

**Chesapeake Marshlands National Wildlife Refuge Complex Hunting Program
Final Environmental Assessment**

February 2007

**FINDING OF NO SIGNIFICANT IMPACT
CHESAPEAKE MARSHLANDS NWRC
HUNTING OPPORTUNITIES**

The U.S. Fish and Wildlife Service proposes to open to turkey and waterfowl hunting on Chesapeake Marshlands National Wildlife Refuge Complex. The Environmental Assessment (EA) for hunting opportunities was issued as a tiered EA from the Draft Comprehensive Conservation Plan and EA (Draft CCP/EA) of July 2005 for the Chesapeake Marshlands NWR Complex. The Hunt EA evaluated three hunt program alternatives, carefully considering their impacts on the environment, and their potential contribution to the mission of the National Wildlife Refuge System, and the refuge's purposes and goals. Hunting activities will be permitted, but administratively limited to those areas specified in the refuge-specific regulations. All or parts of the refuge may be closed to hunting at any time if necessary for public safety, to provide wildlife sanctuary, or for other reasons.

The Service has analyzed the following alternatives to the proposal in an Environmental Assessment (copy attached):

Alternative A: This was the No Action Alternative in the EA required by the Council of Environmental Quality's regulations on implementing the National Environmental Policy Act. Under this alternative, there would be no change from our current hunt programs on refuge lands. The refuge would continue existing programs they currently have in place. No new efforts are undertaken.

Alternative B: This alternative was the Service's Proposed Action in the Draft CCP/EA. This alternative also offers additional opportunities for turkey and waterfowl hunting. These new hunting opportunities would be limited to certain days of the week and specific areas within the refuge.

Alternative C: Alternative C is similar to Alternative B, but does not place any additional restrictions on the state hunting seasons for turkey and waterfowl.

The preferred alternative was selected over the other alternatives because:

1. The preferred alternative would allow the refuge to manage wildlife populations, allow the public to harvest a renewable resource, promote a wildlife-oriented recreational opportunity, increase awareness of Chesapeake Marshlands NWRC and the National Wildlife Refuge System, and meet public demand.
2. The preferred alternative is compatible with general Service policy regarding the establishment of hunting on National Wildlife Refuges.
3. The preferred alternative is compatible with the purpose for which Chesapeake Marshlands NWRC was established.

4. This proposal does not initiate widespread controversy or litigation.
5. There are no conflicts with local, state, regional, or federal plans or policies.

Implementation of the agency's decision would be expected to result in the following environmental, social, and economic effects:

1. The refuge could better manage wildlife populations.
2. This would allow the public to harvest a renewable resource.
3. The public would have increased opportunity for wildlife-oriented recreation.
4. Local businesses would benefit from hunters visiting from surrounding parishes.
5. The Service will be perceived as a good steward of the land by continuing traditional uses of land in Maryland.

Copies of the Environmental Assessment are available by writing:

Chesapeake Marshlands NWRC
2145 Key Wallace Drive
Cambridge, MD 21613

Therefore, it is my determination that the proposal does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of the National Environment Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. This determination is based on the following factors (40 CFR 1508.27):

1. Both beneficial and adverse effects have been considered and this action will not have a significant effect on the human environment (EA, page 26-30)
2. The project will not significantly effect any unique characteristics of the geographic area such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas (EA, page 18, 20, 26-28).
3. There will be no cumulative significant impacts on the environment. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions (EA, pages 20-32).
4. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources (EA, pages 19, 28).
5. The actions are not likely to adversely affect endangered or threatened species, or their habitats (Intra-Service Section 7 Biological Evaluation Form attached to EA).

6. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment (EA, pages 32).

References: Environmental Assessment of 2007 Hunt Plan for Chesapeake Marshlands NWRC, Hunting Plan, Compatibility Determination, Letters of Concurrence, Refuge-specific Regulations, Intra-Service Section 7 Evaluation



Marvin Moriarty
Regional Director
U.S. Fish and Wildlife Service
Hadley, Massachusetts

Acting

3-30-07
Date

UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION STATEMENT

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of **implementing a turkey and waterfowl hunting program for Blackwater NWR**:

Check One:

	is a categorical exclusion as provided by 516 DM 2, Appendix 1 and 516 DM 6, Appendix 1. No further NEPA documentation will therefore be made.
✓	is found not to have significant environmental effects as determined by the attached environmental assessment and finding of no significant impact.
	is found to have significant effects and, therefore, further consideration of this action will require a notice of intent to be published in the <u>Federal Register</u> announcing the decision to prepare an EIS.
	is not approved because of unacceptable environmental damage, or violation of Fish and Wildlife Service mandates, policy, regulations, or procedures.
	is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents (list):
Endangered Species Act, Section 7 Consultation, 2006
Compatibility Determination, 2006

Signature Approval:

1. Lawrence T. McGowan 3/27/07
Originator Date

2. M. S. G. R. L. 3/30/07
WO/RO Environmental Coordinator Date

3. Anthony D. Lopez 3/30/07
Regional Chief Date
National Wildlife Refuge System

4. [Signature] 3/30/07
Regional Director Acting Date

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Introduction

As a result of a 2003 lawsuit filed by the Fund for Animals, the U.S. Fish and Wildlife Service (Service) is required to amend environmental assessments that describe hunting programs at sixteen national wildlife refuges located in the Northeast Region. The amended environmental assessments will address the cumulative impacts of hunting at all refuges which were named in the lawsuit. This document addresses the hunting programs at Chesapeake Marshlands National Wildlife Refuge Complex in Maryland.

The Draft Comprehensive Conservation Plan and Environmental Assessment for the Chesapeake Marshlands National Wildlife Refuge Complex, including Blackwater NWR was released for public review in May 2005. The CCP/EA outlined 3 alternatives for turkey and waterfowl hunting opportunities. This final EA for hunting tiers from the final CCP/EA, which was approved and signed in August 2006. The plan presents the management goals, objectives, and strategies that will best achieve the vision for the Refuge Complex, accomplish the purposes of each refuge, contribute to the mission of the National Wildlife Refuge System, fulfill our legal mandates, and serve the American public. Alternative B represents our preferred alternative which is the management strategy approved in the final CCP. Chesapeake Marshlands NWRC first proposed opening for turkey and waterfowl hunting in an environmental assessment that opened to a public comment period in 2006. Cumulative impacts of the proposed hunting programs will be discussed following a description of the alternatives that were first proposed in 2006.

I. Purpose and Need for Action

As a part of the National Wildlife Refuge Improvement Act of 1997, Congress identified hunting as one of six priority public uses that should be facilitated on national wildlife refuges. Providing opportunities for hunting and fishing where appropriate and compatible with refuge purposes is a specific refuge objective identified in the CCP and will contribute to the achievement of Goal 4. Hunting will have no impact on the other four refuge goals.

Background

In the 1930s, most of Dorchester County was rural. Hunting was a means of providing food for the table, as well as an accepted, popular form of recreation. The local populace hunted on their land, and allowed others to hunt on their land. Blackwater NWR was considered a sanctuary for wildlife, and protected from poachers. Few visitors came to the refuge.

A 1949 amendment to the Duck Stamp Act permitted hunting on 25 percent of the land purchased for the Refuge System with Duck Stamp funds, but Blackwater NWR remained closed to hunting. [Note: Later amendments authorized hunting on up to 40 percent of the land purchased.] After World War II, Americans traveled the Nation's back roads and discovered their national wildlife refuges. Interest developed in using refuges for recreation other than hunting.

Although most wanted to share with their families the sights and sounds of wildlife and the wonders of the living world, many also wanted to use their refuges to sail, swim, camp, fish, hike, jog, water ski, ride horses, sunbathe, bicycle, and rock-climb. Guidance in the first Refuge Manual (1943) left the door open to public uses for the cause of building public support, but conflicts between wildlife and public uses could be foreseen. In the 1957 Refuge Manual, guidance on how to decide which public uses to allow hinted at a wildlife-first priority, but sent mixed signals.

The Refuge Recreation Act of 1962 and the Refuge Administration Act of 1966 placed into law the concept that refuges would be closed to all recreation uses, until the refuge managers could determine that a proposed use was compatible with the purpose for establishing the refuge, and that sufficient funds were available to administer those uses. Usually, these determinations were made locally and, in many cases, were based on local pressures and interests. The compatibility determination for hunting on Blackwater NWR was approved on August 26, 1994.

Waterfowl hunting in Dorchester County had been a major recreational activity, but when hunters discovered the abundance of deer, and especially the exotic sika deer that could not be found elsewhere, they swarmed to Dorchester County. Interest in hunting on Blackwater NWR increased. When the farming community complained that the ever-increasing population of deer on the refuge seriously depredated their crops, interest in promoting hunting on the refuge increased even more. To assist with the crop situation and provide recreation, the refuge deer hunting program began in 1985. Although the current program allows most of the hunters that apply to participate, during the CCP scoping meetings, hunters requested increased opportunities to hunt deer. They also requested a turkey hunt and a resident goose hunt. The resident Canada geese have become major competitors with native wildlife, and the public recommended hunting as a means of controlling the growing population.

II. Proposed Action and the Alternatives

Alternative A. No Action Alternative

Big game hunting for white-tailed and sika deer would continue to be permitted for 4 days of shotgun hunting (generally Mondays and Fridays of the 2-week State season) annually on Blackwater NWR, in accordance with State regulations. Deer hunting would occur on approximately 7,000 acres, which is 30 percent of the refuge and 70 percent of the habitat occupied by sika and white-tailed deer. White-tailed deer are more abundant in the higher woodland areas near agricultural fields of corn and soybeans. Sika deer are more common in the lower and wetter areas of the refuge woodlands and, at times, in the marsh.

