in all National Environmental Policy Act documents is always the “no action alternative, the continuation of existing practices. Furthermore, all possible conditions of beach access are reflected in the range of alternatives we displayed. We are not necessarily limited to these three alternatives in making our final decision. We could take various components of each alternative to structure a new forth alternative. For example, we could take the Forsythe component of Alternative A, the Cape May component of Alternative B, and the Two Mile Beach Unit component of Alternative C, to form a new alternative as our final decision. Some commenters did exactly that when stating that they liked this part of one Alternative and that part of another Alternative.

*Comment:* Some commenters felt that the plans for both Forsythe and Cape May Refuges fell far short of the provisions set forth in the National Wildlife Refuge System Improvement Act of 1997 relative to providing opportunities for compatible wildlife-dependent recreational activities at both refuges. They believed that bird watching, fishing, waterfowl and upland game hunting, trapping, environmental education, wildlife observation and photography should be permitted wherever possible.

*Response:* In our professional judgement, our Proposed Action, Alternative B, provides a good range of compatible wildlife-dependent recreational opportunities on both refuges, while allowing us to still meet our conservation mandates under the Act.

*Comment:* The Jersey Coast Shark Anglers questioned why the planning team for the Jersey Coast Refuges was located in another state. They also questioned how people who don't live in New Jersey or use the Jersey Coast Refuges can possibly make decisions for the local residents.

*Response:* The Planning Team for the Jersey Coast Refuges project was made up of Refuge staff who are local residents, a representative of the New Jersey Division of Fish and Wildlife, and planning staff from our Regional Office in Hadley, Massachusetts. Our Regional Office planning staff provides support services to all of refuges in our 13 state Northeastern Region as they prepare Comprehensive Conservation Plans. Since the U.S. Fish & Wildlife Service and the National Wildlife Refuge System are national in scope and represents a public trust network of conservation lands, any citizen or resident of the United States has the right to comment on any plan or policy regarding an individual refuge or the system as a whole. These

lands, which include the Jersey Coast Refuges, belong to all the American people, not just local residents.

*Comment:* Several commenters noted that properties acquired for National Wildlife Refuges should remain open to traditional compatible wildlife-related public recreational activities pending completion of refuge management plans, unless demonstrated negative impacts of these uses are present.

*Response:* Section 668dd(d)(3)(A)(ii) of the National Wildlife refuge Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997, states that “On lands added to the System after March 25, 1996, the Secretary shall identify, prior to acquisition, withdrawal, transfer, reclassification, or donation of any such lands, existing compatible wildlife-dependent recreational uses that the Secretary determines shall be permitted to continue on an interim basis pending completion of the comprehensive conservation plan for the refuge.” Section 5(2) of the Act states that “The terms wildlife-dependent recreation and wildlife-dependent recreational use mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.” Appendix N of our Revised Draft CCP/EA for the Jersey Coast Refuges contains Interim Compatibility Determinations for both Forsythe and Cape May Refuges. These Interim Determinations indicate that any such uses occurring on lands proposed for acquisition in the document would be considered to be compatible and allowed to continue until plans for those new lands had been completed.

*Comment:* A number of commenters protested our change in policy, which would prohibit beach buggy use at Holgate. They saw no valid reason to mandate changes at this time in the Holgate vehicle policy merely because of the 1964 Wilderness Act general regulations regarding motor vehicles. They felt that instead of following the guidelines and policies of the National Wildlife Refuge Improvement Act of 1997 related to compatible wildlife-related public uses, our plan goes out of its way to prohibit a compatible wildlife-related public use (in this case beach buggies at Holgate) which was successfully mitigated years ago and generally accepted by all over the years.

*Response:* We are mandated to comply with the provisions of the Wilderness Act. The Act clearly states in Section 4(c) that “Except as specifically provided for in this Act.....there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structures or installations within any such area.” The only exception appears in Section 4(d)(1) which states that “Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary ..... deems desirable.” The national Wildlife Refuge System Improvement Act of 1997 identifies only six wildlife-dependent recreational uses. Fishing is a wildlife-dependent recreational use; motorized vehicle use is not a wildlife-dependent recreational use. Therefore, motor vehicle use could never be determined to be a compatible wildlife-dependent use. We simply do not have the authority to be allow uses specifically prohibited by the Wilderness Act or any other law. The Service has clearly been remiss in not fully complying with the spirit and requirements of the Act by not prohibiting the use of motor vehicles above mean high tide within the Holgate Unit. Our Proposed Action, Alternative B, seeks to correct this situation.

*Comment:* Some commenters noted that we have been using the State of New Jersey lands which surrounds the Wilderness to police the area. They stated this as a fact, since they believed that there is no access in the Wilderness for our vehicles as well.

*Response:* Like all citizens of New Jersey we have the right to drive our vehicles within the State owned riparian zone below mean high tide. We also have the authority under the Wilderness Act to utilize the area in the Holgate Unit above mean high tide for administrative purposes. Section 4(c) of the Act states that

“.....except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (emphasis added) (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.” On page II-60 of the Revised Draft CCP/EA we also note that in our administration of the Holgate Unit “We would scrutinize all planned management actions to determine if they are necessary to protect wilderness resources and determine the “minimum tool” needed to carry them out. We would not use a tool simply because it is the most comfortable, convenient, or least expensive.” Use of a motorized vehicle may not always be the “minimum tool” necessary to get our job done. In the Principles of Wilderness Management found in Appendix A of the Revised Draft CCP/EA, the eighth Principle states that we must “Accomplish necessary wilderness management work with the minimum tool, resorting to mechanized or motorized equipment only when its use clearly is the least damaging to the Wilderness resource.”

*Comment:* One commenter felt that the Two-Mile Beach Unit did not benefit from the preliminary planning effort (contacting organizations and individuals to solicit comments and suggestions on natural resources and public uses) that was conducted for Forsythe and Cape May Refuges.

*Response:* The Two-Mile Beach Unit was addressed as part of a series of public scoping meetings held in November and December 1996. Meetings were held in the Townships of Upper, Dennis, Middle and Lower in Cape May County. We also distributed an Issues Workbook before these meetings were held and distributed a Planning Update following the meetings. In April of 1997 we also held an Alternatives Workshop to help us in the development of our alternatives. During these meetings and through the workbooks we received many public comments on the Two Mile Beach Unit, which was still under the jurisdiction of the Coast Guard at that time.

*Comment:* Many commenters felt that the Holgate closure was not necessary to protect the piping plover.

*Response:* Our proposed seasonal closure to motorized vehicle use above mean high tide at the Holgate Unit is solely based on the authority of the Wilderness Act, not the Endangered Species Act. The summer closure of the Holgate Unit from April through August, which has been in place to protect the piping plover since 1988, would not be effected by this action and would remain in place.

*Comment:* A number of commenters, including the Middletown Beach Association, expressed concern over our plans to allow hunting between the Delaware Bay and Route 47.

*Response:* We acknowledge these concerns and all hunting will be conducted in full compliance with State hunting regulations. We will physically post the 450 foot safety zones in the area involved.

*Comment:* Many commenters noted that fishing opportunities would be greatly reduced by our Holgate closure. They felt that this violated our charge under the National Wildlife Refuge System Improvement Act of 1997 to provide opportunities for the six priority general public uses, which include fishing.

*Response:* While we acknowledge that some opportunities would be lost at the Holgate Unit by anglers depending on the use of motorized vehicles, anglers on foot would still have seasonal access to the beach at the Holgate Unit from September through March. We believe that our proposed “seasonal ferry concession” would also continue to provide anglers access to the tip of the Holgate Peninsula. Our Proposed Action, Alternative B, also provides additional fishing opportunities on both Forsythe and Cape May

Refuges.



## Appendix D

### Finding of No Significant Impact The Jersey Coast Refuges (Edwin B. Forsythe and Cape May National Wildlife Refuges, including the Two Mile Beach Unit) Comprehensive Conservation Plan and Environmental Assessment

Three management alternatives for the Jersey Coast Refuges were presented and evaluated as to their effectiveness in achieving Refuge purposes and their impact on the human environment in the Environmental Assessment. Based on this analysis, I have selected Alternative B (the Service's Proposed Action) to be enacted on the Refuges.

One of the actions the Fish and Wildlife Service (Service) will take under this Alternative is to close all lands above mean high tide in the Holgate Unit of the Brigantine Wilderness Area to motor vehicles year-round in compliance with the Wilderness Act. The year-round closure of the Holgate Unit will be fully implemented October 1, 2002.

The following modifications will be made to Alternative B:

1. Given the fact that the mean high tide line is difficult to identify on the ground, we will use the berm crest and/or wet sand/dry sand lines, which are more readily identifiable, as proxies on the beach at the Holgate Unit for the Wilderness boundary. All motorized vehicles will need to stay below the berm crest and wet sand/dry sand lines while they are on the Holgate Unit to avoid violating the Brigantine Wilderness Area. Educational efforts to familiarize anglers and refuge visitors with this new policy will be implemented beginning October 1, 2002.
2. We will investigate the possibility of establishing an experimental shuttle service which would take anglers and other refuge visitors from a convenient location to the tip of the Holgate Unit from September through mid-November.
3. The land protection efforts for both Refuges will be implemented in accordance with the Forsythe and Cape May Refuge Land Protection Plans (LPPs) which have been reviewed and commented on by the affected land owners, and have been approved in compliance with Service policy and the National Environmental Policy Act (NEPA).

For Forsythe Refuge, the Revised Draft CCP/EA identified Land Protection Focus Areas encompassing approximately 17,000 acre, of which the Service proposed to acquire 11,500 acres. In preparing the Refuge LPP we removed all lands that were either being developed or had already been developed, reducing our acquisition target to 3,348 acres.

For Cape May Refuge, the Revised Draft CCP/EA identified Land Protection Focus Areas encompassing approximately 4,900 acre, of which the Service proposed to acquire 3,600 acres. In preparing the Refuge LPP we reevaluated our acquisition target within the Focus Areas and decreased it to 3,591 acres. This was done to insure that we provided long-term protection to the numerous species of shorebirds, neotropical migratory landbirds, waterfowl, long-legged waders, woodcock, raptors, finfish, shellfish, and threatened and endangered species that use Cape May Peninsula.

These new land protection acreage figures are reflected in the Final Comprehensive Conservation Plan for each Refuge. Accordingly, 3,348 acres have been added to the approved boundary of Forsythe Refuge and 3,591 acres have been added to the approved boundary of Cape May Refuge.

Alternative B was selected because it best achieves Refuge purposes, vision and goals; helps fulfill the mission of the National Wildlife Refuge System; maintains and, where appropriate, restores the ecological integrity of both Refuges and the Refuge System; addresses the significant issues and mandates; and is consistent with the principles of sound fish and wildlife management.

I find that the implementation of Alternative B will not have a significant impact on the quality of the human environment in accordance with Section 102 (2) (c) of NEPA and conclude that an environmental impact statement is not required.

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Regional Director, Region 5  
U.S. Fish and Wildlife Service  
Hadley, Massachusetts

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Date

## Appendix E

### Species and communities of special emphasis in the Jersey Coast landscape from *Significant Habitats and Habitat Complexes of the New York Bight Watershed* (USFWS 1997)

The list is not all-inclusive; it includes species found in the watersheds during part of their life cycle, and selected under the following criteria:

1. Federally listed as threatened or endangered;
2. migratory bird, especially declining species, Neotropical migrants, colonial waterbirds, shorebirds, or waterfowl;
3. marine mammal;
4. Sea turtle;
5. interjurisdictional fish;
6. State-listed as threatened, endangered, or special concern.

Complete species lists are being compiled by staff at the Refuge, and are available for review for vertebrates. They will be published in one or more of the step-down plans.

### Codes used in lists of species of special emphasis

#### Global Element Ranks (from The Nature Conservancy)

- G1 Critically imperiled globally because of extreme rarity (typically 5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3 Rare or uncommon but not imperiled. Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
- G4 Not rare and apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery; cause for long-term concern. (Usually more than 100 occurrences.)
- G5 Demonstrably secure globally; widespread and abundant, though it may be quite rare in parts of its range, especially at the periphery.
- GH Of historical occurrence throughout its range, - possibly extinct i.e., formerly part of the established biota with the expectation that it may be rediscovered (e.g., Bachman's warbler).
- GU Possibly in peril range-wide, but status uncertain; need more information.



- GX Believed to be extinct throughout its range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.
- G#G# Range of ranks; insufficient information to rank more precisely.
- G? Not yet ranked.
- G#T# For infraspecific taxa; the G rank applies to the full species and the T rank applies to the infraspecific taxon.
- G#Q Taxonomic status is questionable.

**State Element Ranks (from Nature Conservancy and/or State Heritage Programs)**

Numeric Rank: Based primarily on the number of occurrences of the species in the state.

- S1 Critically imperiled in state (usually 5 or fewer occurrences); especially vulnerable to extirpation in the state.
- S2 Imperiled in state (usually 6 to 20 occurrences).
- S3 Rare or uncommon in state (usually 21 to 100 occurrences).
- S4 Widespread, abundant, and apparently secure in the state, but with cause for long-term concern (usually more than 100 occurrences).
- S5 Widespread, abundant and demonstrably secure in state.
- S? Not yet ranked in the state.
- SU Unrankable or uncertain status due to lack of information; possibly in peril
- SE Exotic: an exotic established in the state.
- SA Accidental or casual in state (infrequent and far outside usual range).
- SH Historical: species occurred historically in the state (with the expectation that it may be extant and rediscovered), generally not having been verified in the past 20 years.
- SX Apparently extirpated from state.
- SN or SZN Regularly occurring, usually migratory and typically non-breeding, species for which no significant or effective habitat conservation measures can be taken in the state; no definable occurrences.

For species with distinct breeding (B) and non-breeding (N) populations, a breeding status SRANK can be coupled with its complementary non-breeding SRANK, separated by a comma, e.g., S2B, S3N or S1B, SHN.

- SR Reported from state, but without persuasive documentation; species may be misidentified.
- SRF Reported falsely; erroneously reported as occurring in the state and error has persisted in the

literature.

SP Potentially occurs in the state, but no occurrences reported.

.1 Species documented from a single location.

### **Federal Status or Authority**

E Formally listed as Endangered under the Endangered Species Act of 1973.

T Formally listed as Threatened under the Endangered Species Act of 1973.

PE Proposed Endangered.

PT Proposed Threatened.

C1 Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

C1\* Taxa which may be possibly extinct (although persuasive documentation of extinction has not been made).

### **Species of Concern**

Federal species of concern includes those species formerly considered C2 candidates as described below. Although these C2 and C3 candidates are no longer officially considered for listing under the Endangered Species Act, the former candidate status is important historical information and is retained for this report.

C2 Taxa for which the information now in the possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

C3 Taxa that are no longer being considered for listing as threatened or endangered species. Such taxa are further coded to indicate three subcategories, depending on the reason(s) for removal from consideration.

3A Taxa for which the Service has persuasive evidence of extinction.

3B Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Act's definition of "species."

3C Taxa that have proven to be more abundant or widespread than was previously believed.

SA Similarity of appearance of species.

### **Other Federal Authorities**

- I Interjurisdictional Fish - Move between state and local jurisdictions (e.g., anadromous)
- MB Migratory Bird Treaty Act

**New Jersey Legal Status**

- D Declining species: a species that has exhibited a continued decline in population numbers over the years.
- E Endangered species: an species whose prospects for survival within the state are in immediate danger due to one or many factors - loss of habitat, over-exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
- T Threatened species: a species that may become endangered if conditions surrounding the species begin or continue to deteriorate.
- EX Extirpated species: a species that formerly occurred in New Jersey, but is not now known to exist within the state.
- I Introduced species: a species not native to New Jersey that could not have established itself here without the assistance of man.
- INC Increasing species: a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long time period.
- P Peripheral: a species whose occurrence in New Jersey is at the extreme edge of its present natural range.
- S Stable species: a species whose population is not undergoing any long-term increase or decrease within its natural cycle.
- U Undetermined species: a species about which there is not enough information available to determine the status.
- LP Pinelands: a species listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction.

Species and Community Presence in geographic macrosites that comprise Forsythe National Wildlife Refuge. The Refuge lands are partitioned into five macrosites or geographically distinct ecosystems. They include: pine barrens; Barnegat Bay; Great Bay and Mullica River; Brigantine Bay; and Great Egg Harbor Bay and River. Detailed descriptions of these habitat macrosite can be found in *Significant Habitats and Habitat Complexes of the New York Bight Watershed* (USFWS Coastal Ecosystem Program, 1997). Presence is marked with the following codes:

- + Known to be present
- H Occurred prior to 1970, not known to be present now
- ? Status unsure

Scientific Name	Common Name(s)	Global	Federal	NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<b>ANIMALS</b>										
<b>INVERTEBRATES</b>										
<b>MOLLUSCA</b>										
<i>Argopecten irradians</i>	bay scallop						+	+	+	
<i>Crassostrea virginica</i>	eastern oyster						+	+	+	+
<i>Mercenaria mercenaria</i>	northern quahog						+	+	+	+
<i>Mulinia lateralis</i>	dwarf surfclam						+	+	+	
<i>Mya arenaria</i>	softshell clam						+	+	+	
<i>Mytilus edulis</i>	blue mussel						+	+	+	
<i>Spisula solidissima</i>	Atlantic surfclam									
<i>Illex illecebrosus</i>	northern shortfin squid									
<i>Loligo pealei</i>	longfin squid									
<b>ARTHROPODA</b>										
<b>INSECTA</b>										
<b>ODONATA (Dragonflies and Damselflies):</b>										
<i>Aeshna clepsydra</i>	mottled darner	G4		S?		+				
<i>Anax longipes</i>	comet darner	G5		S2?		+				
<i>Celithemis martha</i>	Martha spotted skimmer	G4		S3S4		+				
<i>Celithemis verna</i>	double-ringed pennant	G5		S1?		+				
<i>Enallagma pictum</i>	painted bluet	G4		S3?		+				
<i>Enallagma recurvatum</i>	barrens bluet damselfly	G3	3C	S3		+				
<i>Libellula axilena</i>	dark-bordered skimmer	G5		S1?		+				
<i>Nehalennia intergricolis</i>	round-necked damselfly	G5				+				
<i>Somatochlora provocans</i>	treetop emerald skimmer	G3G4		S2S4		+				
<i>Sympetrum ambiguum</i>	blue-faced meadowfly	G5		S1?		+				
<b>COLEOPTERA (Beetles):</b>										
<i>Cicindela d. dorsalis</i>	northeastern beach tiger beetle	G4T1T 2	T	SH	E		H			
<i>Cicindela dorsalis media</i>	white tiger beetle	G4T4		S1S2				+		
<b>LEPIDOPTERA (Butterflies and Moths):</b>										
<i>Asterocampa clyton</i>	tawny emperor	G5		S4						
<i>Atrytonopsis hianna</i>	dusted skipper	G4		S4						
<i>Boloria selene myrina</i>	silver-bordered fritillary	G5T5		S2S3						
<i>Euphyes conspicua</i>	black dash	G4		C?						
<i>Fixsenia favonius ontario</i>	northern hairstreak	G4T4		NA?						
<i>Hesperia attalus slossonae</i>	seminole skipper	G4T3		S2S3		+				
<i>Incisalia henrici</i>	Henry's elfin	G5		S3S4						
<i>Incisalia irus</i>	frosted elfin	G4		SU		+				
<i>Mitoura hesseli</i>	Hessel's hairstreak	G3G4	3C	S3S4		+				
<i>Neonympha areolata septentrionalis</i>	Lakehurst satyr	G5T3T4Q		S3		+				
<i>Panoquina panoquin</i>	salt marsh skipper	G5		S5						
<i>Parrhasius m-album</i>	white m hairstreak	G5		C?						
<i>Pieris protodice</i>	checkered white	G5		SH						
<i>Problema bulenta</i>	rare skipper	G2G3	C2	S2		+		+		+
<i>Agrotis buchholzi</i>	Buchholz's dart	G2G3	C2	S2		+				
<i>Apharetra purpurea</i>	a noctuid moth	G4Q		S?		+				
<i>Callopietria granitosa</i>	granitosa fern moth	G4G5		S2S3		+				
<i>Catocala herodias gerhardi</i>	pine barrens underwing	G3T3		S3		+				

Scientific Name	Common Name(s)	Global	Federal	NJ Rank	NJ Stat.	Forsythe Refuge Macrosites				
						Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Catocala jair ssp. 2</i>	jair underwing	G4T4		S3	U	+				
<i>Catocala p. pretiosa</i>	precious underwing	G4T2T3	C2	S2S3				+		+
<i>Chytonix sensilis</i>	a noctuid moth	G4		S1S3		+				
<i>Crambus daeckellus</i>	Daecke's pyralid moth	G1G3	C2	S1S3		+				
<i>Datana ranaeceph</i>	a hand-maid moth	G4		S3S4		+				
<i>Faronta rubripennis</i>	pink streak	G3G4		SU		+				
<i>Heterocampa varia</i>	a notodontid moth	G3G4		S3		+				
<i>Hypomecis buchholzaria</i>	Buchholz's gray	G3G4		S3		+				
<i>Idaea violacearia</i>	a geometrid moth	G4		S1S3		+				
<i>Itame sp. 1</i>	spanworm (geometrid moth)	G3Q		S3		+				
<i>Lithophane lemmeri</i>	Lemmer's pinion moth	G3G4	C2	S2		+		+		
<i>Merolonche doli</i>	Doll's merolonche	G3	C2	S1S3		+				
<i>Meropleon cosmion</i>	a noctuid moth	G4		S1S2		+				
<i>Metarranthis pilosaria</i>	coastal swamp metarranthis	G3G4		S3S4		+				
<i>Papaipema appassonata</i>	pitcher plant borer moth	G4		S2S3		+				
<i>Papaipema stenocelis</i>	chain fern borer moth	G4		S3		+				
<i>Ptichodis bistrigata</i>	southern ptichodis	GU		S1S3		+				
<i>Spartiniphaga carterae</i>	Carter's noctuid moth	G2G3	C2	S2		+				
<i>Zale sp. 1</i>	pine barrens zale	G3Q		S3		+				
<i>Zanclognatha sp.1</i>	a noctuid moth	GUQ		S3		+				
<b>CRUSTACEA</b>										
<i>Callinectes sapidus</i>	blue crab						+	+	+	+
<b>MEROSTOMATA</b>										
<i>Limulus polyphemus</i>	horseshoe crab						+	+	+	+
<b>VERTEBRATES</b>										
<b>FISH</b>										
<b>ELASMOBRANCHIOMORPHI (Cartilaginous Fishes):</b>										
<i>Mustelus canis</i>	smooth dogfish	G?					+		+	
<i>Raja eglanteria</i>	clearnose skate						+			+
<i>Raja erinacea</i>	little skate						+			+
<i>Raja ocellata</i>	winter skate						+			+
<b>OSTEICHTHYES (Bony Fishes):</b>										
<i>Ammodytes americanus</i>	American sand lance	G?					+		+	+
<i>Anguilla rostrata</i>	American eel	G5	I	S5		+	+	+	+	+
<i>Aphredoderus sayanus</i>	pirate perch	G5		S4		+				
<i>Menidia beryllina</i>	inland silverside	G5		S4S5			+	+		
<i>Menidia menidia</i>	Atlantic silverside	G5					+	+	+	+
<i>Opsanus tau</i>	oyster toadfish						+	+		+
<i>Strongylura marina</i>	Atlantic needlefish	G5	I				+			+
<i>Paralichthys dentatus</i>	summer flounder	G?					+			+
<i>Scophthalmus aquosus</i>	windowpane	G?					+		+	+
<i>Acantharchus pomotis</i>	mud sunfish	G5		S4		+				

Scientific Name	Common Name(s)	Forsythe Refuge Macrosites								
		Global	Federal	NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Enneacanthus obesus</i>	banded sunfish	G5		S4		+				
<i>Alosa aestivalis</i>	blueback herring	G5	I	S5			+	+		+
<i>Alosa mediocris</i>	hickory shad	G5	I	S3	W			+		+
<i>Alosa pseudoharengus</i>	alewife	G5	I	S5			+	+		+
<i>Alosa sapidissima</i>	American shad	G5	I	S3S4	W		+			
<i>Brevoortia tyrannus</i>	Atlantic menhaden	G?	I				+	+	+	+
<i>Clupea harengus</i>	Atlantic herring	G?	I				+	+		+
<i>Myoxcephalus aeneus</i>	grubby sculpin	G?					+			
<i>Notemigonus crysoleucas</i>	golden shiner	G5		S5				+		+
<i>Notropis hudsonius</i>	spottail shiner	G5		S5				+		+
<i>Fundulus diaphanus</i>	banded killifish	G5		S5			+	+		+
<i>Fundulus heteroclitus</i>	mummichog	G5		S5			+	+	+	+
<i>Fundulus luciae</i>	spotfin killifish	G3G4		S3			+			
<i>Anchoa hepsetus</i>	striped anchovy						+	+		+
<i>Anchoa mitchilli</i>	bay anchovy	G5	I				+	+	+	+
<i>Esox americanus americanus</i>	redfin pickerel	G5		S5		+	+			
<i>Merluccius bilinearis</i>	silver hake	G?	I				+			
<i>Pollachius virens</i>	pollack	G?					+			+
<i>Urophycis chuss</i>	red hake	G?	I				+			
<i>Apeltes quadracus</i>	fourspine stickleback	G5		S4			+	+		+
<i>Gobiosoma bosci</i>	naked goby	G5					+			+
<i>Gobiosoma ginsburgi</i>	seaboard goby	G?					+			+
<i>Ameiurus catus</i>	white catfish	G5		S5			+			+
<i>Ameiurus natalis</i>	yellow bullhead	G5		S5		+				
<i>Ameiurus nebulosus</i>	brown bullhead	G5		S5			+			+
<i>Tautoga onitis</i>	tautog	G?					+			
<i>Tautoglabrus adspersus</i>	cunner	G?					+			+
<i>Mugil cephalus</i>	striped mullet	G5	I				+		+	
<i>Morone americana</i>	white perch	G5		S5			+	+		+
<i>Morone saxatilis</i>	striped bass	G5	I	S4	W		+			+
<i>Perca flavescens</i>	yellow perch	G5		S5			+			+
<i>Pleuronectes americanus</i>	winter flounder	G5?	I				+	+	+	+
<i>Pomatomus saltatrix</i>	bluefish	G?	I				+	+	+	+
<i>Salvelinus fontinalis</i>	brook trout	G5		S3		+				
<i>Cynoscion regalis</i>	weakfish	G?	I				+	+	+	+
<i>Leiostomus xanthurus</i>	spot	G5	I				+	+	+	+
<i>Menticirrhus saxatilis</i>	northern kingfish	G?	I				+			+
<i>Micropogonias undulatus</i>	Atlantic croaker	G5					+			+
<i>Scomber scombrus</i>	Atlantic mackerel	G?					+			
<i>Centropristis striata</i>	black sea bass	G?	I				+			
<i>Trinectes maculatus</i>	hogchoker	G5					+			+
<i>Sienotomus chrysops</i>	scup	G?					+			+
<i>Peprilus triacanthus</i>	butterfish	G?					+			+
<i>Syngnathus fuscus</i>	northern pipefish	G?					+		+	+
<i>Prionotus carolinus</i>	northern searobin	G?	I				+			+
<i>Prionotus evolans</i>	striped searobin	G?	I				+			+
<i>Umbra pygmaea</i>	eastern mudminnow	G5		S5		+				
<b>AMPHIBIANS</b>										
<i>Acris c. crepitans</i>	northern cricket frog	G5		S3	U	+				

Scientific Name	Common Name(s)	Forsythe Refuge Macrosites								
		Global	Federal	NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Hyla andersonii</i>	pine barrens treefrog	G4	3C	S3	E	+			+	
<i>Hyla chrysoscelis</i>	Cope's gray treefrog	G5		S2	E	+				
<i>Rana sphenocephala</i>	southern leopard frog	G5		S5	S	+				
<i>Scaphiopus h. holbrookii</i>	eastern spadefoot	G5		S4	D	+				
<i>Ambystoma maculatum</i>	spotted salamander	G5		S3	D	+				
<i>Ambystoma t. tigrinum</i>	eastern tiger salamander	G5		S2	E	+	+	+		
<i>Hemidactylum scutatum</i>	four-toed salamander	G5		S3	D	+				
<i>Pseudotriton m. montanus</i>	eastern mud salamander	G5		S1	T	+				?
<b>REPTILES</b>										
<i>Eumeces fasciatus</i>	five-lined skink	G5		S3	U	+				
<i>Crotalus horridus</i>	timber rattlesnake	G5		S2	E	+				
<i>Elaphe guttata</i>	corn snake	G5		S1	E	+				
<i>Heterodon platirhinos</i>	eastern hognose snake	G5		S5	D	+				
<i>Pituophis m. melanoleucus</i>	northern pine snake	G5T4	C2	S3	T	+	+	+	+	+
<i>Caretta caretta</i>	loggerhead sea turtle	G3	T	SN	E					
<i>Clemmys guttata</i>	spotted turtle	G5		S5		+				
<i>Clemmys insculpta</i>	wood turtle	G4		S3	T	+				
<i>Clemmys muhlenbergii</i>	bog turtle	G3	C1	S2	E	+				
<i>Malaclemys t. terrapin</i>	northern diamondback terrapin	G5T5	C2	SU			+	+	+	+
<i>Terrapene c. carolina</i>	eastern box turtle	G5		S5	S	+				
<b>BIRDS</b>										
<i>Gavia immer</i>	common loon	G5	MB	SN	S					
<i>Gavia stellata</i>	red-throated loon	G5	MB	SN	S					
<i>Podiceps auritus</i>	horned grebe	G5	MB	SN	S					
<i>Podilymbus podiceps</i>	pie-billed grebe	G5	MB	S1	E/S	+			B?/M	
<i>Pelicanus occidentalis</i>	brown pelican	G4	MB	S1	INC		B?			
<i>Phalacrocorax auritus</i>	double-crested cormorant	G5	MB	SN	INC				M	
<i>Ardea herodias</i>	great blue heron	G5	MB	S2	T/S	B	M		S/M	
<i>Botaurus lentiginosus</i>	American bittern	G4	MB	S3	T/S	B			S/M	?
<i>Bubulcus ibis</i>	cattle egret	G5	MB	S3	INC/I NC			B	B/M	B/M
<i>Casmerodius albus</i>	great egret	G5	MB	S3	S/S		B	B	B/M	B/M
<i>Egretta caerulea</i>	little blue heron	G5	MB	S3	T/S		B		B/M	B/M
<i>Egretta thula</i>	snowy egret	G5	MB	S3	S/S		B	B	B/M	B/M
<i>Egretta tricolor</i>	tricolored heron	G5	MB	S3	INC/S		B		B/M	B/M
<i>Ixobrychus exilis</i>	least bittern	G5	MB	S3	D/S	B?			B?/M	?
<i>Nycticorax violaceus</i>	yellow-crowned night-heron	G5	MB	S2	T/T		B?	B?	B/M	B/M
<i>Nycticorax nycticorax</i>	black-crowned night-heron	G5	MB	S3	D/S		B	B	B/M	B/M
<i>Plegadis falcinellus</i>	glossy ibis	G5	MB	S3	D/S		B	B	B/M	B/M
<i>Cygnus columbianus</i>	tundra swan	G5	MB	SN	S	M/W		M/W	M	M/W
<i>Branta canadensis</i>	Canada goose	G5	MB	S5		B/M/W	B/M/ W	B/M/W	B/M/ W	B/M/ W
<i>Branta bernicla</i>	brant	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Chen caerulescens</i>	snow goose	G5	MB	SN			M/W		M/W	M/W
<i>Aix sponsa</i>	wood duck	G5	MB	S5		B			B/M	

