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May 2005



Chesapeake Marshlands National Wildlife Refuge Complex
Highlights of the Draft Environmental Assessment and Comprehensive Conservation Plan



U.S. Fish & Wildlife Service

Chesapeake Marshlands National Wildlife Refuge Complex

*Highlights of the Draft
Environmental Assessment and
Comprehensive Conservation Plan*

May 2005



This goose, designed by J.N. "Ding" Darling, has become the symbol of the National Wildlife Refuge System.

The *U.S. Fish and Wildlife Service* is the principal federal agency responsible for conserving, protecting, and enhancing fish and wildlife, plants and their habitats for the continuing benefit of the American people. The Service manages the 93-million acre National Wildlife Refuge System comprised of more than 540 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological services field stations. The agency enforces federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

Comprehensive Conservation Plans provide long-term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.



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Comprehensive Conservation Plan
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Why does the Refuge Complex need a CCP and EA?



Bald eagle.
USFWS photo

The purpose of the Comprehensive Conservation Plan (CCP) is to provide management guidance for achieving the highest and best contribution to wildlife resources for which the Service is responsible for managing on the Refuge Complex. The CCP will identify the role that units of the Refuge Complex will play in fulfilling the mission of the Fish and Wildlife Service, the mission of the National Wildlife Refuge System, and the purposes for which the units of the Refuge Complex were established. The Environmental Assessment (EA) identifies three alternatives for managing the Refuge Complex, and discusses how each of those actions will affect the physical, biological, archaeological, historical, and socioeconomic environments. The preferred draft management alternative, *Conservation Biology for Diversity of Trust Species*, is the alternative the agency believes would best fulfill its statutory mission, responsibilities, and refuge purposes, giving consideration to economic, environmental, technical and other factors. The final CCP will be developed from public and agency comments we receive on this draft CCP/EA, and will determine our management direction, goals, objectives, and strategies for the next 15 years (2005–2020).

The National Wildlife Refuge System Improvement Act of 1997 requires the preparation of CCPs for national wildlife refuges. The National Environmental Policy Act of 1969 requires the preparation of an environmental assessment for this planning action, and provides a process from which the public may gain an understanding of and make input into the planning process.

The draft CCP and EA:

- provides a clear statement of the desired future conditions for habitat, wildlife, facilities, and people;
- ensures that management of the refuges reflects the mission, goals, mandates, and policies of the Refuge System;
- ensures the compatibility of current and future wildlife-dependent recreational uses of the refuges;
- provides long-term continuity and direction for refuge management;
- provides a basis for refuge budget development, operations, maintenance and construction;
- outlines a plan for land conservation, including identifying areas for future land protection at the refuges; and,
- provides refuge neighbors, visitors, and local and government officials with an understanding of Service management actions on and around these refuges.

Who developed the CCP and EA?

A planning team consisting of representatives from all divisions within the Fish and Wildlife Service initially developed the draft CCP and EA, with input and assistance from staff from Maryland’s Department of Natural Resources, Delaware’s Department of Natural Resources and Environmental Control, Maryland Greenways and Resource Planning Office, The Nature Conservancy, The Conservation Fund, Dorchester County Planning Department, Dorchester and Wicomico County Councils, U.S. Army Corps of Engineers, U.S. Department of Agriculture, National Park Service, Maryland Cooperative Extension Service, the Maryland and Dorchester County Departments of Tourism, Maryland land trusts, Nanticoke Watershed Alliance, American Farmland Trust, Congressional staff, State representatives, County officials, and local community leaders, businessmen, and citizens. The planning team conducted 17 open houses in 14 locations in the four county area, and mailed 3,000 workbooks to interested citizens to gather public input and identify issues or concerns. The draft EA was reviewed and approved by the Northeast Regional Director of the Fish and Wildlife Service. A final CCP will be developed after considering the public’s comments on the draft CCP/EA.

How will our preferred management actions benefit fish, wildlife, and people?



Snow geese.
USFWS photo

The proposed actions identified in the draft preferred alternative will:

- increase protection for over 270 species of rare, and Federal and State threatened and endangered species;
- result in delisting the Delmarva fox squirrel from the endangered species list;
- provide habitat necessary to sustain 10 percent of Maryland’s wintering Atlantic Population of Canada geese, lesser snow geese, and dabbling ducks;
- restore 10,000 acres of emergent marsh to 1933 conditions;
- provide high quality forest habitat for 22 species of globally significant forest interior dwelling migratory bird species;
- control or eradicate injurious, invasive, and exotic species;
- increase waterfowl and songbird utilization and production;
- improve habitat for and enhance resident wildlife populations;

- restore wetlands and hydrology;
- provide expanded opportunities for research;
- provide additional wildlife-dependent recreation (wildlife observation and photography, hunting, fishing, and environmental education and interpretation);
- significantly improve facilities and add staff;
- protect additional adjoining lands through easements, agreements, or fee title acquisition;
- restore Atlantic white cedar forests; and,
- improve understanding of the dynamics of the Chesapeake Bay ecosystem and population interactions.

What is the mission of the National Wildlife Refuge System?

The mission of the National Wildlife 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.” Wildlife has first priority in the management of the refuge system; wildlife-dependent recreation uses or other appropriate uses may be allowed only after they have been determined to be a compatible use; and wildlife-dependent recreation activities, namely hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, will be emphasized.

What refuge units form the Refuge Complex?

The Chesapeake Marshlands National Wildlife Refuge Complex comprises the Blackwater National Wildlife Refuge (NWR), Eastern Neck NWR, and the Chesapeake Island Refuges, consisting of Martin NWR and Susquehanna NWR, which collectively includes the Barren Island, Watts Island, Bishops Head, and Spring Island Divisions (see figure 1).

The Service continues to strive for more efficient and cost effective ways to manage refuges in the National Wildlife Refuge System. Grouping refuges administratively is one way to reduce the number of supervisory positions; to better focus limited dollars, staff, and equipment to accomplish the highest priority resource management activities; and to consolidate facilities to reduce operating and maintenance costs. In 2004, a decision was made to



Black skimmer.
USFWS photo

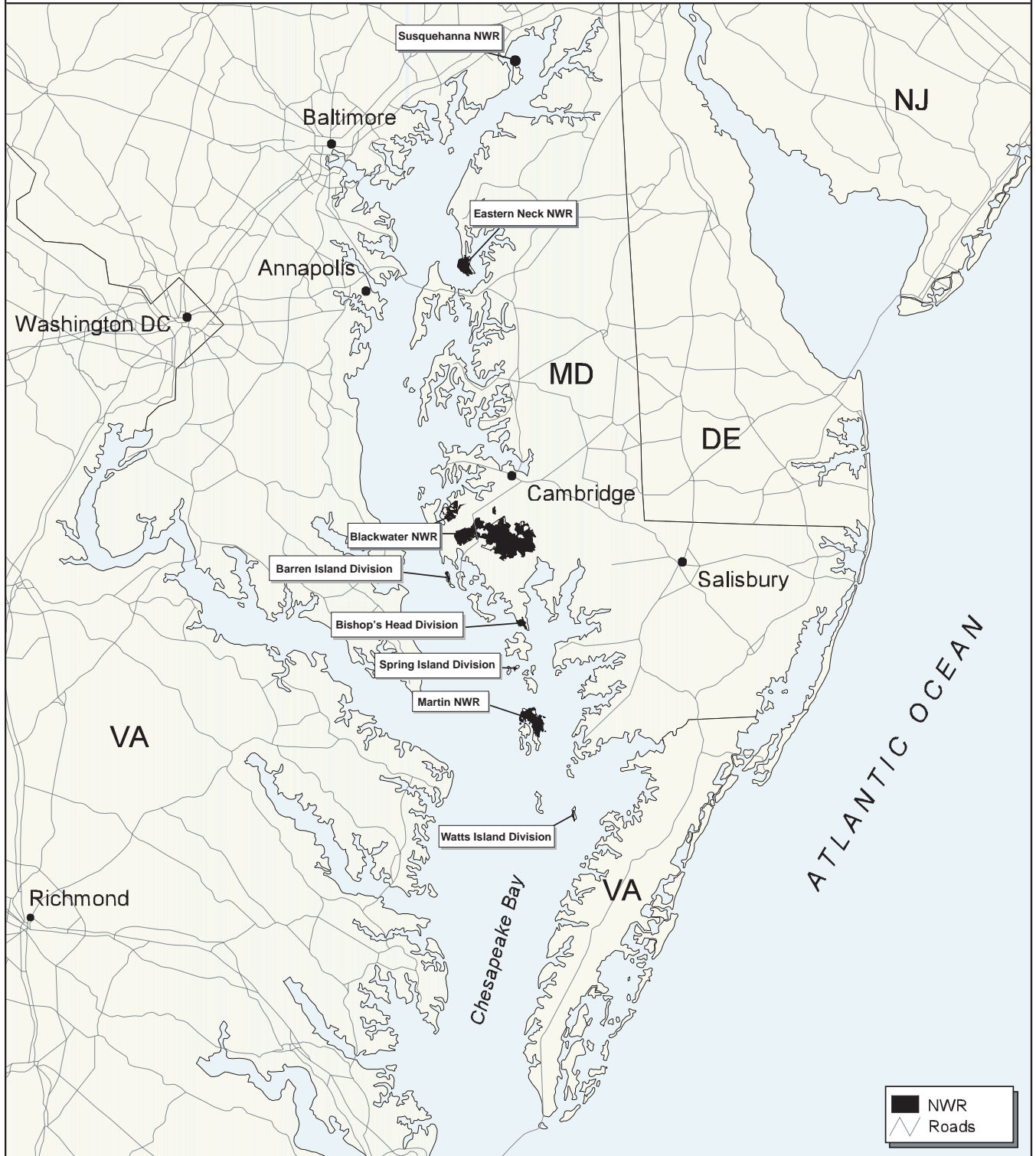
combine all the island refuges (Eastern Neck, Martin, and Susquehanna NWRs) along Maryland's Eastern Shore under one manager and administer them collectively under the supervision of the project leader for the Chesapeake Marshlands National Wildlife Refuge Complex in Cambridge, Maryland. Because that decision was implemented near the end of the EA/CCP planning process, the only refuge that was not included is Eastern Neck NWR. Therefore, we will prepare a separate CCP for Eastern Neck soon. We will consider long-term plans for the comprehensive management of that important refuge at that time. We have already held public scoping meetings for the Eastern Neck CCP and EA, and will restart it early in 2005.