Hunting areas would be located in upland forest and forested wetland habitat, away from public use areas, away from high-density waterfowl use areas, and away from most of the marsh and open water. Portions of the marshes adjacent to forested wetlands would be hunted for sika deer; however, these areas tend not to be intensively used by waterfowl, as evidenced by past biweekly aerial waterfowl surveys. No other hunting would be available for the public on Blackwater NWR. The Wildlife Drive would be closed to other, non-hunting visitors during the 4-day shotgun hunt. The remainder of the Blackwater NWR hunt areas would be closed to other types

of public entry throughout the year. A check station would be operated by staff to collect biological data on harvested deer.

The refuge would continue to be divided into hunt areas defined by readily identifiable boundaries. Hunter densities in each hunt area would be no more than one hunter per 20 acres, and could range as high as one hunter per 40 acres.

Strategies for the Chesapeake Island Refuges

There would continue to be no opportunities for hunting on the Island Refuges.

Alternative B. Additional hunting opportunities for turkey and waterfowl for limited times within state seasons

The number of hunting days and types of hunts at Blackwater NWR would be increased, as would the acreage available for big game hunting (approximately 10,430 acres, and increasing with protection). Big game hunting for white-tailed and sika deer would be permitted for a minimum of 53 days (45 days of archery hunting generally beginning the last Saturday in September, continuing consecutively until mid-November, and ending with a late archery season beginning the first Saturday in January and ending the third Saturday in January; 2 days of muzzle-loading rifle or shotgun hunting the third Friday and Saturday in October; 2 days of youth only shotgun hunting the second and fourth Saturdays in November; and 4 days of shotgun hunting the first and second Mondays and Fridays of the statewide firearms season), all within State seasons, and consistent with State weapons, bag limits, and hunting hours.

During the archery seasons, all vehicle access would be prohibited, and hunters would walk in from existing designated parking areas. During the firearms seasons, vehicles would be restricted to designated refuge roadways. There would be no off-road vehicle or ATV use allowed during any hunting season. There would be no access allowed by boats during any of the big game hunting seasons. The first section of the Wildlife Drive would only be closed the first 2 days of the shotgun hunt, leaving the second part of the Wildlife Drive open for public use. Hunting opportunities would be provided to a minimum of 3,000 hunters annually on a first come, first served, mail in system (non-quota for the archery season, but with quotas for the firearms hunts).

Hunters would be restricted to zoned areas for safe distribution, with a ratio of no more than one hunter per 20 acres, although some areas may have only one hunter per 40 acres. Blackwater NWR would honor the commitments related to Blackwater NWR protections where the Service assured the public that the historical tradition of hunting deer would be permitted if compatible with the objectives of Blackwater NWR. With the protection of additional property, the refuge would open other areas suitable to hunting with the number of hunters per acre the same, and would increase the number of total hunters accordingly. Check stations would be operated by staff and volunteers during muzzle-loader and shotgun hunts to obtain age, sex, species, and weight data. Deer killed during the archery season would be required to be checked at a Maryland DNR certified checking station. An annual hunt program would be prepared and submitted for review prior to July 1. Summaries of the biological information would be published in the Annual Narrative Report. Administrative fees would be charged for the permits.

Senior citizens and youth would receive a 50-percent discount on these fees. Fees would be utilized to hire a hunt program coordinator and maintain parking areas and signs.

One area of the refuge would be designated for certified wheelchair-bound big game hunters. Hunt leaflets, regulations, and maps would be prepared and published annually, and distributed to hunters. Refuge-specific regulations would be published annually in the Federal Register and codified in Title 50, Part 32. A hunter database would be maintained to facilitate mailings and distribution of information. Blackwater NWR would continue the same precautions for threatened and endangered species and migratory waterfowl as in alternative A. Hunting would be regulated in time and space to eliminate conflicts with endangered species and other public uses and to ensure compatibility with refuge purposes. Annual spotlight surveys, harvest data, herd health conditions, and available habitat would continue to ensure that the deer hunt remained biologically sound.

Deer hunting, while maintaining herd numbers within acceptable levels, would continue to provide opportunities to use a renewable resource. Hunting seasons would be adjusted annually to take into consideration changes indicated in herd quality by biological monitoring (APCs, antler size, reproductive rates, etc.).

By April 2007, Blackwater NWR would be open to spring turkey hunting in accordance with State season regulations. Spring turkey hunting on a quota basis would be open Tuesdays and Saturdays for 5 weeks (10 days) during the State season (April 18 to May 16). Turkey hunting would require a permit determined by a lottery system issued to 14 hunters per day (140 hunters) on approximately 7,485 acres in 10 areas (Areas B1, D, M2, N, R, S, T, U1, U2, and U3) located where public use would not occur as specified in the Annual Hunt Plan. Scout days would be authorized the day before each hunt day. New areas would be evaluated and considered as they are protected that would not conflict with public use areas or endangered and threatened species (bald eagle) and would not have a negative impact on other wildlife and habitat resources or public safety. A compatibility determination would be completed for the Blackwater NWR turkey hunt before it would be initiated.

By Spring 2007, Blackwater NWR would be open to spring hunting (March 15 through April 15) of resident Canada geese according to the Annual Hunt Plan based on the Integrated Wildlife Damage Management Plan for Control of Resident Canada Geese, if the State opens a spring season or if consistent with the Service EIS on managing these injurious resident waterfowl. Hunting would occur in areas that would not conflict with public use or endangered and threatened species (bald eagle) and would not have a negative impact on other wildlife and habitat resources or public safety. Boating access to the hunt areas would be closed to non-hunters during the hunting season. Resident goose hunting would require a permit determined by a lottery system issued for 30 blind sites constructed by the hunter within 100 yards of a numbered post. The blind sites would be located in areas B1, B2, G, F, J, K, L, and O on approximately 8,300 acres of marsh (3,731 acres), fields (70 acres), and open water (4,500 acres). Thirty permits per day (27 days) would be issued providing 810 recreational waterfowl hunting opportunities. New areas would be evaluated and considered as they are protected that would not conflict with public use areas or endangered and threatened species (bald eagle),

would not have a negative impact on other wildlife and habitat resources, or adversely affect public safety. Retrievers would be permitted.

Migratory waterfowl hunting would be conducted along both sides of the upper portion of the Blackwater River from the 335 bridge to Route 16, on Beaver Dam Creek (Areas B, M, R, and S, figure 1) (Less than 10 percent of the existing refuge), and around Barren Island, Bishops Head, and Spring Island. Up to 40% of all future acquisitions, including the proposed Nanticoke River lands and waters, will be open for waterfowl hunting. We will permit 13 hunt parties per hunt day during waterfowl season. Hunters who are certified permanently mobility impaired by a physician may be accompanied by a permitted assistant who may also hunt.

Strategies for the Chesapeake Island Refuges

With more than 5,000 acres available on the Island Refuges, waterfowl and rail hunting could be proposed at a later date where compatible in areas not affected by Secretarial Closing Order. Quota waterfowl and rail hunting, in accordance with state seasons and bag limits, will be considered on Spring Island, Watts Island, and on South Marsh Island, should Maryland DNR enter into an MOU with the Service for its management or decide to sell the island to the Service. There would be no hunting on Martin NWR as stated in the Secretarial Closing Order. There would be no hunting on Bloodsworth Island for human safety.

Alternative C. Additional hunting opportunities for deer, small game, turkey and waterfowl for entire state seasons.

Hunting would increase: forest game (150 hunting days); small game except squirrels (150 hunting days); big game (105 hunting days); and waterfowl (184 hunting days), in conformance with State species seasons and bag limits, and with no quota system. Hunters would be authorized to use refuge roads during all hunting seasons. The seasonal restrictions and waterway closures on Blackwater NWR would be eliminated. Waterfowl hunting would be authorized for the maximum 40 percent of all respective refuge areas. Recreational turtle trapping would be permitted in all areas according to State seasons and regulations.

Kiosks and parking areas would be constructed for each hunt area to provide hunt maps and hunting information. Signs would be installed to provide hunting information for hunters. Vehicles would be restricted to existing roads. Two additional full-time Law Enforcement Officers would be hired to enforce hunting regulations for the increased number of hunters and increased hunt areas and other refuge regulations. In accordance with the Management Guidelines for Bald Eagles in the Chesapeake, the refuge would continue to restrict hunting near eagle nests to a minimum radius of 250 yards. Eagle roost sites would be protected by a ¼-mile minimum buffer zone where no entry would be permitted.

Strategies for the Chesapeake Island Refuges

Approximately 5,000 acres would be approved for both waterfowl and rail hunting, in accordance with state seasons and bag limits, with no quotas on the number of hunters. Under the Secretarial Order against the taking of waterfowl, there would be no hunting on Martin NWR, or on Bloodsworth Island, because of safety issues.

III. Affected Environment

The environment affected by the proposed action would be primarily the vegetation and wildlife resources; however some effect could occur on the physical resources of soils, hydrology, and air quality. Cultural, aesthetic, and socio-economic resources also could be impacted. Discussion of the affected environment and impacts will be limited to these resources, which have been identified as the most likely to be affected by the proposed action and its alternatives.

A. Physical Resources

In this section, information is presented regarding the physical resources that could be affected by or affect the turkey and waterfowl hunting on Chesapeake Marshlands NWR. Specifically, this section will cover location, geology and soils, hydrology, and air quality.