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<i>Anas acuta</i>	northern pintail	G5	MB	SN			M/W	M/W	B/M/W	M/W
<i>Anas americana</i>	American wigeon	G5	MB	SN			M/W	M/W	B/M/W	M/W
<i>Anas clypeata</i>	northern shoveler	G5	MB	SN			M/W	M/W	B/M/W	M/W
<i>Anas crecca</i>	green-winged teal	G5	MB	SN		B?	M/W	M/W	B/M/W	M/W
<i>Anas discors</i>	blue-winged teal	G5	MB	S5		B	B?/M		B/M	M/W
<i>Anas platyrhynchos</i>	mallard	G5	MB	S5		B	B/M/W	B/M/W	B/M/W	B/M/W
<i>Anas rubripes</i>	American black duck	G4	MB	S4		B	B/M/W	B/M/W	B/M/W	B/M/W
<i>Anas strepera</i>	gadwall	G5	MB	S5			B/M	B	B/M/W	B?/M/W
<i>Aythya valisineria</i>	canvasback	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Aythya americana</i>	redhead	G5	MB	SN			M/W			
<i>Aythya collaris</i>	ring-necked duck	G5	MB	SN		M/W	M/W			
<i>Aythya marila</i>	greater scaup	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Aythya affinis</i>	lesser scaup	G5	MB	SN			M/W?			M/W
<i>Bucephala clangula</i>	common goldeneye	G5	MB	SN			M/W		M/W	
<i>Bucephala albeola</i>	bufflehead	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Clangula hyemalis</i>	oldsquaw	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Lophodytes cucullatus</i>	hooded merganser	G5	MB	SN			M/W		M	M/W
<i>Melanitta nigra</i>	black scoter	G5	MB	SN				M/W		M/W
<i>Melanitta fusca</i>	white-winged scoter	G5	MB	SN						M/W
<i>Melanitta perspicillata</i>	surf scoter	G5	MB	SN				M/W		M/W
<i>Mergus merganser</i>	common merganser	G5	MB	S4			M/W			M/W
<i>Mergus serrator</i>	red-breasted merganser	G5	MB	SN			M/W	M/W	M/W	M/W
<i>Oxyura jamaicensis</i>	ruddy duck	G5	MB	SN			M/W		B/M/W	
<i>Accipiter cooperii</i>	Cooper's hawk	G4	MB	S2	E	+				
<i>Accipiter striatus</i>	sharp-shinned hawk	G5	MB	S1	U/U		M			
<i>Buteo lineatus</i>	red-shouldered hawk	G5	MB	S2	E/T					
<i>Buteo platypterus</i>	broad-winged hawk	G5	MB	S4	S/S	B		B	B/M	
<i>Circus cyaneus</i>	northern harrier	G5	MB	S2	E/U		B/M/W	B/M/W	S/W	B/M/W
<i>Falco columbarius</i>	merlin	G4	MB	SN	S		M	W		
<i>Falco peregrinus</i>	peregrine falcon	G3	MB	S1	E		B/M	B/M/W	B/W	B/W
<i>Haliaeetus leucocephalus</i>	bald eagle	G3G4	MB	S1	E	M/W?		W		S/W
<i>Pandion haliaetus</i>	osprey	G5	MB	S3	T/T		B/W	B/W	B/W	B/W
<i>Fulica americana</i>	American coot	G5	MB	S1	D		M/W		B?/M/W	
<i>Gallinula chloropus</i>	common moorhen	G5	MB	S4		B?				
<i>Laterallus jamaicensis</i>	black rail	G4?	MB	S3	T		B		B?	?
<i>Porzana carolina</i>	sora	G5	MB	S4		B		B	B?	?
<i>Rallus elegans</i>	king rail	G4G5	MB	S3	U/U					?
<i>Rallus limicola</i>	Virginia rail	G5	MB	S4		B	B	B	B?	?
<i>Rallus longirostris</i>	clapper rail	G5	MB	S5			B/M	B/M	B/M	B/M
<i>Charadrius melodus</i>	pipit plover	G3	MB	S1	E		B/M	B?/M	B/M	B?
<i>Charadrius semipalmatus</i>	semipalmated plover	G5	MB	S?	S		M		M	M
<i>Pluvialis dominica</i>	lesser golden-plover	G5	MB	SN	S/S				M	
<i>Pluvialis squatarola</i>	black-bellied plover	G5	MB	SN	S/S		M		M	M



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<i>Haematopus palliatus</i>	American oystercatcher	G5	MB	S4	INC/S		B?		M	M
<i>Arenaria interpres</i>	ruddy turnstone	G5	MB	SN	S				M	M
<i>Bartramia longicauda</i>	upland sandpiper	G5	MB	S1	E	B				
<i>Calidris alba</i>	sanderling	G5	MB	SN	D				M	M
<i>Calidris alpina</i>	dunlin	G5	MB	SN	INC				M	M
<i>Calidris canutus</i>	red knot	G5	MB	SN	D				M	M
<i>Calidris fuscicollis</i>	white-rumped sandpiper	G5	MB	SN	S				M	
<i>Calidris himantopus</i>	stilt sandpiper	G5	MB	SN	INC				M	
<i>Calidris maritima</i>	purple sandpiper	G5	MB	SN	INC				W	
<i>Calidris maura</i>	western sandpiper	G5	MB	SN	S				M	
<i>Calidris minutilla</i>	least sandpiper	G5	MB	SN	S				M	
<i>Calidris pusilla</i>	semipalmated sandpiper	G5	MB	SN	S	M			M	M
<i>Catoptrophorus semipalmatus</i>	willet	G5	MB	S4	INC/S		B/M		B/M	B/M
<i>Limnodromus griseus</i>	short-billed dowitcher	G5	MB	SN	S					M
<i>Limosa fedoa</i>	marbled godwit	G5	MB	SN	D				M	
<i>Limosa haemastica</i>	Hudsonian godwit	G5	MB	SN	D				M	
<i>Numenius phaeopus</i>	whimbrel	G5	MB	SN	S				M	
<i>Scolopax minor</i>	American woodcock	G5	MB	S5						
<i>Tringa flavipes</i>	lesser yellowlegs	G5	MB	SN	S		B/M	B/M	B/M	B/M
<i>Tringa melanoleuca</i>	greater yellowlegs	G5	MB	SN	S		M	M	M	M
<i>Larus philadelphia</i>	Bonaparte's gull	G5	MB	SN	S					
<i>Rynchops niger</i>	black skimmer	G5	MB	S2	E		B/M	B	B/M	
<i>Sterna antillarum</i>	least tern	G4	MB	S2	E	+	B/M	B?/M	B/M	B?/M
<i>Sterna dougallii</i>	roseate tern	G5	MB	S1	E		B?			
<i>Sterna forsteri</i>	Forster's tern	G5	MB	S3	INC/S		B		B/M	B
<i>Sterna hirundo</i>	common tern	G5	MB	S3	D/S		B	B	B/M	B/M
<i>Sterna nilotica</i>	gull-billed tern	G5	MB	S3	S		B	B?	B/M	
<i>Coccyzus americanus</i>	yellow-billed cuckoo	G5	MB	S4	S/S	B		B	B	B
<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	G5	MB	S4	S/S	B			B	B
<i>Asio flammeus</i>	short-eared owl	G5	MB	S1	E/U			W		
<i>Strix varia</i>	barred owl	G5	MB	S3	T/T	B	B		B?	S/W
<i>Tyto alba</i>	common barn-owl	G5	MB	S4	S/S				B	
<i>Caprimulgus carolinensis</i>	chuck-will's-widow	G5	MB	S4	INC/S	B	B			
<i>Caprimulgus vociferus</i>	whip-poor-will	G5	MB	S4	D/S	B	B	B	B	B
<i>Chordeiles minor</i>	common nighthawk	G5	MB	S4	S/S	B	B			
<i>Archilochus colubris</i>	ruby-throated hummingbird	G5	MB	S4	D/S	B		B		B
<i>Chaetura pelagica</i>	chimney swift	G5	MB	S5	S/S	B?	B	B		B
<i>Dryocopus pileatus</i>	pileated woodpecker	G5	MB	S4	S/S	B?				
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	G5	MB	S3	T/T	B				
<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	G5	MB	SN	S	M				
<i>Contopus virens</i>	eastern wood-pewee	G5	MB	S4	S/S	B	B	B		B
<i>Empidonax minimus</i>	least flycatcher	G5	MB	S4	S/S					
<i>Empidonax traillii</i>	willow flycatcher	G5	MB	S4	INC/S	B	B			
<i>Empidonax vireescens</i>	acadian flycatcher	G5	MB	S4	INC/S		B	B		B
<i>Myiarchus crinitus</i>	great crested flycatcher	G5	MB	S4	S/S		B	B		B
<i>Tyrannus tyrannus</i>	eastern kingbird	G5	MB	S5	D/D	B	B	B		B
<i>Eremophila alpestris</i>	horned lark	G5	MB	S3	D/S	B		B	B	
<i>Hirundo pyrrhonota</i>	cliff swallow	G5	MB	S2	T/S					

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<i>Progne subis</i>	purple martin	G5	MB	S4	D/S	B		B	B	B
<i>Riparia riparia</i>	bank swallow	G5	MB	S4	S/S					
<i>Sialia sialis</i>	northern rough-winged swallow	G5	MB	S4	S/S	B?				
<i>Certhia americana</i>	brown creeper	G5	MB	S4	S/S	B				
<i>Cistothorus platensis</i>	sedge wren	G5	MB	S1	E				B?	
<i>Cistothorus palustris</i>	marsh wren	G5	MB	S4	D/S		B	B	B/M	B/M
<i>Catharus fuscescens</i>	veery	G5	MB	S4	S/S					
<i>Catharus guttatus</i>	hermit thrush	G5	MB	S4	S/S	B				
<i>Catharus ustulatus</i>	Swainson's thrush	G5	MB	SN	S					
<i>Hylocichla mustelina</i>	wood thrush	G5	MB	S5	S/S	B	B	B	B	B
<i>Poliophtila caerulea</i>	blue-gray gnatcatcher	G5	MB	S4	INC/S	B?	B	B		
<i>Sialia sialis</i>	eastern bluebird	G5	MB	S4	S	B		B		B
<i>Dumetella carolinensis</i>	gray catbird	G5	MB	S5	S/S		B	B		B
<i>Vireo flavifrons</i>	yellow-throated vireo	G5	MB	S4	S/S	B?				
<i>Vireo griseus</i>	white-eyed vireo	G5	MB	S4	D/S	B	B	B	B	B
<i>Vireo solitarius</i>	solitary vireo	G5	MB	S3	S/S	M				
<i>Dendroica caerulescens</i>	black-throated blue warbler	G5	MB	S4	S/S	M				
<i>Dendroica cerulea</i>	cerulean warbler	G4	MB	S3	S/S	B?				
<i>Dendroica coronata</i>	yellow-rumped warbler	G5	MB	S4	S/S	M/W	M/W	M/W	M/W	M/W
<i>Dendroica discolor</i>	prairie warbler	G5	MB	S5	S/S			B	M	B
<i>Dendroica dominica</i>	yellow-throated warbler	G5	MB	S4	S/S	B?				B
<i>Dendroica fusca</i>	blackburnian warbler	G5	MB	S4	S/S					
<i>Dendroica magnolia</i>	magnolia warbler	G5	MB	S4	S/S	M				
<i>Dendroica palmarum</i>	palm warbler	G5	MB	SN	S					
<i>Dendroica pensylvanica</i>	chestnut-sided warbler	G5	MB	S4	S/S					
<i>Dendroica pinus</i>	pine warbler	G5	MB	S4	S/S		B	B		B
<i>Dendroica striata</i>	blackpoll warbler	G5	MB	SN	S	M				
<i>Dendroica virens</i>	black-throated green warbler	G5	MB	SN	S	B				
<i>Helminthos vermivorus</i>	worm-eating warbler	G5	MB	S4	S/S					
<i>Icteria virens</i>	yellow-breasted chat	G5	MB	S4	D/S	B				B
<i>Mniotilta varia</i>	black-and-white warbler	G5	MB	S4	S/S	B	B	B	B/M	
<i>Oporornis formosus</i>	Kentucky warbler	G5	MB	S4	S/S	B	B			
<i>Parula americana</i>	northern parula	G5	MB	S3	P/S			B		B
<i>Protonotaria citrea</i>	prothonotary warbler	G5	MB	S3	INC/S	B		B		B
<i>Seiurus aurocapillus</i>	ovenbird	G5	MB	S5	S/S	B	B	B	B	B
<i>Seiurus motacilla</i>	Louisiana waterthrush	G5	MB	S4	S/S	B				
<i>Seiurus noveboracensis</i>	northern waterthrush	G5	MB	S4	S/S	M				
<i>Serophaga ruticilla</i>	American redstart	G5	MB	S5	S/S	B	B	B		
<i>Vermivora pinus</i>	blue-winged warbler	G5	MB	S4	INC/S	B	B			B
<i>Vermivora ruficapilla</i>	Nashville warbler	G5	MB	S3	S/S					
<i>Wilsonia canadensis</i>	Canada warbler	G5	MB	S4	S/S	M				
<i>Wilsonia citrina</i>	hooded warbler	G5	MB	S4	D/S	B			B	B
<i>Piranga olivacea</i>	scarlet tanager	G5	MB	S4	S	B		B	B	B
<i>Piranga rubra</i>	summer tanager	G5	MB	S4	S	B?				B
<i>Peucaea ludoviciana</i>	rose-breasted grosbeak	G5	MB	S4	S/S					
<i>Ammodramus caudacutus</i>	sharp-tailed sparrow	G5	MB	S4	S/S		B	B	B/M	B
<i>Ammodramus maritimus</i>	seaside sparrow	G4	MB	S4	S/S		B	B	B/M	B

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<i>Ammodramus savannarum</i>	grasshopper sparrow	G4	MB	S2	T/T	B	B		B	
<i>Junco hyemalis</i>	dark-eyed junco	G5	MB	S4	S/S	M/W	M/W	M/W	M/W	M/W
<i>Melospiza georgiana</i>	swamp sparrow	G5	MB	S4	S/S					
<i>Passerculus sandwichensis</i>	savannah sparrow	G5	MB	S2	T/T	B		B		
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee	G5	MB	S5	S/S			M/W		
<i>Pooecetes gramineus</i>	vesper sparrow	G5	MB	S2	E	B				
<i>Zonotrichia albicollis</i>	white-throated sparrow	G5	MB	SN	S/S	M/W	M/W	M/W	M/W	M/W
<i>Dolichonyx oryzivorus</i>	bobolink	G5	MB	S2	T/T	+				
<i>Icterus spurius</i>	northern oriole	G5	MB	S5	S/S	B	B	B		B
<i>Sturnella magna</i>	eastern meadowlark	G5	MB	S4	D/S	B	B	M/W		
<i>Carduelis pinus</i>	pine siskin	G5	MB	SN	S	W				
<i>Carpodacus purpureus</i>	purple finch	G5	MB	S4	S/S					
<b>MAMMALS</b>										
<i>Synaptomys cooperi</i>	southern bog lemming	G5		S2	U	+				
<i>Balaenoptera physalus</i>	finback whale	G2	E	SN	E					
<i>Delphinus delphis</i>	common dolphin	G5		SN	U					
<i>Lagenorhynchus acutus</i>	Atlantic white-sided dolphin	G4								
<i>Megaptera novaeangliae</i>	humpback whale	G3	E	SA	E					
<i>Stenella coeruleoalba</i>	striped dolphin	G5		SN	U					
<i>Tursiops truncatus</i>	bottle-nosed dolphin	G5		SN	S					
<i>Lutra canadensis</i>	river otter	G5		S4		+		+		
<b>VASCULAR PLANTS</b>										
<b>PTERIDOPHYTES (Ferns and Fern Allies)</b>										
<i>Lygodium palmatum</i>	climbing fern	G4		S2	LP	+				
<i>Schizaea pusilla</i>	curly-grass fern	G3	3C	S3	LP	+	+	+	+	
<b>GYMNOSPERMS (Cone-bearing Plants)</b>										
<i>Chamaecyparis thyoides</i>	Atlantic white cedar	G4		S5		+		+	+	
<b>ANGIOSPERMS (Flowering Plants):</b>										
<b>MONOCOTYLEDONEAE (Monocots):</b>										
<i>Sagittaria australis</i>	southern arrowhead	G5		S1	E	H?				
<i>Sagittaria subulata</i>	strap-leaf arrowhead	G4		S2				+		+
<i>Sagittaria teres</i>	quill-leaf arrowhead	G3		S1	E	+		+		
<i>Orontium aquaticum</i>	golden club	G5		S4				+		
<i>Carex barrattii</i>	Barratt's sedge	G4	3C	S4	LP	+				
<i>Carex mitchelliana</i>	Mitchell's sedge	G3G4		S2		+	+			
<i>Carex polymorpha</i>	variable sedge	G2G3	C2	S1	E	H?				
<i>Carex rostrata</i>	beaked-sedge	G5		S2		H?				
<i>Cyperus lancastriensis</i>	Lancaster flatsedge	G5		S2	E	H?				
<i>Cyperus polystachyos var. texensis</i>	coast flatsedge	G5T5		S1	E	H?		+		
<i>Cyperus schweinitzii</i>	Schweinitz's flatsedge	G5		SE		+				
<i>Eleocharis brittonii</i>	Britton's spikerush	G4G5		S1.1	E					
<i>Eleocharis equisetoides</i>	knotted spikerush	G4		SH	E(LP)	+				
<i>Eleocharis melanocarpa</i>	black-fruited spikerush	G4		S1	E					
<i>Eleocharis quadrangulata</i>	angled spikerush	G4		S2						

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		Global	Federal	NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Eleocharis tortilis</i>	twisted spikerush	G5		S1	E					
<i>Eriophorum tenellum</i>	rough cottongrass	G5		S1	E	H?				
<i>Fuirena squarrosa</i>	hairy umbrella-sedge	G4G5		S3			+			
<i>Rhynchospora filifolia</i>	thread-leaved beaked rush	G5		S1	E	H?				
<i>Rhynchospora globularis</i>	grass-like beaked rush	G5		S1	E	H?				
<i>Rhynchospora inundata</i>	horned beaked rush	G4		S2	LP	+				
<i>Rhynchospora knieskernii</i>	Knieskern's beaked rush	G1	T	S1	E(LP)	+				
<i>Rhynchospora microcephala</i>	small-headed beaked rush	G?		S1	E	+		+		+
<i>Rhynchospora pallida</i>	pale beaked rush	G3		S3		+				
<i>Rhynchospora rariflora</i>	rare-flowering beaked rush	G5		S1	E					
<i>Rhynchospora scirpoides</i> (= <i>Psilocarya scirpoides</i> )	long-beaked bald-rush	G4		S2		+				
<i>Scirpus longii</i>	Long's bulrush	G2	C2	S2	E(LP)	+				
<i>Scleria minor</i>	slender nutrush	G4		S4	LP	+				
<i>Scleria pauciflora</i> var. <i>caroliniana</i>	few-flowered nutrush	G5T4T5		S2		+				
<i>Scleria reticularis</i> var. <i>pubescens</i>	nutrush	G5TU		S4		'?'				
<i>Eriocaulon parkeri</i>	Parker's pipewort	G3	3C	S2		+		+		+
<i>Juncus caesariensis</i>	New Jersey rush	G2	C2	S2	E (LP)	+		+		
<i>Juncus coriaceus</i>	leathery rush	G5		S1	E					
<i>Juncus torreyi</i>	Torrey's rush	G5		SU		H?				
<i>Helonias bullata</i>	swamp pink	G3	T	S3	E(LP)	+	+			+
<i>Melanthium virginicum</i>	Virginia bunchflower	G5		S1	E	H?				
<i>Narthecium americanum</i>	bog asphodel	G2	C1	S2	E(LP)	+		+		
<i>Tofieldia racemosa</i>	false asphodel	G5		S1	E(LP)	+				
<i>Uvularia puberula</i> var. <i>nitida</i>	pine barren bellwort	G5T3		S2	E	+				
<i>Zigadenus leimanthoides</i>	death-camus	G4Q		S1	E	+				
<i>Arethusa bulbosa</i>	swamp pink	G4		S2					+	
<i>Listera australis</i>	southern twayblade	G4		S2	LP	+	+			+
<i>Platanthera cristata</i>	crested yellow orchid	G5		S3	LP				+	
<i>Platanthera flava</i> var. <i>herbiola</i>	tubercled rein orchid	G4T4Q	3C	S2						
<i>Platanthera integra</i>	yellow fringeless orchid	G4	3C	S1	E(LP)	+				
<i>Platanthera nivea</i>	snowy orchid	G5		SH	E					
<i>Spiranthes laciniata</i>	lace-lip ladies'-tresses	G4G5		S1	E	+				
<i>Spiranthes odorata</i>	fragrant ladies'-tresses	G5		S2		H?	+		+	
<i>Tipularia discolor</i>	crane-fly orchid	G4G5		S3						
<i>Aristida basiramea</i> var. <i>curtissii</i>	Curtis' three-awned grass	G5T4T5		S2		+				
<i>Calamagrostis pickeringii</i>	Pickering's reedgrass	G4		S1	E	+				
<i>Calamovilfa brevipilis</i>	pine barren reedgrass	G4	3C	S4	LP	+		?		
<i>Coelorachis rugosa</i>	wrinkled jointgrass	G5		S1	E	+				
<i>Dichanthelium aciculare</i>	bristling witchgrass	G4G5		S1	E					
<i>Dichanthelium scabriusculum</i>	sheathed witchgrass	G4		S2		+				
<i>Dichanthelium wrightianum</i>	Wright's witchgrass	G4		S2		+				

Scientific Name	Common Name(s)	Global	Federal	Forsythe Refuge Macrosites						
				NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Gymnopogon brevifolius</i>	short-leaved skeleton grass	G5		S1	E					
<i>Muhlenbergia capillaris</i>	long-awned smoke grass	G5		S1	E	H?				
<i>Muhlenbergia torreyana</i>	pine barren smoke grass	G3	3C	S3	LP	+				
<i>Panicum hirtii</i>	Hirst's panic grass	G1	C2	S1	E(LP)	+				
<i>Sacciolepis striata</i>	American cupscale	G5		S1	E					
<i>Sphenopholis pensylvanica</i>	swamp oats	G4		S3						
<i>Xyris caroliniana</i>	sand yellow-eyed grass	G4G5		S1	E(LP)	+				
<i>Xyris fimbriata</i>	fringed yellow-eyed grass	G5		S1	E	+				
<i>Xyris jupicai</i>	Richard's yellow-eyed grass	G5		SH						
<i>Xyris montana</i>	northern yellow-eyed grass	G4		S1	E	+				
DICOTYLEDONEAE (Dicots):										
<i>Sesuvium maritimum</i>	seabeach purslane	G5		S2			+		+	
<i>Amaranthus pumilus</i>	seabeach amaranth	G2	T	SH	E		H?	H?		
<i>Eryngium aquaticum</i>	marsh rattlesnake master	G4		S3				+		
<i>Hydrocotyle verticillata</i>	water-pennywort	G5		S2						
<i>Asclepias lanceolata</i>	smooth orange milkweed	G5		S2			+	+		
<i>Aster radula</i>	swamp or low rough aster	G5		S1	E	+			+	
<i>Boltonia asteroides</i> var. <i>glastifolia</i>	boltonia	G5T?		S1	E	H?				
<i>Cacalia atriplicifolia</i>	pale indian plantain	G4G5		S1	E	H?				
<i>Chrysopsis (=Pityopsis) falcata</i>	sickle-leaved golden aster	G3G4		S3	LP	+				
<i>Cirsium virginianum</i>	Virginia thistle	G3G4		S1	E			+		
<i>Coreopsis rosea</i>	pink or rose tickseed	G3		S2	LP	+				
<i>Eupatorium resinsum</i>	pine barren boneset	G3	C2	S2	E(LP)	+	+	?		
<i>Gnaphalium helleri</i>	Heller's everlasting	G4G5		SH	E	H?				
<i>Kuhnia eupatorioides</i>	false boneset	G5		S1	E	H?				
<i>Pluchea foetida</i>	stinking fleabane	G5		S1	E					
<i>Solidago elliotii</i>	coastal goldenrod	G5		S3		+				
<i>Solidago tarda</i>	late goldenrod	G?		S3		+				
<i>Onosmodium virginianum</i>	Virginia false-gromwell	G4		S1	E	+				
<i>Lobelia boykinii</i>	Boykin's lobelia	G2	C2	S1	E(LP)	+				
<i>Lobelia canbyi</i>	Canby's lobelia	G4		S3	LP	+				
<i>Honckenya peploides</i>	seabeach sandwort	G5		S2			+		+	
<i>Chenopodium rubrum</i>	red goosefoot	G5		S1	E					+
<i>Hypericum adpressum</i>	creeping St. John's-wort	G2G3	C2	S2	E					
<i>Cuscuta cephalanthi</i>	button-bush dodder	G5		S1	E	H?				
<i>Cuscuta polygonorum</i>	smartweed dodder	G5		S2						
<i>Stylisma pickeringii</i> var. <i>pickeringii</i>	Pickering's morning-glory	G4T2T3	C2	S1	E(LP)	+				
<i>Diospyros virginiana</i>	persimmon	G5		S5				+		
<i>Corema conradii</i>	broom crowberry	G4		S1	E(LP)	+				
<i>Crotonopsis elliptica</i>	elliptical rushfoil	G5		S2	LP	+				
<i>Euphorbia purpurea</i>	glade spurge	G3	C2	S1	E					
<i>Aeschynomene virginica</i>	sensitive joint-vetch	G2	T	S1	E(LP)	+		+		
<i>Clitoria mariana</i>	butterfly pea	G5		S1	E	H?				