Why is the Refuge Complex important?

The three refuges and the four divisions that form the Refuge Complex provide important habitat and protection to support 12 globally rare and regionally significant migratory birds; 56 of 57 Birds of Conservation Concern in the Mid-Atlantic Coast; 54 of 135 National Birds of Conservation Concern; the largest colonial and wading bird rookeries in the Chesapeake Bay; the world's largest extant population of the endangered Delmarva fox squirrel; the largest nesting population of bald eagles north of Florida on the Atlantic Coast; 270 rare, and Federal and State threatened and endangered species (13 Federal-listed species); 8 species of anadromous fish and nine interjurisdictional fish species; 16 percent of the remaining submerged aquatic vegetation in the Chesapeake Bay; largest remaining contiguous forest land on the Delmarva Peninsula; several threatened habitats including coastal plain ponds, xeric dunes, rich woods, and Atlantic white cedar swamps; 23 Natural Heritage sites; one-third of all tidal wetlands in Maryland; northernmost three-square bulrush marshes in the United States; and extremely important wetlands, 68 percent of which are decreasing nationally. Because of these outstanding natural resources, the area has received numerous noted national, regional, and local designations, including, but not limited to, being designated a Wetlands of International Importance for Waterfowl site (RAMSAR); Western Hemisphere Shorebird Reserve Network Site, North American Waterfowl Management Plan Joint Venture Focus Area, State Wild and Scenic River, Biosphere Reserve, Essential Fish Habitat, Important Bird Area, The Nature Conservancy Last Great Place, and an Exceptional Recreation and Ecological System.

Figure 1

Chesapeake Marshlands National Wildlife Refuge Complex



Data Sources:
Tiger data 1:100,000 roads and hydrology.
USFWS refuge boundary data
Map prepared for DRAFT Chesapeake Marshlands National Wildlife Refuge Complex Comprehensive Conservation Plan, September 2004.
This map is for planning purposes only.



What are the purposes of the units in the Refuge Complex?

Purposes for Blackwater NWR.—For lands acquired under the *Migratory Bird Conservation Act* (16 U.S.C. § 715d), the purpose of the acquisition is “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

For lands acquired under the *Endangered Species Act of 1973* (16 U.S.C. § 1534), the purpose of the acquisition is “to conserve (A) fish or wildlife which are listed as endangered or threatened species...or (B) plants.”

For lands acquired under the *Refuge Recreation Act* (16 U.S.C. § 460K-1), the purpose of the acquisition is for “(1) incidental fish and wildlife-oriented recreation; (2) the protection of natural resources; and (3) the conservation of endangered species or threatened species.”

For lands acquired under the *North American Wetlands Conservation Act* (16 U.S.C. § 4401–413), the purpose of the acquisition is to “(1) protect, enhance, restore, and manage an appropriate distribution and diversity of wetland ecosystems and other habitats for migratory birds and other fish and wildlife in North America; (2) maintain current or improved distribution of migratory bird populations; and (3) sustain an abundance of waterfowl and other migratory birds consistent with the goals of the North American Waterfowl Management Plan and the international obligations contained in the migratory bird treaties and conventions and other agreements with Canada, Mexico, and other countries.”

For lands acquired under the *Refuge Administration Act* (16 U.S.C. § 668ddb), the purpose of the donation is “to protect, enhance, restore, and manage wetland ecosystems and other habitats for migratory birds, endangered and threatened species, and other wildlife.”

Purpose for Susquehanna NWR.—Executive Order No. 9185 establishes its purpose as “a refuge and breeding ground for migratory birds and other wildlife.”

Purpose for Martin NWR.—For lands acquired under the *Migratory Bird Conservation Act* (16 U.S.C. § 715d), the purpose of the refuge is “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

Purpose for the Barren Island Division.—For lands acquired under the *Migratory Bird Conservation Act* (16 U.S.C. § 715d), the purpose of the refuge is “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

Purpose for the Bishops Head Division.—For lands acquired under the *Migratory Bird Conservation Act* (16 U.S.C. § 715d), the purpose of the refuge is “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

Purpose for the Watts Island Division.—For lands acquired under the *Refuge Administration Act* (16 U.S.C. § 668ddb), the purpose is “to protect, enhance, restore, and manage wetland ecosystems and other habitats for migratory birds, endangered and threatened species, and other wildlife.”

What is the vision for the Refuge Complex?



Saltwater marsh on the refuge.

Lisa M. Mayo photo

“The Chesapeake Marshlands National Wildlife Refuge Complex will provide the foundation for the creation of the most complete network of protected lands in our Nation’s largest estuary. This assemblage of diverse island, wetland, upland, and aquatic habitats will represent all the biotic communities unique to the upper and middle Chesapeake Bay. The Refuge Complex will continue to be internationally and nationally renowned for its wetland habitats, which sustain significant populations of waterfowl and other Service trust resources. These refuges will expand their role in protecting, restoring, and managing the full range of natural processes, community types, and native plant and animals, making them anchors for biological diversity and ecosystem-level conservation locally, regionally, and within the National Wildlife Refuge System. The Refuge Complex will serve as a leader in the strategic acquisition or protection

of important habitats within the watershed, and as a center to showcase the best science and technology used for wildlife conservation.

“The Refuge Complex will demonstrate the importance of the natural world to the quality of human life; the value of, and need for, fish and wildlife management; and the human role in preserving and enhancing wildlife habitat. The Refuge Complex will forge partnerships to address the natural, historical, and cultural resource issues of the region. Local communities will recognize these refuges as national treasures, and actively participate in their stewardship. The Refuge Complex will raise public awareness and understanding of the Refuge System mission by providing clean, welcoming, safe, and accessible opportunities and facilities for compatible, high-quality, wildlife-oriented experiences. In collaboration with many partners, a wide range of innovative, stimulating, general public and environmental education programs and activities will be provided to diverse audiences.

“By accomplishing this vision, these refuges will ensure healthy fish, wildlife, and plant resources for people to enjoy today and an enduring legacy for generations to come.”

What are the major goals of the Refuge Complex?

The following broad goals of the Refuge Complex support the mission of the Refuge System and our vision. We have stepped down these goals from the purposes of the refuges and other guiding plans and laws. Along with the vision statement for the Refuge Complex, they establish management direction. They aid in selecting the preferred action alternative and developing the final CCP.

Goal 1. Protect and enhance Service trust resources and other species and habitats of special concern.

Goal 2. Maintain a healthy and diverse Chesapeake Bay ecosystem with a full range of natural processes, natural community types, and the full spectrum of native plants and animals to pass on to future generations of Americans.

Goal 3. In collaboration with our conservation partners, create the most complete network of protected lands within the Chesapeake Bay Watershed.

Goal 4. Develop and implement quality scientific research, environmental education, and wildlife recreation programs that raise public awareness and are compatible with refuge purposes.

Goal 5. Ensure that staffing, facilities, resource protection, and infrastructure are developed commensurate with plan implementation.



Waterfowl banding.
USFWS photo

What major issues and concerns did the public identify?

During our public scoping process, the public identified as major concerns the four issues listed below. We considered them most carefully as we developed our alternatives and evaluated their environmental impacts.

- Potential effects of an expanding human population and changing demographics on Service trust resources (urban sprawl, vessel traffic and waterborne activities on the Blackwater and Nanticoke Rivers, and changing public attitudes and demands)
- Potential effects of land acquisition and refuge expansion
- Potential effects of habitat changes (wetland or marsh loss, island loss, water quality degradation, forest health/composition/fragmentation/management, riparian buffer loss and degradation)
- Potential effects on floral and faunal populations (injurious, exotic, invasive species; lack of scientific data; rare, threatened, endangered species management; and waterfowl management)

What are the important problems affecting fish and wildlife?

1. *Fragmentation of habitats.* The fragmentation of Refuge Complex fish and wildlife habitats is a direct threat to their integrity, both now and in the years ahead. For example, the clearing of forest and residential sprawl are two major threats to natural resources and their management on the Eastern Shore. Fragmented habitats eliminate travel corridors essential for wide-ranging and migratory species, destroy the linkages between reservations necessary to maximize habitat availability, impede the recovery of endangered and threatened species such as the Delmarva fox squirrel, and obstruct goals for sustaining forest interior dwelling species (FIDS) of migratory songbirds. Fragmentation also interferes with management objectives aimed at public access and wildlife-dependent recreational use.

2. *Wetland loss and degradation.* Since its establishment in 1933, Blackwater NWR has lost nearly 7,000 acres of wetlands. That loss has occurred primarily in the brackish tidal three-square bulrush marsh at the heart of the refuge, near the confluence of the Little Blackwater and Blackwater Rivers, but now it is also progressing downstream at an increasing rate of about 500 acres yearly. Since the 1970s, several scientific studies have focused on this unusually high rate of wetland loss, which may be the result of several confounding factors, including sea-level rise, land subsidence, saltwater intrusion, severely modified hydrology, and excessive herbivory by an exploding population of nutria (~50,000), an exotic species introduced in the 1940's from South America. Marsh loss of this magnitude is a concern for Blackwater NWR, not only because of the substantial loss of wetland acres, but also because it compromises the ability of the refuge to fulfill its mandate to provide habitats for waterfowl and threatened or endangered species (see figures 2 and 3, marsh comparison photos, page 13).

3. *Island loss.* The Chesapeake Bay shoreline is severely eroding in many areas. Particularly hard hit are the islands off the Eastern Shore. Since colonial times, islands have lost at least 10,806 acres just in the middle eastern portion of the Bay. The shoreline recession rates of many islands exceed 3 meters per year, with an associated load of approximately 2,541,717 kg (2,500 tons) of sediment per mile annually entering the bay. Water clarity and submerged aquatic vegetation health are being impacted, and some of the most important colonial water bird nesting areas and waterfowl wintering habitats in the region are being lost.