1. Location

Chesapeake Marshlands NWR is comprised of Blackwater NWR and the Chesapeake Island Refuges, which consist of Martin NWR, Eastern Neck NWR, Susquehanna NWR and its Baren Island, Watts Island, Bishops Head, and Spring Island Divisions. Blackwater NWR is located south of the Choptank River on the eastern side of the Chesapeake Bay, Maryland's Eastern Shore. Both areas are part of the Chesapeake Bay Ecosystem, the largest estuary in the United States. Isolated islands or small clumps of firm ground dot the vast marsh landscape. Surrounded by shallow sounds, marsh islands, and adjacent waters are the Bay's most productive estuarine areas. They produce the aquatic and emergent plant communities, which in turn provide optimum habitat for large concentrations of waterfowl, and nursery areas for small fish and crabs. Blackwater NWR is located in Dorchester County, Maryland, approximately 12 miles south of Cambridge. Blackwater NWR is currently comprised of approximately 23,444 acres of tidal marsh and open water areas, wooded wetlands, loblolly pine and mixed hardwood forests, freshwater impoundments, and agricultural lands.

2. Geology and Soils

Soils data for Blackwater and its surrounding focus area included in the approved Preliminary Project Plan for additional land acquisition are compiled in a survey of Dorchester County by Brewer (1995), a recent update of an earlier report (Anonymous 1963). Soil associations in these areas include Elkton-Othello and Tidal marsh, with the latter type encompassing a majority of the current refuge. The Elkton-Othello association is described as "moderately fine textured to medium-textured soils that are dominantly poorly drained" (Anonymous 1963). Tidal marsh designates areas subject to flooding by salt water. A total of 11 major soil types are present in the survey area. The most prevalent are the Bestpitch and Transquaking series, found on estuarine tidal marshes; Elkton series, found on lowland flats and small depressions; Honga peat, found on brackish submerged upland marshes along tidally influenced bays; Othello series, found on lowland flats; and Sunken mucky silt loam, found on lowland flats (Brewer 1995). The better drained soils on the refuge occur only in small, isolated areas. These include Matapeake and Mattapex series, both found on the edges of lowland flats, or the fluvial banks.

Bestpitch and Transquaking soils formed in moderately decomposed organic deposits from salt tolerant herbaceous plants that overlie clayey mineral estuarine sediments (Brewer 1995:26). Bestpitch and Transquaking soils have a thick, highly organic refuge this soil type is found on the tidal marshes along Blackwater River. Elkton soils formed in aeolian silt deposits overlying sandy fluvio-marine sediments (Brewer 1995:32). On the refuge this soil type is found on most of Parsons Creek Neck, on most of Buttons Neck, on a large area in the center of Green Brier Swamp, and surrounding the Othello and Kentuck soils on Gum Swamp. Honga soils formed in moderately decomposed organic deposits from salt tolerant herbaceous plants overlying silty mineral sediments (Brewer 1995:47). Honga soils have a thick organic surface layer (approximately 22 inches [56 cm]). This soil type is found on large areas adjacent to Parsons Creek, and along most of the tidal marshes of Blackwater River.

Marsh deposits on Blackwater NWR began about 3,800 years ago. Many deposits are almost 4 meters thick in the oldest areas of the marsh, but average deposits are between 2 and 3 meters thick. Most of the material is loose, organic muck. The Blackwater and Little Blackwater Rivers are the major sources of inorganic sediments for most of the marshes on the refuge, with occasional storm deposition from Fishing Bay being important for marshes in the southeastern part of the refuge. The emergent marsh is noticeably being replaced by open water through erosion, subsidence, sea-level rise, increasing salinities, and eat-outs from muskrats, nutria, and geese. In the last 100 years, effective sea-level rise (land subsidence added to sea-level rise) has been 12 inches in the Chesapeake Bay area (Leatherman et al. 1995).

Matapeake, Mattapex, Othello, Kentuck, and Sunken soils all formed in loess (silty) deposits overlying sandy fluvio-marine sediments (Brewer 1995:56, 58, 62). On Blackwater, Matapeake soil is found on the banks of Buttons Creek and Little Blackwater River. Mattapex soils are found on the banks of Buttons Creek and Little Blackwater River, and on an island between Wolfpit Marsh and Goose Pond (Middle Ridge). Othello soils are found on the bank of the unnamed tributary to Corsey Creek and on most of Kentuck Swamp. Kentuck soils are found always in combination with Othello soils, and are on the more elevated area above the unnamed tributary to Corsey Creek, on Kentuck Swamp, on most of Green Brier Swamp, on Dragon Swamp, and on small areas of Gum Swamp. Sunken soils are found in large areas surrounding the Honga peat along Parsons Creek, Corsey Creek, and Blackwater River, and on all of McGraw Island.

Matapeake silt loam, mattapex silt loam, and othello silt loam are considered prime farmland. These soil types are found primarily on Hog Range and in the existing farm field along Key Wallace Drive. The U.S. Department of Agriculture recognizes that responsible levels of government should encourage and facilitate the wise use of our Nation's prime farmland because of the importance in meeting the Nation's short- and long-range needs for food and fiber. Elkton loam and elkton silt loam are also very good soil types for farmland if properly drained.

Prior converted (PC) wetland soils, i.e., Class 3 soils, are primarily the wetter Elkton and Othello series. PC wetlands having these soil types can be readily converted to freshwater impoundment systems and forested wetlands. The potential productivity is moderately high for loblolly pine and some hardwood trees (swamp chestnut oak, willow oak, and water oak) on the Elkton and

Othello soils. Engineering, recreational, and facility development properties of these soils is found in the Soil Survey Update for Dorchester County.

3. Hydrology

The main section of the refuge is drained by the Blackwater River, which empties into Fishing Bay to the southeast, a large shallow embayment at the north end of Tangier Sound. Major tributaries of the Blackwater River include Buttons Creek, Little Blackwater River, and Backgarden Creek on the north flank, and Meekins Creek, Coles Creek, and Raccoon Creek on the south flank.

The upper two-thirds of the Blackwater River is separated from the lower third by Maple Dam Road, which is a substantial barrier for water, sediment, and chemical transport. Maple Dam Road, also called Shorters Wharf Road, runs north and south along the west side of Green Brier Swamp and then through the marshes for approximately 6.1 miles (10 km) with no culverts. The road was first established in the early 1900's, and sometime before World War II was built up with oyster shells and dredge spoil (Pendleton and Stevenson 1983:143). The north and south ends of Maple Dam Road are first depicted on Martenet's 1865 map, but are separated by Keenes Ditch. A 1934 map shows the north end of the road, from Cambridge to a point directly east of Church Creek, as an improved county connecting road; the section that continues to Shorters Wharf is shown as a state road; and the section from Shorters Wharf to Lakesville was an unimproved county connecting road (Hoen & Co. 1934). The road was paved and raised several times, and Pendleton and Stevenson (1983:145) reported that in the mid-1960's the road was at an elevation where it was no longer flooded on a regular basis. However, the road currently continues to flood during most spring tides at several places from Wolfpit Marsh to the Blackwater River bridge at Robbins.

Historically, Blackwater River and Parsons Creek were not connected. According to the cartographic evidence, sometime between 1850 and 1865 Parsons Creek was channelized to accommodate the removal of timber (Cowperthwait 1850; Martenet 1865). An 1850 map does not depict a channel extending off of Parsons Creek. The next map of this area found during a recent archaeological and geomorphological reconnaissance (USFWS Contract No. 50181-7-C062) is the 1865 map by Martenet, which shows "Stewart's" Canal connecting Parsons Creek and Big Blackwater. Sometime between 1865 and 1877 another canal or ditch was excavated to facilitate boat travel following Corsey Creek up to Tobacco Stick Bay, now Madison Bay. After this point, only the marshes between the headwaters of Blackwater River and Parsons Creek provided a filter protecting Blackwater River from the influx of salt water from the Little Choptank River. Marsh loss, caused by excessive herbivory by nutria and accompanying salt water intrusion, has recently allowed a connection between Parsons Creek and the head of Blackwater River, so the river is now tidally influenced from both ends. This breach was first noticed in 1989.

The tides are asynchronous at the opposite ends of Blackwater River. A 4-hour tidal delay between the two connections to the Bay creates a pumping action that increases the salinity of the Blackwater River channels and swamps. According to salinity tests performed by the refuge staff, the freshest water is consistently found near the mouth of Buttons Creek (Glenn Carowan,

personal communication 1997). A study conducted in June 1931 found that most of Blackwater River was brackish, but that salinity decreased to the northwest in the vicinity of Little Blackwater River (Uhler and Nelson 1931).

Salinity monitoring during the Pendleton and Stevenson (1983:74) study indicated that salinity rates fluctuate seasonally. During a winter with high freshwater runoff, the entire river system within the refuge was essentially fresh. Salinity trends are also associated with climatic episodes, particularly storm surges and runoff fluctuations. Storm tides can flood refuge wetland areas with saltwater, which results in salt-saturated soils and tree mortality. Severe drought conditions, like those that occurred in 1997 and 1999, can also cause severe tree mortality, particularly in the transitional zones where forests meet marshlands.

4. Air Quality

Dorchester County is classified as a Class II area under the Clean Air Act, with air quality that is generally good. Dorchester County is in attainment for all criteria pollutants, which means that it meets the National Ambient Air Quality Standards for emissions. Visibility in the county is good, generally averaging three to five miles. Facilities within the county that could be sensitive to smoke include Dorchester General Hospital, 9 miles from the refuge; City of Cambridge, 8 miles; Dorchester Airport, 8 miles; and Eastern Shore Hospital Center, 8.5 miles. All of these facilities are north of the refuge.