		Forsythe Refuge Macrosites								
Scientific Name	Common Name(s)	Global	Federal	NJ Rank	NJ Stat.	Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
<i>Desmodium sessilifolium</i>	sessile-leaved tick-trefoil	G5		S1	E	+				
<i>Desmodium strictum</i>	pineland tick-trefoil	G4		S2	LP	+				
<i>Galactia volubilis</i>	downey milk-pea	G5		SH	E					
<i>Stylosanthes biflora</i>	pencil flower	G5		S3		H?				
<i>Quercus nigra</i>	water oak	G5		S1	E					
<i>Gentiana autumnalis</i>	pine barren gentian	G3	3C	S3	LP	+				
<i>Myriophyllum tenellum</i>	slender water-milfoil	G5		S1	E	H?				
<i>Utricularia biflora</i>	two-flowered bladderwort	G5		S1	E	+				
<i>Utricularia olivacea</i>	dwarf white bladderwort	G4		S1	E(LP)	+				
<i>Utricularia purpurea</i>	purple bladderwort	G5		S3	LP	+			+	
<i>Utricularia resupinata</i>	reversed bladderwort	G4		S1	E(LP)	+				
<i>Linum intercursum</i>	sandplain flax	G4G5		S1	E	+				
<i>Ammannia latifolia</i>	Koehn's tooth-cup	G5		S1	E					+
<i>Rotala ramosior</i>	tooth-cup	G5		S3						
<i>Rhexia aristosa</i>	awned meadowbeauty	G3	C2	S1	E(LP)	+				
<i>Nymphoides cordata</i>	floating heart	G5		S3	LP	+				
<i>Ludwigia hirtella</i>	hairy ludwigia	G5		S2	LP	+				
<i>Oenothera humifusa</i>	sea-side evening-primrose	G5		S1	E		+		+	
<i>Oenothera oakesiana</i>	Oakes' evening-primrose	G4?Q		S2						
<i>Plantago maritima ssp. juncooides</i>	seaside plantain	G5T5		S2					+	
<i>Polygonum densiflorum</i>	stout smartweed	G5		S1	E					
<i>Polygonum glaucum</i>	seabeach knotweed	G3		S1	E		+			
<i>Polygonum setaceum var. injectum</i>	swamp smartweed	G5T4		S2?						
<i>Glaux maritima</i>	seabeach milkwort	G5		SH	E		+			
<i>Hottonia inflata</i>	featherfoil	G4		S1	E					
<i>Prunus angustifolia</i>	chickasaw plum	G5		S2	E	H?				
<i>Diodia virginiana</i>	larger buttonweed	G5		S1	E					
<i>Galium hispidulum</i>	coast bedstraw	G5		S1	E					
<i>Oldenlandia uniflora</i> (= <i>Hedyotis uniflora</i> )	clustered bluets	G5		S3						+
<i>Populus heterophylla</i>	swamp cottonwood	G5		S2						
<i>Schwalbea americana</i>	chaffseed	G2	E	S1	E(LP)	+				
<i>Phoradendron serotinum</i>	mistletoe	G5		S2	LP	+	+			
<b>COMMUNITIES and ECOSYSTEMS</b>										
<b>MARINE WETLAND COMMUNITIES</b>										
Marine Subtidal Aquatic Bed		G5		SU			+	+	+	+
Marine Intertidal Gravel/Sand Beach		G5		SU			+		+	
<b>ESTUARINE WETLAND COMMUNITIES</b>										
Freshwater Subtidal Aquatic Bed		G4		SU				+		+
Tidal River		G4						+		+
Low Salt Marsh		G5		S5			+	+	+	+
High Salt Marsh		G5		S5			+	+	+	+
Salt Panne		G5		S5			+	+	+	+
Brackish Intertidal Shore		G3G4						+		
Brackish Intertidal Mudflats		G3G4						+		
Brackish Tidal Marsh		G4		S2?				+		+

Scientific Name	Common Name(s)	Global	Federal	NJ Rank	NJ Stat.	Forsythe Refuge Macrosites				
						Pine Barren	Barn. Bay	Gr. Bay Mullica R.	Brig. Bay	Gr. Egg
Freshwater Intertidal Shore		G3G4						+		
Freshwater Intertidal Mudflats		G3G4						+		
Freshwater Tidal Marsh		G3G4		S3?		?		+		+
Freshwater Tidal Swamp		G2G3		S1S2				+		
Coastal Plain Pond (lacustrine)		G3G4						+		
<b>PALUSTRINE WETLANDS</b>										
Pine Barrens Shrub Swamp (palustrine)		G5		S5		+				
Coastal Plain Vernal Pond		G3?		S2S3		+				
Pine Barren Savanna		G2		S2S3		+				
Pitch Pine Lowland Forest (palustrine)		G3		S3		+				
Cape May Lowland Swamp		G1		S1?						
Coastal Plain Atlantic White Cedar Swamp		G3G4		S4?		+	+	+	+	
Red Maple-Hardwood Swamp		G5		S5			+			
<b>TERRESTRIAL/UPLAND COMMUNITIES</b>										
Maritime Dunes		G4					+	+		
Coastal Dune Shrubland		G4		S2?			+		+	
Coastal Dune Woodland		G2G3		S1			+			
Pine Plains		G1		S1		+				
Pitch Pine-Scrub Oak Barrens		G2				+				
Pitch Pine-Oak-Heath Woodland		G3G4				+				
<b>ANIMAL CONCENTRATION AREAS</b>										
Anadromous Fish Concentration								+		+
Bald Eagle Wintering Site		G?		S?		+		+		+
Coastal Heron Rookery		GU		S3			+	+	+	+
Migratory Shorebird Concentration Site		G?		S?			+	+	+	+
Waterbird Nesting Colony							+	+	+	+
Raptor Concentration Area										
Waterfowl Concentration Area							+	+	+	+

## Appendix F

### Pre-Acquisition Compatibility Determination

#### Existing Wildlife-dependent Uses of Refuge Lands within New Refuge Acquisition Areas

STATION NAME: Edwin B. Forsythe National Wildlife Refuge

DATE(S) ESTABLISHED: Brigantine NWR - Jan. 24, 1939;  
Barnegat NWR - June 21, 1967;  
Edwin B. Forsythe NWR - May 22, 1984 - by combining the former  
Brigantine and Barnegat NWR's.

#### ESTABLISHING AND ACQUISITION AUTHORITIES:

Edwin B. Forsythe National Wildlife Refuge was created on May 22, 1984 by combining the former Brigantine and Barnegat National Wildlife Refuges (98 Stat. 207). The Brigantine National Wildlife Refuge was established on January 24, 1939 by the Migratory Bird Conservation Commission under the authority of the Migratory Bird Conservation Act, to preserve estuarine habitats important to Atlantic brant (*Branta berniclia*) and to provide nesting habitats for black ducks (*Anas rubripes*) and rails. The Barnegat National Wildlife Refuge was established on June 21, 1967, under the authority of the Migratory Bird Conservation Act, for preservation of estuarine feeding and resting habitat for ducks and brant. The State of New Jersey enabling legislation is New Jersey Statutes, Annotated, Title 23, Chapter 4, Section 23:4-56.

#### PURPOSE(S) FOR WHICH ESTABLISHED:

For lands acquired under the Migratory Bird Conservation Act (16 U.S.C. 715-715r), as amended, the purpose of the acquisition is "...for uses as an inviolate sanctuary, or for any other management purpose, for migratory birds." Migratory Bird Conservation Act (16 U.S.C. 715d).

For lands acquired under the Fish and Wildlife Act of 1956 (16 U.S.C. 742(a) 754), as amended, the purpose of the acquisition is "... for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 U.S.C. 742 (a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1)).

For lands acquired under the Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901(b)) "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...." Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901(b), 100 Stat. 3583). For lands within the Brigantine Wilderness Area, "...to secure for the American people of present and future generations the benefits of an enduring resource of wilderness." (78 Stat. 890:16 U.S.C. 1121 (note), 1131-1136, Wilderness Act of 1964).



OTHER APPLICABLE LAWS, REGULATIONS, AND POLICIES:

1. Antiquities Act of 1906 (34 STAT 225).
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 STAT 1222).
3. Refuge Recreation Act of 1962 (16 U.S.C. 460k 1-4; 76 STAT 653).
4. National Wildlife Refuge Administrative Act of 1966 (16 U.S.C. 668dd - 668ee; 80 STAT 927), as amended.
5. National Environmental Policy Act of 1969 (42 U.S.C. 4321, *et seq*; 83 STAT 852).
6. National Wildlife Refuge System Regulations in the Code of Federal Regulation (CFR)50 Subchapter C.
7. The Endangered Species Act of 1973 (16 U.S.C. 1531-1543; 87 STAT 884), as amended.
8. Executive Order 11990, Protection of Wetlands.
9. Wilderness Act of 1964 (16 U.S.C. 1121(note), 1131-1136).
10. Clean Air Act (42 U.S.C. 7401 *et seq*), as amended.
11. National Wildlife Refuge System Improvement Act of 1997 (P. L. 105-57).

DESCRIPTION OF PROPOSED USE:

Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are defined as wildlife-dependent recreational uses by The National Wildlife Refuge System Improvement Act of 1997. This interim compatibility statement addresses only these uses.

ANTICIPATED IMPACTS OF THE USE:

The current levels of the six wildlife-dependent recreational uses defined in The National Wildlife Refuge System Improvement Act of 1997 (i.e., hunting, fishing, wildlife observation and photography, and environmental education and interpretation) in the proposed refuge expansion areas do not appear to be having any negative impacts on the habitat or wildlife within the areas.

DETERMINATION:

This use is compatible X .

This use is not compatible \_\_\_ .

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The parcel needs to be posted.

JUSTIFICATION:

See Anticipated Impacts of the Use:

NEPA COMPLIANCE:

CATEGORICAL EXCLUSION		
ENVIRONMENTAL ASSESSMENT	X	1994
ENVIRONMENTAL IMPACT STATEMENT		
FONSI	X	1994

The 1994 Environmental Assessment and Finding of No Significant Impacts (FONSI) for expanding the Edwin B. Forsythe National Wildlife Refuge have been superceded by the July 2000 Revised Draft

Edwin B. Forsythe National Wildlife Refuge have been superceded by the July 2000 Revised Draft Environmental Assessment and Comprehensive Conservation Plan and March 2001 FONSI prepared for the Jersey Coastal Refuges.

REFUGE MANAGER: Stephen P. Atzert DATE: 06/07/2004  
REVIEWED BY: Anthony D. Lege DATE: 6/14/2004

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## Appendix G

### Ecosystem services and functions (Costanza, et al. 1997)

Number	Ecosystem Service*	Ecosystem Functions	Examples
1	Gas regulation	Regulation of atmospheric chemical composition.	CO <sub>2</sub> /O <sub>2</sub> balance, O <sub>3</sub> for UVB protection, and SO <sub>x</sub> levels
2	Climate regulation	Regulation of global temperature, precipitation, and other biological mediated climatic processes at global or local levels.	Greenhouse gas regulations, DMS production affecting cloud formation.
3	Disturbance regulation	Capacitance, damping and integrity of ecosystem response to environmental fluctuations.	Storm protection, flood control, drought recovery and other aspects of habitat response to environment variability mainly controlled by vegetation structure.
4	Water regulation	Regulation of hydrological flows.	Provisioning of water for agricultural (such as irrigation) or industrial (such as milling) processes or transportation.
5	Water supply	Storage and retention of water.	Provisioning of water by watersheds, reservoirs, and aquifers.
6	Erosion control & sediment retention	Retention of soil within an ecosystem.	Prevention of loss of soil by wind, runoff, or other removal processes, storage of silt in lakes and wetlands.
7	Soil formation	Soil formation processes.	Weathering of rock and the accumulation of organic material.
8	Nutrient cycling	Storage, internal cycling, processing and acquisition of nutrients.	Nitrogen fixation, N.P. and other elemental or nutrient cycles.
9	Waste treatment	Recovery of mobile nutrients & removal or breakdown of excess or xenic nutrients & compounds.	Waste treatment, pollution control, detoxification.
10	Pollination	Movement of floral gametes.	Provisioning of pollinators for the reproduction of plant populations.
11	Biological control	Trophic-dynamic regulations of populations.	Keystone predator control of prey species, reduction of herbivory by top predators.
12	Refugia	Habitat for resident and transient populations.	Nurseries, habitat for migratory species, regional habitats for locally harvested species or overwintering grounds.

<b>Number</b>	<b>Ecosystem Service*</b>	<b>Ecosystem Functions</b>	<b>Examples</b>
13	Food production	That portion of gross primary production extractable as food.	Production of fish, game, crops, nuts, fruits by hunting, gathering, subsistence farming or fishing.
14	Raw materials	That portion of gross primary production extractable as raw materials.	The production of lumber, fuel or fodder.
15	Genetic resources	Sources of unique biological materials and products.	Medicine, products for materials science, genes of resistance to plant pathogens and crop pests, ornamental species (pets and horticultural varieties of plants).
16	Recreation	Providing opportunities for recreational activities.	Ecotourism, sport fishing, and other outdoor recreational activities.
17	Cultural	Providing opportunities for non-commercial uses.	Aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems.

## Appendix H

### Refuge Operating Needs System (RONS) Project List

**Terms used in this appendix:**

**Startup cost:** The project's estimated expenses for the first year (in year 2000 dollars X 1000)

**Recurring cost:** The project's estimated expenses for the second and following years (in year 2000 dollars X 1000)

**15-year Total Cost:** Estimated expenses for all projects over the 15-year duration of this CCP

**Staff (FTEs):** Full Time staffing Equivalent (one FTE is one person working full time for one year; seasonal staff are calculated as 0.5 FTE.)

**Average FTE:** The average additional FTEs required over the 15-year duration of this CCP, taking into to consideration that some projects have shorter durations (less than 15 years)

**Table H-1.** *Funding and staffing required for RONS projects for Forsythe Refuge.*

	Startup Costs (\$000)	Recurring Costs (\$000)	15-year Total Cost (\$000)	Average FTE
<b>Edwin B. Forsythe Total</b>	<b>\$14,479</b>	<b>\$3,668</b>	<b>\$54,184</b>	<b>34.5</b>

**Table H-2.** *RONS projects for Forsythe Refuge.*

Start Year	Project Title: E.B. Forsythe NWR	Startup Cost (\$000)	Recurring Cost (\$000)	15-year Total Cost (\$000)	Staffing (FTEs)	Duration (years)
2001	Grassland Restoration and Management	84.7	6.1	169.5	0.3	15
2001	Restoration/Management of Early Succession Habitats	21.3	3.3	67.6	0.3	15
2001	Saltmarsh Restoration	1,222.0	1,222.0	18,330.6	1	15
2001	Upland Forest Restoration and Management	60.7	60.7	911.2	0.5	15
2001	Invasive Species Control	23.6	23.6	354.0	0.5	15
2001	Waterfowl Monitoring and Management	59.0	52.0	787.0	1	15
2001	Invasive/Native Plant Species Survey	114.0	94.0	208.0	1	2

Start Year	Project Title: E.B. Forsythe NWR	Startup Cost (\$000)	Recurring Cost (\$000)	15-year Total Cost (\$000)	Staffing (FTEs)	Duration (years)
2001	Develop Vegetation/Habitat Map	128.0	106.0	552.0	1	5
2001	Develop Wildlife/Refuge Database and Archive	132.0	126.0	1,896.0	1	15
2001	Conduct Technical Outreach on Land Protection/Management	114.0	104.0	1,570.0	1	15
2001	Post & Patrol Newly Acquired Refuge Lands and Hunting Areas	107	82.0	1255.0	2	15
2001	Establish Holgate Boat Taxi Concessionaire	30	36.0	534.0	1.2	15
2001	Survey & Post Boundary of Holgate Wilderness Area	189	70.0	1169.0	2	15
2001	Assess Impact of Mosquito Control on Wildlife	50.0	30.0	470.0	0.5	15
2001	Conduct Endangered Species Survey, Restoration, & Management	100.0	70.0	1,080.0	1	15
2001	Expand Deer Management Zone 58	20.0	20.0	300.0	0.5	15
2001	Enhance & Maintain New Observation Platform at Barnegat Impoundment	20.0	2.5	55.0	0.1	15
2001	Develop Outreach and Public Education Program	65.7	55.7	845.5	1	15
2001	Open Fishing Area along Parkertown Road	15.0	3.7	66.8	0.1	15
2001	Develop <i>Brigantine Wilderness Area</i>	8.9	3.7	42.2	0.1	10
2001	Develop Holgate Wilderness Area brochure	8.9	3.7	42.2	0.1	10
2001	Reformat and print <i>Forsythe Bird List</i>	8.6	5.4	84.2	0.1	15
2001	Reformat and print <i>Forsythe Wildlife Drive</i>	8.6	5.4	84.2	0.1	15
2001	Reprint General <i>Forsythe NWR</i> Brochure	8.8	6.4	98.4	0.1	15
2002	Study on Barrier Island Ecology & Impact of Public Use	70.0	50.0	270.0	0	5
2002	Construct Univ. Accessible Observation Platform at Experimental Pool	30.0	7.5	127.5	0.1	14
2002	Develop <i>People's Impacts on Wildlife</i>	6.4	3.2	25.6	0.1	7
2003	Small Vertebrate Survey (Mammals, Reptiles, Amphibians)	108.0	91.0	472.0	1	5

Start Year	Project Title: E.B. Forsythe NWR	Startup Cost (\$000)	Recurring Cost (\$000)	15-year Total Cost (\$000)	Staffing (FTEs)	Duration (years)
2003	Construct Observation Boardwalk at Holgate	25	6.3	100.6	0.1	13
2003	Study Impact of Development on Water Quality/Quantity and Wetlands	70.0	50.0	670.0	1	13
2003	Construct Univ. Accessible Saltwater Fishing Pier, Mullica R.	38.0	9.5	152.0	0.2	13
2003	Construct New Office with Visitor Contact Facility at Barnegat	250.0	62.5	1,000.0	1.5	13
2003	Construct Trail and Kiosk at Four-Mile Branch Bog	35.0	8.8	140.0	0.2	13
2004	Nesting Bird Survey	95.0	89.0	451.0	1	5
2004	Complete second half of the DeCamp Trail	30.0	7.5	112.5	0.2	12
2004	Conduct nature tours & on-site support on the Wildlife Drive	30.0	26.0	316.0	0.7	12
2004	Conduct nature tours & on-site support at Holgate Wilderness	30.0	26.0	316.0	0.7	12
2005	Fish & Aquatic Invertebrate Survey	149.0	127.0	657.0	3	5
2005	Develop Holgate Observation Platform with Long Beach Township	10	2.5	35.0	0.1	11
2005	Construct Seasonal Observation Deck at Bonnet Island	25.0	6.2	87.0	0.1	11
2005	Develop Outdoor Classroom Sites	20.0	5.0	70.0	0.1	11
2005	Develop and Implement Teacher Training Workshops	22.2	8.0	102.2	0.3	11
2005	Purchase and Develop Wildlife Learning Materials for Children	23.1	7.0	93.1	0.2	11
2005	Construct New Office and Visitor Center at Brigantine (Construction Funds)	10,000.0	500.0	15,000.0	2	11
2006	Monitor Public Use Activity and Impact	50.0	30.0	320.0	0.5	10
2006	Develop Forsythe video	30.0		30.0		1
2007	Study Pre-Colonial Ecology of Southeast Jersey Landscape	70.0	50.0	270.0	0	5
2007	Implement changes in Migratory Game Bird Hunting	20.0	20.0	180.0	0.5	9
2007	Develop Universally Accessible Deer Hunt Sites in DMZ 56	5.0	0.2	7.0		9



Start Year	Project Title: E.B. Forsythe NWR	Startup Cost (\$000)	Recurring Cost (\$000)	15-year Total Cost (\$000)	Staffing (FTEs)	Duration (years)
2007	Conduct nature tours & on-site support at Reedy Creek	30.0	26.0	238.0	0.7	9
2007	Help teachers develop class wildlife and habitat projects	15.0	15.0	135.0	0.5	9
2007	Construct Office and Visitor Center at Reedy Creek	250.0	62.5	750.0	1	9
2008	Habitat Use by Migrating/Wintering Birds of Prey Study	149.0	127.0	657.0	1	5
2008	Refurbish existing Fire Lane Trails (done Start-up)	10.0	2.5	27.5	0.1	8
2008	Refurbish Primitive Trail at Murry Grove	25.0	6.2	68.8	0.1	8
2008	Develop Parking for Canoers/Kayakers on Westecunk Creek	17.5	4.4	48.3	0.1	8
2008	Develop <i>Forsythe Refuge Visitor Opportunities</i>	6.4	3.0	18.4	0.1	5
2008	Produce <i>Canoers/Kayakers Guide to Forsythe NWR</i>	10.0	3.0	13.0	0.1	2
2009	Construct Universally accessible Freshwater Fishing Site	36.0	9.0	90.0	0.2	7
2010	Refurbish Primitive Trail at Cedar Run Bog	40.0	10.0	90.0	0.2	6
2012	Develop Parking for Canoers/Kayakers on Cedar Run Creek	17.5	4.4	30.7	0.1	4
2012	Develop <i>Forsythe Amphibians and Reptiles</i>	6.4	3.0	9.4	0.1	2
2014	Refurbish Primitive Trail at Collinstown Road	25.0	6.2	31.2	0.1	2
2014	Develop <i>Forsythe Mammals</i>	6.4	3.0	9.4	0.1	2
	<b>Forsythe Subtotal</b>	<b>\$14,479</b>	<b>\$3,668</b>	<b>\$54,184</b>	<b>34.5</b>	

# Appendix I

## Maintenance Management System (MMS) Project List

The Maintenance Management System (MMS) was established in 1982 to enhance Service-wide efforts in planning and budgeting for maintenance activities. The MMS database deals specifically with maintenance planning and budgeting. It serves to facilitate and standardize the documentation of backlogged maintenance needs - maintenance deficiencies which have gone uncorrected for 12 or more months since the deficiency arose due to lack of funding. Backlogged maintenance needs can include:

Repair and Rehabilitation - Work needed as a result of physical deterioration or functional obsolescence of buildings, other structures, facilities, or equipment. This category of maintenance may include projects that are to modify facilities for new functions, or to make improvements or additions (limited to 10% of GSF) to existing facilities to enhance their purpose or utility.

Facility and Equipment Replacement - Sometimes the most cost effective "repair" of a building, other facility, or equipment item is the replacement of it. To be eligible for listing in this MMS database, the proposed replacements must be of generally similar size and purpose. An ATV cannot be replaced with a pickup truck. A dilapidated barn cannot be replaced with a new pole shed if the pole shed's size exceeds the barn's size by more than 110%.

Backlogged maintenance needs do not include:

New buildings, other facilities, or equipment - except when they are replacing dilapidated or obsolete items of similar size and kind. New items and major capital improvements are documented in Refuge Operations Needs (RONS) database.

Unfunded custodial maintenance needs - Routine or minor maintenance activities of a custodial nature. Examples include grass mowing, snow removal, grounds maintenance, janitorial services, minor plumbing, and light bulb or window glass replacement.

Habitat restoration, rehabilitation, or maintenance - MMS maintenance needs are restricted to facilities, structures, and equipment.

Projects or items under \$5,000 - Items under \$5000 are covered by the stations annual maintenance allocation.

Attached is a table of the current project backlog for the Edwin B. Forsythe National Wildlife Refuge. The listing includes a project description and estimated cost.

MMS - Project Listing

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 1	CostEst: \$100	97105	Radio Equipment	R	S
RR:	CumOblig:	Replace malfunctioning low-band systems with narrow band system. This is dangerous when staff required to work alone in remote areas of the refuge especially during foul weather, out			
NR:	Backlog: \$100				
Fix type: Replace					
<File Missing>		1	<File Missing>	%Cplt:	0%

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 5	CostEst: \$60	98005	Refuge Office siding	R	
RR:	CumOblig: \$15	Replace deteriorated exterior T-111 siding on the headquarters. Replacement of flashing and painting included as necessary.			
NR:	Backlog: \$45				
Fix type: Repair/reha					
<File Missing>		25	<File Missing>	4037	%Cplt: 25%

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 12	CostEst: \$30	99004	Restroom/Kiosk Parking	R	
RR:	CumOblig: \$0	Repave walkways around the headquarters building, restroom, kiosk areas and the parking lot areas to allow ADA 504 access for handicap visitors.			
NR:	Backlog: \$30				
Fix type: Repair/reha					
<File Missing>		1	<File Missing>	%Cplt:	0%

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 26	CostEst: \$10	98006	Refuge Office/Shop Doors	R	
RR:	CumOblig: \$0	Replace corroded doors and doorway frames in several refuge facilities due to the coastal salt air environment.			
NR:	Backlog: \$10				
Fix type: Repair/reha					
<File Missing>		2	<File Missing>	6890	%Cplt: 0%

MMS - Project Listing

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 20	CostEst: \$100	99003	Lily Lake Road	R	S
RR:	CumOblig: \$0	Pave the existing gravel road to bring it to a safe standard for vehicle and staff personnel. This road provide public access around the Lily Lake. This road was determined as poor by the			
NR:	Backlog: \$100				
Fix type: Repair/reha					
<File Missing>		1	<File Missing>	%Cplt:	0%

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 99	CostEst: \$100	99002	Scotts Landing Road	R	
RR:	CumOblig: \$0	Repave deteriorated Scotts Landing Road which the pavement is cracked and broken up winter climate of the northeast. This road is use to access the public boat ramp area.			
NR:	Backlog: \$100				
Fix type: Repair/reha					
<File Missing>		1	<File Missing>	%Cplt:	0%

52512 Edwin B. Forsythe NWR - Barnegat Division			FndSrc/FYGrp/Sfty		
SR: 46	CostEst: \$30	90227	16' Boat and Motor	R	
RR:	CumOblig: \$0	Replace a leaking 16-foot boat and non-functioning engine motor needed for enforcement of endangered species, waterfowl, and refuge regulations. Includes galvanized			
NR:	Backlog: \$30				
Fix type: Replace					
<File Missing>		1	<File Missing>	2	%Cplt: 0%

52512 Edwin B. Forsythe NWR - Barnegat Division			FndSrc/FYGrp/Sfty		
SR: 18	CostEst: \$30	93040	17' Whaler and Trailer	R	
RR:	CumOblig: \$0	Replace a leaking 17-foot boat, motor, and trailer used for endangered species recovery efforts and refuge operations.			
NR:	Backlog: \$30				
Fix type: Replace					
<File Missing>		1	<File Missing>	1	%Cplt: 0%

MMS - Project Listing

52512 Edwin B. Forsythe NWR - Barnegat Division			FndSrc/FYGrp/Sfty		
SR: 39	CostEst: \$20	90220	1957 12' Aluminum Boat	R	S
RR:	CumOblig: \$0	Replace old 1957 12-foot aluminum boat, motor and trailer which are considered unsafe to operate used for migratory birds, wildlife programs and public use.			
NR:	Backlog: \$20				
Fix type: Replace					
<File Missing>		1	<File Missing>	2	%Cplt: 0%

52512 Edwin B. Forsythe NWR - Barnegat Division			FndSrc/FYGrp/Sfty		
SR: 500	CostEst: \$10	97204	Manahawkin Swamp Bridge	R	S
RR:	CumOblig: \$0	Demolish an abandoned wooden bridge to prevent a public safety hazard. General condition is poor. Live load capacity is dangerously low. No truck restriction is recommended. Repair work			
NR:	Backlog: \$0				
Fix type: Remove					
<File Missing>		1	<File Missing>	21	%Cplt: 100%

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty		
SR: 4	CostEst: \$65	89033	East Pool Water Control	R	
RR:	CumOblig: \$0	Replace a deteriorated concrete water control structure with an aluminum structure and riser. Take out a second old water control structure and fill in to create natural setting.			
NR:	Backlog: \$65				
Fix type: Replace					
<File Missing>		2	<File Missing>		%Cplt: 0%

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty		
SR: 6	CostEst: \$60	98508	Scotts Landing	R	S
RR:	CumOblig: \$0	A public boat ramp damage by vehicle ramming into bulkhead, causing a fire. The bulkhead is also undermined. Project involves replacing bulkhead and dock, grading, and covering with			
NR:	Backlog: \$60				
Fix type: Repair/reha					
<File Missing>		1	<File Missing>	44	%Cplt: 0%

MMS - Project Listing

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty			
SR: 7	CostEst: \$35	97104		Water Street/Shropshire	R	S
RR:	CumOblig: \$0	Remove and dispose of asbestos properly and then demolish the abandoned houses and garages. These facility have deteriorated to a point beyond repair, have been vandalized and have				
NR:	Backlog: \$35					
Fix type: Remove						
<File Missing>		2	<File Missing>		%Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty			
SR: 8	CostEst: \$50	97101	C	1988 Ram and Van	R	
RR:	CumOblig: \$0	Replace aging pickup truck (1988 Dodge Ram 8/99 - mileage 50,000) and Van (1992 Astro Van - 80,000 miles) used to support wildlife and public use programs.				
NR:	Backlog: \$50					
Fix type: Replace						
<File Missing>		1	<File Missing>		%Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty			
SR: 24	CostEst: \$16	93006		Visitor Center Carpeting	R	
RR:	CumOblig: \$0	Replace worn-out carpeting in the headquarters' auditorium that has been stained and matted down.				
NR:	Backlog: \$16					
Fix type: Repair/reha						
<File Missing>		1	<File Missing>		4037 %Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty			
SR: 10	CostEst: \$15	98506		Rovins House	R	S
RR:	CumOblig: \$0	Demolish an abandoned two-story concrete masonry structure. Public dumping and mice infestations have made this site a health hazard to refuge employees and the visiting				
NR:	Backlog: \$15					
Fix type: Remove						
<File Missing>		1	<File Missing>		%Cplt: 0%	

MMS - Project Listing

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty				
SR: 11	CostEst: \$30	90110		Boston Whaler and Trailer	R		
RR:	CumOblig: \$0	Replace a worn-out 16-foot boat and trailer used for endangered species recovery efforts and for enforcement of waterfowl hunting and refuge regulations.					
NR:	Backlog: \$30						
Fix type: Replace							
<File Missing> 1			<File Missing> 1			%Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty				
SR: 14	CostEst: \$24	97101	D	1989 Dakota	R		
RR:	CumOblig: \$0	Replace aging pickup trucks (1989 Dodge Dakota - 8/99 mileage 60,000) used to support wildlife and public use programs.					
NR:	Backlog: \$24						
Fix type: Replace							
<File Missing> 1			<File Missing>			%Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty				
SR: 17	CostEst: \$35	93365	C	Cabin Quarters#1 Asbestos	R		S
RR:	CumOblig: \$0	Completely rehabilitate cabin for leaky showers, rotted floors, windows sweats, no insulation, no egress to backyard, failed septic system and asbestos in basement. These					
NR:	Backlog: \$35						
Fix type: Remove							
<File Missing> 1			<File Missing>			%Cplt: 0%	

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty				
SR: 25	CostEst: \$25	93003		Workshop HVAC	R		S
RR:	CumOblig: \$0	Replacing the shop HVAC the current system is not adequate HVAC to remove the saw dust in the shop generated health hazard to staff.					
NR:	Backlog: \$25						
Fix type: Repair/reha							
<File Missing> 1			<File Missing> 2853			%Cplt: 0%	

MMS - Project Listing

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty		
SR: 40	CostEst: \$10	90195	Radio Tower	R	S
RR:	CumOblig: \$0	Replace radio tower damaged by storms for a reliable communication system since cell phones do not work in certain areas of the refuge. Radio communication is essential for the staff			
NR:	Backlog: \$10				
Fix type: Replace					
<File Missing>		1	<File Missing>	%Cplt:	0%

52511 Edwin B. Forsythe NWR - Brigantine Division			FndSrc/FYGrp/Sfty		
SR: 500	CostEst: \$10	93005	Boundary Signs and Posts	R	
RR:	CumOblig: \$10	Repost boundary signs on ten thousand acres of refuge. Currently many signs and posts are missing. proper posting is necessary for the public to identify refuge lands.			
NR:	Backlog: \$0				
Fix type: Replace					
<File Missing>		1	<File Missing>	%Cplt:	100%

52510 Edwin B. Forsythe NWR			FndSrc/FYGrp/Sfty		
SR: 40	CostEst: \$15	20011	Shop Roof	C	9999
RR: 999	CumOblig: \$0	Replace 2700 square foot of shingle roofing on the maintance shop			
NR: 417	Backlog: \$15				
Fix type: Replace					
<File Missing>		1	<File Missing>	2700	%Cplt: 0%





# Appendix J

## Glossary

**alternative** – a reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2) [see also *management alternative* below].

**amphidromous fish** – fish that can migrate from fresh water to the sea, or vice versa, not for the purpose of breeding, but at other times during the life cycle of the fish.