4. *Lack of forest management.* The lack of forest management, coupled with other endemic processes, have had significant impacts on forest health. The public was quick to point out that increased stress and decreased vigor make refuge forests highly susceptible to disease and insect infestations. In the past decade, a number of epidemics of forest insects and diseases have had devastating effects on tree populations. The more familiar cases include the southern pine beetle, and most recently, the gypsy moth.



Nutria.
USFWS photo

5. *Proliferation of injurious, invasive, and exotic species.* The Refuge Complex is experiencing problems with certain species of exotic, invasive, and injurious plants and animals that conflict with its management objectives. Nutria, mute swans, gypsy moths, southern pine beetles, Phragmites, purple loosestrife, Johnson grass, thistle, saltmarsh fleabane, resident Canada geese, and starlings are some of the more notorious species that are adversely affecting refuge habitats and wildlife.

6. *Lack of scientific data.* The lack of information about wildlife populations, their habitats, and the effects of management actions on trust wildlife species continues to adversely affect management decisions.

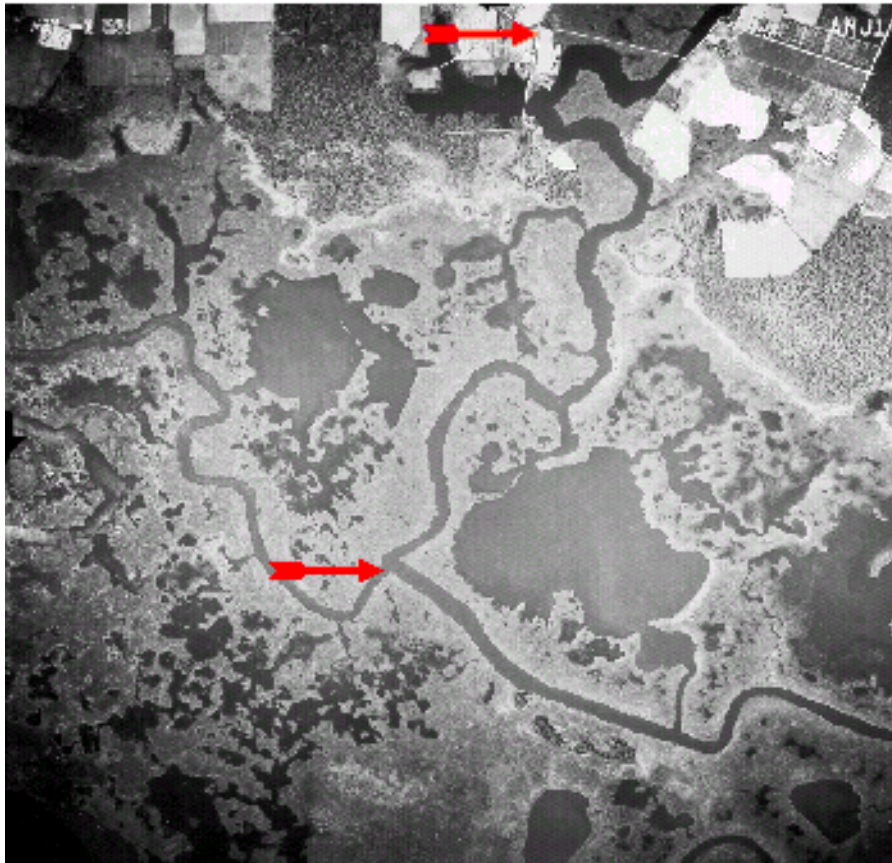


Figure 1. 1939 marsh (compare to 1989 marsh below; arrows depict same location on photos)

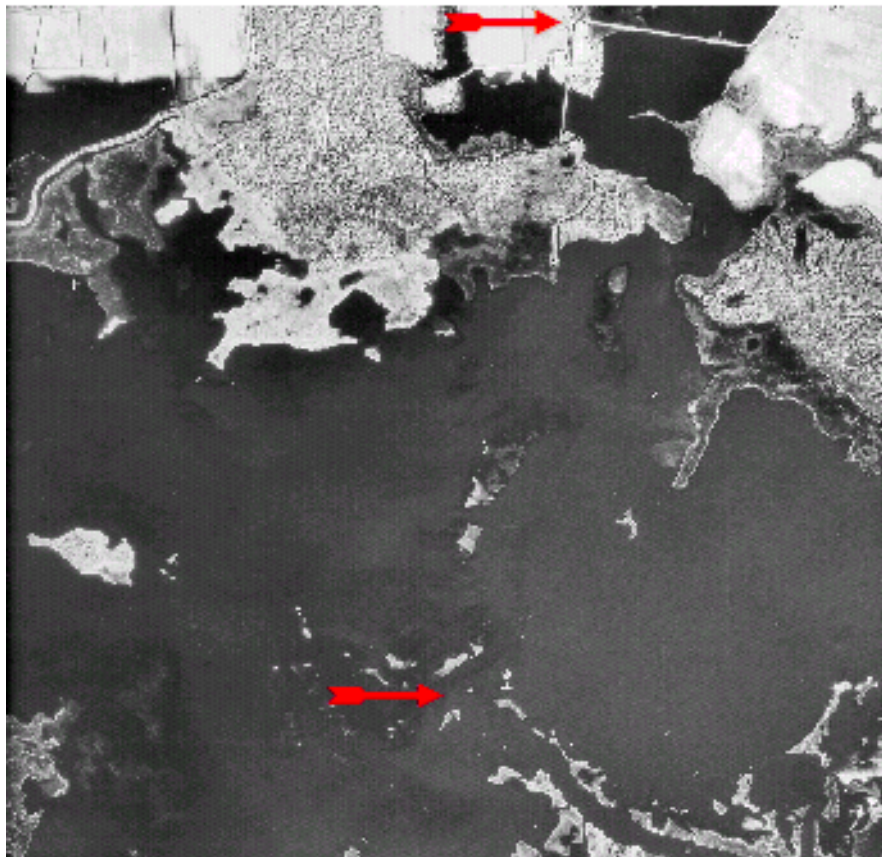


Figure 2. 1989 marsh (compare to 1939 marsh)

What alternatives did the planning team evaluate?

The planning team evaluated the following three alternatives for managing the Refuge Complex: species-specific management, conservation biology for trust species diversity, and maximum public use with no habitat management (see table 1, “Tabular comparison of alternatives,” page 27).

Alternative A. Species-specific Management (No Action Alternative)

Alternative A represents traditional single-species management, which characterizes our current management. It focuses on providing for the habitat needs of key wildlife trust species and groups of species. In alternative A, the Service would maintain a key species approach to managing the Refuge Complex. The overall mission for the Blackwater NWR and Chesapeake Island Refuges would be to provide habitat for wintering and nesting waterfowl, for endangered species such as the Delmarva fox squirrel and species of special emphasis, and for nesting colonial water birds. Species of special interest would include Canada geese and lesser snow geese, wintering dabbling ducks, nesting black ducks, wood ducks, tundra swans, ospreys, bald eagles, peregrine falcons, and colonial bird species such as great blue herons, great egrets, least terns, and black skimmers. Management activities and practices under this alternative would generally follow the goals, objectives and strategies outlined in the Station Management Plan (1991).

- Additional land protection would be limited to in-holdings and occasionally, the addition of properties of 40 acres or less that meet the 10-percent rule for categorical exclusions.
- Management programs would focus on selected Federal trust species only.
- Intensively managed habitats would be necessary to support refuge purposes.
- Public environmental education would be limited.
- Existing levels of the “big six” public use recreational activities would be maintained.
- Existing levels of inventory, monitoring, and adaptive management would continue.
- Susquehanna NWR lands would be transferred to the state, private conservation organization or other identity.

Alternative B. Conservation Biology for Trust Species Diversity (Preferred Alternative)

Alternative B is our preferred course of action, based on conservation biology and biological diversity. It represents the adaptive management approach, which is holistic, yet more flexible and adaptable; it allows management modifications based on the results of several proposed surveys and monitoring programs.

Unlike alternative A, the preferred alternative B recognizes that ecosystems such as the Chesapeake Bay cannot be considered only one species at a time, but must be considered and protected in their entirety. Active management focuses on the restoration, enhancement, and maintenance of natural biological communities, biodiversity, and ecological processes.

Alternative B emphasizes the active habitat management of forest lands, croplands, and waters for the benefit of all migratory bird species; the maintenance and recovery of endangered and threatened species; the restoration of submerged aquatic vegetation and wetlands; the reduction or elimination of invasive plant and animal species, e.g., Phragmites, purple loosestrife, nutria, mute swans, gypsy moths, resident Canada geese; additional research and inventories; and the expansion of the Blackwater NWR boundary primarily through partnerships and easements. The existing cropland program acreage will be reduced, prior converted wetlands will be reforested, and the moist soil program will be expanded. Management will be directed to also include nontarget species, namely, butterflies, reptiles, amphibians, and fish.



Refuge canoe and kayak trail.

Friends of Blackwater photo

Numerous actions in our preferred alternative B aim at improving our ability to accommodate public use and wildlife-dependent recreational opportunities, to the extent that they are compatible with refuge purposes and missions. Some of the new opportunities recommended at Blackwater NWR include building a new, accessible fishing pier and parking area at Key Wallace Bridge, new hiking and canoe trails, canoe access ramp, wetland observation deck, rebuilding the wildlife observation tower, remodeling and expanding the Visitor Center, updating the exhibits at the Center, enhancing signage, providing new hunting opportunities (turkeys, resident Canada geese, and waterfowl), and providing numerous outreach and environmental education programs and learning experiences (see public use figures 5 through 7, below).

Landscape-scale land protection is also a major goal for Blackwater refuge in alternative B. Two general areas, both previously approved for planning purposes by the Director in July 1995, are considered: 17,500 acres immediately surrounding the existing refuge, and 16,000 acres east of the existing refuge along the Nanticoke River.