B. Biological Resources

Both vegetation and wildlife resources would be affected by turkey and waterfowl hunting.

1. Vegetation

Blackwater NWR consists of approximately 13,320 acres of tidal marshes and open water areas, and approximately 9,214 acres of woodlands. Approximately 750 acres of the refuge are managed agricultural units. Crops are planted annually to provide winter food for migrating waterfowl. Corn, clover, millet, milo, buckwheat, and winter wheat are the main agricultural crops. Thirty freshwater impoundments, totaling approximately 600 acres, have been constructed since the 1940s, and these "moist soil management units" are managed intensively for migratory birds.

Approximately 135 acres are refuge administrative lands, consisting of roads, building, and storage areas.

Blackwater NWR marshes, typical of Maryland's Eastern Shore, are tidal, brackish, estuarine marshes. Because these brackish marshes form a wide transition zone between the more seaward marshes to the inland marshes, they generally have a high diversity of plant species. Dominant plant species include extensive areas of black needlerush intermixed with saltmarsh hay, saltgrass, Olney three-square bulrush, and smooth cordgrass (Tiner and Burke 1995). At Blackwater NWR, these marshes have been managed through burning for years, resulting in the sub-climax species, Olney three-square bulrush being the dominant marsh vegetation, occurring

in almost monospecific stands (Pendleton and Stevenson 1983). However, saltmarsh hay, smooth cordgrass, saltgrass, and black needlerush are commonly interspersed among stands of Olney three-square bulrush. Several small pine islands are also distributed throughout the marsh. When refuge populations of wintering Canada geese reached almost 100,000 in the late 1960's and early 1970's, geese caused extensive damage to these fragile marshes creating eat-outs that later enlarged and combined to result in marsh loss to open water.

Portions of Blackwater NWR support one of the best examples of a complex of tidal saltwater wetlands, tidal freshwater wetlands, non-tidal wetlands, upland islands, and Delmarva Bays in Maryland. These wetland communities incorporate ten different major tidal types and approximately fifteen types of non-tidal wetlands. Both estuarine and palustrine wetlands are well represented. Within the palustrine wetlands, palustrine forested, palustrine scrub-shrub, palustrine emergent, and open water are the major types. The federally endangered swamp pink is believed to occur in bog-like habitats. Within the estuarine wetlands, estuarine emergent, intertidal forested, estuarine scrub-shrub, and aquatic bed are represented. The whole gamut of hydraulic regimes, ranging from seasonally saturated soils to permanently flooded areas, can be found in the palustrine wetlands, and the estuarine wetland regimes, ranging from tidal to irregularly flooded, are equally well defined. Tidal wetland communities within these parcels include salt marsh cordgrass, saltmeadow, saltbush, black needlerush, freshwater mixed, arrow arum-pickerel weed, cattail, narrowleaf cattail, yellow pond lily, and tidal mudflat, which make this complex extremely diverse.

Four forest cover types were delineated on the refuge by Whiteman and Onken (1994). These are loblolly pine, in which loblolly pine comprises at least 80 percent of the basal area of the stand; loblolly pine-oak, in which loblolly pine comprises 20-79 percent and oak species account for 20 percent or more of the basal area; loblolly pine-mixed hardwood, in which loblolly pine comprises 20-79 percent and hardwoods other than oak comprise at least 20 percent of the basal area of the stand; and mixed hardwoods, in which various hardwood species account for at least 80 percent of the stand. The most dominant tree species on the refuge is loblolly pine. The common hardwoods include sweet gum, swamp chestnut oak, willow oak, and white oak. In addition to these four forest types, Whiteman and Onken (1994) also delineated areas of blanket tree mortality generally associated with flooding and saltwater intrusion, with standing dead trees ranging from 50 to 90 percent.

The upland agricultural and forested areas of the refuge provide additional species diversity. Being dominated by non-wetland species and providing transition zones that usually are higher in diversity, they provide excellent pine tree nesting and perching sites for many of the more than 160 bald eagles and 10 golden eagles that winter on the refuge. The hardwoods, as well as the pines, also provide excellent habitat for the Delmarva fox squirrel, and numerous other species.

2. Wildlife

Blackwater NWR provides habitat for a rich diversity of wildlife. Over 282 species of birds, 38 species of mammals and 45 species of reptiles and amphibians occur on the refuge for at least part of the year. The most conspicuous bird species are the waterfowl, particularly during

migration. Peak numbers of geese occur in January, and peak numbers of ducks can be seen in November. Waterfowl species nesting in the refuge wetlands include blue-winged teal, gadwalls, mallards, black ducks, wood ducks, exotic mute swans, and resident Canada geese. A breeding bird survey conducted on two tracts of the refuge in 1996 recorded 85 species of birds nesting in the refuge's forested wetlands. The shallow waters and marshes of the refuge provide excellent feeding areas for numerous species of wading birds. Shorebirds, gulls, and terns also use the refuge for foraging and nesting, as well as numerous raptors, of which the most predominant is the bald eagle. Largest of the mammal species are the two species of deer: the native white-tailed deer and the exotic sika deer, both of which maintain healthy populations on the refuge. Both muskrat and the introduced nutria are thought to contribute to marsh loss through their foraging activities. Efforts to control these two species have been on-going on the refuge for many years. Commonly observed species of the secretive reptiles and amphibians include the painted turtle, red-bellied turtle, northern cricket frog, southern leopard frog, and occasionally, a copperhead. Blackwater also hosts a wide array of fish species, and its marshes and estuaries are a spawning and nursery ground for commercial and sport fin and shellfish. However, present knowledge of the fisheries resources is inadequate.

Blackwater NWR has also historically provided habitat and protection for three federally endangered species: the bald eagle, the Delmarva fox squirrel, and the peregrine falcon. The refuge's forests provide unique and important habitat for the largest aggregation and nesting population of bald eagles north of Florida, and the nation's largest protected population of Delmarva fox squirrels. Bald eagles and Delmarva fox squirrels are year-round residents, while peregrine falcons are occasionally observed migrating through the mainland marshes of Blackwater. The Delmarva fox squirrel appears to be stable on the refuge. The red-cockaded woodpecker, once found on Blackwater NWR, has not been sighted since 1976, and is now believed to be extinct in Maryland. The Northeastern tiger beetle is believed to have suitable habitat on Barren Island; however, no specimen has been found to date. Sea turtles such as the endangered Atlantic loggerhead, green, hawksbill, leatherback, and Atlantic ridley are occasionally found in the waters surrounding Barren Island, Bishops Head Point, and Spring Island. Several Species in Need of Conservation also occur on Blackwater NWR: the black rail, Henslow's sparrow, sedge wren, northern harrier, carpenter frog, rare skipper, and sweet-scented ladies-tresses. The adjacent Fishing Bay WMA provides important habitat for three federally endangered species, two federal candidate species, and six State-listed species in Need of Conservation.

C. Socio-economic/Cultural Resources

1. Socioeconomic Resources

Dorchester County, Maryland, is the watershed for the Blackwater and Little Blackwater Rivers, much of Marshyhope Creek, and the lower reaches of the Nanticoke River. Located in the southwestern portion of Maryland's Eastern Shore, it is bounded on the north by the Choptank River and Talbot and Caroline Counties; on the west by the Chesapeake Bay; on the south by Bloodworth Straits and Tangier Sound; and on the east, by the Nanticoke River, Wicomico County, Maryland and Sussex County, Delaware. The county is virtually surrounded by water,

except for the point of “attachment” in its northeast section. U.S. Route 50 connects Cambridge, the county seat, to the Baltimore–Washington area and to the Maryland seacoast. The extension of Maryland Route 16 west of Cambridge and the Cambridge–Vienna section of Route 50 separate “North Dorchester” from “South Dorchester”. The division of the county is due to geographic differences that also affect the extent and nature of development and the use of the land. Prime agricultural soils, those most easily converted to residential or industrial development, are found in North Dorchester. Not surprisingly, most new residential development is also in North Dorchester County, in the Cambridge–Hurlock corridor.

The county’s population has been growing very slowly, with a 3-percent increase from 1970–1990. Population decreased slightly from 1980 to 1990. The only portions of the county with significant population gains between 1970 and 1990 were in North Dorchester. With the exception of Hurlock and Secretary, all of the incorporated towns lost population between 1970 and 1990. Most portions of South Dorchester had a more than 10-percent loss of population between 1980 and 1990. Many districts had a more than 30-percent population loss between 1970 and 1990. The 1990 census characterized 92.9 percent of the population as rural in nature, and of that, 5.4 percent were on farms, and 7.1 percent were considered urban. Although the Blackwater and Nanticoke rivers watershed spans 67 percent of the county, it contains only 30 percent of the population.

Compared to other Maryland counties, Dorchester County is relatively poor. Dorchester has a higher proportion of low and moderate income households and a lower effective buying income. In 1990, 14 percent of the population was below the poverty level. The county’s housing stock is older, and housing values are lower compared to other counties. A higher proportion of homes are substandard.

The county’s economic problems include an estimated 1,150 manufacturing and warehouse jobs that have been lost since 1986. Non-manufacturing employment has increased in recent years, but has not made up for that loss. The county’s unemployment rate was 9.8 percent in 1993, up from 7.6 percent in 1990. The Statewide unemployment rate was 6.2 percent in 1993. Dorchester County’s share of regional employment fell from 20 percent in 1971 to 15 percent in 1992. Competing job opportunities, decreasing yields, and increasing operating expenses resulted in the decline of farming, forestry, and fishing occupations. Social problems have been cited as contributing to labor force quality problems and lagging incomes.