**anadromous** – fish that spend a large proportion of their life cycle in the ocean and return to freshwater to breed.

**aquatic barrier** – any obstruction to fish passage.

**aquatic** – growing in, living in, or dependent upon water.

**biological integrity** – composition, structure, and function at the genetic, organism, and community levels consistent with natural conditions, and the biological processes that shape genomes, organisms, and communities.

**biological or natural diversity** – the abundance, variety, and genetic constitution of animals and plants in nature. Also referred to as “biodiversity.”

**breeding habitat** – habitat used by migratory birds or other animals during the breeding season.

**buffer zones** – protective land borders around critical habitats or water bodies that reduce runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals and plants and their habitats.

**candidate species** – those species for which the Service has on file sufficient information on biological vulnerability and threats to propose them for listing.

**carrying capacity** – the size of the population that can be sustained by a given environment.

**catadromous fish** – fish that spend most of their lives in fresh water but migrate to sea to reproduce.

**Categorical Exclusion (CE, CX, CATEX, CATX)** – a category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a Federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).

**CFR** – Code of Federal Regulations.

**Challenge Grant Cost Share Program** – a grant program administered by the Fish and Wildlife Service providing matching funds for projects supporting natural resource education, management, restoration and protection on Service lands, other public lands and on private lands.

**community** - the area or locality in which a group of people resides and shares the same government.

**community type** – a particular assemblage of plants and animals, named for the characteristic plants.

**compatible use** – an allowed use that will not materially interfere with, or detract from, the purposes for which the unit was established (Service Manual 602 FW 1.4).

**compatibility determination** – a compatibility determination is required for a wildlife-dependant recreational use or any other public use of a refuge. A compatible use is one which, in the sound professional judgement of the Refuge Manager, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s)

**Comprehensive Conservation Plan (CCP)** – a document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge, help fulfill the mission of the System, maintain and, where appropriate, restore the biological integrity, diversity, and environmental health of each refuge and the System, and meet other mandates.

**concern** – see *issue*.

**conservation** – the management of natural resources to prevent loss or waste. Management actions may include preservation, restoration, and enhancement.

**conservation agreements** – written agreements reached among two or more parties for the purpose of ensuring the survival and welfare of unlisted species of fish and wildlife and/or their habitats, or to achieve other specified conservation goals. Participants voluntarily commit to implementing specific actions that will remove or reduce the threats to these species.

**conservation easement** – a legal agreement between a landowner and a land trust (a private, nonprofit conservation organization) or government agency that permanently limits a property's uses in order to protect its conservation values.

cooperative agreement – the legal instrument used when the principal purpose of the transaction is the transfer of money, property, services or anything of value to a recipient in order to accomplish a public purpose authorized by Federal statute and substantial involvement between the Service and the recipient is anticipated.

**cultural resources** – evidence of historic or prehistoric human activity, such as buildings, artifacts, archaeological sites, documents, or oral or written history.

**cultural resource inventory** – a professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).

**cultural resource overview** – a comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate

information from a field offices background or literature search described in Section VIII. of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).

**database** – a collection of data arranged for ease and speed of analysis and retrieval, usually computerized.

**diadromous** – fish that migrate from freshwater to saltwater or the reverse: a generic term that includes anadromous, catadromous and amphidromous fishes.

**digitizing** – the process of converting information from paper maps into geographically referenced electronic files for a geographic information system (GIS).

**easement** – an agreement by which a landowner gives up or sells one of the rights on his/her property. For example, a landowner may donate a right of way across his/her property to allow community members access.

**ecosystem** – a biological community together with its environment, functioning as a unit. For administrative purposes, the Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries and vary in their sizes and ecological complexity.

**ecotourism** – a type of tourism that maintains and preserves natural resources as a basis for promoting economic growth and development resulting from visitation to an area.

**ecosystem approach** – a way of looking at socio-economic and environmental information based on ecosystem boundaries, rather than town, city, or county boundaries.

**ecosystem-based management** – an approach to making decisions based on the characteristics of the ecosystem in which a person or thing belongs. This concept takes into consideration interactions between the plants, animals, and physical characteristics of the environment when making decisions about land use or living resource issues.

**ecosystem services** - the benefits human populations derive, directly or indirectly, from ecosystem functions (e.g., gas regulation, disturbance regulation, soil formation, pollination, raw materials).

**emergent wetland** – wetlands dominated by erect, rooted, herbaceous plants.

**endangered species** – a federally protected species which is in danger of extinction throughout all or a significant portion of its range.

**environmental education** – education aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution (Stapp et al. 1969).

**Environmental Assessment (EA)** – A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

**Environmental Impact Statement (EIS)** – A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the

environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).

**estuaries** – deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land.

**estuarine wetlands** – "The Estuarine system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semienclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land." (Cowardin et al. 1979)

**exemplary community type** – an outstanding example of a particular community type.

**extirpated** – no longer occurring in a given geographic area.

**federal land** – public land owned by the Federal government, including lands such as National Forests, National Parks and National Wildlife Refuges.

**federally listed species** – a species listed under the federal Endangered Species Act of 1973, as amended, either as endangered, threatened or species at risk (formerly candidate species).

**Finding of No Significant Impact (FONSI)** – A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a Federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).

**forbs** – A flowering plant, excluding grasses, sedges, and rushes, that does not have a woody stem and dies back to the ground at the end of the growing season.

**forested land** – land dominated by trees. For the purposes of the impacts analysis in this document, all forested land was assumed to have the potential to be occasionally harvested, and forested land owned by timber companies was assumed to be harvested on a more intensive, regular schedule.

**forested wetlands** – wetlands dominated by trees.

**geographic information system (GIS)** – a computerized system used to compile, store, analyze and display geographically referenced information. Can be used to overlay information layers containing the distributions of a variety of biological and physical features.

**goal** – descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units.

**grant agreement** – the legal instrument used when the principal purpose of the transaction is the transfer of money, property, services or anything of value to a recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute and substantial involvement between the Service and the recipient is not anticipated.

**habitat fragmentation** – breaking up of a specific habitat into smaller unconnected areas. A habitat area that is too small may not provide enough space to maintain a breeding population of the species in question.

**habitat conservation** – the protection of an animal or plant's habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced.

**habitat** – the place where a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be free of harmful contaminants.

**hydrologic or flow regime** – characteristic fluctuations in river flows.

**Integrated Pest Management (IPM)** - sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.

**interjurisdictional fish** – populations of fish that are managed by two or more states or national or tribal governments because of the scope of their geographic distributions or migrations.

**interpretive facilities** – structures that provides information about an event, place or thing by a variety of means including printed materials, audiovisuals or multimedia materials. Examples of these would be kiosks which offer printed materials and audiovisuals, signs and trailheads.

**interpretive materials** – any tool used to provide or clarify information, explain events or things, or serve to increase awareness and understanding of the events or things. Examples of these would be: (1) printed materials such as brochures, maps or curriculum materials; (2) audio/visual materials such as videotapes, films, slides, or audio tapes; and (3) interactive multimedia materials, such as cd-rom and other computer technology.

**invasive exotic species** – non-native species which have been introduced into an ecosystem, and, because of their aggressive growth habits and lack of natural predators, displace native species.

**grassroots conservation organization** – any group of concerned citizens who come together to actively address a conservation need.

**habitat macrosites** - an area important because of the presence of rare species, ecological communities, and functioning ecosystems.

**issue** – any unsettled matter that requires a management decision; e.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concerns, or the presence of an undesirable resource condition. Issues should be documented, described, and analyzed in the CCP even if resolution cannot be accomplished during the planning process (Service Manual 602 FW 1.4). See also: *key issue*.

**key issue** – an issue meeting the following three criteria:

1. Falls within the jurisdiction of the Service;
2. Can be addressed by a reasonable range of alternatives;
3. Influences the outcome of the project.

**land trusts** – organizations dedicated to conserving land by purchasing land, receiving donations of lands, or accepting conservation easements from landowners.

**limiting factor** – an environmental limitation that prevents further population growth.

**local agencies** – generally referring to municipal governments, regional planning commissions or conservation groups.

**long term protection** – mechanisms such as fee title acquisition, conservation easements or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintenance of the species population at the site.

**management alternative** – a set of objectives and the strategies needed to accomplish each objective (Service Manual 602 FW 1.4).

**management concern** – see *issue*.

**management opportunity** – see *issue*.

**management plan** – a plan that guides future land management practices on a tract of land. In the context of this environmental impact statement, management plans would be designed to produce additional wildlife habitat along with the primary products, such as timber or agricultural crops. See cooperative agreement.

**management strategy** – a general approach to meet unit objectives. A strategy may be broad, or it may be detailed enough to guide implementation through specific actions, tasks, and projects (Service Manual 602 FW 1.4).

**migratory game birds** - birds regulated under the Migratory Bird Treaty Act and state laws, that are legally hunted, includes ducks, geese, woodcock, rails.

**minimum tool rule** - Apply only the minimum impact policy, device, force, regulation, or practice to bring about a desired result. Achieve results using the most “light-handed” approach (Hendee, 1990).

**mission statement** – succinct statement of the unit's purpose and reason for being (Region 7 Planning Staff).

**mitigation** – actions taken to compensate for the negative effects of a particular project. Wetland mitigation usually takes the form of restoration or enhancement of a previously damaged wetland or creation of a new wetland.

**National Environmental Policy Act of 1969 (NEPA)** – requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision making (from 40 CFR 1500).

**National Wildlife Refuge (Refuge)** – “A designated area of land, water, or an interest in land or water within the System, but does not include Coordination Areas.” Find a complete listing of all units of the System in the current *Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service*.

**National Wildlife Refuge System (Refuge System)** – all lands and waters and interests therein administered by the Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish and wildlife, including those that are threatened with extinction.

**National Wildlife Refuge System Mission (mission)** – “The mission of the System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration

of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

**native plant** – a plant that has grown in the region since the last glaciation and occurred before European settlement.

**non-consumptive, wildlife-oriented recreation** – photographing or observing plants, fish and other wildlife.

**non-point source pollution** – nutrients or toxic substances that enter water from dispersed and uncontrolled sites.

**nonforested wetlands** – wetlands dominated by shrubs or emergent vegetation.

**Notice of Intent (NOI)** – a notice that an environmental impact statement will be prepared and considered (40 CFR 1508.22). Published in the Federal Register.

**Objective** – a concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Make objectives attainable, time-specific, and measurable.

**occurrence site** – a discrete area where a population of a rare species lives or a rare plant community type grows.

**old field** – an area that was formerly cultivated or grazed and where woody vegetation has begun to invade. If left undisturbed, it will eventually succeed into a forest. Many old fields occur at sites marginally suitable for crop production or pasturing. Old fields are highly variable in the Northeast, depending on soil, land use history, and management.

**Open Marsh Water Management (OMWM)** - a mosquito control technique that improves habitat conditions in salt marshes for mosquito-eating fish by creating ponds that will maintain the fish between lunar tides.

**palustrine wetlands** – "The Palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0%." (Cowardin et al. 1979)

**Partners for Wildlife Program** – a voluntary habitat restoration program undertaken by the Fish and Wildlife Service in cooperation with other governmental agencies, public and private organizations, and private landowners to improve and protect fish and wildlife habitat on private lands while leaving the land in private ownership.

**partnership** – a contract or agreement entered into by two or more individuals, groups of individuals, organizations or agencies in which each agrees to furnish a part of the capital or some in-kind service, i.e., labor, for a mutually beneficial enterprise.

**population monitoring** – assessments of the characteristics of populations to ascertain their status and establish trends related to their abundance, condition, distribution, or other characteristics.

**prescribed fire** – the application of fire to wildland fuels to achieve identified land use objectives (Service



Manual 621 FW 1.7), either from natural or intentional ignition.

**priority public uses** – see *wildlife-dependant recreational uses*.

**private land** – land that is owned by a private individual, group of individuals, or non– governmental organization.

**private landowner** – any individual, group of individuals or non–governmental organization that owns land.

**private organization** – any non–governmental organization.

**Proposed Action** – activities for which an Environmental Assessment is being written; the alternative containing the actions and strategies recommended by the planning team. The proposed action is, for all practical purposes, the draft CCP for the refuge.

**protection** – mechanisms such as fee title acquisition, conservation easements or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintenance of the species population at the site.

**public** – individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in the Service issues and those who do or do not realize that Service decisions may affect them.

**public involvement** – a process that offers impacted and interested individuals and organizations an opportunity to become informed about, and to express their opinions on Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.

**public involvement plan** – broad long term guidance for involving the public in the comprehensive planning process.

**public land** – land that is owned by the local, state, or Federal government.

**rare species** – species identified in Appendix 3–6 as Species of Special Emphasis due to their uncommon occurrence within the watershed.

**rare community types** – plant community types classified as rare by any of the four state Natural Heritage Programs. As used in this environmental impact statement, is inclusive of the exemplary community types. The types are listed in Appendix 3-4.

**Record of Decision (ROD)** – a concise public record of decision prepared by the Federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement as to whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigat CFR 1505.2).

**refuge goals** – descriptive, open-ended and often broad statements of desired future conditions that convey a purpose but do not define measurable units (Writing Refuge Management Goals and Objectives: A Handbook).

**refuge purposes** – the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, a refuge unit, or refuge subunit, and any subsequent modification of the original establishing authority for additional conservation purposes (Service Manual 602 FW 1.4).

**refuge lands** – those lands in which the Service holds full interest in fee title, or partial interest such as easements.

**Refuge Operating Needs System (RONS)** – the Refuge Operating Needs System is a national database which contains the unfunded operational needs of each refuge. We include projects required to implement approved plans, and meet goals, objectives, and legal mandates.

**restoration** – the artificial manipulation of a habitat to restore it to something close to its natural state. Involves taking a degraded grassland and re-establishing habitat for native plants and animals. Restoration usually involves the planting of native grasses and forbs, and may include shrub removal and prescribed burning.

**runoff** – water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface into a water body.

**Service presence** – the existence of the Service through its programs and facilities which it directs or shares with other organizations; the public awareness of the Service as a sole or cooperative provider of programs and facilities.

**species of concern** – Species present in the watershed for whom the Refuge has a special management interest. The following criteria were used to identify “species of concern”:

1. Federally listed as threatened or endangered;
2. migratory bird, especially declining species, Neotropical migrants, colonial waterbirds, shorebirds, or waterfowl;
3. marine mammal;
4. sea turtle;
5. interjurisdictional fish;
6. State-listed as threatened, endangered, or special concern..

**state land** – public land owned by a state such as state parks or state wildlife management areas.

**step-down management plans** – step-down management plans describe management strategies and implementation schedules. Step-down management plans are a series of plans dealing with specific management subjects (e.g., croplands, wilderness, and fire) (Service Manual 602 FW 1.4).

**stopover habitat** – habitat used during bird migration for rest and feeding.

**strategy** – a specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives.

**threatened species** – a federally protected species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**tributary** – a stream or river that flows into a larger stream, river or lake.

**trust resource** – one that through law or administrative act is held in trust for the people by the government. A federal trust resource is one for which trust responsibility is given in part to the federal government through federal legislation or administrative act. Generally, federal trust resources are those considered to be of national or international importance no matter where they occur, such as endangered species and species such as migratory birds and fish that regularly move across state lines. In addition to species, trust resources include cultural resources protected through federal historic preservation laws, nationally important and threatened habitats, notably wetlands, navigable waters, and public lands such as state parks and National Wildlife Refuges.

**unfragmented habitat** – large blocks of unbroken habitat of a particular type.

**unit objective** – desired conditions which must be accomplished to realize a desired outcome. Objectives are the basis for determining management strategies, monitoring refuge accomplishments, and measuring the success of the strategies. Objectives should be attainable and time-specific and may be stated quantitatively or qualitatively (Service Manual 602 FW 1.4).

**universally accessible** – a universally accessible recreation site is designed to accommodate people with physical disabilities. Interpretive materials at such a sight would be accessible to the visually impaired.

**upland** – dry ground; other than wetlands.

**U.S. Fish and Wildlife Service Mission** – our mission is to work with others to “conserve, protect, and enhance fish and wildlife, and their habitat for the continuing benefit of the American people.”

**vernal pool** – depressions holding water for a temporary period in the spring and used by a variety of amphibians for egg laying.

**vision statement** – concise statement of what the unit could be in the next 10 to 15 years (Region 7 Planning Staff).

**visitor center** – a permanently staffed building offering exhibits and interpretive information to the visiting public. Some visitor centers are co-located with refuge offices, other include additional facilities such as classrooms or wildlife viewing areas.

**visitor contact station** – compared to a visitor center, a contact station is a smaller facility which may not be permanently staffed.

**watchable wildlife** – all wildlife is watchable. A watchable wildlife program is a strategy to help maintain viable populations of all native fish and wildlife species by building an effective, well-informed constituency for conservation. Watchable wildlife programs are tools by which wildlife conservation goals can be met while at the same time fulfilling public demand for wildlife recreational activities (other than sport hunting, trapping or sport fishing).

**watershed** – the geographic area within which water drains into a particular river, stream or body of water. A watershed includes both the land and the body of water into which the land drains.

**wet meadow** – meadows located in moist low-lying areas, most often dominated by large colonies of reed

canary grass. They are often created by collapsed beaver dams and exposed old pond bottoms. Salt marsh meadows are subject to daily coastal tides.

**wetlands** – The U.S. Fish and Wildlife Service's definition of wetlands states that "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water." (Cowardin et al 1979)

**wilderness** - The legal definition is found in the Wilderness Act of 1964 Section 2c (P.L. 88-577): "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." This legal definition places wilderness on the "untrammelled" or "primeval" end of the environmental modification spectrum. Wilderness is roadless lands, legally classified as component areas of the National Wilderness Preservation System, and managed so as to protect its qualities of naturalness, solitude and opportunity for primitive types of recreation (Hendee, 1990).

**wilderness management** - Government and citizen activity to identify–within the constraints of the Wilderness Act–goals and objectives for classified wildernesses and the planning, implementation, and administration of policies and management actions to achieve them. Involves the application of guidelines and principles to achieve established goals and objectives, including management of human use and influences to preserve naturalness and solitude (Hendee, 1990).

**wildlife-dependent recreational use** – "A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation." These are the six priority public uses of the System as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife. We also will consider these other uses in the preparation of refuge CCPs, however, the six priority public uses always will take precedence.

**wildlife management** – the practice of manipulating wildlife populations, either directly through regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors.



# Appendix K

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# Appendix L

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## Appendix M

### Land Protection Plan

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## **A. Introduction**

The U.S. Fish and Wildlife Service is currently completing its Comprehensive Conservation Planning Process for the Edwin B. Forsythe National Wildlife Refuge (NWR). In the resulting Comprehensive Conservation Plan (CCP), the “Action Alternative” that the Service has selected includes expanding the Edwin B. Forsythe NWR acquisition area.

The Purpose of this Land Protection Plan (LPP) is to provide landowners and municipal, county and state officials an outline of the Service’s policies, priorities and potential methods for protecting the land within these refuge expansion areas.

## **B. Project Description**

The Edwin B. Forsythe NWR is located in Ocean, Burlington and Atlantic Counties, New Jersey. The refuge expansion areas include a mixture of marshes, forested wetlands, upland forests and upland fields. The refuge expansion areas encompass 3,348 acres, including 792 acres in Lacey Township, 95 acres in Stafford Township, 635 acres in Eagleswood Township, 106 acres in Little Egg Harbor Township, 475 acres in the City of Port Republic, and 1,245 acres in Galloway Township.

The refuge expansion areas are a subset of the Land Protection Focus Areas contained in the Revised Draft CCP. These Focus Areas encompass approximately 17,000 acres. In the Revised Draft CCP, the Service proposed to acquire 11,500 of these 17,000 acres. We have since reduced the acquisition target to the 3,348 acres included in the refuge expansion areas. The reasons for the substantial reduction in the amount of Service land acquisition are outlined in section **D**.

## **C. Threats to Resources**

Because of increasing development pressure throughout the central Jersey Coast, especially in the Barnegat Bay region and Atlantic County, many citizens who attended the 11 public meetings held at the start of the CCP process emphasized the need for expanding land acquisition. Barnegat Bay is a National Estuary Program area. The wetlands of the Edwin B. Forsythe NWR are one of seventeen Wetlands of International Importance designated in the United States under the Ramsar Convention. The refuge is a unit of the Western Hemisphere Shorebird Reserve Network (WHSRN). The Jacques Cousteau National Estuary Research Reserve overlays much of the refuge.

## **D. Proposed Action and Objectives**

The Service proposes to acquire 3,348 additional acres to provide long-term protection to the numerous species of shorebirds, neotropical migratory landbirds, waterfowl, long-legged waders, raptors, finfish and shellfish, and threatened and endangered species. The objectives are to protect:

1. Known sites of threatened or endangered species and communities;
2. Areas important to the ecological health of lands already owned (e.g., to ensure intact ecosystem processes, protect the quality and quantity of water for wetlands, provide habitat corridors between existing conservation lands, or create contiguous areas of sufficient size to protect viable populations);
3. Areas important for priority wildlife species (e.g., critical stopover habitat for migrating birds of concern);
4. Areas identified as priority sites for protection by other conservation organizations; and
5. Areas still viable for conservation protection (i.e., not already developed).

The following are some of the reasons for the substantial reduction in the expanded refuge acquisition area.

1. There are State Forest or Park or Wildlife Management Area properties within, or immediately adjacent to, some of the lands within the Land Protection Focus Areas:

- Little Egg Harbor Township portion of the Westecunk Creek Land Protection Focus Area,
- Mill Branch/Tuckerton Creek Land Protection Focus Area
- Sims Property Land Protection Focus Area

(There are some State-owned properties within the expanded refuge area that the Service does propose to purchase, for example, in the Eagleswood Township portion of the Westecunk Creek Focus Area and in the Galloway Township portion of the Nacote Creek Focus Area.)

2. There are township open space properties and deed restricted properties within the Nacote Creek Land Protection Focus Area.

3. Some of the Land Protection Focus Areas, either totally or in part, are no longer suitable for consideration as refuge or other conservation types of property, because they are being developed or have already been developed:

- Berkeley Township portion of the South Cedar Creek Land Protection Focus Area,
- Waretown and Oyster Creeks Land Protection Focus Area,
- Pancoast Area Land Protection Focus Area,
- Otis Bog section of the Ballenger Creek and Otis Bog Creek Land Protection Focus Area, and
- Nacote Creek Land Protection Focus Area.

## **E. Protection Alternatives**

This section describes and evaluates four land protection alternatives to protect the biological resources in the Edwin B. Forsythe NWR Land Protection Focus Area shown on Maps 2-8a, 2-8b, 2-8c, and 2-8d in the Edwin B. Forsythe and Cape May National Wildlife Revised Draft Comprehensive Conservation Plan and Environmental Assessment (U.S. Fish and Wildlife Service, July 2000). It is the Service's policy to acquire only the minimum interest necessary to meet the Refuge objectives.

### **1. No Action**

Under the "No Action" alternative, the Service would rely on existing federal, State and local land use regulations to preserve the wildlife values of the Land Protection Focus Areas. We would provide technical assistance on federally regulated species, particularly through Section 7 consultation provided under the Endangered Species Act. Under this alternative, most of the Land Protection Focus Areas would probably be developed for residential homes and associated recreational facilities.

### **2. Acquisition and Management by Others**

Under this alternative, the Service would encourage other organizations and agencies, such as the New Jersey Department of Environmental Protection, the Atlantic County and Ocean County Open Space Programs and the New Jersey Conservation Foundation, to protect and manage resources within the Land Protection Focus Areas. The Service would provide technical or resource support as needed. Each of the above agencies or organizations already owns lands within the Land Protection Focus Areas.

### **3. Less than Fee Acquisitions**

Under this alternative, the Service would protect and manage land through conservation easement. An easement is ownership of certain rights to a property, for example, development rights. Easements can be purchased for a set period of time or in perpetuity. This method of protection allows lands to remain in private ownership, while allowing the Service control over the management of the land. Once purchased, an easement is a legal restriction on the use of a property, and is binding even if the ownership changes. For this reason, conservation easements generally decrease the value of the land and decrease tax revenue.

To meet the refuge goal of providing long term protection to the biological resources, any conservation easement the Service acquires must: 1) preclude destruction or degradation of habitat, and 2) allow the Service to adequately manage use of the area. Usually, this means purchasing the development right to the property in perpetuity. On the east coast, development rights often amount to 80 to 95% of the land cost. The Service will use conservation easements where they are cost-efficient or where owners of important habitats do not wish to sell in fee title.

### **4. Fee Acquisition**

Under this alternative, the Service would protect the properties through acquisition of all interest in land. This would ensure the long term protection of the resources and allow the Service to fully manage the habitats to benefit Trust resources.

The Service makes Revenue Sharing payments on lands owned in fee. These annual payments to local municipalities are intended to offset local tax losses resulting from federal land ownership. Revenue Sharing payments can be as high as 3/4% of the appraised land value.

## **F. Acquisition Alternatives**

The Secretary of the Interior is authorized to acquire full or partial interests in land via direct purchase, donation, exchange, or transfer. A brief description of each method follows.

### **1. Purchase**

This is the most direct means of obtaining fee title or an interest in land. The Service negotiates the sale of some or all rights to a property from a willing seller. Lands are purchased with Land and Water Conservation Fund, Migratory Bird Conservation Fund, or donated funds. In all acquisitions, the Service is required by Public Law 91-646, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, to offer fair market value as determined by an approved appraisal that meets professional standards and federal requirements. The Act further entitles landowners, tenants, and others to certain payments related to relocation, if they are displaced by a federal land acquisition program. These entitlements include housing differential, moving expenses, and other incidental expenses associated with selling the property. These payments are in addition to the purchase price of the property and are not taxable under federal tax laws. The Service provides relocation advisory services to all persons displaced from their lands by acquisition for Refuge purposes.

### **2. Donation**

A citizen or private organization may wish to make a gift of land or interests in land to the Service for wildlife purposes. Aside from the cost factor, these acquisitions are no different from purchases.



### 3. Exchange

The Service may exchange lands under Service ownership for land having greater habitat or wildlife value. Inherent in the exchange concept is the requirement to get dollar value for dollar value. Exchanges are attractive in that they usually do not increase federal land holdings or require funds for purchase, but they may be very labor intensive and take a long time to complete.

### 4. Transfer

Lands may be transferred to the Service from another federal agency. There are no federally-owned properties within the proposed refuge expansion areas.

### 5. Condemnation

As a federal agency, the Service does have the power of eminent domain. However, the Service has a strict policy of acquiring land only from willing sellers, and condemnations are extremely rare. In certain circumstances, where the Service and the willing seller cannot reach an agreement on the value of the property, or where the rightful owner of a property cannot be determined, condemnation may be used to determine fair market value or to clear title. In these “friendly condemnations,” the Service will only initiate the condemnation process at the request of a willing seller or a town, as in the latter case.

## G. Coordination

The Land Protection Focus Areas were developed through the CCP in consultation with federal and State agencies, federal, State, County and local elected officials, private organizations, and private citizens. This planning process started in August 1996. We held eleven public meetings on the CCP during the fall of 1996. We held an “Alternatives” workshop in April 1997. We released a Draft CCP and Environmental Assessment for 45 days of review and comment in the Spring of 1999, and released a Revised Draft CCP and Environmental Assessment for 30 days of review and comment in Summer of 2000. A Finding of No Significant Impact (FONSI) was released in February 2001.

The Draft Land Protection Plan was mailed to all the landowners within the proposed expansion area in December 2001. The Draft LPP was also mailed to each of the six municipalities (Lacey, Stafford, Eagleswood, Little Egg Harbor, Port Republic, and Galloway) and the two counties (Atlantic and Ocean) containing the proposed refuge expansion areas.

During the 30-day public comment period, which ended January 21, 2002, eleven private landowners who owned land within the proposed expansion area contacted the refuge office. All eleven persons expressed an interest in selling their property to the Service. One private landowner within the proposed expansion area contacted the refuge office one day after the close of the 30-day public comment period. He said that he was not interested in selling his property to the Service now, but might be interested in donating the property to the Service in the future.

The Refuge Manager spoke with officials in all six municipalities and the two counties concerning the Draft LPP.

The Refuge Manager spoke with the Lacey Township Administrator. There is a proposal to build an adult community on a property within the proposed expansion area. The Administrator was concerned that the State land use regulatory agency might use the inclusion of that property within the approved refuge acquisition area as a reason to deny necessary State approvals for development. Service policy is to work only with willing sellers. Lands within an approved refuge acquisition boundary are subject only to the same Federal, State and local laws and regulations as properties outside an approved refuge acquisition boundary. The National Wildlife Refuge System does not use the inclusion of a property within an approved refuge acquisition area as a reason to oppose development proposals for such a property, because it is Service policy to work with willing sellers.

The Refuge Manager spoke with the Stafford Township Director of Community Development. She expressed approval of the new refuge acquisition boundary in that township.

The Refuge Manager spoke with the Mayor of Eagleswood and the Administrator of Little Egg Harbor, respectively. Neither individual expressed any concerns with the Draft LPP. The Refuge Manager faxed the Draft LPP to the Port Republic City Committee. The Committee made no comments on the proposed expansion.

The Refuge Manager spoke with the Assistant Administrator for Galloway Township. She noted that the amount of the annual Refuge Revenue Sharing payments made to the township decreased from \$70,444 for FY 1999 to \$29,363 for FY 2000. She indicated that the township might not be inclined to support refuge expansion, if such a reduced level of Refuge Revenue Sharing payments were to continue. The actual amount of annual Refuge Revenue Sharing depends on the amount of funding Congress appropriates out of the general treasury to complement the revenues generated from the sale of products off of refuge lands.