Given the importance of Maryland's lower Eastern Shore to Service trust resources and the expanse of the area, a partnership approach was determined to be essential. Partners involved in this landscape-scale planning include the Service, Maryland DNR, Delaware DNREC, The Nature Conservancy (TNC), The Conservation Fund (TCF), Eastern Shore Land Trust, Ducks Unlimited, DOD, Lower Shore Land Trust, Maryland Environmental Trust, and Delaware Wildlands.

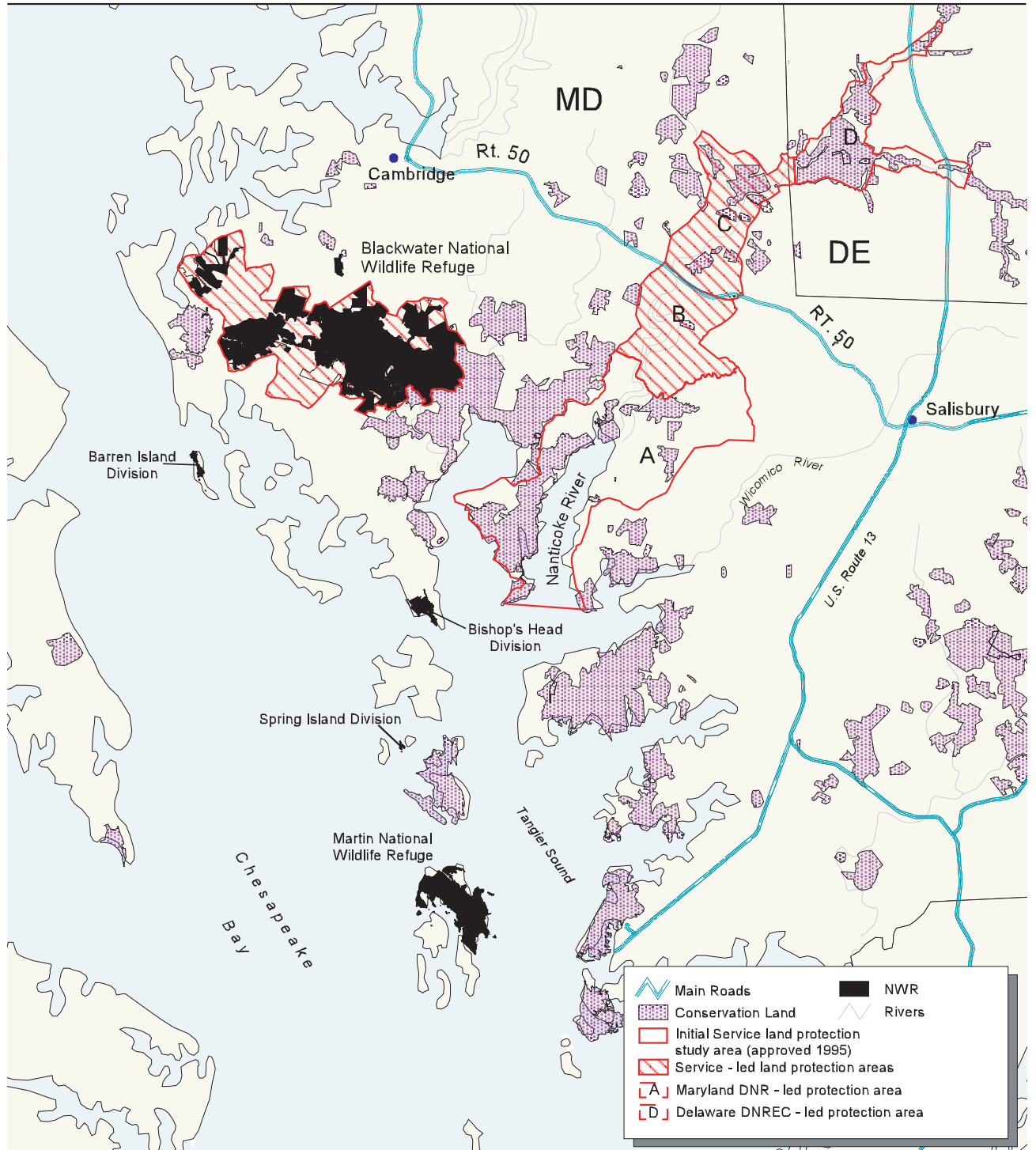
The partners met regularly during the past 9 years to develop the four project work areas (A, B, C, and D) identified in figure 4, "Current and proposed protected areas". The Nanticoke planning group assigned primary responsibilities for land protection at the mouth of the river, zone A, to the Maryland DNR. The Delaware DNREC will be responsible for land protection in zone D. Working cooperatively, the Service and the nonprofit organizations will be responsible for land protection within the two central zones, B and C. The Maryland DNR will be primarily responsible for land protection east of Route 336 and Shorters' Wharf Road around their Fishing Bay Wildlife Management Area (WMA) and the Taylor Island WMA. All of these lands consist of low-lying forest and marsh habitats extremely important to some of the refuge's highest management priorities: the endangered Delmarva fox squirrel, the threatened bald eagle, waterfowl concentrations, Neotropical migrants, and other forest interior dwelling landbirds.

These two land protection proposals will further develop landscape linkages between Service lands and the state WMAs. Several smaller, disjunct units of conservation lands are also located in the vicinity of the refuge, and are managed by State or private conservation organizations, e.g. Chesapeake Audubon, or are under easement as part of the Maryland Environmental Trust program. The potential for additional landscape linkages and partnerships is very high (see figure 4, "Current and proposed protected areas").

Figure 4

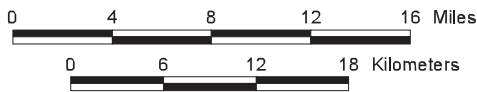
Current and Proposed Protected Areas

Chesapeake Marshlands National Wildlife Refuge Complex



Data Sources:
 Tiger data 1:100,000 roads and hydrology.
 USFWS refuge boundary data

Map prepared for DRAFT Chesapeake Marshlands National Wildlife Refuge Complex Comprehensive Conservation Plan, September 2004.
 This map is for planning purposes only.