Dorchester’s two industrial parks are located in the incorporated towns of Cambridge and Hurlock. Approximately 1900 acres are zoned industrial in the unincorporated parts of the county.

Agriculture is a key industry for Dorchester County, which ranked 7th in value of products produced in Maryland. According to the 1992 Census of Agriculture, Dorchester’s 347 farms (123,762 acres) covered one-third of the county’s land, down from the 438 farms (139,416 acres) in 1982. The total value of all agricultural products sold exceeded \$64 million, the most valuable products being poultry and poultry products, followed by soybeans, corn, and wheat. Fresh vegetables, aquaculture, and watermelons, and hogs are also important. Approximately 500 farm employees earned more than \$3.3 million. In 1992, 3,170 acres were enrolled in agricultural

preservation districts, and 1,303 acres were protected from development by perpetual easements. With the advent of the Rural Legacy Program and other incentives, thousands of additional acres have been protected from development in recent years.

Historically, woodland and forest products have been important to Dorchester County's economy. Ninety-eight percent of the forest land is privately owned: 40 percent by farmers; the remainder, by industry and private individuals. Loblolly pine is the principal commercial timber species because it grows rapidly and straight. A local forestry board, appointed by the secretary of the Maryland Department of Natural Resources, reviews timber harvest plans within the Chesapeake Bay Critical Areas. Outside the Critical Area, forest resources are protected primarily through non-tidal wetlands regulations and the county's forest conservation ordinance. Loss of forest land to crop farming has declined, and the size of the county's forest resources has stabilized.

Sand and gravel are the county's only mineral resources. Areas of potential sand or sand and gravel are located mostly in North Dorchester, and south of Vienna to Henry's Crossroads. The sand and gravel industry grew from one operator in 1966 to seven in 1992. Most operations are north of Route 50. As of 1994, 220 acres were under permit form mining and 111 acres were actively being worked.

Tourism has significant potential in contributing to Dorchester's economy. Compared to other counties in Maryland, Dorchester ranked 21st out of 24 in terms of expenditures by travelers. The Offices of Tourism and Economic Development estimate that Blackwater NWR generates approximately \$15,000,000 annually, or almost 90 percent of the county's tourism revenue. The new Sailwinds Park and Hyatt Conference Center will undoubtedly have a significant effect on the county's tourism industry in years to come.

Approximately 60 percent of Dorchester County lies in the 100-year flood plain. Most of that is tidal flood plain. As of 1990, 15 percent of the county's population lived in the flood plain.

At 350,300 acres of land, Dorchester County is Maryland's largest county. Dorchester has large natural resource areas, including substantial coastal areas, wetlands, forests, and agricultural lands. The county is characterized by open, natural, agricultural, and forested areas. Only 3 percent of its land is developed. As shown in the tables above, its developable land area is small, compared to the entire county.

2. Cultural Resources

Blackwater NWR contains nine known prehistoric archaeological sites, and 60 historical archaeological sites. Because no comprehensive subsurface archaeological survey has been conducted, these known sites are likely to represent only a small subset of all preserved sites on the refuge. Seven of these prehistoric archaeological sites have been reported by collectors or identified during inspections of the ground surface by archaeologists. Two additional prehistoric sites were located during subsurface testing as part of the Garrow study.

There is little information about the quality or character of the seven original prehistoric sites,

and not enough information to evaluate the National Register eligibility of the sites. Six of these seven original sites are on Barren Island. Changes in the shore line of Barren Island mean that at least four of these Barren Island sites are likely to have been inundated or damaged since they were reported in 1985. The condition of these six sites has not been checked since they were reported 15 years ago. The seventh original prehistoric site is in an 85-acre field which extends deep into Green Briar Swamp. This site is known only through finding an undated projectile point on the surface. Surface inspection of the site as part of the TRC Garrow study yielded no new artifacts, and showed no signs of disturbance.

One of the two newly discovered prehistoric sites, 18DO399, which has Late Woodland Period (A.D. 900–1600), nineteenth, and twentieth century components, is likely to be eligible for the National Register, based on work done there by TRC Garrow Associates as part of their reconnaissance study. This means the site is likely to contain important information about prehistory. The site is at least 60 X 165 meters in extent, and a radio carbon date on charcoal from a basin shaped feature has been calibrated to a range of A.D. 1275–1425. The site is contained in deposits likely to have formed through river and estuary deposition activity. Almost half of the known prehistoric archaeological sites in the vicinity of the refuge date to the Woodland Period, characterized by more sedentary village life and maize agriculture (Millis et al., 1998:78). Until about A.D. 1250, the climate was unusually warm and sea level was similar to today. Between A.D. 1250 and 1900, global climate was cyclically colder than today. This affected the Atlantic Slope and thus, Blackwater NWR. Sea level during the period of this Late Woodland site's occupation was lower than today by 2 or 3 feet. Thus, the time when the site was occupied was a period when the refuge was more suitable for human habitation than today. At the time of occupation, the site was along side fresh water, and remains contain no evidence of shellfish harvesting.

The second newly discovered prehistoric site at Blackwater, 18DO400, seems to contain few artifacts. A flake of quartzite produced during tool making and a worn sherd of Middle to Late Woodland Period pottery are the only artifacts. These artifacts had been disturbed by plowing, but limited testing at the site was not enough to evaluate the site's eligibility for the National Register.

Most of the 60 historical archaeological sites in the Archaeological Site Inventory are believed to exist based on an 1877 map. Most locations have never been confirmed in the field. In addition to these inventoried potential nineteenth century sites, there may be unlocated seventeenth and eighteenth century historical archaeological sites at Blackwater, as well.

The Eastern Shore was open to patenting in 1659, but period maps indicate that most settlement was along the Bay shore and the lower reaches of major drainages until the eighteenth century (Millis et al., 1998:83–84). Maryland's Eastern Shore was settled by Anglo-Americans from the Western Shore, driven by the need for fertile well drained tobacco farming land. The land along the Blackwater and Transquaking Rivers was surveyed for sale a few years after 1659. Barren Island was used for pasture by an owner living in Cambridge. By 1673, plantations along Parson's Creek and Slaughter Creek may have extended into the refuge (Millis et al., 1998:84). Because early transportation was by water, sites related to these plantations would have been oriented to the rivers and creeks, rather than nineteenth and twentieth century roads. No

historical archaeological sites or structures sites on the refuge are known to date to this period.

Blackwater contains two confirmed eighteenth century archaeological sites. By the eighteenth century, perhaps as early as 1726, the Stapleforts were farming on the refuge, on the bank of the Little Blackwater River. Twenty seven other eighteenth century patents included refuge land. The Staplefort “Blackwater Farm” site is BLK–001H. The site is likely to contain intact archaeological deposits, even though there has been twentieth century disturbance. By the early eighteenth century, Maryland farmers used slaves for labor, and as yet unlocated slave quarters and cemetery may be part of BLK–001H. A 1794 map shows Routes 16, 335, and Key Wallace Drive traversing what is now the refuge. Subsequent change in sea level means that some formerly habitable locations along these roads and elsewhere in the refuge may now be poorly drained or submerged. In addition to the Staplefort site, Blackwater contains an eighteenth century site in the vicinity of a Late Woodland Period prehistoric shell midden (18DO160 or BLK 047P/068H) on Barren Island.

IV. Environmental Consequences

Alternative A: No Action Alternative

Physical Impacts

Impacts from the 4-day shotgun hunt on Blackwater NWR would be anticipated to be minimal, as demonstrated by closely monitoring the impacts of annual hunts during 1972 and from 1985 to present. Impacts on habitats would be expected to be minimal and then only temporary, as trampled ground vegetation would recover. During the firearms season, vehicles would be restricted to designated roadways. There would be no off-road vehicles or ATV use allowed during any hunting season.

Biological Impacts

Impacts on wildlife would include the harvest of deer. A regulated deer hunt would be essential to accomplish the goal of managing a healthy deer population. Deer would be managed to minimize the potential for serious habitat alteration or degradation and density-dependent diseases. It would also help reduce crop depredations on refuge and adjacent landowner’s crops.

Other species of wildlife would experience temporary negative impacts in the way of minor disturbances from hunters in the area. On the other hand, reduction in the size of the deer herd would benefit other species of wildlife (Delmarva fox squirrel and waterfowl) in that competition for food would be reduced.

Without natural predators or some means of population control, the deer herd would exceed the carrying capacity of refuge environments and would be regulated by natural means of disease and starvation. Over-population would cause crop depredation problems, over-browsing within native hardwood stands and reforested tracts, and damage to trees from rubbing of antlers on trees.

Habitat degradation by deer would negatively impact other wildlife that depend on this habitat. Deer hunting would help keep deer within the carrying capacity of their habitat. When the

population exceeds the carrying capacity, biological parameters within the herd (APC's weight, antler size, reproductive rates, etc.) indicate the deterioration of the herd quality. Stress factors associated with overpopulation would become acute, causing diseases and high mortality.

Dickerson (1983) noted the drastic effect of the "no hunting" approach to deer management. He examined harvested deer from a state park in New York where hunting had been prohibited for 71 years. Through these observations, he concluded that due to the lack of hunting, the deer herd was in the worst physical condition of any he had observed in New York and possibly the northeast. Hunting seasons would be adjusted annually to take into consideration changes indicated in herd quality by biological monitoring. Blackwater NWR would continue to limit the number of hunters and number of hunt days, based on the yearly evaluation.