The Refuge Manager spoke with officials in the both the Atlantic County and Ocean County planning departments. The counties did express any concerns with the Draft LPP.

## **H. Socioeconomic and Cultural Aspects**

As a result of this planning effort, the Service could acquire up to 3,348 acres of land within the Land Protection Focus Areas. Service acquisition will protect the important watershed areas upstream from lands already owned, as well as several additional sites with rare species, and corridors connecting Refuge lands with other nearby conservation areas. This land will provide more contiguous habitats for migrating birds, and allow for better conservation reserves for populations of non-migratory species. This acquisition will also enable improved management and water quality protection for waters feeding into the Refuge and the Barnegat Bay ecosystem.

Improved land protection through planning and acquisition will result in a variety of economic benefits to local and county governments. Avoiding sprawl and promoting smart growth will reduce the amount of direct and indirect expenses related to development. Acquisition of potentially developable lands will increase the value of remaining developable lands by increasing demand and preserving local ecosystem values. Sustaining the output of ecosystem goods and services is the key to sustainable wildlife resources, sustainable economic activities, and a healthy human population.

Refuge Revenue Sharing payments to municipalities within which the Service acquires property will increase as the Service acquires the additional 3,348 acres. If the Service did acquire all this land (assuming an average appraised value of \$3,000 per acre), the full payment value of Refuge Revenue Sharing payments to local municipalities would increase by \$75,330 per year [3,348 acres X \$3000/acres = \$10,044,000 X .0075 (3/4% of appraised value) = \$75,330]. It should also be noted that refuge lands require very few local services.

Refuge lands will increase protection for cultural resources in the area. Service ownership will protect known cultural resource sites against vandalism, and will protect unidentified and undeveloped cultural resource sites from disturbance or destruction. Service interpretive programs will promote public appreciation for the area's natural and cultural resources.

# I. Acquisition Priorities

The Land Protection Focus Areas were based on the following criteria:

1. Known sites of threatened or endangered species and communities;
2. Areas important to the ecological health of lands already owned (e.g., to ensure intact ecosystem processes, protect the quality and quantity of water for wetlands, provide habitat corridors between existing conservation lands, or create contiguous areas of sufficient size to protect viable populations);
3. Areas important for priority wildlife species (e.g., critical stopover habitat for migrating birds of concern);
4. Areas identified as priority sites for protection by other conservation organizations; and
5. Areas still viable for conservation protection (i.e., not already developed).

Most of the properties within the 3,348-acre expanded refuge acquisition area are privately owned, but there are a substantial number of publicly owned properties (township, county and state) as well. (See **Table 1**.) Within the expanded refuge acquisition boundary, we identified three levels of acquisition priorities based on the above criteria. These priorities do not reflect a landowner's preference to sell the land. Since Service policy is to acquire land only from willing sellers, the order of actual land acquisition will be based on availability, in the priority order listed below. **Table 1** lists parcels within the expanded refuge acquisition area by township tax lot so that landowners can better understand the Service's acquisition priorities and how the proposed Refuge expansion may impact their lands.

**Priority 1:** There are 2,656 acres of priority 1 properties within the refuge expansion area. We would focus our protection efforts on purchasing these properties first. These lands have very high biological and trust resource value, and are crucial for providing connectivity among habitats and natural communities. These lands consolidate and protect the integrity of our trust resources. These lands best safeguard watershed values.

**Priority 2:** There are 361 acres of priority 2 properties within the refuge expansion area. These lands have high biological and trust resource value. These lands are an important link in overall biological resource protection. These lands help protect proposed priority 1 refuge lands; or protect existing refuge lands. These lands contribute to watershed protection.

**Priority 3:** There are 331 acres of priority 3 properties within the refuge expansion area. These lands have somewhat lower biological and trust resource value. These lands would help consolidate ownership for more effective management, or to protect existing refuge lands. These lands contribute to watershed protection.

## Parcel Maps and Tables

The maps in this appendix show the land we own now, the new acquisition boundaries, and the parcels we plan to acquire. Following the maps, tables identify each parcel, its tax map number, its acreage, whether it is publicly or privately owned, and our priority and recommended option for acquiring it.

We have grouped the parcels into Group A, B, and C maps solely to enlarge their display. *Those groupings do not connote priority rankings* (see tables). We plan to acquire either full or partial interest in all the parcels by fee purchase from willing sellers.

A set of tax maps from the townships in the proposed expansion areas follow the maps for each grouping.

*Expanded definitions of each table column head follow.*

**Priority:** ranked on a scale of one to three, with one being our highest priority acquisitions.

**Block and Lot:** taxing authority block and lot numbers.

**Acres:** estimated acreage from town tax maps. Portions of some parcels are included within the current, approved acquisition boundary for Edwin B. Forsythe NWR. For these parcels, we calculated only the expansion acreage.

**Protection type:** We have identified here what we believe, given the information now available, is the minimal level of Service interest needed for project objectives that is also cost-effective. However, as parcels become available in the future, changes may be warranted to ensure we are using the option that best fits the situation at that time (see section E, Protection Alternatives).

**Acquisition type:** purchase, donation, transfer, or exchange (see section F, Acquisition Alternatives).

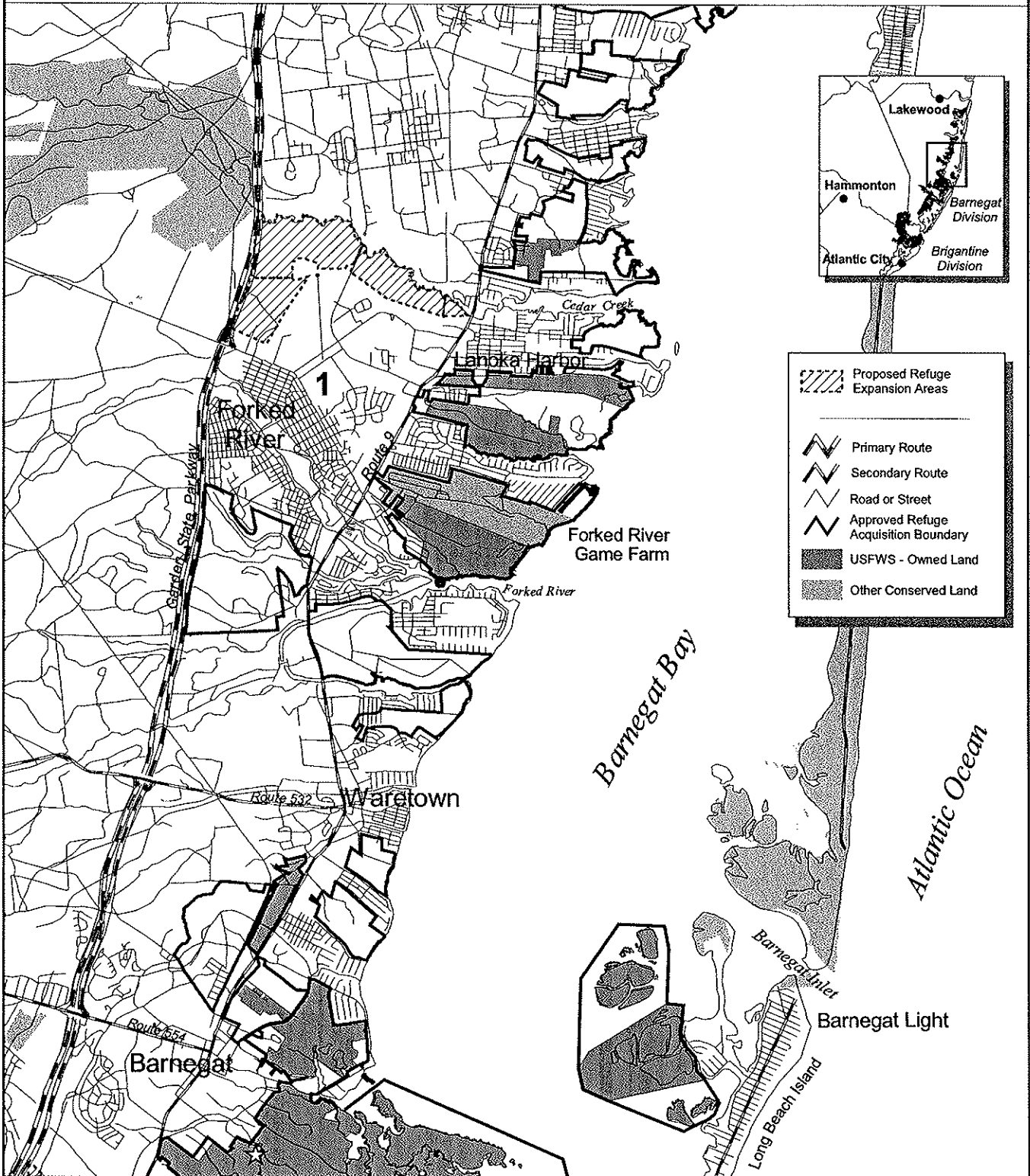
**Ownership:** public or private. Public ownership describes parcels owned by municipalities, state agencies, or federal agencies.

MAP A

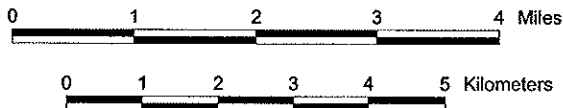
# Proposed Refuge Expansion Areas

## *Edwin B. Forsythe National Wildlife Refuge*

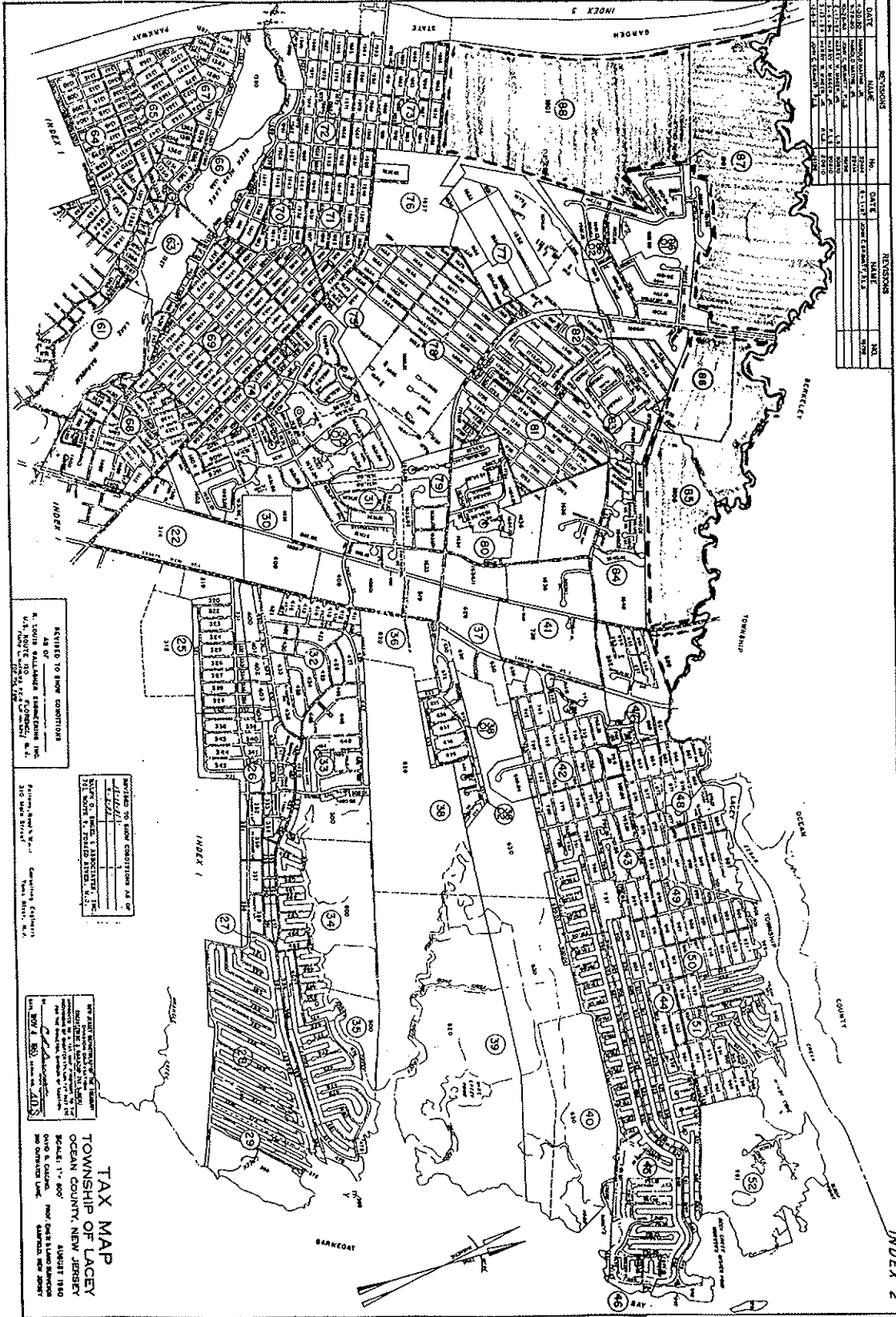
### *Barnegat Division, Ocean County, New Jersey, Group A*



Data Sources:  
USGS - 1:100,000 roads & hydro.  
New Jersey - other protected land.  
USFWS - refuge boundaries &  
other refuge information.  
Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
November 2001.  
This map is for planning purposes only.



- 101-20 101-20 101-20 101-20 101-20 101-20 101-20 101-20 101-20 101-20
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DATE	REVISIONS	NO.	DATE	REVISIONS	NO.
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**TAX MAP**  
TOWNSHIP OF LACEY  
OCEAN COUNTY, NEW JERSEY  
SCALE: 1" = 800'  
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BY: 10/1/80

Map 1

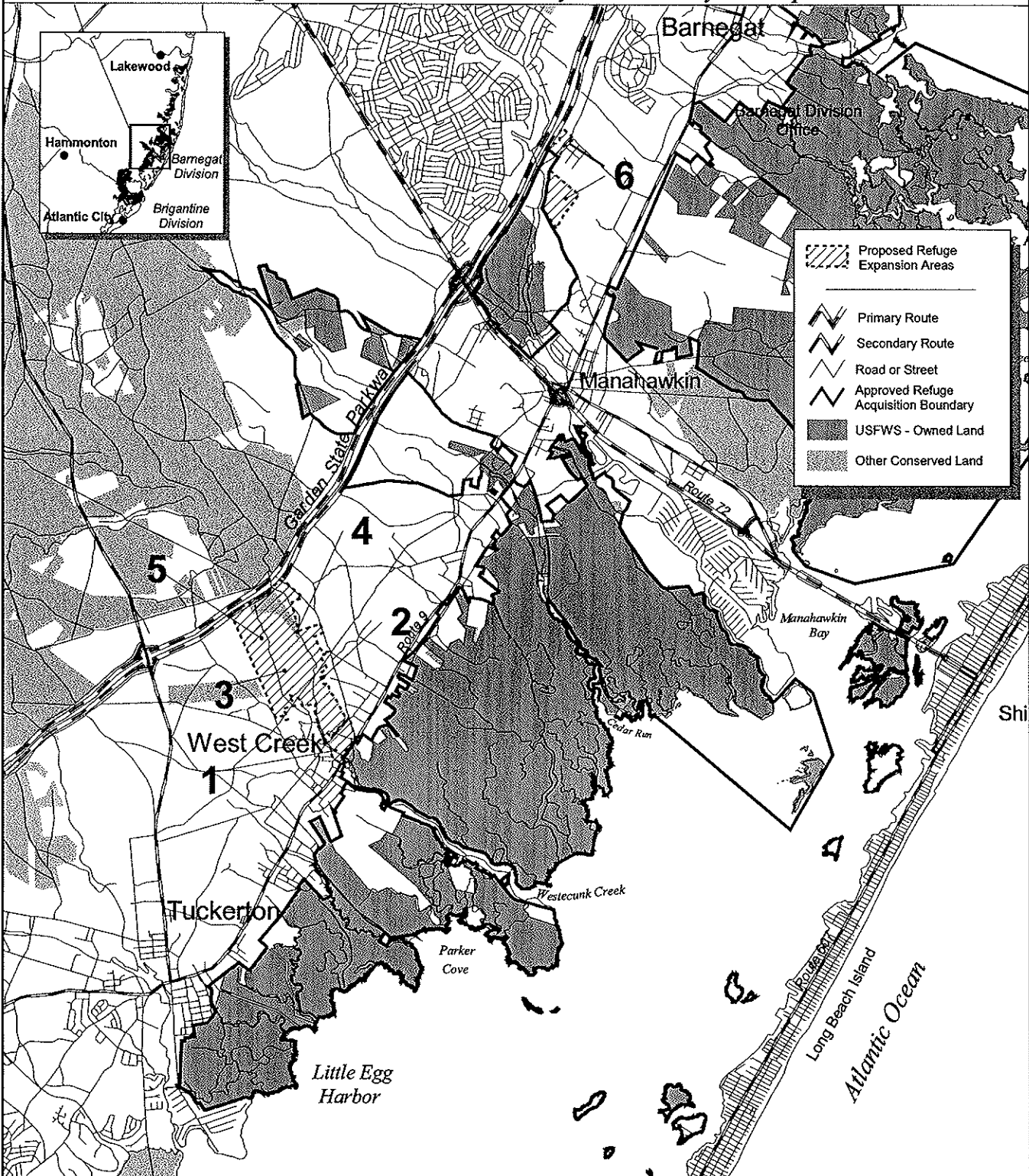
Group A Map 1

MAP B

# Proposed Refuge Expansion Areas

## Edwin B. Forsythe National Wildlife Refuge

### Barnegat Division, Ocean County, New Jersey, Group B



Data Sources:  
USGS - 1:100,000 roads & hydro.  
New Jersey - other protected land.  
USFWS - refuge boundaries &  
other refuge information.  
Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
November 2001.  
This map is for planning purposes only.







- 10-1-84 CHANGED ALPHABETICAL LOTS & BLKS TO NUMERALS
- 11-1-85 REMOVE LOT 11 A B.L.E. 101
- 12-1-85 ADDED OCEAN BLK 100
- 13-1-85 REVISED ALPHABETICAL TO LOT 24, BLOCK 100.
- 14-1-85 REVISED ALPHABETICAL TO LOT 10, BLOCK 100.
- 15-1-85 ADDED OCEAN BLK 100
- 16-1-85 ADDED OCEAN BLK 100
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ADDITIONAL NOTES:  
 1. ALL LOTS 1-100 & BLKS 1-100  
 2. ALL LOTS 101-200 & BLKS 101-200  
 3. ALL LOTS 201-300 & BLKS 201-300  
 4. ALL LOTS 301-400 & BLKS 301-400  
 5. ALL LOTS 401-500 & BLKS 401-500  
 6. ALL LOTS 501-600 & BLKS 501-600  
 7. ALL LOTS 601-700 & BLKS 601-700  
 8. ALL LOTS 701-800 & BLKS 701-800  
 9. ALL LOTS 801-900 & BLKS 801-900  
 10. ALL LOTS 901-1000 & BLKS 901-1000

NO.	DESCRIPTION	DATE
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3	ADDED OCEAN BLK 100	12-1-85
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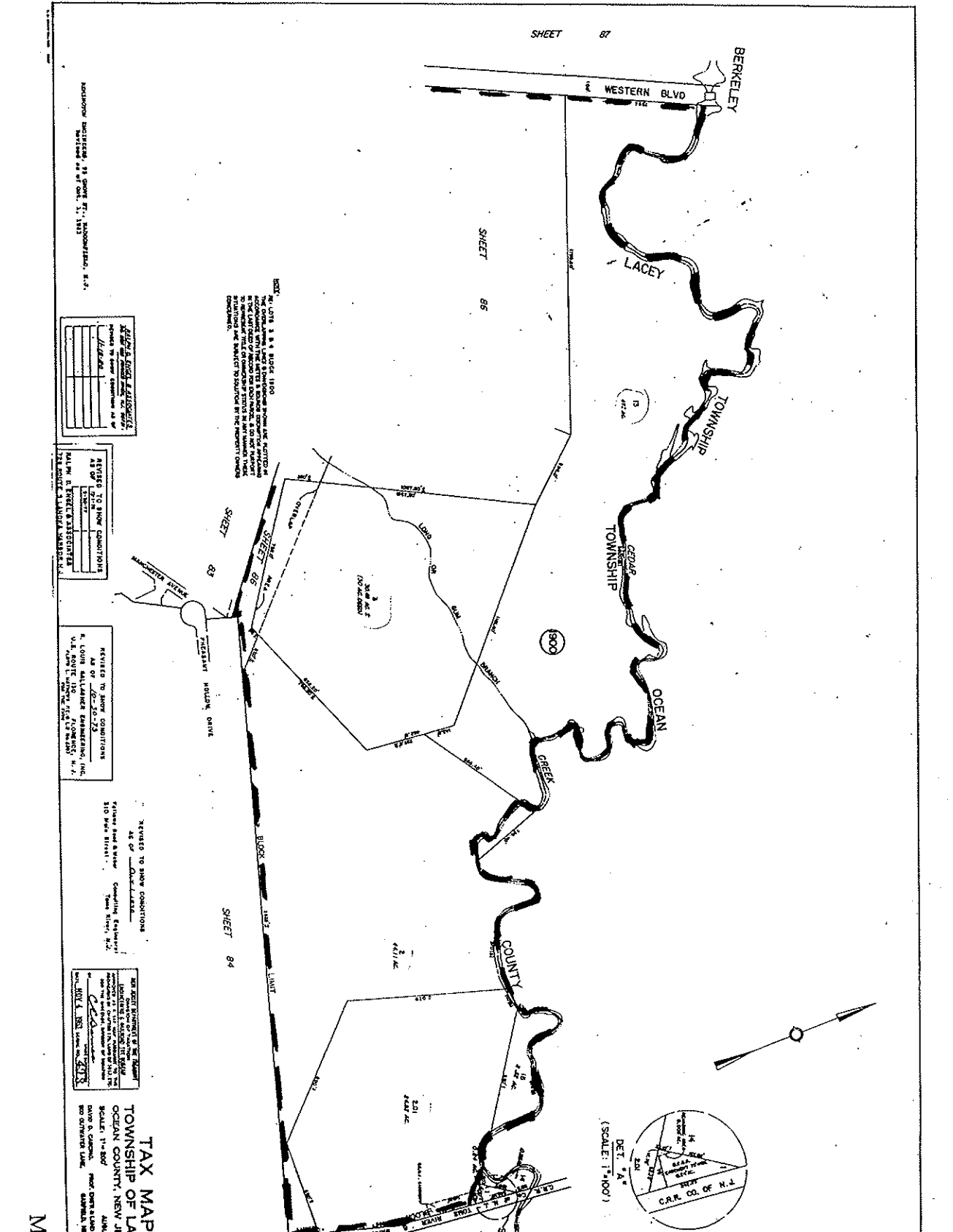
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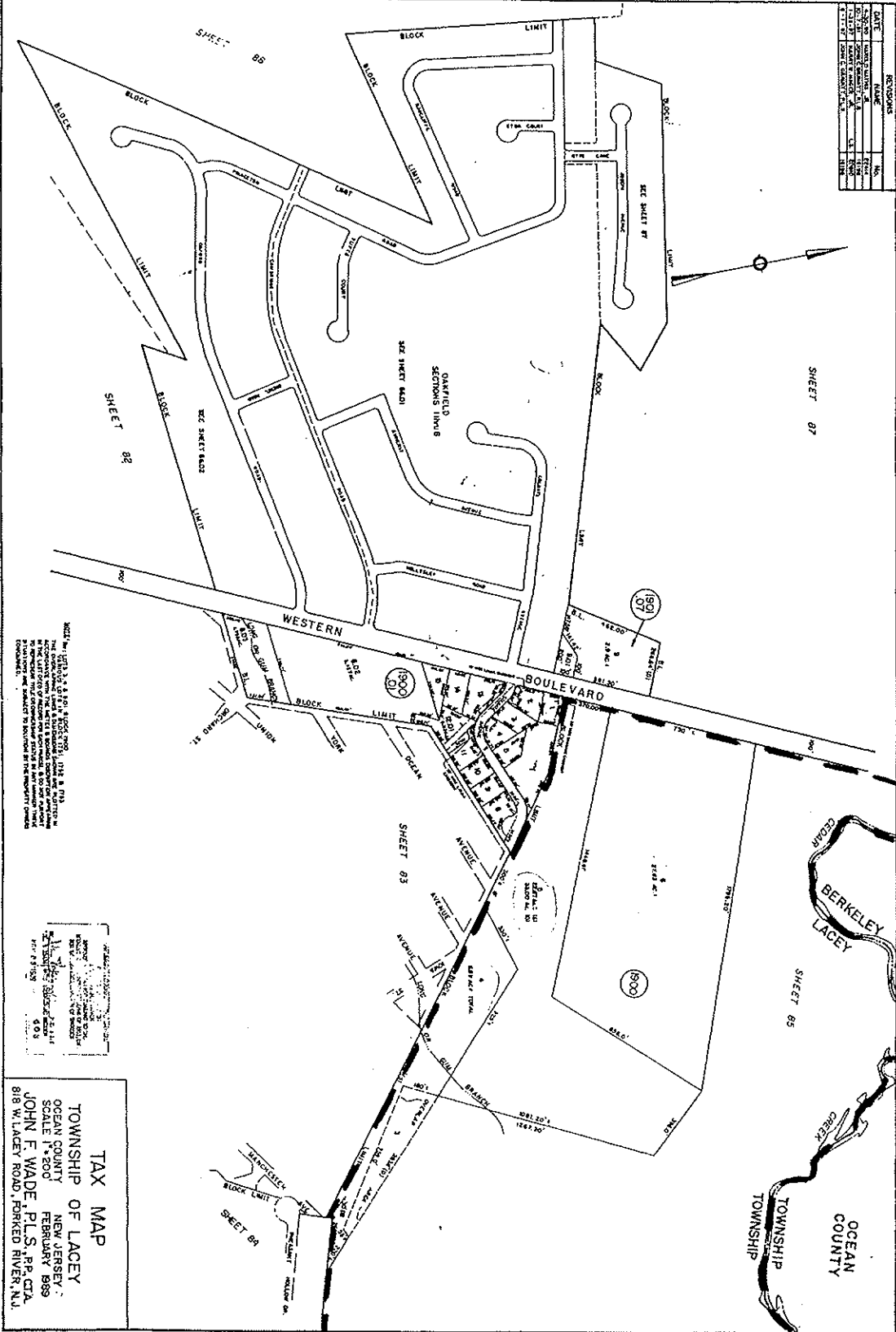
**TAX MAP**  
**TOWNSHIP OF LACEY**  
**OCEAN COUNTY, NEW JERSEY**  
 SCALE: 1"=500'  
 DATE: 10/1/85

Map 2

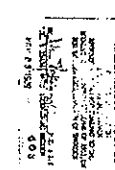


- 1. - 11-87 APPROXIMATE SUBDIVISION OF LOTS 18-22 BLOCK 200 AND LOT 7 BLOCK 190 (SEANBOROUGH LANE)
- 2. - 12-87 BLOCK 190 BLOCK 190 (LOT 18 BLOCK 11 NEW LOT 18 IN 12-87)
- 3. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22
- 4. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22
- 5. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22
- 6. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22

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1. - 12-87 APPROXIMATE SUBDIVISION OF LOTS 18-22 BLOCK 200 AND LOT 7 BLOCK 190 (SEANBOROUGH LANE)  
 2. - 12-87 BLOCK 190 BLOCK 190 (LOT 18 BLOCK 11 NEW LOT 18 IN 12-87)  
 3. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22  
 4. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22  
 5. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22  
 6. - 12-87 APPROXIMATE SUBDIVISION OF BLOCK 190 LOTS 18-22 INTO NEW LOTS 18-22