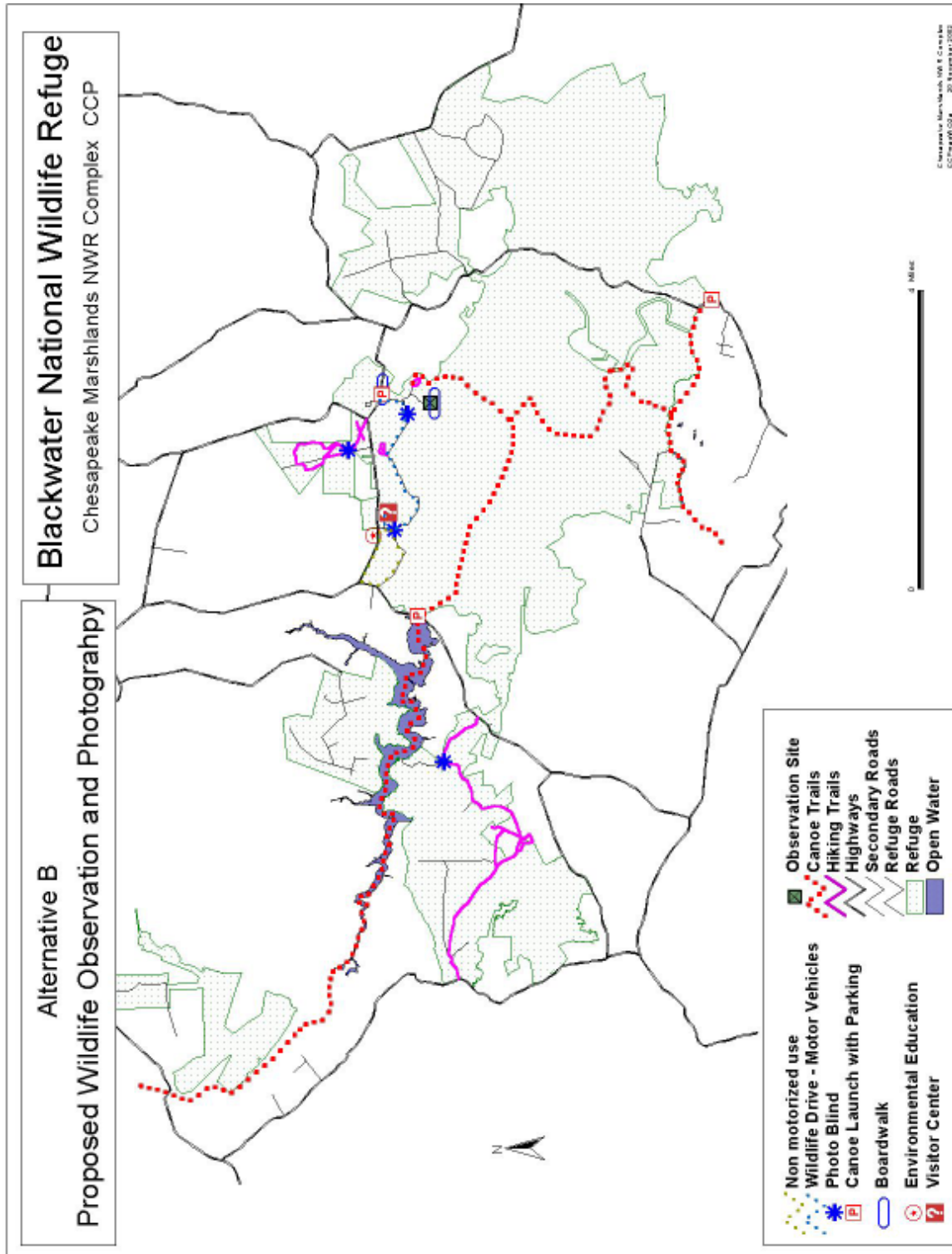


Figure 5. Alternative B: Proposed public use facilities

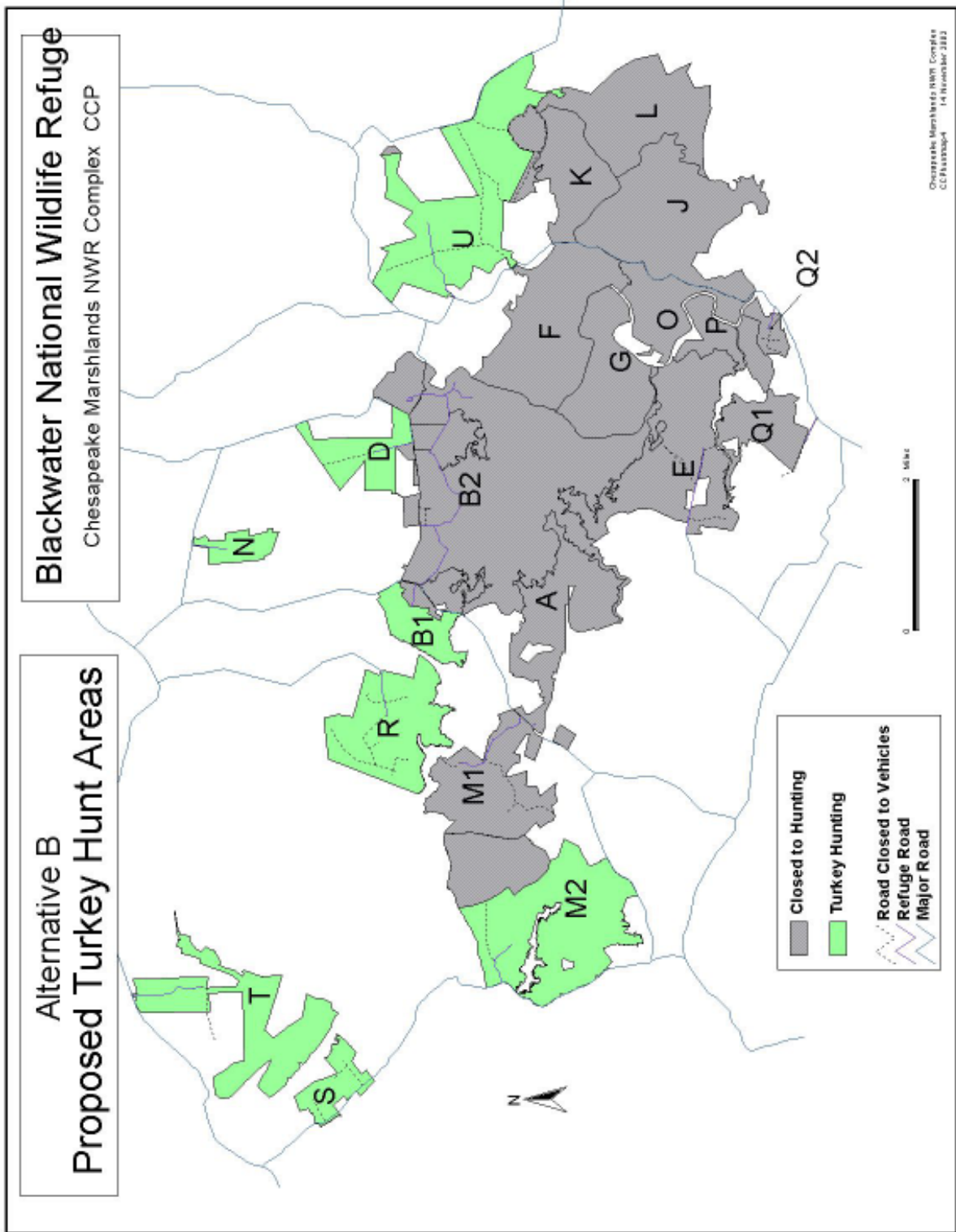


Figure 6. Alternative B: Proposed turkey hunt areas

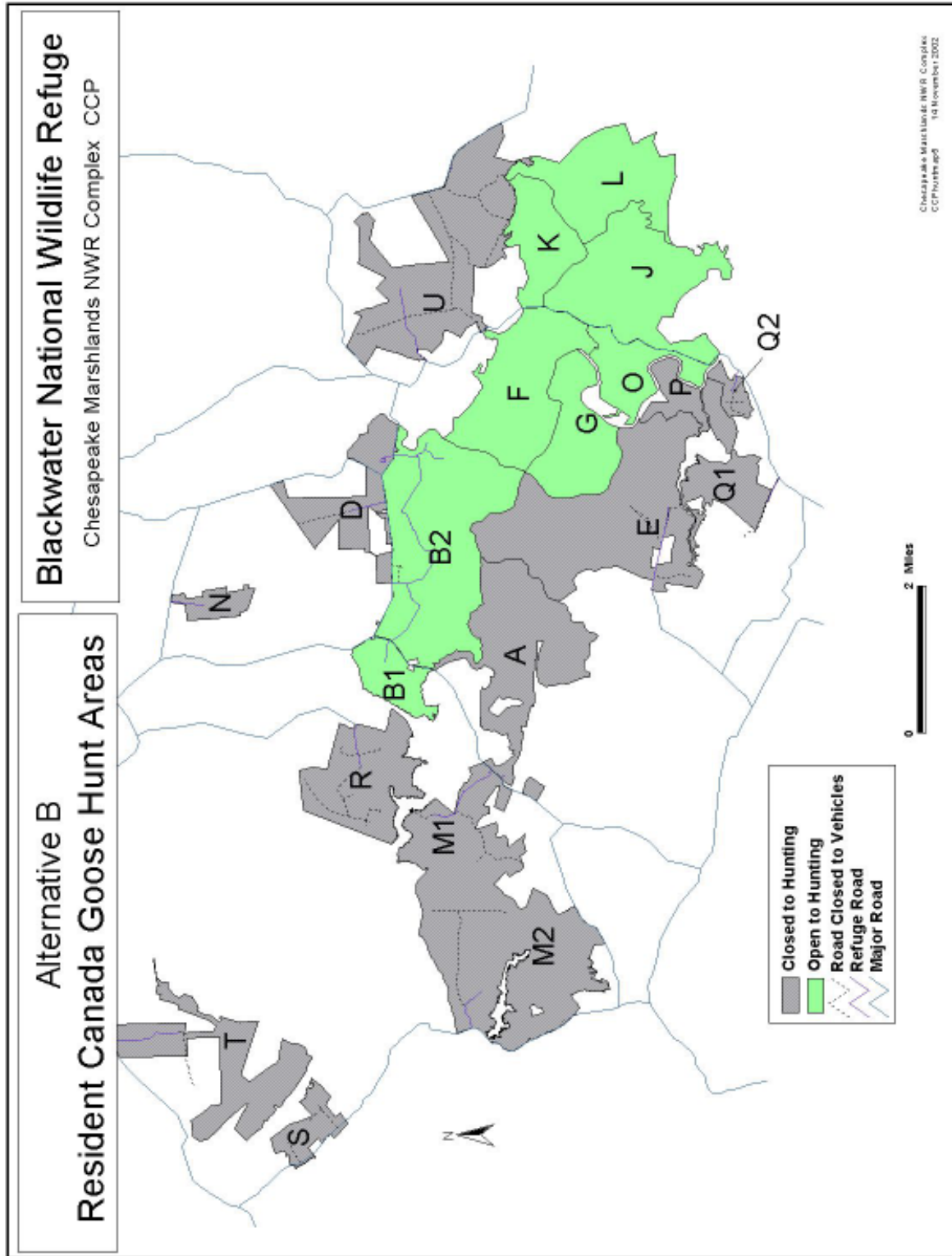


Figure 7. Alternative B: Proposed resident Canada goose hunt areas

In alternative B, we will



Ovenbird.

USFWS photo

- manage and restore habitats, where appropriate;
- develop and implement forest management programs that support forest interior dwelling migratory birds and endangered species;
- eradicate or control injurious, invasive, and exotic species;
- protect an additional 31,314 acres of land by the most appropriate methods, concentrating on conservation easements;
- ensure that refuge purposes are secure, yet incorporate additional management programs that focus on biodiversity using all available tools;
- develop and implement programs and partnerships to address threats and issues;
- ensure vibrant community involvement in all activities;
- restore the natural hydrology of the Blackwater River;
- expand the “big six” public recreational uses to the extent they remain compatible with refuge purposes;
- focus on educating the public about the importance of their national wildlife refuges at all ecological and social scales, explaining external threats; and
- implement aggressive inventory and monitoring, research, and adaptive management programs.

Alternative C. Maximum Public Use with No Habitat Management

In alternative C, active habitat manipulation, restoration, or intervention would not occur, and nature would be left to take its course. This alternative would focus exclusively on managing only Federal trust resources within the limits of laws, other mandates, or policies expressed by Congress and the Service. No programs would be designed or implemented for a variety of other species, habitats, or processes that are not formally recognized as mandates of the Refuge System. Biological diversity and ecosystem management would not be goals under this alternative. The “big six” public recreational programs would be maximized within the limits of compatibility and resource protection.

Active management of the moist soil and cropland units would be eliminated; populations of exotic species would proceed without human intervention;

and, periodic prescribed fires would be conducted only as a safety precaution to reduce fuel loads. Efforts to address sea-level rise, water quality impacts, and other known or suspected anthropogenic impacts will not occur. The Refuge Complex will not initiate or perform significant inventory and monitoring efforts, except as required by relevant mandates for Federal trust species. This alternative strives to the highest possible degree to maintain the essential wildness of the land and the natural succession of ecosystem and habitats in response to the larger natural environmental and anthropogenic forces acting on the landscape.

In alternative C, we will

- allow natural or anthropogenic forces act upon the communities, habitats, and species within the Refuge Complex;
- protect strategic land (land essential for providing critical habitat for trust species) in concert with partners;
- conduct very few management programs with no adaptive management;
- conduct no significant inventory and monitoring; and
- reallocate all available resources to accommodate compatible “big six” priority public uses.

What resource projects are planned for the next 15 years under Alternative B, the Service’s preferred alternative?

The resource projects summarized below would be accomplished over the next 15 years under implementation of alternative B. Project costs are estimated in today’s dollars. This is not an all-inclusive list.