Impacts on threatened and endangered species and their habitats would be minimized by taking several precautions. In accordance with the "Management Guidelines for Bald Eagles in the Chesapeake," hunting near eagle nests would be restricted to a minimum radius of 250 yards. Open marsh areas, where eagles typically feed, would be entirely closed to hunting, and eagle roost sites would be protected by a ¼-mile minimum buffer zone where no entry would be permitted. Eagle activity usually increases in late December and nesting begins in early January, well after hunting seasons would end.

Delmarva fox squirrels are found in the upland hunting areas, but hunter-squirrel encounters would be expected to be brief and generally non-disturbing. Almost 100 percent of white-tailed deer hunters use deer stands (tree stands must not damage the tree), when questioned during hunter check-in at past Blackwater NWR hunts. Consequently, most hunter movement involved going to and coming from their stand. Law enforcement patrols during past hunts observed very little movement from deer hunters. Furthermore, sika deer are hunted primarily in wet forest, where Delmarva fox squirrels are seldom observed. Deer hunting would have little impact on the Delmarva fox squirrel.

Migratory waterfowl, shorebirds, and marsh and water birds use areas, such as the moist soil impoundment system, adjacent cropland, and marsh, would be closed to hunting, and would not be impacted. Hunting, while maintaining herd numbers within acceptable levels, would provide opportunities to utilize a renewable resource. Hunters would be oriented to Blackwater NWR rules before going into the field. They would receive a copy of the hunting regulations with their application. The hunting would be zoned to minimize contact between hunters and non-hunters. Areas along the Wildlife Drive would be closed to the public during the 4-day shotgun hunt.

Socioeconomic Impacts

Closing the first half of the Wildlife Drive and associated self-guided trails on Blackwater NWR during the 4-day shotgun season would produce a negative impact on visitors. Although the Visitor Center would remain open and would be unaffected by the deer hunt, visitors who had traveled some distance to see Blackwater NWR would be disappointed and, possibly, irate at not being able to see most of the only area open for public observation. However, weekday only hunting would not seriously affect many visitors.

Cultural and Historical Resource Impacts

There would be no cultural or historical resource impacts.

Alternative B. Additional hunting opportunities for turkey and waterfowl for limited times within state seasons

Physical Impacts

Impacts on physical resources are expected to be minimal and only temporary, as trampled ground vegetation would recover. Personal observation by Blackwater NWR staff of the habitat during hunting season would lead a biologist to suspect that the deer population, especially bucks, damage more vegetation than the hunters would. Trampled vegetation would still have ample time to recover between the additional turkey hunt in the spring and the deer hunt in the fall. The resident Canada goose hunt and migratory waterfowl hunts on 40 percent of newly protected areas would be in marsh, fields, and on open water. The hunters would only travel to and from their blind site, disturbing a minimal amount of vegetation that would recover quickly after the hunt season. For impacts associated with the spring hunt of resident Canada geese, see the EA for an Integrated Wildlife Damage Management Plan.

Biological Impacts

That big game hunting would have little impact on other wildlife has been demonstrated for many years on these lands, whether in Federal or private ownership. Deer would be killed, but hunting would serve as the major control mechanism to keep a healthy herd with less stress and mortality from diseases caused by overpopulation. The size and locations of areas for hunting would be designed to balance opportunities for hunting while still maintaining substantial areas as sanctuaries for all species of wildlife. All sensitive areas important to endangered species would be closed to hunting.

The total acreage for migratory bird hunting would be within the 40-percent limit prescribed by the Migratory Bird Conservation Act. The hunting of resident Canada geese in the early spring would occur after the migratory waterfowl have left the area, and would not occur in sensitive nesting areas for colonial, marsh, and waterbirds, or endangered species. Removing these highly injurious species would greatly help the restoration of the fragile marsh ecosystem, eliminate the depredation of important food resources during the growing season, and minimize the transmittal of disease to migratory waterfowl. Since waterfowl hunting would only occur on 40 percent of newly protected lands on the Complex, inviolate sanctuaries with no disturbance would remain on more than 23,000 acres of Blackwater NWR, more than 3,000 acres on the collective island refuges in the Chesapeake Bay, and a minimum of 10,000 acres on the proposed Nanticoke protection area. Waterfowl harvests would occur, but the overall numbers would not adversely affect refuge purposes.

Limited spring turkey hunting in accordance with the restrictions and numbers of hunters proposed would have insignificant impacts on biological resources, except that, obviously, a few turkeys would be killed. However, their removal from the population would not have significant impacts on the species or its abundance.

Socioeconomic Impacts

The increase in hunting would provide recreational opportunities for 260 waterfowl hunters and 140 turkey hunters at Blackwater NWR. These activities and programs would produce a positive impact on refuge management, visitor attitudes, and local economy. The local purchases of gas, food, lodging, hunting licenses, equipment, and supplies by the increased number of hunters, especially those from other areas like Pennsylvania and Western Maryland, would contribute substantially to the local economy. They would spread the word to their friends, encouraging them to come to the area to take advantage of the high quality recreation and, thus, positively affect the local economy. Deer hunting would also contribute to the reduction of vehicle damage and human injury from collisions between deer and vehicles.

We expect favorable support from hunters and hunting clubs, especially those desiring to hunt sika deer, but there may be some unfavorable reaction from hunters who own or lease lands adjacent to refuge property, who have possessive feelings about the refuge deer, since deer are often shot as they move off the refuge. Others may favor the refuge hunts, since they offer additional opportunities and increased success as deer move off the refuge onto their properties. Adjacent landowners and farmers generally would favor the deer hunt as helping to reduce crop depredation. We expect unfavorable responses from anti-hunting and animal welfare groups.

Generally, the local community is hunting-oriented and, in the past, has supported refuge hunting. Some negative impact may arise from conflicts among refuge user groups, but most areas have been properly zoned.

Increased hunting opportunities would increase the number of licenses and duck stamps sold, as well as the amount of locally purchased hunting supplies. According to Dorchester County Tourism and Economic Development Office statistics, hunters would contribute more than \$1,500,000 annually to the local economy by participating in the proposed hunts.

Cultural and Historical Resource Impacts

There would be no impacts on cultural or historical resources predicted.

Alternative C. Additional hunting opportunities for deer, small game, turkey and waterfowl for entire state seasons.

Physical Impacts

An unlimited number of hunters, for 150 days of the year, unrestricted by time or space, would destroy vegetation in some areas if they chose to concentrate there. Roadways and parking areas would consistently be over-used, rutted, and subject to increased erosion.

Biological Impacts

Alternative C would create the potential for increased negative impacts on non-target species of wildlife and their habitats. There would be no sanctuary areas. The alternative would increase stress on wildlife species, and increase the potential for conflicts between hunters and other refuge users. Increased human activity in general would be expected to cause greater disturbance to wildlife and wildlife habitat at varying degrees depending on the intensity of the activity. Hunter quality and success would most likely be much reduced.

Waterfowl, forest, and big game species should remain healthy if hunting limits continued to be established by state regulations based on previous harvest and populations. Restricting waterfowl hunting to 40 percent of newly protected areas would have a minimal effect on the total waterfowl population already restricted by state regulations. Annual turnover rates for small game species (e.g., rabbit and raccoon) are generally high due to natural mortality. As a result, normal hunting mortality would not affect the annual breeding population. The annual hunting occurring under this alternative would not affect the overall status of these species.

The incidental take of the endangered Delmarva fox squirrel would become more likely with the addition of small game hunting. Although the Refuge Complex would restrict hunting near eagle nests and roosts, increased types of hunting, especially waterfowl hunting, would include areas in the open marsh where eagles typically feed, and when eagles are nesting. This could cause a negative impact on the threatened bald eagle.

In comparison with the other, more restrictive alternatives, hunting on this scale would modify the distribution and use of various habitats by migratory birds, affect their activity budget, reduce their foraging time, adversely affect their ability to store fat reserves necessary for migration and breeding, disrupt pair and family bonds, and contribute to increased hunting mortality.

Socioeconomic Impacts

Hunting in all refuge areas would discourage, if not prevent, birders, photographers, and other visitors from using refuge properties during hunting seasons. Non-hunters would likely be irate, extremely disappointed, and upset after having traveled to these refuges to find they were unable to take advantage of the wonderful opportunities to observe wildlife in their natural habitats. Visitation for activities other than hunting would decrease, while visitation for hunters would increase up to a point, and then most likely hunter numbers would stabilize as hunt quality and success declined. As a result, visitor use of restaurants, lodging, service stations, and other facilities would decline. Hunters are not as likely to take an interest in other tourist industry activities as the wildlife observer, and would not be as likely to visit other attractions, thereby creating a negative effect on the tourist industry.

Cultural and Historical Resource Impacts

There would be the likelihood of cultural or historical resource impacts associated with vandalism of historical structures (primarily graveyards), and, potentially, some effect on archaeological sites by artifact collectors who take advantage of the lack of limitations in this alternative.

Cumulative Impact Analysis

A. Anticipated Direct and Indirect Impacts of Proposed Hunt on Wildlife Species

Resident Wildlife

No Action Alternative

Under this alternative, the refuge would not open to turkey or waterfowl hunting. Current public use levels on the refuge would remain the same. As a result, additional mortality of individual hunted animals would not occur under this alternative. Disturbance by hunters to hunted and non-hunted wildlife would also not occur.