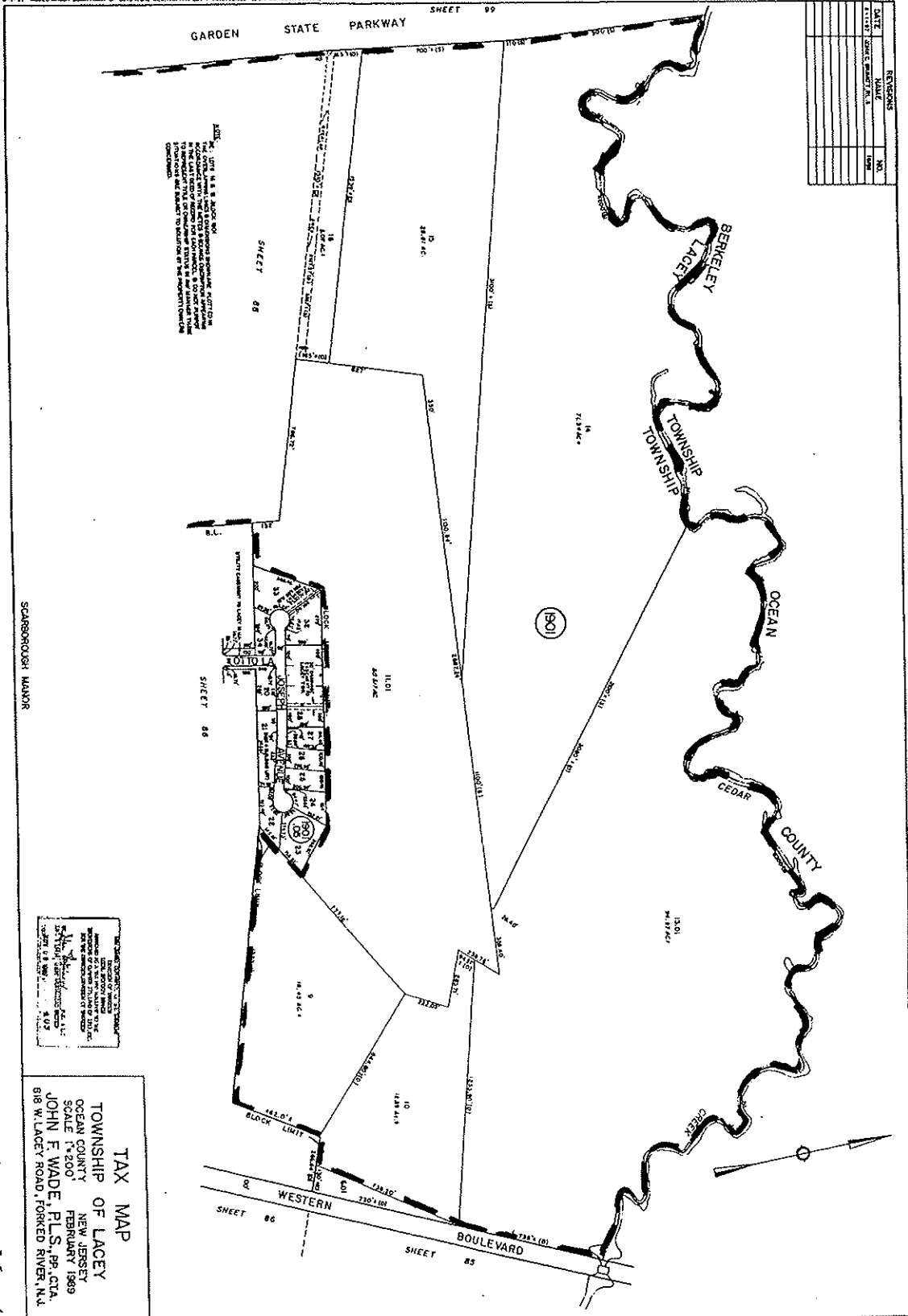
**TAX MAP**  
**TOWNSHIP OF LACEY**  
**OCEAN COUNTY**  
**NEW JERSEY**  
**SHEET 85**  
**JOHN F. WADE, P.L.S., R.P., C.T.A.**  
**818 W. LACEY ROAD, FORKED RIVER, N.J.**

Map 3

Group B Map 3

8-1-87 ADDED MAJOR SUBDIVISION OF LOTS HERE B.L.K. NO. 6 AND LOT 7 B.L.K. 1901.00 (SCARBOROUGH MANOR)

NO.	NAME	REGIONS
1	SCARBOROUGH MANOR	
2		
3		
4		
5		
6		
7		
8		
9		
10		



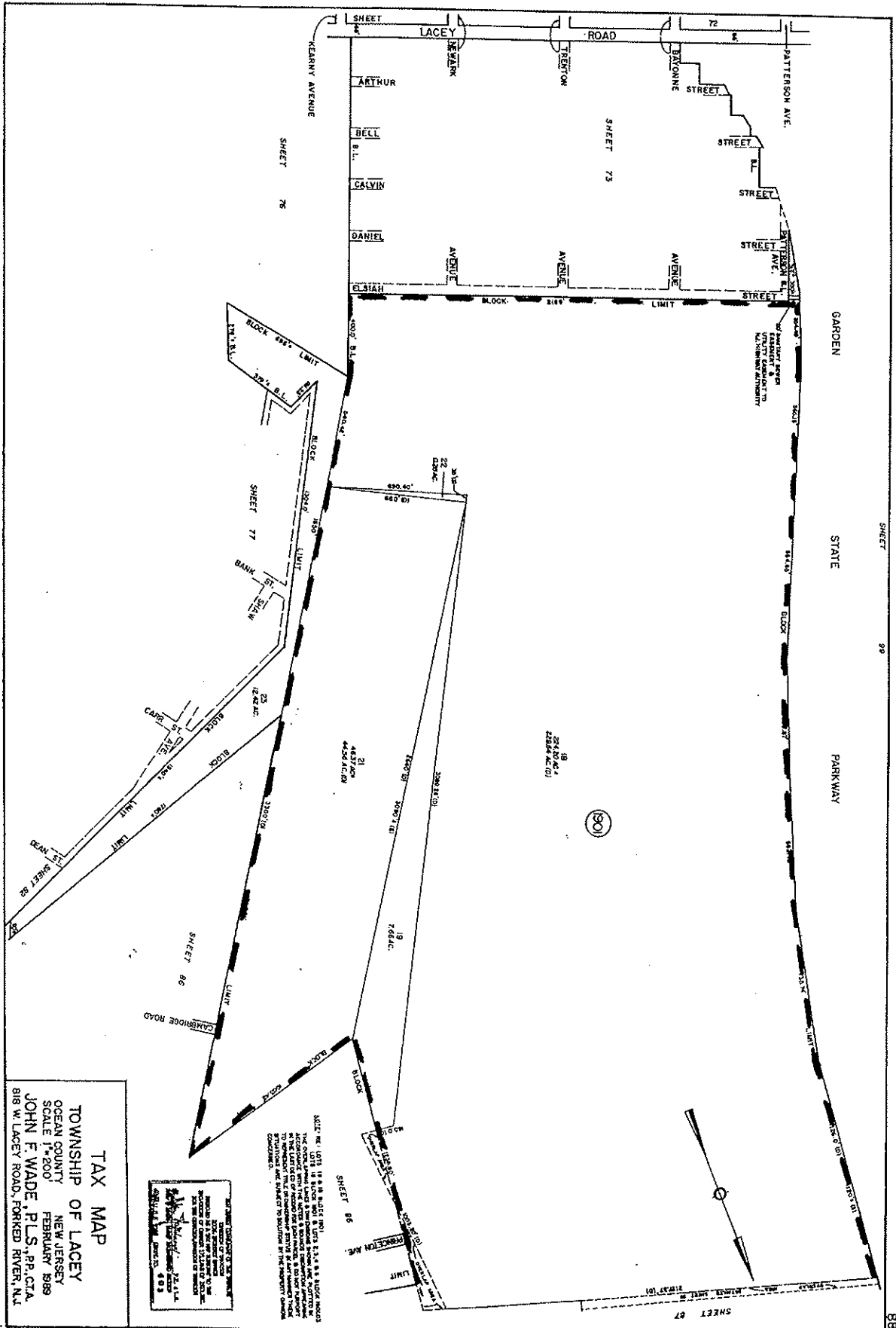
NOTE: THE TOWN OF BERKELEY LACEY HAS A ZONING ORDINANCE WHICH PROVIDES FOR A 10% OVERLAY ZONING DISTRICT. ANY DEVELOPMENT IN THIS DISTRICT MUST BE IN ACCORDANCE WITH THE TERMS OF SUCH ORDINANCE. A ZONING MAP IS AVAILABLE FROM THE TOWN ENGINEER'S OFFICE. FOR MORE INFORMATION, CONTACT THE TOWN ENGINEER'S OFFICE AT 100 W. LACEY ROAD, FORKED RIVER, N.J. 08043.

SCARBOROUGH MANOR

THE TOWN ENGINEER'S OFFICE  
 TOWN OF BERKELEY LACEY  
 100 W. LACEY ROAD  
 FORKED RIVER, N.J. 08043  
 TEL: 908-761-1100  
 FAX: 908-761-1101

**TAX MAP**  
 TOWNSHIP OF LACEY  
 OCEAN COUNTY  
 NEW JERSEY  
 SCALE 1"=200'  
 FEBRUARY 1989  
 JOHN F. WADE, P.L.S., PP.-CTA.  
 618 W. LACEY ROAD, FORKED RIVER, N.J.

Map 4



**TAX MAP**  
**TOWNSHIP OF LACEY**  
 OCEAN COUNTY  
 NEW JERSEY  
 SCALE 1"=200'  
 FEBRUARY 1989  
 JOHN F. WADE, P.L.S., P.P., C.T.A.  
 816 W. LACEY ROAD, FORKED RIVER, N.J.

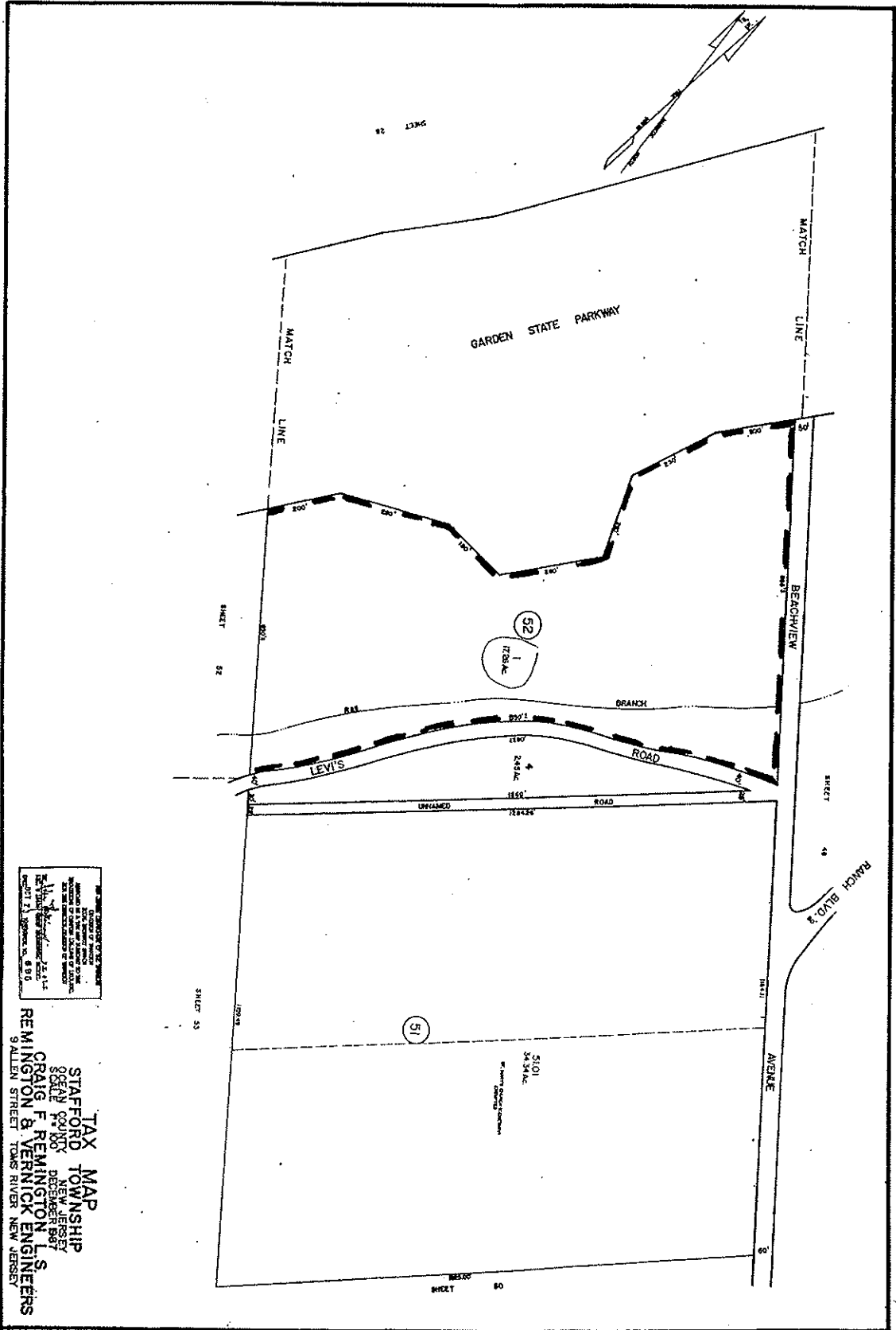
NOTHING TO BE CONSIDERED AS A WARRANTY OR GUARANTEE OF THE ACCURACY OF THE INFORMATION CONTAINED HEREIN. THE USER OF THIS MAP SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION CONTAINED HEREIN. THE USER OF THIS MAP SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION CONTAINED HEREIN.

NOTE: ALL LOTS 12 & 13 IN BLOCK 1001, SHEET 75, ARE SUBJECT TO A DEED OF TRUST TO THE OCEAN COUNTY TAX COLLECTOR. THE OCEAN COUNTY TAX COLLECTOR HAS A LIEN ON THESE LOTS FOR TAXES DUE TO THE COUNTY. THE OCEAN COUNTY TAX COLLECTOR HAS A LIEN ON THESE LOTS FOR TAXES DUE TO THE COUNTY.

Map 5



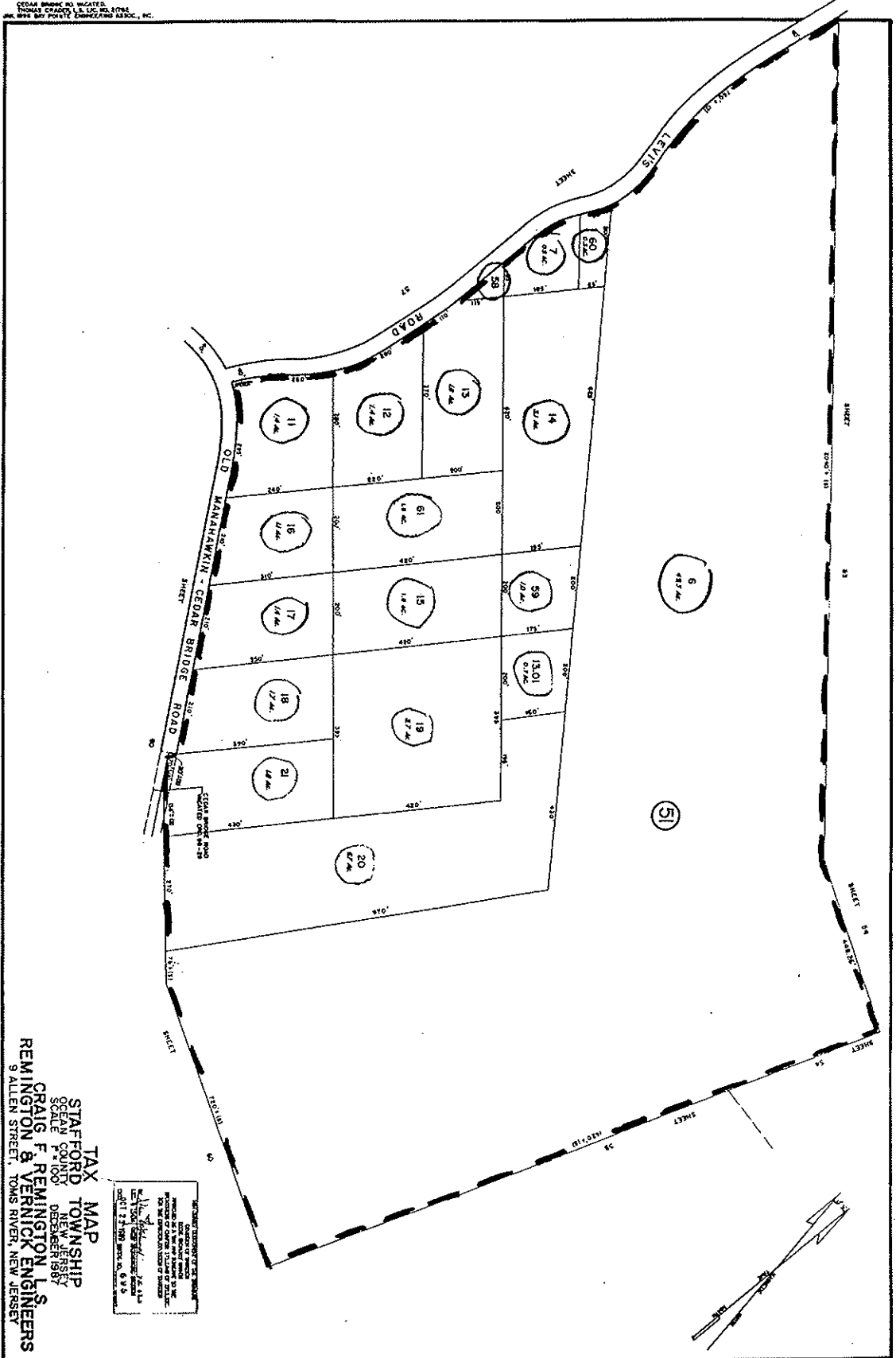
2010 LOT TO BE DESCRIBED  
 MATCHING MAP PORTS ENGINEERING ASSOC., INC.  
 847 NORTH COUNTY ROAD 4430, S.W.  
 ALBANY, GEORGIA 31707  
 478-2444



THE STATE OF GEORGIA  
 DEPARTMENT OF REVENUE  
 TAX MAPS DIVISION  
 2011-2012 FISCAL YEAR  
 2011-2012 FISCAL YEAR  
 2011-2012 FISCAL YEAR  
 2011-2012 FISCAL YEAR

**TAX MAP**  
**STAFFORD TOWNSHIP**  
**2011-2012 FISCAL YEAR**  
**CRAIG F. REMINGTON & SONS**  
**REMINGTON & VERNICK ENGINEERS**  
 9 ALLEN STREET, TOMS RIVER, NEW JERSEY

CECIL BRIDGE SO LOCATED.  
 TOWNSHIP CHARTER OF 1810, REV. 1874.  
 MAP MADE BY POLITY CONSULTING ASSOC., INC.



**TAX MAP**  
**STAFFORD TOWNSHIP**  
**OCEAN COUNTY**  
**NEW JERSEY**  
**DECEMBER 1983**  
**REMINGTON & VERNICK ENGINEERS**  
 9 ALLEN STREET, TOMS RIVER, NEW JERSEY

NOT TO SCALE  
 ALL DIMENSIONS IN FEET AND INCHES  
 DIMENSIONS TO CENTER OF ROAD  
 DIMENSIONS TO CENTER OF RAILROAD  
 DIMENSIONS TO CENTER OF CANAL  
 DIMENSIONS TO CENTER OF DITCH  
 DIMENSIONS TO CENTER OF STREAM  
 DIMENSIONS TO CENTER OF FENCE  
 DIMENSIONS TO CENTER OF CURB  
 DIMENSIONS TO CENTER OF SIDEWALK  
 DIMENSIONS TO CENTER OF DRIVEWAY  
 DIMENSIONS TO CENTER OF WALKWAY  
 DIMENSIONS TO CENTER OF PATHWAY  
 DIMENSIONS TO CENTER OF FENCE LINE  
 DIMENSIONS TO CENTER OF FENCE POST  
 DIMENSIONS TO CENTER OF FENCE RAIL  
 DIMENSIONS TO CENTER OF FENCE BRACKET  
 DIMENSIONS TO CENTER OF FENCE CAP  
 DIMENSIONS TO CENTER OF FENCE POINT  
 DIMENSIONS TO CENTER OF FENCE END  
 DIMENSIONS TO CENTER OF FENCE CORNER  
 DIMENSIONS TO CENTER OF FENCE JUNCTION  
 DIMENSIONS TO CENTER OF FENCE INTERSECTION  
 DIMENSIONS TO CENTER OF FENCE CROSSING  
 DIMENSIONS TO CENTER OF FENCE OVERLAP  
 DIMENSIONS TO CENTER OF FENCE GAP  
 DIMENSIONS TO CENTER OF FENCE BREAK  
 DIMENSIONS TO CENTER OF FENCE HOLE  
 DIMENSIONS TO CENTER OF FENCE PIT  
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 DIMENSIONS TO CENTER OF FENCE DITCH  
 DIMENSIONS TO CENTER OF FENCE TRENCH  
 DIMENSIONS TO CENTER OF FENCE GULLY  
 DIMENSIONS TO CENTER OF FENCE CREEK  
 DIMENSIONS TO CENTER OF FENCE RIVER  
 DIMENSIONS TO CENTER OF FENCE LAKE  
 DIMENSIONS TO CENTER OF FENCE OCEAN

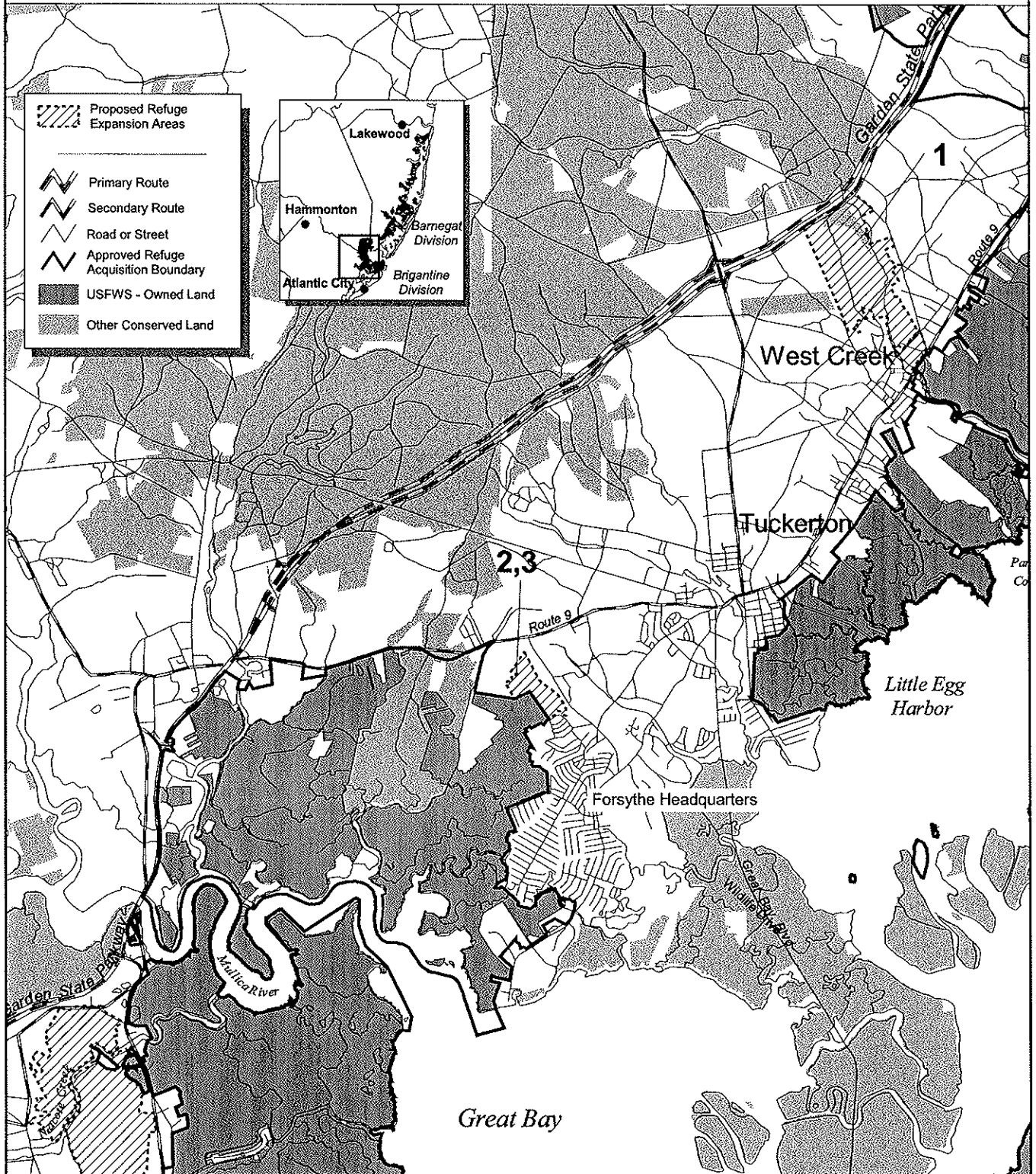
Group B Map 6b

MAP C

# Proposed Refuge Expansion Areas

## *Edwin B. Forsythe National Wildlife Refuge*

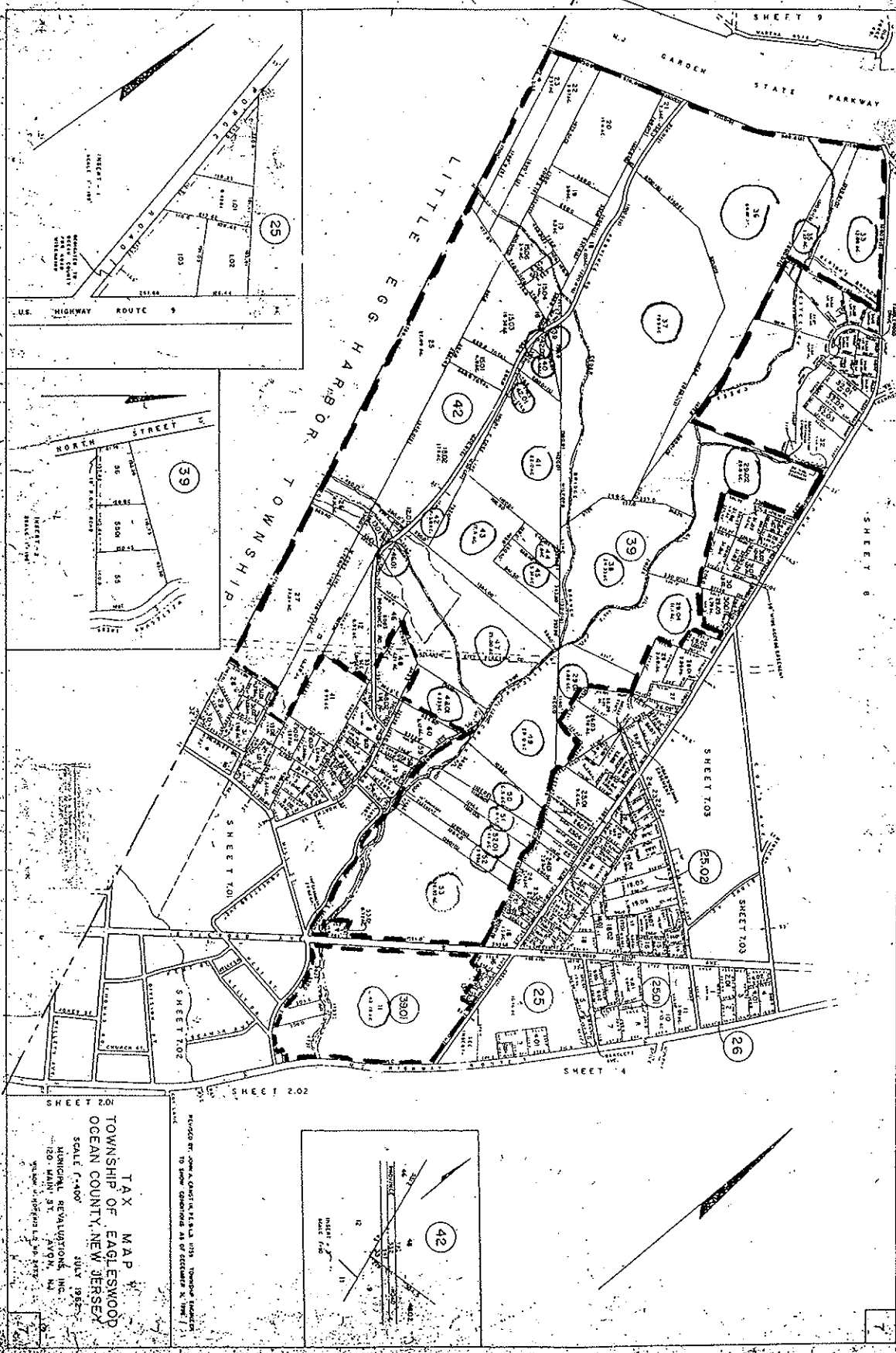
### *Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey, Group C*



Data Sources:  
USGS - 1:100,000 roads & hydro.  
New Jersey - other protected land.  
USFWS - refuge boundaries &  
other refuge information.  
Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
November 2001.  
This map is for planning purposes only.