Project 1. Staffing

The preferred alternative includes three priority levels of staffing. The first-level priority will fill historical and minimum critical mission vacancies needed to accomplish current programs and activities (no expansion of programs, activities, or facilities). The Complex is now operating with only two-thirds of its approved minimum staff; an immediate effort will be made to fill these vacant positions. The second-level priority identifies new positions required to manage the Nanticoke lands when the acreage acquired reaches 5,000 acres. The third-level priority will fully staff the Complex.

Priority Level 1: Fill Current Minimum Staffing Vacancies

Chesapeake Islands Manager (GS-12) (to remain vacant)

Refuge Operations Specialist (GS-11)

Engineering Equipment Operator (WG-10)

Education Specialist (GS-5)

Recreation Aid (GS-5)

Administrative Support Assistant (GS-7)

Estimated cost to the Service: \$339,000

Priority Level 2: Nanticoke Protection Area Positions

Refuge Manager (GS-12) **Note:** This would replace the Island Refuges Manager

Maintenance Worker (WG-8)

Park Ranger (Law Enforcement) (GS-5)

SCEP (GS-5)

Estimated cost to the Service: \$98,000

Priority Level 3: Fully Staff the Nanticoke Protection Area and the Complex

Outdoor Recreation Planner(s) (GS-5)(GS-7)(GS-9)

Biologist (GS-9)

Administrative Support Assistant (GS-5)

Estimated Cost to the Service: \$ 210,000

Project 2. Marsh Restoration

We will restore more than 7,000 acres of emergent marsh on Blackwater NWR to 1933 coverage levels with assistance from the Maryland DNR, U.S. Army Corps of Engineers, EPA, NOAA, National Aquarium at Baltimore, and other partners. We will plug Stewarts Canal, a source of major salt water intrusion, to protect 18,000 acres of freshwater habitat and a Maryland Natural Heritage Area. We will protect the eroding shoreline on Barren and Watts Island, and implement a study to determine the feasibility, proper methods, and strategies to protect and maintain the shorelines and coves that shelter important submerged aquatic vegetation areas on Smith Island.

Estimated cost to the Service: \$1,364,000



Volunteers planting marsh grass.

National Aquarium in Baltimore photo

Project 3. Habitat Inventory and Management

We will implement a number of strategies to provide quality habitat to support 10 percent of Maryland's wintering waterfowl, including intensively managing a minimum of 420 acres of cropland (a 25-percent reduction from current acreage), regulating water levels on 460 acres of moist soil impoundments (a 25-percent increase), and restoring wetlands. We will develop and implement a habitat management plan to create and improve seven forested cores between 400 and 865 acres each to provide contiguous forested areas for 22 species of forest interior dwelling nesting bird species of regional importance. Forest management practices and land protection strategies will be utilized to delist the Delmarva fox squirrel, and maintain bald eagle nesting and roost sites for the refuge's population of 200 bald eagles. All applicable recovery plan objectives for threatened and endangered species will be accomplished. We will continue to appropriately utilize prescribed fire to improve and maintain habitats and to reduce fuel loads to minimize threats from wildfires.

Estimated cost to the Service: \$416,000

Project 4. Forest Management

We will develop and implement forest habitat management. We will reforest all lands previously converted to agriculture that are necessary to expand our forest cores to the minimum acreage to support nesting forest interior dwelling migratory birds and Delmarva fox squirrels. Two miles of 50ft. wide corridors will be planted to connect disjunct forested patches and create travel corridors for fox squirrels. We will implement the timber management improvement plan, and evaluate the relationship of forest succession and harvest procedures to Delmarva fox squirrel use.

Estimated cost to the Service: \$992,000

Project 5. Geographic Information System (GIS)

We will map refuge resources using a geographic information system. Project completion will necessitate acquisition of the necessary computer hardware, software, and satellite scans of the area. Information generated through this effort will greatly facilitate implementation of all refuge management programs.

Estimated cost to the Service: \$250,000.

Project 6. Land Acquisition

A new acquisition boundary will be finalized for the complex. By combining fee title purchases (60 percent) with easements (30 percent) and cooperative agreements (10 percent), we will protect 31,314 additional acres within the proposed acquisition boundary approved for detailed planning by the Director in 1995 (see figure 4, "Current and proposed protected areas). Adding these lands to the Refuge Complex will remove numerous small inholdings and consolidate refuge boundaries, eliminating many administrative and public access issues. In addition, the lands provide additional habitat capability for the refuge and, in at least several areas, excellent opportunities for migratory bird management. All available fee title acquisitions will be from willing sellers only.

Estimated cost to the Service: \$60,000,000.

Project 7. Archaeological Survey

We will complete a comprehensive archaeological survey of all Refuge Complex properties. This project proposal is essential to meet cultural resource mandates and provides baseline information for protection of existing resources and resource and public use development activities.

Estimated cost to the Service: \$84,000.

Project 8. Public Use Developments

Basic developments for implementation of a wildlife-dependent recreation program will be implemented. These developments include directional signing, entrance signs, general brochures, species list brochures, environmental education materials, visitor contact stations, interpretive foot trails, trail head parking, interpretive signing, outdoor classroom sites (non-structural), boundary posting and maintenance.

Estimated cost to the Service: \$570,000

New facilities will include remodeling the existing visitor center to include a multipurpose room capable of seating 150 people and serving as environmental education classrooms. A second story storage room will be remodeled into an observatory and ornithological library. Additional improvements and additional administrative space will be provided for public use and law enforcement staff. More than \$900,000 of the estimated cost for this project will come from grants and partner donations.

Estimated cost to the Service: \$810,000

Opportunities for environmental education and interpretation will be expanded. An environmental education manual will be prepared, and two teacher training workshops will be conducted annually. A minimum of 15 types of environmental education programs will be conducted for at least

150 students each. An environmental education pavilion would be constructed with assistance from the Friends of Blackwater. We would expand our partnerships with local environmental education centers and youth groups.

Estimated cost to the Service: \$813,000

We will provide 100,000 hours of interpretation a year to more than 500,000 visitors. We now provide only 26,000 hours. Interactive computers and live action monitors of ospreys and eagles will be available in the visitor center. Exhibit areas in the existing visitor center will be remodeled, expanded, and updated. The wildlife drive will be redesigned and rerouted to separate motorists and pedestrians and bicyclists. Two additional kiosks would be constructed. A canoe launching area and parking area will be constructed on Route 335. The old observation tower will be replaced with an accessible observation deck. Six observation and photo blinds will increase photo opportunities.

Estimated cost to the Service: \$936,000



Waterfowl hunters.
USFWS photo

Hunting and fishing opportunities will be enhanced and expanded. A new accessible fishing pier will be constructed with the assistance of several partners along Key Wallace Drive on the Little Blackwater River. A canoe and kayak launching area will also be provided on the Nanticoke River and on the Blackwater River at Shorters Wharf.

Estimated cost to the Service: \$557,000.

We will expand big game hunting to all suitable newly acquired lands increasing the area open to big game hunting by almost 10,500 acres. We will provide opportunities for a minimum of 3,000 hunters annually. New opportunities for turkey and waterfowl hunting will be authorized. Spring hunting of resident Canada geese will help control the expanding population of resident geese. Approximately 23,000 acres will remain an inviolate sanctuary for wintering and migrating waterfowl and other wildlife.

Estimated cost to the Service: \$74,000

Public outreach activities will be expanded. Two travelers' information radio stations will be constructed on Route 50. Personal relationships with the media will be strengthened, a weekly news article will be prepared for local newspapers and radio stations, and participation in local, regional, and national events would be expanded. Landowner outreach and education for protection of Delmarva fox squirrels will be developed and implemented.

Estimated cost to the Service: \$186,000

Project 9. Control or eradicate injurious, invasive, and exotic species

We will continue to implement programs to eradicate nutria and mute swans, control gypsy moths, Phragmites, purple loosestrife, Johnson grass, and Canadian thistle, and to reduce the resident Canada goose population to 1989 levels. The multiagency nutria control partnership will continue to cooperate to implement a fully integrated effort based on information gained during a 3-year pilot study and lessons learned from the successful eradication program in Great Britain.

Estimated cost to the Service: \$643,000 (includes current nutria program funding from refuges)

Project 10. Implement Good Science

The public recommended that the Refuge Complex fill four specific information gaps by implementing: (1) a baseline inventory to determine the occurrence and spatial distribution of flora and selected fauna; (2) a long-term monitoring program to determine temporal trends in selected flora and fauna; (3) an adaptive management program to guide significant habitat and population management actions; and (4) detailed research into habitat-species relationships. We would encourage and provide opportunities for research by other agencies, universities, and institutions. We will specifically implement additional research activities with the U.S. Geological Survey to address marsh loss and restoration, effects of sea level rise, and effects of fire management activities. We will maintain facilities for potential use by researchers.

Estimated cost to the Service: \$1,636,000

Project 11. Expand Fire Management Capabilities

Prescribed burning and fire suppression activities will be improved and expanded to woodland areas to improve habitats for forest interior dwelling and nesting migratory birds and Delmarva fox squirrels. New seasonal fire fighter quarters and additional facilities to improve fire fighter safety and maintenance of equipment will be constructed.