Proposed Action Alternative

Limited spring turkey hunting in accordance with the restrictions and numbers of hunters proposed would have insignificant impacts on biological resources. Spring turkey hunting would not directly impact resident wildlife species with the exception of the take of resident turkeys. However, their removal from the population would not have significant impacts on the species or its abundance. Turkey hunting on the refuge is limited to 10 half-day hunts for 14 hunters during the spring. Wild Turkey Project Manager and other members of the management team with Maryland Department of Natural Resources (MD DNR) have collected and compiled population and harvest data for turkeys across the state. Data indicate that for the four county region surrounding Blackwater NWR the average number of turkeys per square mile is 12.3. MD DNR considers any ratio of greater than 10 turkeys per square mile to be “high” (B. Long, pers comm.). The local turkey population has withstood hunting on surrounding private lands for decades without any negative cumulative effects. Based on harvest data, the average success rate for Maryland turkey hunters is 6% success (MD DNR 2006). Considering the number of hunt days the refuge will be offering, the anticipated take on the refuge is 8 turkeys, less than 6% of the estimated population on the refuge and 0.008% of the regional population (B. Long, unpublished data). The hunt will also not affect Eastern Neck National Wildlife or Patuxent Research Refuge as both Maryland refuges are spatially separated from Blackwater NWR in terms of turkey population home ranges. The refuge wild turkey hunt should not cumulatively adversely impact the turkey population.

Hunter disturbance to non-hunted resident wildlife may be a negative cumulative impact; however, such an impact is unlikely because of the timing of the hunt. The hunts will occur during a time of the year when small mammals, reptiles, amphibians, and invertebrates are inactive and thus the likelihood of hunter interaction extremely rare. Isolated encounters with small mammals, reptiles, amphibians, and invertebrates should not have cumulative negative effects on populations.

Additional Opportunity Action Alternative (Entire State Season)

Under this alternative, an unlimited number of hunters could visit the refuge to hunt for 150 days, unrestricted by time or space. Forest and big game species populations should remain healthy if hunting limits continued to be established by state regulations based on previous harvest and populations. Annual turnover rates for small game species are generally high due to natural mortality; therefore, normal hunting mortality would not affect the annual breeding population. The annual hunting occurring under this alternative would not affect the overall status of hunted species.

The alternative creates the potential for increased negative impacts on non-hunted resident wildlife. The increase in human activity in general will increase stress on wildlife species and

cause greater disturbance to wildlife and wildlife habitat at varying degrees. The likelihood of hunter interaction with small mammals, reptiles, amphibians, and invertebrates increases with the increases in hunter numbers and the number of hunt days.

Migratory Birds

No Action Alternative

Migratory waterfowl hunting would not be permitted under this alternative and, therefore, additional mortality of waterfowl species would not occur. Waterfowl, shorebirds, and marsh and water birds use areas, such as the moist soil impoundment system, adjacent cropland, and marsh, would be closed to hunting, and would not be impacted. As a result, there would be no increase in disturbance to those species. Because the refuge would also not open to turkey hunting, migratory forest species would not be impacted by an increase in hunter disturbance.

Proposed Action Alternative

The U.S. Fish and Wildlife Service annually prescribes frameworks, or outer limits, for dates and times when hunting may occur as well as for the number of birds that may be taken and possessed. These frameworks are necessary to allow State selections of hunt seasons and take limits for recreation and sustenance; aid Federal, State, and tribal governments in the management of migratory game birds; and permit harvests at levels compatible with population status and habitat conditions. Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the Service annual promulgates regulations (50 CFR Part 20) establishing the frameworks from which States may select season dates, bag limits, shooting hours, and other options for each migratory bird hunting season. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Thus, in effect, Federal annual regulations both allow and limit the hunting of migratory birds.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of those birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when “hunting, taking capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg” of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to “the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has administratively divided the nation into four Flyways for the primary purpose of managing migratory game birds. Each Flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Blackwater NWR is within the Atlantic Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR Part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules, based on “early” and “late” hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl seasons not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties (USFWS 2006).

Because the Service is required to take abundance of migratory birds and other factors into consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, State and Provincial wildlife-management agencies, and others. To determine the appropriate frameworks for each species, we consider factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest. After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game bird management becomes a cooperative effort of State and Federal governments. After Service establishment of final frameworks for hunting seasons, the States may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the Federal frameworks but never more liberal. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations. In fact, based upon the findings of an environmental assessment developed when a National Wildlife Refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the State allows. At Blackwater NWR, season length is more restrictive for waterfowl than the State allows.

Blackwater NWR and the surrounding lands of Maryland’s lower Eastern Shore offer expansive ponds, wetlands, fields, and open water areas that attract large populations of migrating waterfowl. The five-year average populations of ducks and geese, estimated by Maryland mid-winter surveys, are 53,204 and 55,695 respectively in the lower Eastern Shore counties surrounding the refuge (Raftovich, pers. comm.). State population five-year averages are also estimated by mid-winter surveys at 237,641 ducks and 489,503 geese (Serie and Raftovich 2005). Atlantic Flyway five-year average population estimates are 1,186,438 ducks and 1,384,937 geese (Serie and Raftovich 2005). Historically, waterfowl hunting in the local area has been a major recreational activity and much of the surrounding public and private lands are currently hunted during waterfowl season.

The total acreage for migratory bird hunting on Blackwater NWR would be within the 40-percent limit prescribed by the Migratory Bird Conservation Act. The hunting of resident Canada geese in the early spring would occur after the migratory waterfowl have left the area, and would not occur in sensitive nesting areas for colonial, marsh, and water birds, or endangered species. Removing these highly injurious species would greatly help the restoration of the fragile marsh ecosystem, eliminate the depredation of important food resources during the growing season, and minimize the transmittal of disease to migratory waterfowl. Since waterfowl hunting would only occur on 40 percent of newly protected lands on the Complex, inviolate sanctuaries with no disturbance would remain on more than 23,000 acres of Blackwater NWR, more than 3,000 acres on the Chesapeake Island NWR, and a minimum of 10,000 acres on the proposed Nanticoke protection area. Waterfowl harvests would occur, but the overall numbers would not adversely affect refuge purposes or State or Atlantic Flyway populations.

The average daily success rate for duck hunters is 12.3% success and for geese hunters is 13.0% success (USFWS 2006). Under the proposed action, Blackwater NWR will offer 260 waterfowl hunter days. This equates to an estimated additional 50 ducks and 50 geese harvested at Blackwater each year. This harvest impact represents 0.028% and 0.033% respectively of Maryland's three-year average harvest of 180,300 ducks and 150,867 geese (USFWS 2004, USFWS 2005, USFWS 2006) and 0.00003% and 0.00007% respectively of the Atlantic Flyway three-year average harvests of 1,478,700 ducks and 719,466 geese (USFWS 2004, USFWS 2005, USFWS 2006). Migratory waterfowl hunting at Blackwater NWR will have little or no effect on non-hunted resident and migratory species. Waterfowl hunters will primarily be utilizing temporary hunting blinds in open water areas. This reduces hunter interaction with upland or marsh migratory species. Hunting season also does not overlap with the nesting season for non-hunted migratory birds and therefore, long-term future impacts are not likely.

NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, "Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88-14)," filed with the Environmental Protection Agency on June 9, 1988. We published Notice of Availability in the Federal Register on June 16, 1988 (53 FR 22582), and our Record of Decision on August 18, 1988 (53 FR 31341). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment, "Duck Hunting Regulations for 2006-07," and on August 24, 2006, Finding of No Significant Impact. Further, in a notice published in the September 8, 2005, Federal Register (70 FR 53376), the Service announced its intent to develop a new Supplemental Environmental Impact Statement for the migratory bird hunting program. Public scoping meetings were held in the spring of 2006, as announced in a March 9, 2006, Federal Register notice (71 FR 12216). More information may be obtained from: Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, NWR, Washington, D.C. 20240.

Additional Opportunity Action Alternative (Entire Season)

Hunting on an unrestricted time and space scale within State and Federal regulations would modify the distribution and use of various habitats by migratory birds, affect their activity budgets, reduce their foraging time, adversely affect their ability to store fat reserves necessary

for migration and breeding, disrupt pair and family bonds, and contribute to increased hunting mortality. The acreage of inviolate sanctuary for the protection of wintering waterfowl would be decreased. The expected mortality of waterfowl on the refuge would significantly increase without restrictions on the number of hunters per hunt day or on the locations in which hunting would be allowed.

Endangered Species

No Action Alternative

Because current public use levels on the refuge would remain the same, there would be no increased chance of adversely affecting threatened and endangered species.

Proposed Action Alternative

Endangered and threatened species that utilize the refuge are bald eagle and Delmarva fox squirrel. A Section 7 Evaluation was conducted in association with this assessment for opening turkey and waterfowl hunting on Blackwater NWR. It was determined that the proposed alternative will not likely adversely affect these endangered species.

The Complex is known for its nesting and wintering concentrations of American bald eagles. Eagles use the expansive marshes, open waters, and upland areas to feed throughout the year. Dorchester County and Blackwater NWR support the highest nesting density of eagles in the state of Maryland and in the entire mid-Atlantic region. The annual midwinter American bald eagle surveys conducted in January each year have recorded an average of 132 bald eagles for the past three years. Big game and migratory waterfowl hunting would have no adverse effect on bald eagles because all sensitive areas important as nesting or aggregation sites for threatened and endangered species would be closed to hunting. In accordance with the “Management Guidelines for Bald Eagles in the Chesapeake,” all hunting near eagle nests would be restricted to a minimum radius of 250 yards. Big game hunting seasons would end well before the increase in eagle activity in late December and nesting in early January. The majority of the refuge’s marsh areas, where eagles typically feed, would be entirely closed to hunting, and eagle roost sites would be protected by a ¼-mile minimum buffer zone where no entry would be permitted.