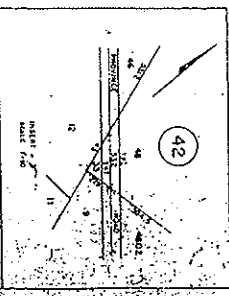






TAX MAP  
 TOWNSHIP OF EAGLEWOOD  
 OCEAN COUNTY, NEW JERSEY  
 SCALE 1"=400'  
 MUNICIPAL REVALUATIONS, INC.  
 120 MAIN ST. AVON, MA.  
 JULY 1985  
 SHOWS 2000 L.S. AS OF 7/1/85

PLACED BY JOHN A. GUSTIN & SONS, TOWNSHIP ENGINEER  
 TO SHOW CHANGES AS OF DECEMBER 31, 1985

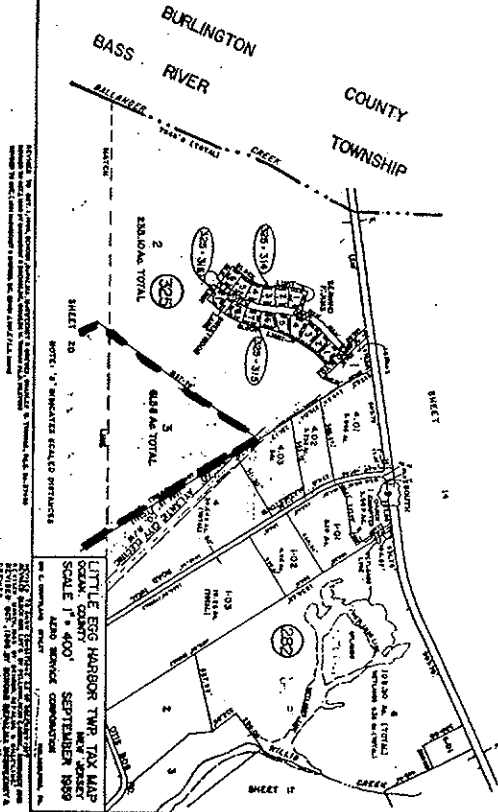


Map 1

REVISIONS		
DATE	NAME	No.
05/14/1959	WILLIAM L. BARRON	1
05/14/1959	WILLIAM L. BARRON	2
05/14/1959	WILLIAM L. BARRON	3
05/14/1959	WILLIAM L. BARRON	4
05/14/1959	WILLIAM L. BARRON	5
05/14/1959	WILLIAM L. BARRON	6
05/14/1959	WILLIAM L. BARRON	7
05/14/1959	WILLIAM L. BARRON	8
05/14/1959	WILLIAM L. BARRON	9
05/14/1959	WILLIAM L. BARRON	10
05/14/1959	WILLIAM L. BARRON	11
05/14/1959	WILLIAM L. BARRON	12
05/14/1959	WILLIAM L. BARRON	13
05/14/1959	WILLIAM L. BARRON	14
05/14/1959	WILLIAM L. BARRON	15
05/14/1959	WILLIAM L. BARRON	16
05/14/1959	WILLIAM L. BARRON	17
05/14/1959	WILLIAM L. BARRON	18
05/14/1959	WILLIAM L. BARRON	19
05/14/1959	WILLIAM L. BARRON	20

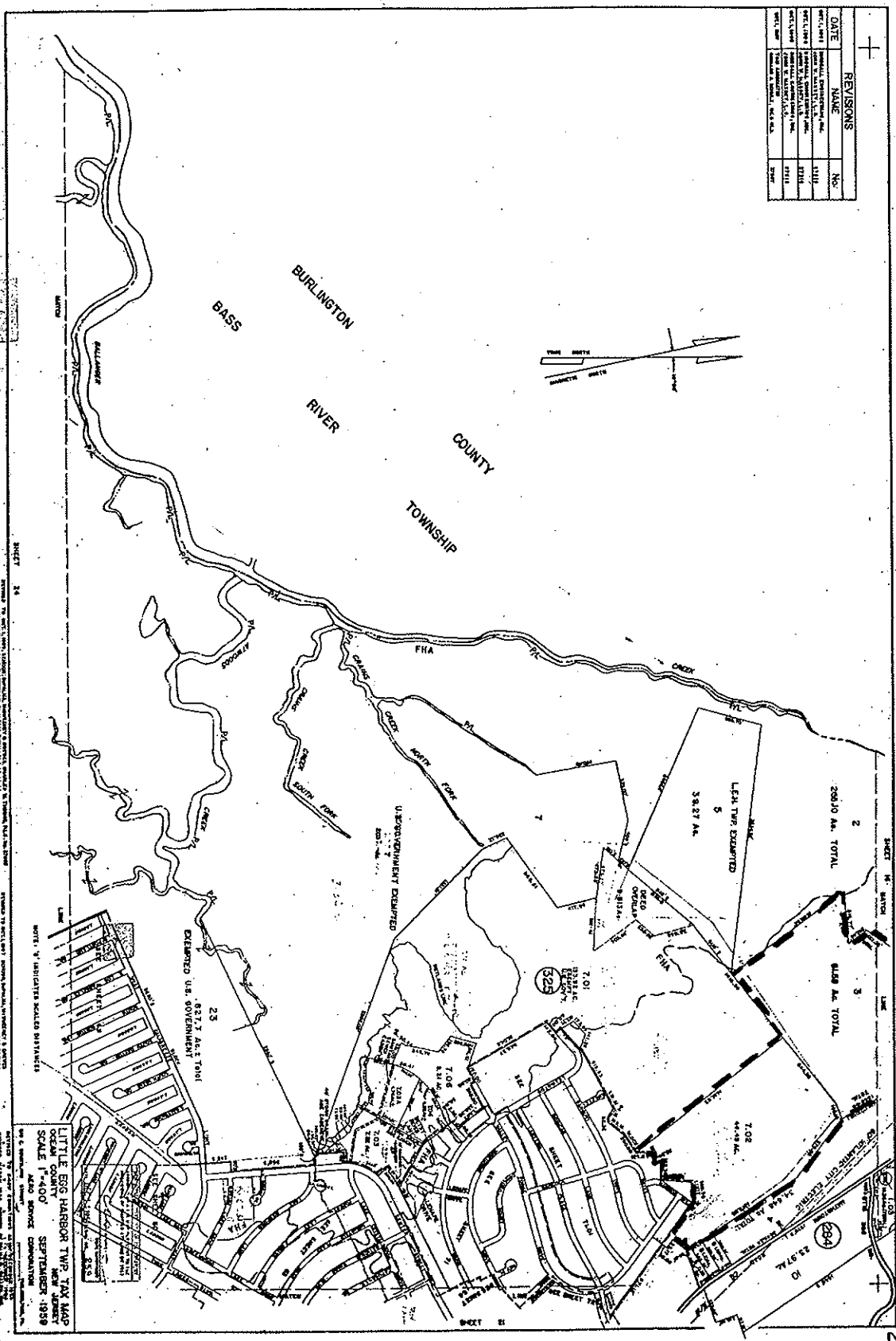
NOTE: THIS MAP IS A REVISION OF THE ORIGINAL MAP AND SHOULD BE USED IN CONNECTION WITH THE ORIGINAL MAP.

WILLIAM L. BARRON  
 1000 N. 10th St.  
 Grand Rapids, Mich. 49503  
 Phone: 883-8838



Map 2

REVISIONS			
DATE	NAME	NO.	
APRIL 1988	REDACTED	1	INITIAL
MAY 1988	REDACTED	2	INITIAL
JULY 1988	REDACTED	3	INITIAL
SEPTEMBER 1988	REDACTED	4	INITIAL
NOVEMBER 1988	REDACTED	5	INITIAL
JANUARY 1989	REDACTED	6	INITIAL
MARCH 1989	REDACTED	7	INITIAL
MAY 1989	REDACTED	8	INITIAL
JULY 1989	REDACTED	9	INITIAL
SEPTEMBER 1989	REDACTED	10	INITIAL
NOVEMBER 1989	REDACTED	11	INITIAL
JANUARY 1990	REDACTED	12	INITIAL
MARCH 1990	REDACTED	13	INITIAL
MAY 1990	REDACTED	14	INITIAL
JULY 1990	REDACTED	15	INITIAL
SEPTEMBER 1990	REDACTED	16	INITIAL
NOVEMBER 1990	REDACTED	17	INITIAL
JANUARY 1991	REDACTED	18	INITIAL
MARCH 1991	REDACTED	19	INITIAL
MAY 1991	REDACTED	20	INITIAL
JULY 1991	REDACTED	21	INITIAL
SEPTEMBER 1991	REDACTED	22	INITIAL
NOVEMBER 1991	REDACTED	23	INITIAL
JANUARY 1992	REDACTED	24	INITIAL
MARCH 1992	REDACTED	25	INITIAL
MAY 1992	REDACTED	26	INITIAL
JULY 1992	REDACTED	27	INITIAL
SEPTEMBER 1992	REDACTED	28	INITIAL
NOVEMBER 1992	REDACTED	29	INITIAL
JANUARY 1993	REDACTED	30	INITIAL



SHEET 24  
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 SHEET 99  
 SHEET 100

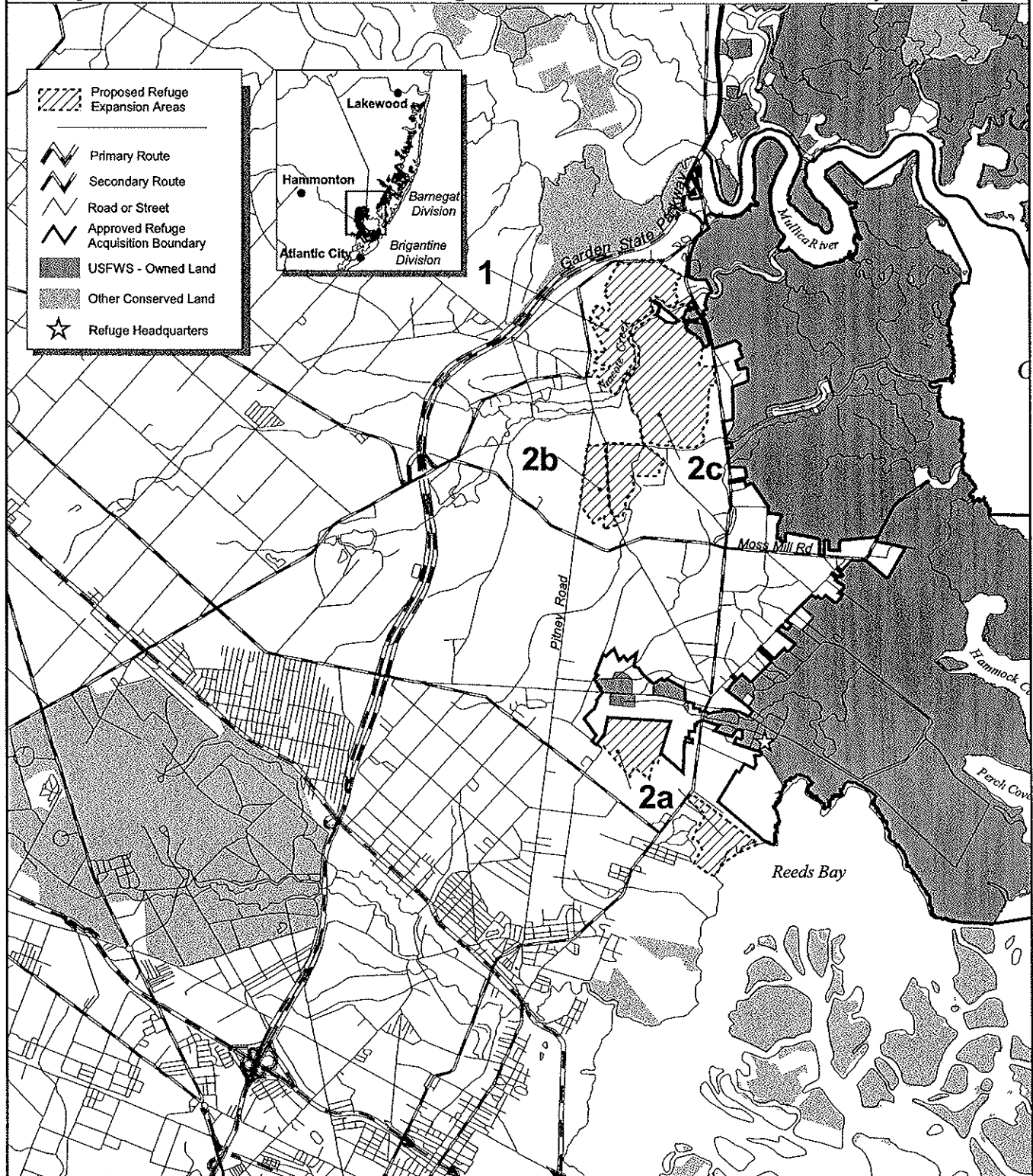
Map 3

MAP D

# Proposed Refuge Expansion Areas

## Edwin B. Forsythe National Wildlife Refuge

Brigantine Division, Atlantic, Burlington and Ocean Counties, New Jersey, Group D

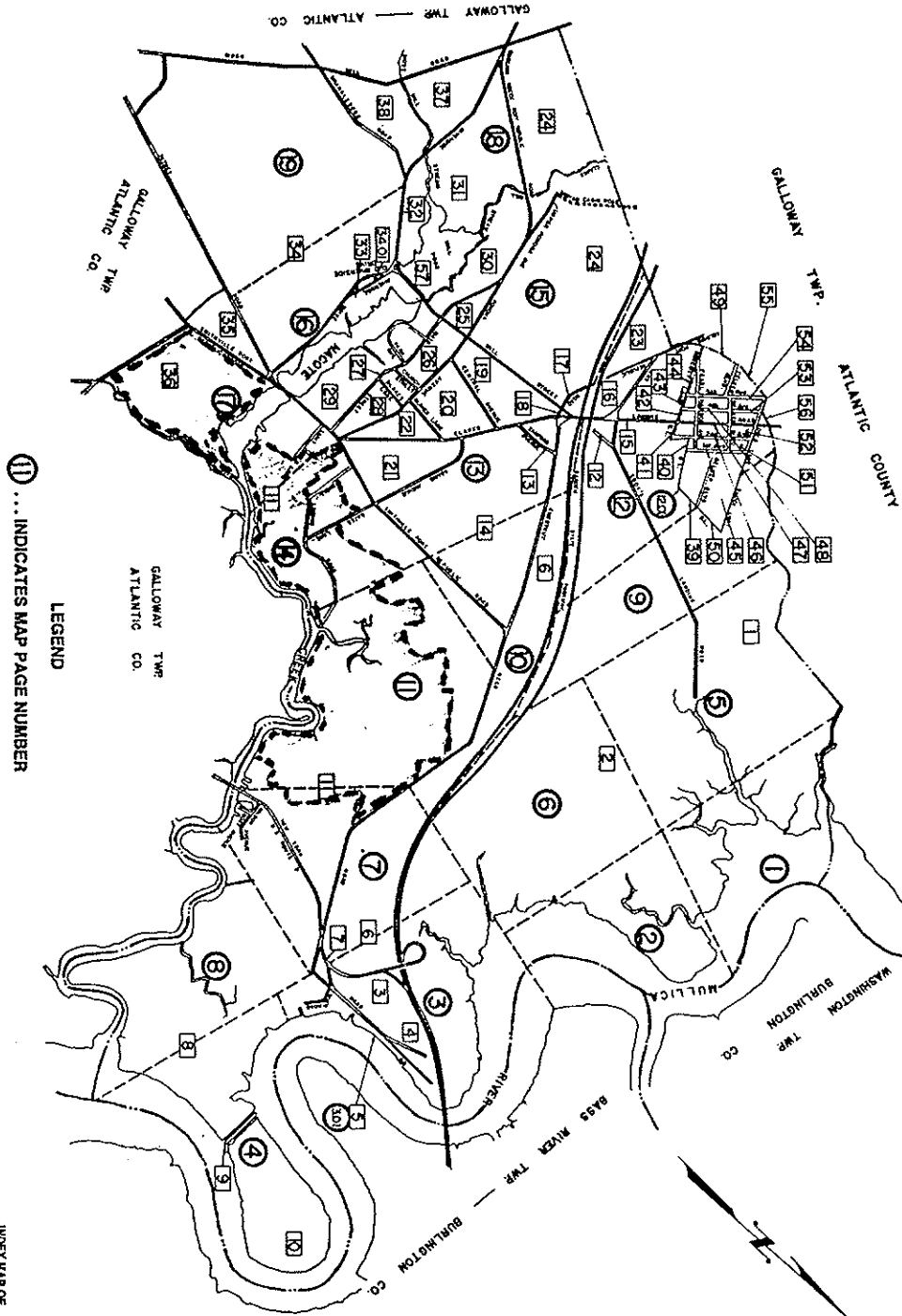


Data Sources:  
USGS - 1:100,000 roads & hydro.  
New Jersey - other protected land.  
USFWS - refuge boundaries &  
other refuge information.  
Map prepared for Jersey Coast Refuges  
Comprehensive Conservation Plan,  
November 2001.  
This map is for planning purposes only.



# Port Republic

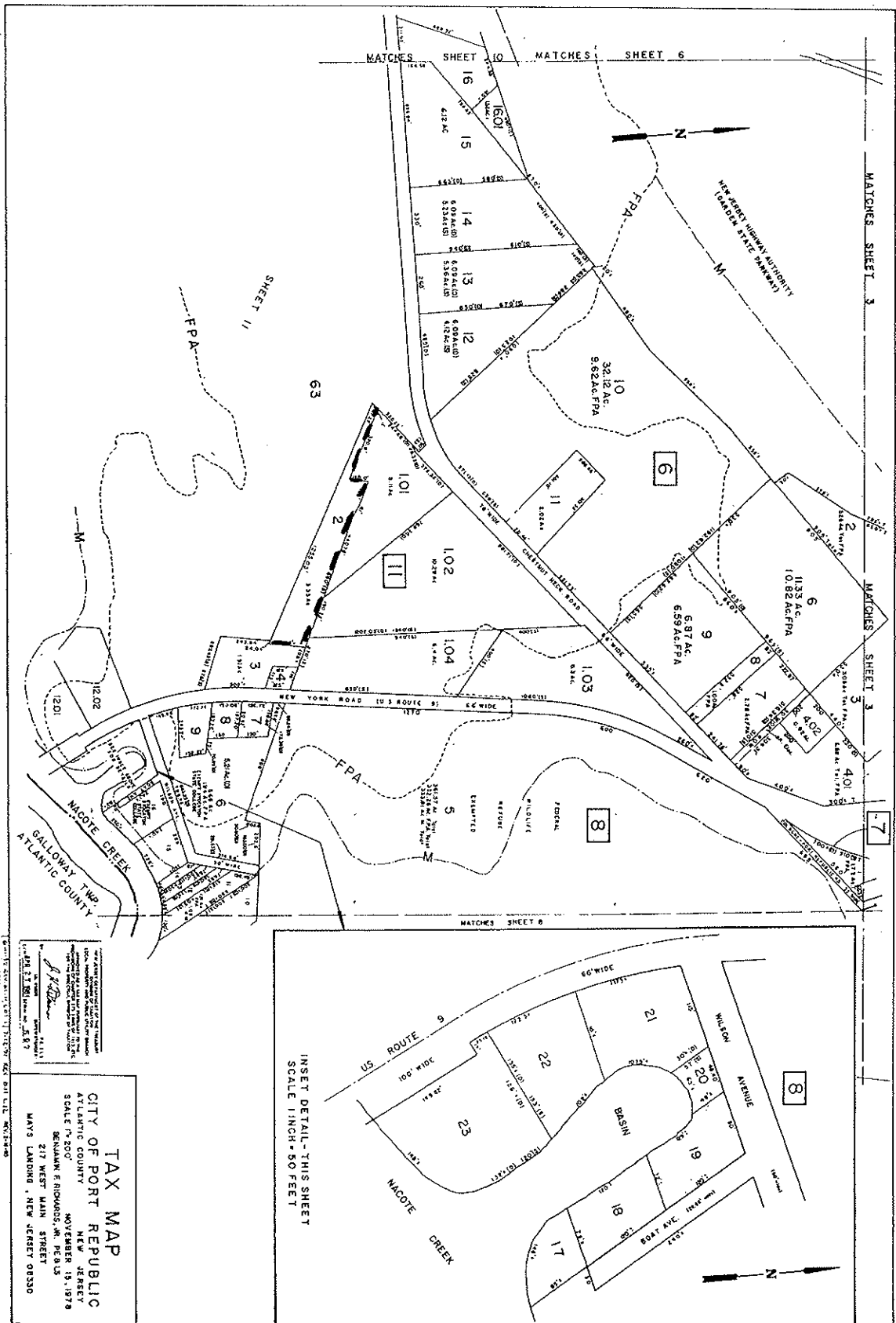
INDEX MAP OF  
PORT REPUBLIC CITY  
ATLANTIC COUNTY, NEW JERSEY



⑪ ... INDICATES MAP PAGE NUMBER

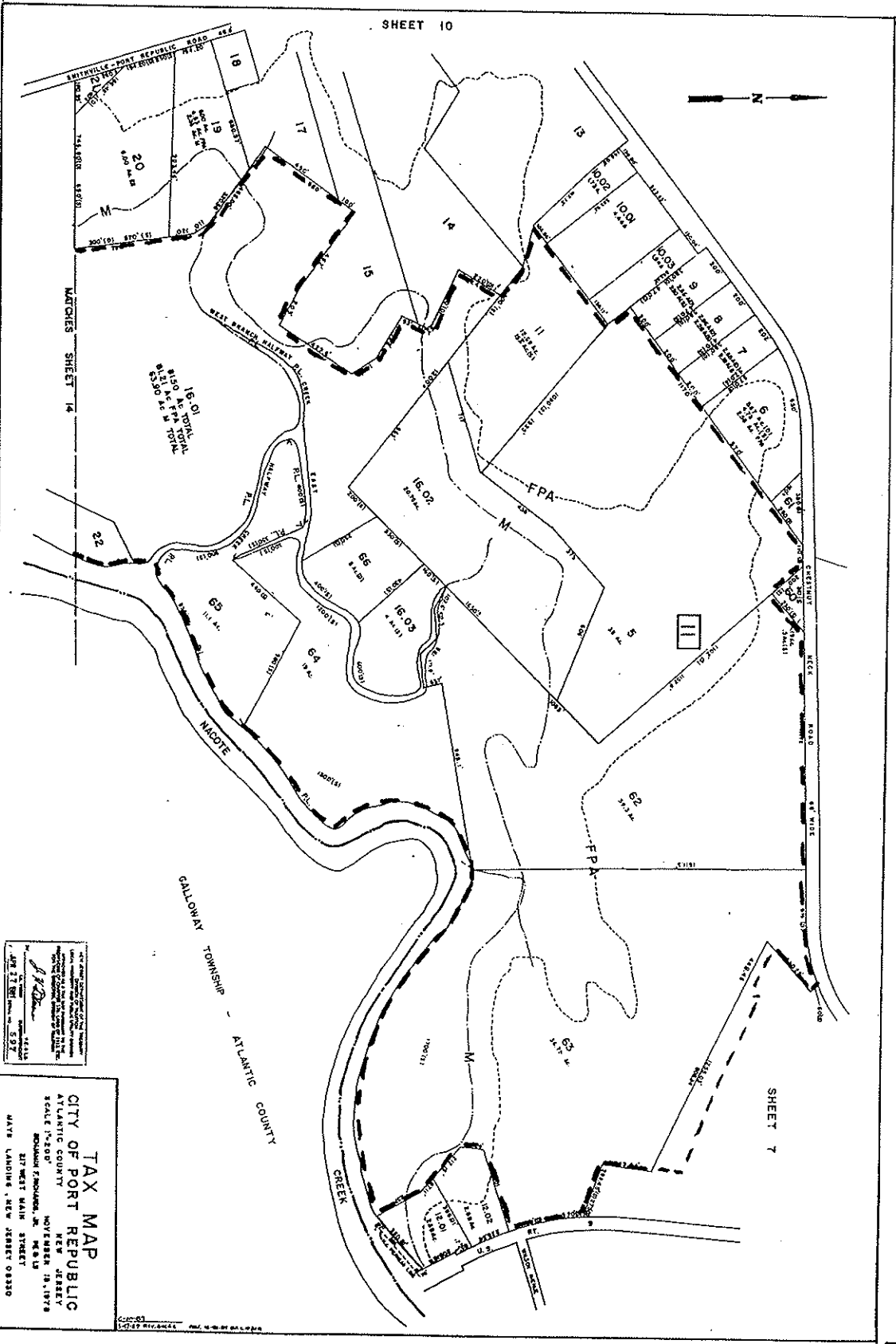
LEGEND

Map 1



THE STATE OF NEW JERSEY  
 DEPARTMENT OF TREASURY  
 DIVISION OF TAXATION  
 TAX MAP  
 CITY OF PORT REPUBLIC  
 ATLANTIC COUNTY  
 NOVEMBER 19, 1979  
 BRUNSWICK F. RICHMOND, N.J. 08009  
 217 WEST MAIN STREET  
 MAYS LANDING, NEW JERSEY 08330

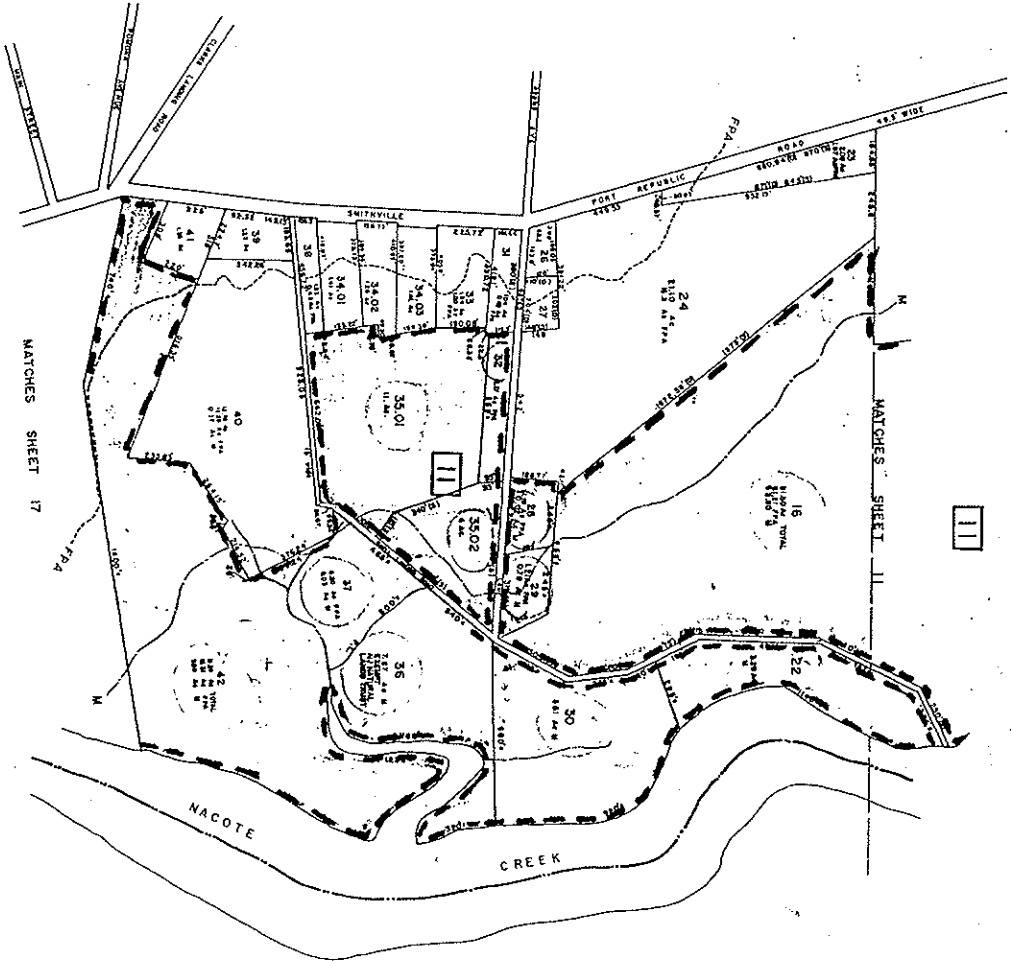
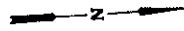
**TAX MAP**  
**CITY OF PORT REPUBLIC**  
**ATLANTIC COUNTY**  
**NOVEMBER 19, 1979**  
 BRUNSWICK F. RICHMOND, N.J. 08009  
 217 WEST MAIN STREET  
 MAYS LANDING, NEW JERSEY 08330



15-0001 544-0404(1) 19-21-81 07-07-82  
 J.M. FINE  
 537  
 1978

**TAX MAP**  
**CITY OF PORT REPUBLIC**  
 ATLANTIC COUNTY  
 NEW JERSEY  
 NOVEMBER 18, 1978  
 MOULDER F. MOULDER, JR.  
 217 WEST MAIN STREET  
 MAYE LANDING, NEW JERSEY 08230