Estimated cost to the Service: \$384,000



Prescribed burning on the refuge.
USFWS photo

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Table 1. Tabular Comparison of Alternatives

Blackwater NWR [27](#)
 Island Refuges [44](#)

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Exotic, Invasive, or Injurious Species Management			
Resident Canada Goose	No population control	Reduce population to 350	No population control
Mute Swan	Active population control in accordance with Atlantic Flyway Council (AFC) recommendations	Eradicate by 2010	No population control
Gypsy Moth	Aggressive control (annual egg mass and defoliation surveys and aerial spraying)	Aggressive control as in alternative A, but also implement IPM techniques and silvicultural prescriptions of our Forest Management Plan	No control
Purple Loosestrife	No control	Aggressive mechanical, chemical, biological controls	No control
Nutria	Remove 4,000 nutria annually, using primarily trapping incentives	Eradicate by 2015	No population control

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Johnson Grass and Canadian Thistle	Mechanical and chemical control as necessary	Aggressive mechanical, chemical, and biological control	No control
Phragmites	Mechanical and chemical control in MSUs only	Eradicate in MSUs and reduce below calendar year 2000 acreage in natural marshes through mechanical, chemical, and biological control	No control
Inventory, Monitoring, and Research			
Surveys	Conduct 34 types (not numbers) of biological surveys: <ul style="list-style-type: none"> ■ 4 habitat ■ 8 waterfowl ■ 2 colonial bird ■ 4 big game ■ 1 shorebird ■ 1 mammal ■ 5 raptor ■ 3 breeding bird ■ 1 contaminant ■ 1 forest pest 	In addition to the surveys in alternative A: <ul style="list-style-type: none"> ■ Develop and implement an inventory and monitoring program and baseline inventory ■ Complete GIS ■ Implement long-term monitoring ■ Implement adaptive management <p>Additional surveys include</p>	Eliminate most surveys in alternatives A and B, but continue to <ul style="list-style-type: none"> ■ Develop and implement a Complex-wide inventory and monitoring program, but only for trust species ■ Monitor selected exotics ■ Inventory forests on newly acquired lands ■ Complete GIS <p>Management-based surveys</p>

Blackwater NWR

Alternative A
Species-specific Management

Alternative B
Conservation Biology for
Trust Species Diversity

Alternative C
Maximum Public Use with
No Habitat Management

would be eliminated.

- NAAMP route
- Expanded Region 5 surveys
- MD colonial waterbirds
- MAPS
- Monitor water quality
- Expand forest inventory
- Distribution and inventory of invasive species, rare flora, lepidopterans, threatened or endangered species, and anadromous fish

Research

Limited management-based research

- Greatly expanded research, particularly in an adaptive management context, including
- Nutria Damage Reduction Pilot Program
 - Effects of prescribed fire on DFS, FIDs, marsh habitats
 - Effects of TSI on DFS, FIDs
 - Sea-level rise and land subsidence research

Management-based research would be eliminated.

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
<ul style="list-style-type: none"> ■ American Black Duck Initiative ■ Effects of AFOs on water quality ■ Genetics of blue-winged teal and lesser snow geese 			
Fish and Wildlife Population Management			
Waterfowl	Actively manage habitat to support 6% of Maryland’s AP Canada geese, lesser snow geese, and dabbling duck populations	Actively manage habitat to sustain 10% of Maryland’s AP Canada geese, lesser snow geese, and dabbling duck populations	No active management; protect habitat only; only monitor waterfowl populations
Neotropical Migrants (FIDs)	No management	Actively manage forest habitats for 22 breeding Neotropical or FID and 9 area-sensitive species	No management

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Shore/Marsh/Water Birds	No specific management	<p>Actively manage water levels in 200 acres of MSU specifically for these species</p> <p>Maintain, enhance 15,000 acres of estuarine emergent marsh</p> <p>Manage Pool 3C as marsh or water bird rookery</p>	No management
Raptors	Except for actions identified for raptor species in the “Supplemental Nest Box” programs, no management other than protection	<p>Continue supplemental nest box programs if warranted</p> <p>Manage forest habitats specifically for red-shouldered hawks, broad-winged hawks, Coopers hawks, and barred owls</p>	No active management or monitoring of these species

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Supplemental Nest Structures	Maintain existing structures: <ul style="list-style-type: none"> ■ 30 Osprey platforms ■ 200 Wood Duck boxes ■ 30 Bluebird boxes ■ 10 Barn Owl boxes ■ <10 Prothonotary Warbler boxes 	Evaluate program efficacy in achieving local, regional, and national population goals	Eliminate supplemental nest structures except those used for environmental education.
Fish	No management	Inventory anadromous and interjurisdictional species Restore the natural hydrology of the upper Blackwater River Monitor water quality Implement contaminants study on AFOs	Species inventory and water quality monitoring only
Furbearers	Use public trapping as a tool for managing muskrat, red and gray fox, racoon, river otter, mink, and nutria populations	Continue to use trapping as a management tool for muskrat and nutria only, but modify program to include recommendations from the Nutria Damage Reduction Pilot Program	No management

Blackwater NWR

Alternative A
Species-specific Management

Alternative B
Conservation Biology for
Trust Species Diversity

Alternative C
Maximum Public Use with
No Habitat Management

Threatened and Endangered Species Management

Delmarva Fox Squirrel

Active management in accordance with Recovery Plan including

- Benchmark surveys
- 25 acres of food plots
- Capture for translocation
- Public education and outreach
- Law enforcement
- Forest type inventory
- DFS research

In addition to alternative A:

- Conduct presence-or-absence surveys*
- Extend mark and recapture studies*
- Describe habitat use and requirements*
- Develop integrated habitat protection strategy*
- Field test HSI model*
- Monitor threats to habitats*
- Implement forest habitat management scheme (15" DBH)
- Monitor effects of timber harvest
- Develop, refine, and monitor prescriptive habitat management
- Establish connective forested corridors
- Increase law enforcement*
- Increase public education and outreach

* See alternative C

7 Only the activities identified by asterisks in alternative B

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Bald Eagle	Active management to provide wintering and nesting habitat for 10 nests, with Recovery Plan activities, including <ul style="list-style-type: none"> ■ Maintain an 11,270-acre inviolate sanctuary ■ Protect nesting areas ■ Participate in Midwinter Survey 	Same as alternative A	Same as alternative A
Swamp Pink, Sandplain Gerardia, and Sensitive Joint-Vetch	No management	Determine occurrence, distribution, and abundance, and implement recovery plan	No management
Red-cockaded Woodpecker	Maintain 1,000 acres of mature loblolly pine forest habitat	In addition to alternative A, implement surveys and determine the appropriateness of reintroduction	No active management
Habitat Management			
Cropland Management	Crop 640 acres, force account (100% available for wildlife)	Crop 420 acres (300 acres of grasses/forbs by force account, and 120 acres corn/sorghum by contract) (100% available for wildlife)	No cropland management; allow 560 acres of current cropland to succeed naturally; abandon infrastructures

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Moist Soil Management	Maintain 370 acres as MSUs for wintering or migrating waterfowl	Increase MSUs to 460 acres and manage 200 acres specifically for spring migrating shorebirds	Fire management
Riparian Zone Management	Survey water quality	<p>Promote State and Federal cost share programs</p> <p>Develop partnerships</p> <p>Replace bulkhead at Pool 1</p> <p>Rip-rap the Wildlife Drive</p> <p>Continue water quality surveys</p>	No active management; continue water quality surveys; promote cost share programs.
Fire Management	Annual prescribed fire regime in marshlands, and aggressive wildfire suppression.	<p>Multiple-objective prescribed fire regime of four fire frequencies: annual; 3-yr.; 10-yr.; and no year.</p> <p>Extensive monitoring program.</p> <p>Prescribed fire in marshlands and woodlands.</p> <p>Aggressive wildfire suppression.</p>	<p>Limited suppression fire regime: wildfire suppression where necessary to protect human safety, infrastructures, and important resources.</p> <p>No prescribed fire.</p>

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Forest Management	No active management; continue to acquire forested land	<p>Actively manage current 8,400 acres of forest and acquire additional forest.</p> <p>Forest management includes</p> <ul style="list-style-type: none"> ■ Creating seven contiguous mature forest cores >400 acres each ■ Increasing size of four cores to 865 acres ■ Developing forest corridors ■ Implementing IPM program to control pests ■ Using silvicultural treatments, timber harvest, prescribed fire, TSI, refo- restation, and salvage cuts to maintain, enhance forest health ■ Implementing monitoring components 	Same as alternative A, and include a monitoring component

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Public Use Management			
Environmental Education	Conduct one environmental education (EE) program	Conduct 15 EE programs	Conduct 19 EE programs
	Conduct one teacher workshop per year	Conduct two teacher workshops per year	Conduct four teacher workshops per year
	Loan EE equipment to teachers Conduct two group programs	Publish EE Manual for three age groups	Publish EE manual for four age groups
	Active role in Dorchester County Envirothon	Conduct nine group programs	Conduct 20 group programs
	Maintain environmental education pavilion	Develop Envirothon for two age groups	Develop Envirothon for three age groups
	Conduct one shared EE program	Purchase land and build EE outdoor classroom	Purchase land and build EE Center
	Train 100 volunteers per year	Conduct five shared EE programs	Conduct 10 shared EE programs
	No website programs	Train 250 volunteers	Train 350 volunteers
		Develop three changeable EE website programs	Develop five changeable EE website programs
Environmental Interpretation	Maintain 3,000-sq-ft Visitor	Remodel Visitor Center w/ new	Remodel Visitor Center w/ new

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
	Center w/ outdated exhibits	exhibits	exhibits
	Conduct 26,000 hours interpretation annually	Conduct 100,000 hours interpretation annually	Conduct 150,000 hours interpretation annually
	Conduct 3 special events and 12 programs annually	Conduct 8 special events and 24 programs annually	Conduct 8 special events and 52 programs annually
	Maintain 11 interpretive brochures	Develop 17 interpretive brochures	Develop 30 interpretive brochures
	Maintain Refuge interpretive video and film library	Update refuge video and film library	Update refuge video and film library
	Maintain four kiosks with interpretive panels	Build 2 kiosks with interpretive panels	Build 30 kiosks with interpretive panels
		Build butterfly garden	Build butterfly garden
		Serve as Chesapeake Gateway site	Serve as Chesapeake Gateway site
		Develop habitat demonstration area	Develop habitat demonstration area
		Develop MOU with South Dorchester Folk Museum	Develop MOU with South Dorchester Folk Museum

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Wildlife Observation and Photography	Maintain 6.5-mile Wildlife Drive	Reconstruct 6.5-mile Wildlife Drive	Reconstruct 6.5-mile Wildlife Drive
	3 to 4 miles of hiking trails	5 miles of hiking trails	40 miles of hiking trails
	No canoe, kayak trails; boating permitted from April 1 to September 30	10 miles canoe, kayak trails (open same as alternative A)	20 miles of canoe, kayak trails (open year-round)
	Do not rebuild observation tower	Build ADA observation tower	Build ADA observation tower
	Photography permitted	Build three photo blinds	Build six photo blinds
	No photography programs	Develop four photo programs	Develop eight photo programs
Fishing and Crabbing	April 1–September 30 boat only; 5,350 acres	April 1–September 30; boat only; 5,785 acres	Year-round bank and boat fishing; entire refuge
	No public boat or canoe ramps	Build canoe ramp and parking	Permit public use of Little Blackwater ramp
	No refuge shoreline access to	Build accessible fishing	

Tabular Comparison of Alternatives

Blackwater NWR		Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		fishing	boardwalk, pier, and parking Implement concessionaire canoe rentals	Build trails, parking and kiosks to all fishing areas Implement concessionaire canoe rentals Build island camping platforms and stocked fish ponds
Hunting	Big Game: Sika and White-tailed Deer	4 days quota hunt; 7,000 acres (firearms only)	51 days quota hunt; 10,000 acres (archery, muzzle- loader, firearms, disabled)	150 days; entire refuge; no quota (archery, muzzle-loader, firearms, disabled)
	Resident Geese	None	8,300 acres spring season; quota	Entire refuge, State season; no quota
	Waterfowl	None	40% of new acquisition areas, State season; no quota	40% all refuge areas; State season; no quota
	Turkey	None	15 days spring season; quota	State season; no quota
	Small Game	None	None	State season; no quota
Outreach		Display refuge exhibit at special events on Eastern Shore	Display refuge exhibit in all local events on Eastern Shore	Display exhibit in all local events and all events within reasonable traveling distance

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Participate in other organizational events and programs Produce news releases as needed	Develop partnerships with other organizational events and activities Provide monthly reports to local radio stations and newspapers	Develop partnerships with other organizational events and activities Provide weekly reports to radio and news media	
Continue interactions and relations with congress and other organizations	Build stronger relationships with congress and other organizations	Build even stronger relationships with congress and NGOs	
Provide programs offsite when requested	Provide programs offsite monthly	Provide programs offsite weekly	
Land Protection	Acquire inholdings only 3,865 acres remaining	Protect 31,300 additional acres, acquire inholdings, and establish Nanticoke River division	Same as alternative B

Tabular Comparison of Alternatives

Blackwater NWR	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Cultural, Social, and Economic Resources Management			
Archeology and History	No archeological or historical review	Complete cultural reconnaissance in 2000	Same as alternative B
Refuge Administration			
Staffing	18 FTEs: 16 current plus 2 tier 1 FTEs	26.5 FTEs: alternative A plus Nanticoke area staff and 2 Outdoor Rec. Planners	32.5 FTEs: alternative B plus 2 Park Rangers, 2 LE, 1 BioTech, and 1 RecAid
	8 FTEs fire management	10 FTEs fire management	9 FTEs fire management w/ no prescribed burning and more wildfires
Wilderness Review	Completed; none recommended	Completed; none recommended	Same as alternative B

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Exotic, Invasive, or Injurious Species Management			
Mute Swans	Follow the guidelines of the Swan Management Plan	Eradicate mute swans	No management
Phragmites	Limited control	Aggressive control to reduce below calendar year 2000 acreage	No management
Inventory, Monitoring, and Research			
Research	Limited management-based research	Long-term monitoring and adaptive research, including <ul style="list-style-type: none"> ■ Evaluate need for marshland burning study to include wildlife values ■ Evaluate what is limiting SAV ■ Identify sources of water 	Same as alternative A, except no research for adaptive management

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		<p data-bbox="1163 412 1283 443">pollution</p> <ul style="list-style-type: none"> <li data-bbox="1119 451 1444 482">■ Monitor water quality <li data-bbox="1119 490 1444 591">■ Assess the efficacy of artificial nesting structures <li data-bbox="1119 599 1457 742">■ Before-and-after monitoring of wetland restoration and erosion control <li data-bbox="1119 750 1428 850">■ Conduct research assigned in recovery plans <li data-bbox="1119 859 1331 889">■ Develop GIS <li data-bbox="1119 898 1421 998">■ Evaluate fish use of island and mainland wetlands <li data-bbox="1119 1006 1434 1037">■ Band brown pelicans <li data-bbox="1119 1045 1472 1117">■ Measure water turbidity monthly <li data-bbox="1119 1125 1360 1156">■ Assess terrapin 	

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Surveys	Conduct 19 types of surveys: <ul style="list-style-type: none"> ■ 2 habitat ■ 6 waterfowl ■ 2 colonial bird ■ 1 furbearer ■ 1 shorebird ■ 4 raptor ■ 2 breeding bird, and ■ 1 contaminant survey. 	<p>populations with recommendations for management</p> <ul style="list-style-type: none"> ■ Monitor State of Virginia black duck nests ■ Evaluate the effects of predators on ground nesters <p>In addition to alternative A:</p> <ul style="list-style-type: none"> ■ Develop and implement a baseline inventory plan for refuge complex ■ Develop GIS <p>Also implement other surveys:</p> <ul style="list-style-type: none"> ■ Marshbird callback 	<p>Eliminate most surveys in alternatives A and B, but continue to</p> <ul style="list-style-type: none"> ■ Develop and implement Complex-wide I&M Program, but only for Federal trust species ■ Monitor selected exotics ■ Inventory forests on newly acquired lands

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		<ul style="list-style-type: none"> ■ Black duck production ■ Butterfly stopover use of Island Refuges 	<ul style="list-style-type: none"> ■ Complete development of GIS <p>Management-based surveys would be eliminated.</p>

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Fish and Wildlife Population Management			
Raptors	Maintain nesting structures for ospreys and hacking towers for peregrine falcons	Maintain but assess the contributions of existing nesting structures, and implement recommendations	Remove structures
Waterfowl	Provide sufficient habitat to support 300,000 AP Canada goose use days, 2,000,000 dabbling duck use days, and 150,000 tundra swan use days annually	Provide sufficient habitat to support 5% of AP Canada geese, dabbling ducks, and tundra swans in MD Restore, protect, enhance habitat for black duck production	No active management; protect habitat only; monitor pops.
Shorebirds, Gulls, Terns, et al.	No management	Create islands with dredged material Protect and create upland forest sites (reforestation)	No active management; protect habitat only; monitor populations

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		Assess predator populations and need for control Restore dredged material disposal areas for nesting	
Colonial Birds	Banding and surveys	In addition to alternative A, create 25 acres of colonial bird nesting habitat	No management
Neotropical Migrants	No management	Establish breeding bird survey Restore, protect, and enhance habitats for these sparrows: seaside, Henslows, and sharptail	No active management; protect habitats only
Marsh and Water Birds	Maryland DNR co-op program of banding and inventory	Implement marsh callback survey	Same as alternative A
Threatened and Endangered Species Management			

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Bald Eagle (T)	Protect nests	Prioritize protecting shoreline and pine islands to prevent loss of nest sites Implement bald eagle recovery plan objectives	Same as alternative A
Northeastern Beach Tiger Beetle (E)	No management	Survey occurrence on island beaches Implement recovery plan Consider reintroduction Create 10 acres of beach and dune habitats	No management
Habitat Management			
Wetland Restoration and Erosion Control	No management	Restore 100 acres of wetland habitat Protect 2 miles of shoreline at Barren Island	No management

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		<p>Create 200 ac of emergent wetland at Martin NWR</p> <p>Restore 5,000 acres of SAV at Martin NWR</p> <p>Protect 15 miles of shoreline at Martin NWR</p> <p>Develop a habitat management plan</p> <p>Develop plans with USACOE for addressing shoreline erosion throughout the island chain</p> <p>Restore SAV beds on the Island Refuges to 1970 levels</p> <p>Create habitat using dredged material</p>	

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		Restore 200 acres of wetland and beach habitats throughout the Island Refuges, using dredged material	
Public Use Management			
Environmental Education	700 students per year	Purchase land and build EE Center in partnership with CBF; 15,000 students per year Develop EE programs and restoration projects Develop EE handbook	Same as alternative B
Environmental Interpretation	Maintain Middleton House with outdated exhibits at Ewell, Monday–Friday Maintain kiosk at Middleton House Conduct 1,000 hours guided tours	Upgrade Middleton House and exhibits Upgrade Martin NWR brochure, and expand informational materials to	Same as alternative B; but, increase the intensity and hours of guided tours to at least 20,000 hours.

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
		<p>include all Island Refuges</p> <p>Build kiosk at Ewell ferry dock and at Crisfield</p> <p>Develop Island Refuges leaflet and other self-guided leaflets</p> <p>Conduct 10,000 hours guided tours</p> <p>Develop professional Island Refuges video</p> <p>Build outdoor displays</p> <p>Develop Friends group and sales outlet</p> <p>Develop self-guided canoe trail</p> <p>Develop special events</p>	

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Fishing and Crabbing	Not allowed from refuge properties	Create web site Develop 100-person volunteer program Same as alternative A	Open islands to bank fishing Build trails with kiosks at all fishing areas Build piers on islands
Hunting	No hunting	Quota waterfowl and rail hunting; State seasons on Spring, Watts, and South Marsh Islands	Same as alternative B

Tabular Comparison of Alternatives

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Land Protection	Continue to acquire inholdings within approved boundary	Same as A plus Cooperative Management Agreements with partners	Same as alternative B
Cultural, Social, and Economic Resources Management			
Cultural, Social, and Economic Resources	No management	Establish a sustainable lifestyle foundation Cooperate with Somerset County heritage and tourism groups Assess cultural resources on the Island Refuges	Same as alternative B
Refuge Administration			
Facilities and Infrastructure	Intentionally left blank	Build a visitor and research center to highlight island ecology and the local water-man culture	Same as alternative B

Island Refuges	Alternative A Species-specific Management	Alternative B Conservation Biology for Trust Species Diversity	Alternative C Maximum Public Use with No Habitat Management
Minimum Staffing	2.5 FTEs	2.5 FTEs	6.5 FTEs
Wilderness Review	Reviewed Martin NWR in 1971; no designation	Completed; none recommended	Same as alternative B

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