MATCHES SHEET 13



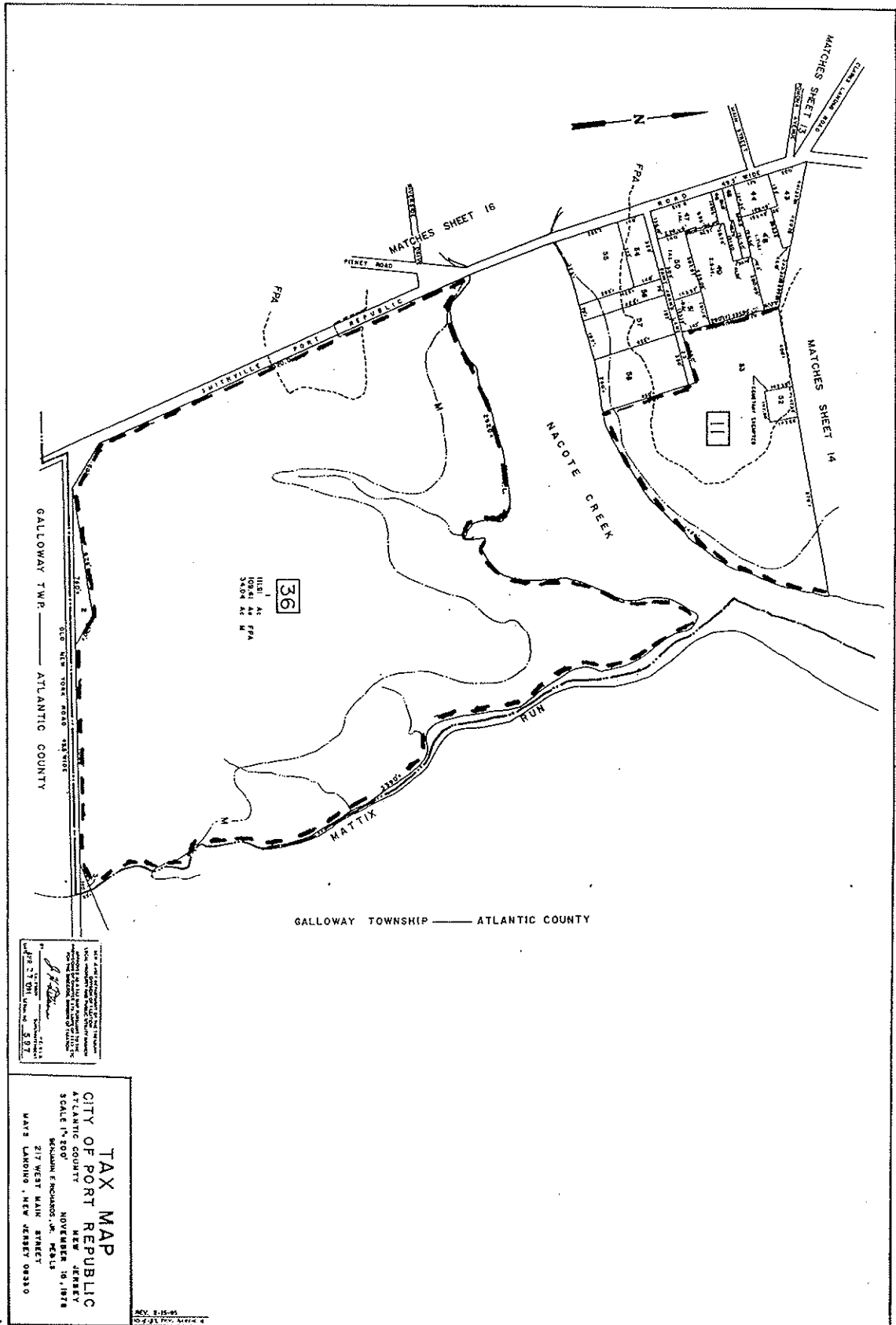
GALLOWAY TOWNSHIP—ATLANTIC COUNTY

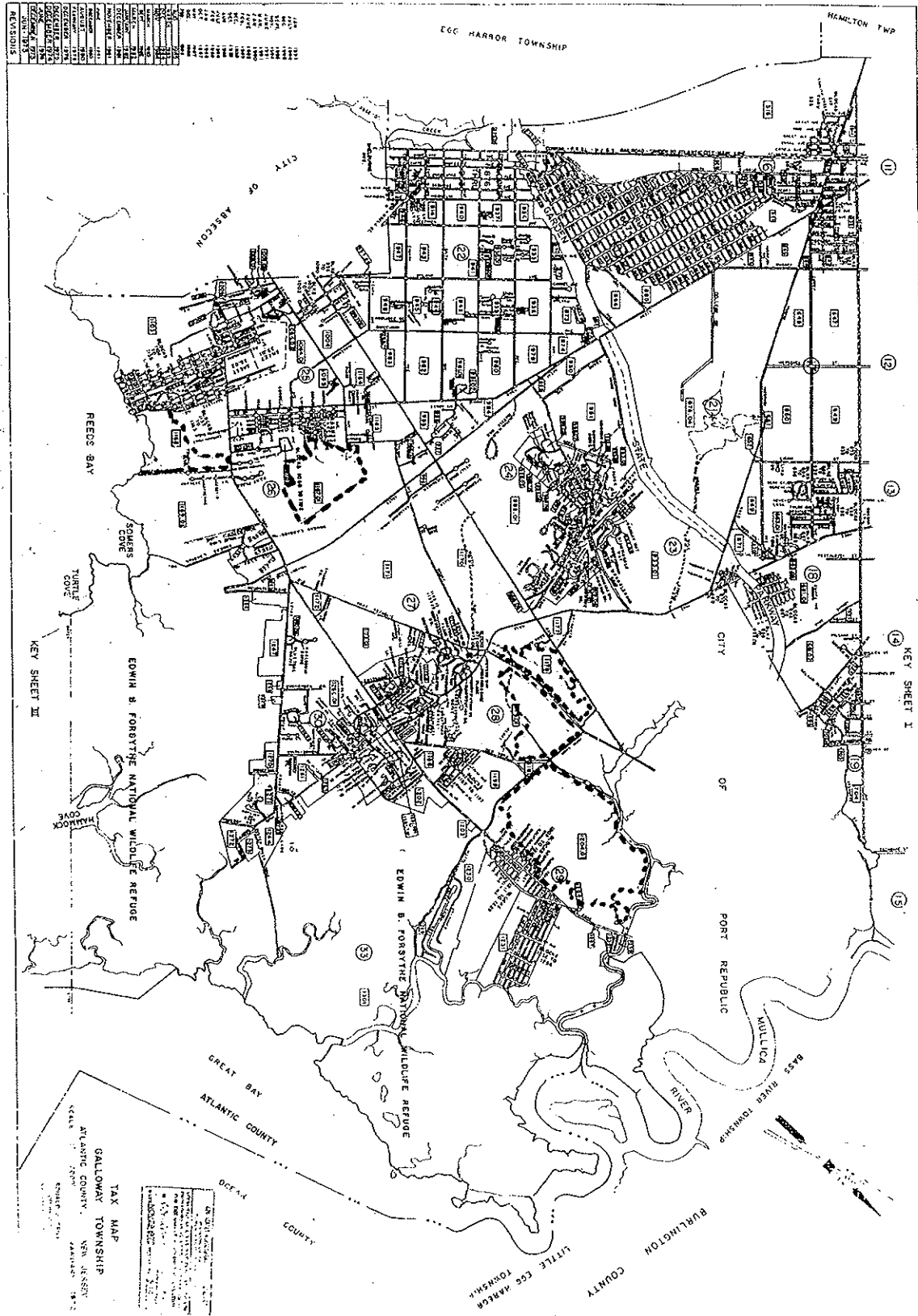
APPROVED FOR THE CITY OF PORT REPUBLIC  
BY THE BOARD OF TAXATION  
DATE: 11/15/1979  
BY: [Signature]  
CITY CLERK

**TAX MAP**  
CITY OF PORT REPUBLIC  
ATLANTIC COUNTY NEW JERSEY  
SCALE 1"=300'  
NOVEMBER 15, 1979  
BRANDON F. ROBERTSON, P.E.  
217 WEST MAIN STREET  
PAYS LANDING, NEW JERSEY 08320

THIS MAP WAS PREPARED BY BRANDON F. ROBERTSON, P.E., CIVIL ENGINEER, 217 WEST MAIN STREET, PAYS LANDING, NEW JERSEY 08320. THE MAP IS A TRUE AND CORRECT REPRESENTATION OF THE CITY OF PORT REPUBLIC, NEW JERSEY, AS OF THE DATE OF THE MAP. THE MAP IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF BRANDON F. ROBERTSON, P.E.

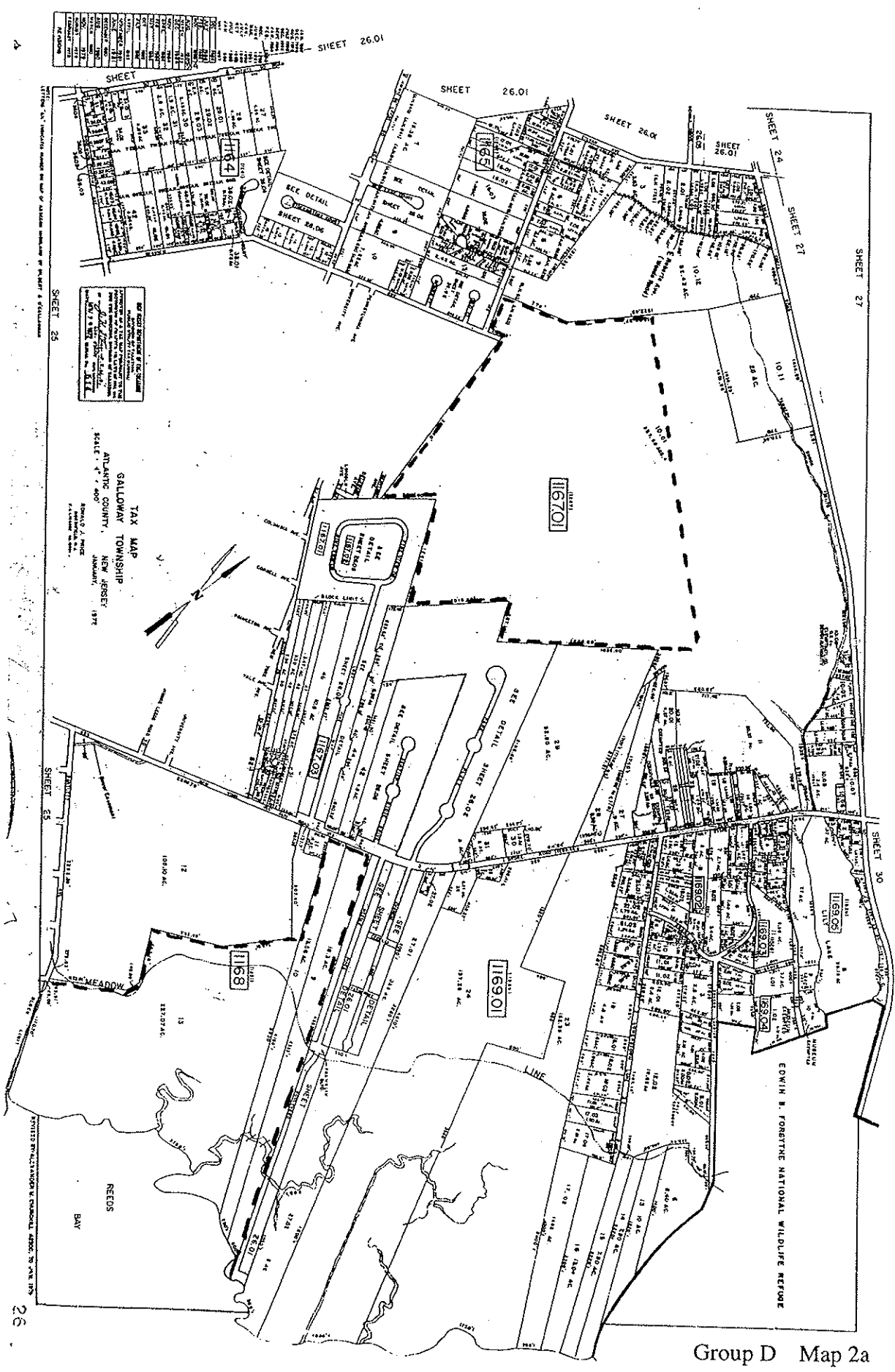






Map 2

Group D Map 2

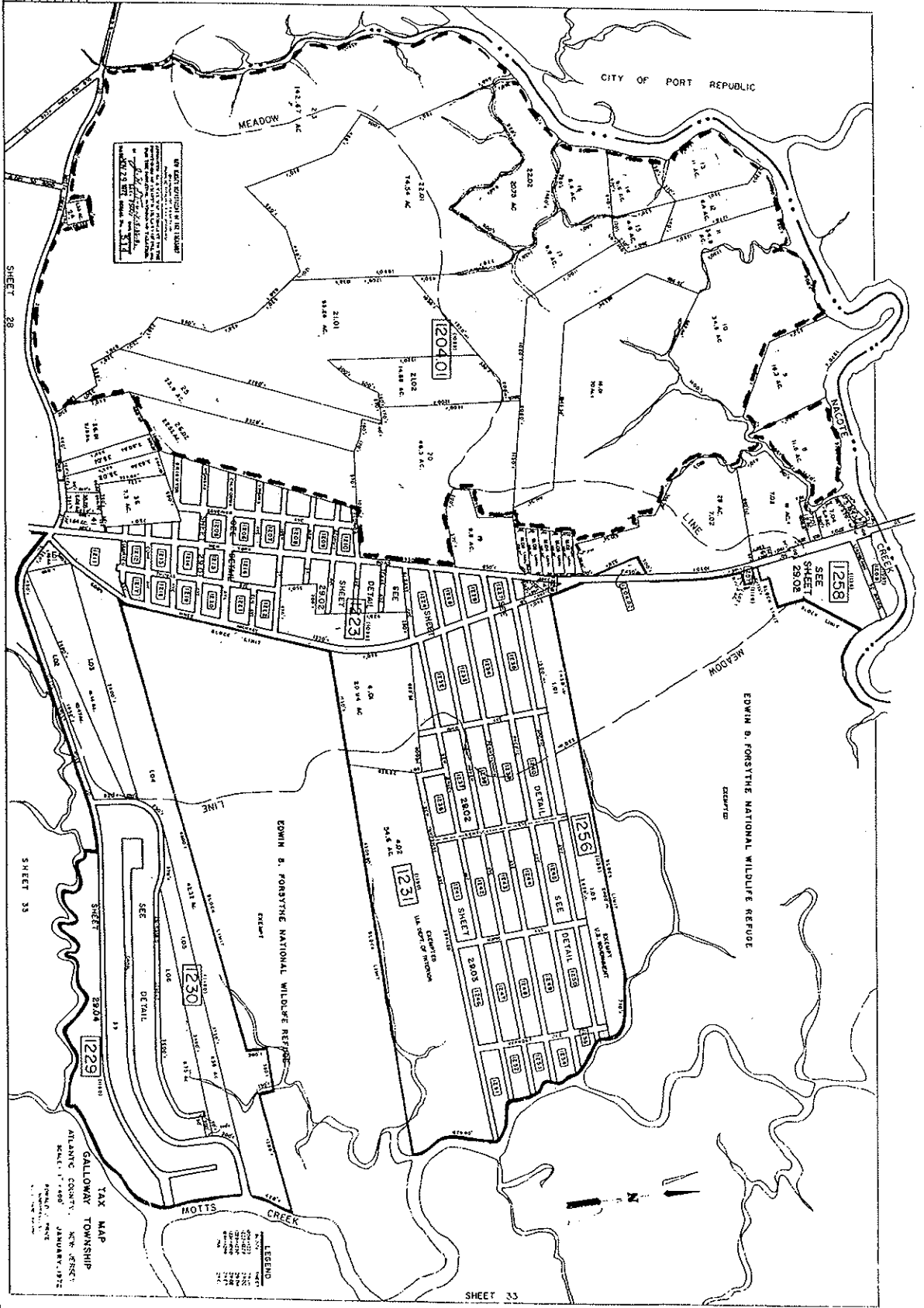


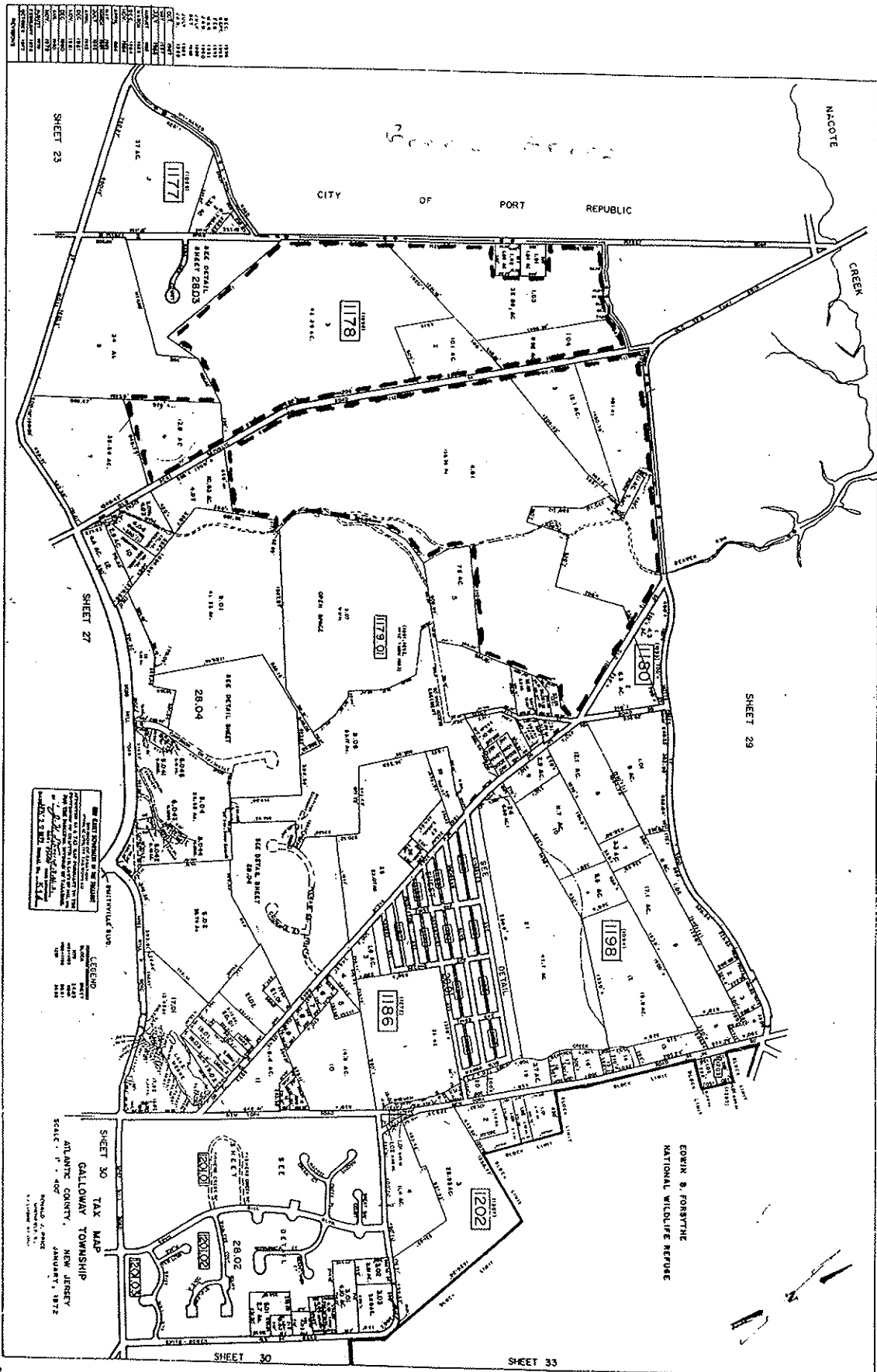
LEGEND	
[Symbol]	WATER
[Symbol]	RAILROAD
[Symbol]	ROAD
[Symbol]	UNIMPROVED LAND
[Symbol]	IMPROVED LAND
[Symbol]	RECREATION
[Symbol]	INDUSTRIAL
[Symbol]	RESIDENTIAL
[Symbol]	AGRICULTURE
[Symbol]	FOREST
[Symbol]	WETLANDS
[Symbol]	SWAMP
[Symbol]	BARREN
[Symbol]	BLANK

TAX MAP  
 GALLOWAY TOWNSHIP  
 ATLANTIC COUNTY, NEW JERSEY  
 SCALE: 1" = 400'  
 EDWARD J. WENZ  
 JANUARY, 1978

Group D Map 2a

1:50,000	1951
1:50,000	1952
1:50,000	1953
1:50,000	1954
1:50,000	1955
1:50,000	1956
1:50,000	1957
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1:50,000	2000





Lot No.	Area	Owner
1	1.00	...
2	2.00	...
3	3.00	...
4	4.00	...
5	5.00	...
6	6.00	...
7	7.00	...
8	8.00	...
9	9.00	...
10	10.00	...
11	11.00	...
12	12.00	...
13	13.00	...
14	14.00	...
15	15.00	...
16	16.00	...
17	17.00	...
18	18.00	...
19	19.00	...
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21	21.00	...
22	22.00	...
23	23.00	...
24	24.00	...
25	25.00	...
26	26.00	...
27	27.00	...
28	28.00	...
29	29.00	...
30	30.00	...
31	31.00	...
32	32.00	...
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36	36.00	...
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SEE DETAIL SHEET 28-04  
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LEGEND  
 1/4" = 1' (Scale)  
 --- (Symbol for street)  
 --- (Symbol for lot line)  
 --- (Symbol for creek)  
 --- (Symbol for railroad)  
 --- (Symbol for utility line)  
 --- (Symbol for fence)  
 --- (Symbol for boundary)  
 --- (Symbol for easement)  
 --- (Symbol for other feature)

SHEET 30 TAX MAP  
 GALLOWAY TOWNSHIP  
 ATLANTIC COUNTY, NEW JERSEY  
 SCALE: 1" = 400'  
 REVISED AND RE-PLANNED BY THE  
 ENGINEER AND ARCHITECT  
 150 N. 3RD ST. PHILADELPHIA, PA.  
 19014

EDWIN S. FORSYTHE  
 NATIONAL WILDLIFE REFUGE



## Lacey Township

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
2	859	11	12.17	Fee Simple	Purchase	public
2	859	12	4.14	Fee Simple	Purchase	private
1	1900	2	44.11	Fee Simple	Purchase	public
1	1900	2.01	24.92	Fee Simple	Purchase	public
1	1900	3	30.49	Fee Simple	Purchase	public
1	1900	4	7.06	Fee Simple	Purchase	private
1	1900	5	30.30	Fee Simple	Purchase	private
1	1900	6	27.82	Fee Simple	Purchase	private
1	1900	13	47.00	Fee Simple	Purchase	private
1	1900	15	2.32	Fee Simple	Purchase	private
1	1901	9	16.88	Fee Simple	Purchase	public
1	1901	10	16.72	Fee Simple	Purchase	private
3	1901	11.01	50.51	Fee Simple	Purchase	private
1	1901	13.01	94.97	Fee Simple	Purchase	private
1	1901	14	71.34	Fee Simple	Purchase	private
1	1901	15	29.81	Fee Simple	Purchase	private
1	1901	16	5.07	Fee Simple	Purchase	public
3	1901	18	229.64	Fee Simple	Purchase	private
3	1901	21	46.37	Fee Simple	Purchase	private
<b>Lacey Township Total:</b>			<b>791.64</b>			

## Stafford Township

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
2	51	6	49.30	Fee Simple	Purchase	private
2	51	7	0.50	Fee Simple	Purchase	private
2	51	11	1.40	Fee Simple	Purchase	private
2	51	12	1.40	Fee Simple	Purchase	private
2	51	13	1.84	Fee Simple	Purchase	private
2	51	13.01	0.70	Fee Simple	Purchase	private
2	51	14	3.10	Fee Simple	Purchase	private
2	51	15	1.84	Fee Simple	Purchase	private
2	51	16	1.10	Fee Simple	Purchase	private
2	51	17	1.40	Fee Simple	Purchase	private
2	51	18	1.70	Fee Simple	Purchase	private
2	51	19	3.70	Fee Simple	Purchase	private
2	51	20	6.70	Fee Simple	Purchase	private
2	51	21	1.80	Fee Simple	Purchase	private
2	51	58	0.10	Fee Simple	Purchase	private
2	51	59	1.00	Fee Simple	Purchase	private
2	51	60	0.30	Fee Simple	Purchase	private
1	52	1	17.26	Fee Simple	Purchase	public
<b>Stafford Township Total:</b>			<b>95.14</b>			

## Eagleswood Township

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
1	39	29.01	7.00	Fee Simple	Purchase	private
1	39	29.02	28.00	Fee Simple	Purchase	private
1	39	29.04	11.10	Fee Simple	Purchase	private
1	39	33	13.41	Fee Simple	Purchase	private
1	39	35	5.00	Fee Simple	Purchase	public
1	39	36	64.10	Fee Simple	Purchase	public
1	39	37	77.00	Fee Simple	Purchase	public
1	39	38	24.33	Fee Simple	Purchase	public
1	39	39	2.95	Fee Simple	Purchase	private
1	39	40	3.45	Fee Simple	Purchase	private
1	39	41	9.00	Fee Simple	Purchase	private
1	39	41AQ	13.00	Fee Simple	Purchase	private
1	39	42	3.00	Fee Simple	Purchase	private
1	39	42.01	0.05	Fee Simple	Purchase	private
1	39	42.02	0.50	Fee Simple	Purchase	public
1	39	43	17.50	Fee Simple	Purchase	private
1	39	44	2.50	Fee Simple	Purchase	private
1	39	45	5.31	Fee Simple	Purchase	private
1	39	46	3.30	Fee Simple	Purchase	private
1	39	46.01	4.00	Fee Simple	Purchase	private
1	39	47	28.15	Fee Simple	Purchase	public
1	39	48.01	6.39	Fee Simple	Purchase	private
1	39	49	20.00	Fee Simple	Purchase	public
1	39	50	7.00	Fee Simple	Purchase	public
1	39	51	5.00	Fee Simple	Purchase	public
1	39	52	3.98	Fee Simple	Purchase	public
1	39	52.01	7.41	Fee Simple	Purchase	private
1	39	53	38.00	Fee Simple	Purchase	private
1	39.01	2	0.16	Fee Simple	Purchase	private
1	39.01	3	0.15	Fee Simple	Purchase	private
1	39.01	4	0.15	Fee Simple	Purchase	private
1	39.01	5	0.15	Fee Simple	Purchase	private
1	39.01	6	0.15	Fee Simple	Purchase	private
1	39.01	7	0.15	Fee Simple	Purchase	private
1	39.01	8	0.18	Fee Simple	Purchase	private
1	39.01	9	0.20	Fee Simple	Purchase	private
1	39.01	10	2.20	Fee Simple	Purchase	private
1	39.01	11	42.15	Fee Simple	Purchase	private
1	42	12	8.92	Fee Simple	Purchase	private
1	42	12.01	1.00	Fee Simple	Purchase	private
1	42	13	13.20	Fee Simple	Purchase	private
1	42	13.01	1.80	Fee Simple	Purchase	private
1	42	15	6.50	Fee Simple	Purchase	public
1	42	15.01	4.00	Fee Simple	Purchase	private
1	42	15.02	17.50	Fee Simple	Purchase	private

## Eagleswood Township (continued)

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
1	42	15.03	10.98	Fee Simple	Purchase	public
1	42	15.04	3.10	Fee Simple	Purchase	public
1	42	15.05	2.00	Fee Simple	Purchase	private
1	42	15.06	3.40	Fee Simple	Purchase	public
1	42	16	0.10	Fee Simple	Purchase	private
1	42	17	0.90	Fee Simple	Purchase	private
1	42	18	4.05	Fee Simple	Purchase	private
1	42	19	5.00	Fee Simple	Purchase	public
1	42	20	19.40	Fee Simple	Purchase	public
1	42	21	2.30	Fee Simple	Exchange/Purchase	public
1	42	22	9.87	Fee Simple	Purchase	public
1	42	23	7.37	Fee Simple	Exchange/Purchase	public
1	42	24	2.54	Fee Simple	Purchase	public
1	42	25	27.49	Fee Simple	Purchase	private
1	42	26	4.16	Fee Simple	Purchase	private
1	42	27Q	23.00	Fee Simple	Purchase	private
<b>Eagleswood Total:</b>			<b>634.65</b>			

## Little Egg Harbor Township

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
1	325	3	61.58	Fee Simple	Purchase	private
1	325	7.02	44.49	Fee Simple	Purchase	private
<b>Little Egg Harbor Total:</b>			<b>106.07</b>			

## Port Republic

Priority	Block	Lot	Acres	Protection type	Acquisition type	Ownership
1	11	2	3.35	Fee Simple	Purchase	public
1	11	5	39.00	Fee Simple	Purchase	private
1	11	11	12.68	Fee Simple	Purchase	private
1	11	16.01	81.50	Fee Simple	Purchase	private
1	11	16.02	20.75	Fee Simple	Purchase	private
1	11	16.03	4.00	Fee Simple	Purchase	private
1	11	22	3.29	Fee Simple	Purchase	private
1	11	23	2.09	Fee Simple	Purchase	public
1	11	28	1.19	Fee Simple	Purchase	private
1	11	29	1.21	Fee Simple	Purchase	private
1	11	30	8.61	Fee Simple	Purchase	private
2	11	32	1.17	Fee Simple	Purchase	private
2	11	35.01	11.00	Fee Simple	Purchase	private



**Port Republic (continued)**

<b>Priority</b>	<b>Block</b>	<b>Lot</b>	<b>Acres</b>	<b>Protection type</b>	<b>Acquisition type</b>	<b>Ownership</b>
1	11	36	7.87	Fee Simple	Purchase	public
1	11	37	8.20	Fee Simple	Purchase	private
1	11	53Q	40.78	Fee Simple	Purchase	private
1	11	62	58.83	Fee Simple	Purchase	private
1	11	63	36.75	Fee Simple	Purchase	private
1	11	65	11.10	Fee Simple	Purchase	public
1	11	66	5.00	Fee Simple	Purchase	private
1	36	1	112.70	Fee Simple	Purchase	public
<b>Port Republic Total:</b>			<b>471.07</b>			

**Galloway Township**

<b>Priority</b>	<b>Block</b>	<b>Lot</b>	<b>Acres</b>	<b>Protection type</b>	<b>Acquisition type</b>	<b>Ownership</b>
1	1167.01	10.01	170.00	Fee Simple	Purchase	public
2	1168	9	18.30	Fee Simple	Purchase	private
2	1168	10	13.50	Fee Simple	Purchase	private
2	1168	13	223.00	Fee Simple	Purchase	private
1	1178	1.03	32.59	Fee Simple	Purchase	public
1	1178	1.04	9.92	Fee Simple	Purchase	public
1	1178	2	10.00	Fee Simple	Purchase	private
1	1178	3	42.30	Fee Simple	Purchase	public
1	1178	6	12.80	Fee Simple	Purchase	public
1	1179.01	1	40.10	Fee Simple	Purchase	public
1	1179.01	2	1.03	Fee Simple	Purchase	public
1	1179.01	3	12.10	Fee Simple	Purchase	private
1	1179.01	4.01	136.38	Fee Simple	Purchase	public
1	1204.01	8	11.50	Fee Simple	Purchase	public
1	1204.01	10	34.50	Fee Simple	Purchase	public
1	1204.01	11	34.90	Fee Simple	Purchase	private
1	1204.01	12	9.40	Fee Simple	Purchase	private
1	1204.01	13	11.00	Fee Simple	Purchase	public
1	1204.01	14	6.60	Fee Simple	Purchase	private
1	1204.01	15	4.60	Fee Simple	Purchase	private
1	1204.01	16	8.40	Fee Simple	Purchase	public
1	1204.01	17	9.90	Fee Simple	Purchase	private
1	1204.01	20	38.00	Fee Simple	Purchase	private
1	1204.01	21.01	55.26	Fee Simple	Purchase	public
1	1204.01	21.02	14.88	Fee Simple	Purchase	private
1	1204.01	22.01	74.54	Fee Simple	Purchase	public
1	1204.01	22.02	20.75	Fee Simple	Purchase	public
1	1204.01	23	142.67	Fee Simple	Purchase	public
1	1204.01	25	23.90	Fee Simple	Purchase	public
1	1204.01	26.02	22.52	Fee Simple	Purchase	private
<b>Galloway Total:</b>			<b>1245.34</b>			

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Federal Relay Service  
for the deaf and hard-of-hearing  
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U.S. Fish & Wildlife Service  
<http://www.fws.gov>

For Refuge Information  
1 800/344 WILD

June 2004



U.S. Fish & Wildlife Service

**Edwin B. Forsythe  
National Wildlife Refuge**

*Comprehensive  
Conservation Plan  
June 2004*