Within the Refuge Complex, Delmarva fox squirrels are only found in the Blackwater Watershed. The Delmarva fox squirrel population on Blackwater NWR, estimated at 550, appears to be stable. Delmarva fox squirrels are found in the upland hunting areas, but hunter-squirrel encounters would be expected to be brief and generally non-disturbing. Most hunter movement will involve going to and coming from upland hunting areas for wild turkey. Migratory waterfowl hunting will occur in open water areas and will therefore have little or no impact on Delmarva fox squirrels.

Additional Opportunity Action Alternative (Entire State Season)

Incidental take of the endangered Delmarva fox squirrel would become more likely with the addition of small game hunting. Increases in hunter numbers and the number of days hunters are

utilizing the refuge would increase hunter disturbance of Delmarva fox squirrel habitats and activities. Although the Refuge Complex would restrict hunting near eagle nests and roosts, increased types of hunting would include areas in the open marsh where eagles typically feed, and when eagles are nesting. Under this alternative the refuge would increase the acreage open to waterfowl hunting to the full 40% allowed. This could cause a negative impact on the threatened bald eagle.

B. Anticipated Direct and Indirect Impacts of Proposed Action on Refuge Programs, Facilities, and Cultural Resources

Other Refuge Wildlife-Dependent Recreation

No Action Alternative

The public would not have the opportunity to harvest a renewable resource, participate in wildlife-oriented recreation that is compatible with the purposes for which the refuge was established, have an increased awareness of Chesapeake Marshlands NWRC and the National Wildlife Refuge System; nor would the Service be meeting public use demand. Public relations would not be enhanced with the local community. There would be no increase in conflict between hunters and non-consumptive wildlife-dependent recreational users.

Proposed Action Alternative

Under the proposed action, the number of hunters and the number of days the refuge is open to hunting would increase. This could conflict with other wildlife-dependent recreational programs. As a result, the refuge's visitor use programs would be adjusted to minimize or eliminate each conflict and provide quality wildlife-dependent recreational opportunities. The proposed turkey hunt would take place primarily in areas that are not currently open to other public use opportunities and therefore, would not impact those uses. Opening one hunt area to turkey hunting opportunities would result in the closure of a hiking trail for the 10 half-day hunts. Based on data regarding the usage of that trail on weekday mornings and Saturday mornings, closing the trail will impact a total of approximately 50 non-consumptive users. All other trails will remain open to other public users and the closed trail will re-open at the end of the hunt day (noon). The proposed migratory waterfowl hunt would only be taking place in areas that are not open to other wildlife-dependent recreational programs and so there would be no conflict between user groups. The majority of the refuge would be maintained as a waterfowl sanctuary, including the area surrounding Wildlife Drive, which is the refuge's highest public use area for wildlife observation and wildlife photography. The establishment of a hunt coordinator position with the duty of corresponding directly with hunters will minimize the workload of refuge staff persons in coordinating the hunt and will consequently have minimal effects on wildlife interpretation and environmental education programs.

The public would be allowed to harvest a renewable resource, and the refuge would be promoting a wildlife-oriented recreational opportunity that is compatible with the purpose for which the refuge was established. The public would have an increased awareness of Chesapeake Marshlands NWRC and the National Wildlife Refuge System and public demand for more

hunting would be met. The public would also have the opportunity to harvest a renewable resource in a traditional manner, which is culturally important to the local community. This alternative would also allow the public to enjoy hunting at no or little cost in a region where private land is leased for hunting, often costing a person \$300-\$2000/year for membership.

Additional Opportunity Action Alternative (Entire State Season)

Opening hunting in all refuge areas would discourage, if not prevent, birders, photographers, and other visitors from using refuge properties during hunting seasons. Other wildlife-dependent recreational programs would conflict with hunting. Wildlife Drive, various hiking trails, and other wildlife-dependent recreational program facilities would close during hunting seasons. Non-consumptive users would be significantly impacted by such an increase in time and space the refuge is open to hunters.

Refuge Facilities

No Action Alternative

Additional damage to roads and trails due to hunter use during wet weather periods would not occur; however, other users would still be using roads, thereby necessitating periodic maintenance. Additionally, costs associated with an expanded hunting program in the form of road and levee maintenance, instructional sign needs, and law enforcement would not be applicable.

Proposed Action Alternative

Under the proposed action, periodic maintenance or improvement of existing parking areas, roads, and trails will cause minimal negative impacts. These activities may cause some wildlife disturbances and small-scale, site-specific soil erosion and damage to vegetation. Activities would be timed to cause the least amount of disturbance to wildlife. Siltation barriers would be used to minimize soil erosion, and all disturbed sites would be restored to as natural a condition as possible. There would be some costs associated with a hunting program in the form of road and trail maintenance, instructional sign needs, and law enforcement. These costs should be minimal relative to total refuge operations and maintenance costs and would not diminish resources dedicated to other refuge management programs. Refuge facilities are not expected to be negatively impacted by the proposed action.

Additional Opportunity Action Alternative (Entire State Season)

Under this alternative, roads and parking areas that are closed in the other two alternatives would open to hunters. As a result, roads and parking areas would be consistently overused, rutted, and subject to increased erosion. This alternative would require regular maintenance or improvement of existing parking areas, roads, and trails, as well as the building of new parking areas, roads, and trails to support the increase in hunter numbers. New roads, parking areas, trails, instructional sign needs, and increases in law enforcement would significantly increase the costs

associated with the hunting program. These costs could diminish resources dedicated to other refuge management programs.

Cultural and Historical Resource Impacts

No Action Alternative

This alternative requires no development of new trails, roads, or other facilities, and therefore, will not have a negative effect on the refuge's cultural and historic resources.

Proposed Action Alternative

The preferred alternative requires no development such as construction of new trails and facilities, thereby producing no negative effect on the refuge's cultural and historic resources. Development of existing roads or trails would have previously required review by the Service's Regional Archaeologist in consultation with the State of Maryland's Historic Preservation Office, as mandated by Section 106 of the National Historic Preservation Act.

Service acquisition of land with known or potential archaeological or historical sites provides two major types of protection for these resources: protection from damage by federal activity and protection from vandalism or theft. The National Historic Preservation Act requires that any actions by a Federal agency which may affect archaeological or historical resources be reviewed by the State Historic Preservation Office, and that the identified effects must be avoided or mitigated. The Service's policy is to preserve these cultural, historic, and archaeological resources in the public trust, and avoid any adverse effects wherever possible.

Land acquisition by the Service would provide some degree of protection to significant cultural and historic resources. If acquisition of private lands does not occur and these lands remain under private ownership, the landowner would be responsible for protecting and preserving cultural resources. Development of off-refuge lands has the potential to destroy archaeological artifacts and other historical resources, thereby decreasing opportunities for cultural resource interpretation and research. There are no anticipated adverse cumulative impacts to this resource on- or off-refuge resulting from implementing the proposed action.

Additional Opportunity Action Alternative (Entire State Season)

There would be the likelihood of cultural or historical resource impacts associated with vandalism of historical structures (primarily graveyards), and, potentially, some effect on archaeological sites by artifact collectors who take advantage of the lack of limitations in this alternative.

C. Anticipated Impacts of Proposed Hunt on Refuge Environment and Community

No Action Alternative

Under this alternative, there would be no additional effects of the refuge hunting program on the refuge environment and community.

Proposed Action Alternative

The refuge expects no sizeable adverse impacts of the proposed action on the refuge environment which consists of soils, vegetation, air quality, water quality and solitude. Some disturbance to surface soils and vegetation would occur in areas selected for hunting; however impacts would be minimal. Hunting would benefit vegetation as it is used to keep many resident wildlife populations in balance with the habitat's carrying capacity. The refuge would also control access to minimize habitat degradation. Impacts on physical resources are expected to be minimal and only temporary, as trampled ground vegetation would recover. Personal observation by Blackwater NWR staff of the habitat during hunting season would lead a biologist to suspect that the deer population, especially bucks, damage more vegetation than the hunters would. Trampled vegetation would still have ample time to recover between the additional turkey hunt in the spring and the deer hunt in the fall. The resident Canada goose hunt and migratory waterfowl hunts on 40 percent of newly protected areas would be in marsh, fields, and on open water. The hunters would only travel to and from their blind site, disturbing a minimal amount of vegetation that would recover quickly after the hunt season. For impacts associated with the spring hunt of resident Canada geese, see the Environmental Assessment for an Integrated Wildlife Damage Management Plan.

The refuge expects impacts to air and water quality to be minimal and only due to refuge visitors' automobile and off-road vehicle emissions and run-off on road and trail sides. The effect of these refuge-related activities, as well as other management activities, on overall air and water quality in the region are anticipated to be relatively negligible, compared to the contributions of industrial centers, power plants, and non-refuge vehicle traffic. Existing State water quality criteria and use classifications are adequate to achieve desired on-refuge conditions; thus, implementation of the proposed action would not impact adjacent landowners or users beyond the constraints already implemented under existing State standards and laws.

Impacts associated with solitude are expected to be minimal given time and space zone management techniques, such as seasonal access and area closures, used to avoid conflicts among user groups.

The increase in hunting would provide recreational opportunities for 260 waterfowl hunters and 140 turkey hunters at Blackwater NWR. These activities and programs would produce a positive impact on refuge management, visitor attitudes, and the local economy. The local purchases of gas, food, lodging, hunting licenses, equipment, and supplies by the increased number of hunters, especially those from other areas like Pennsylvania and Western Maryland, would contribute substantially to the local economy. They would spread the word to their friends, encouraging them to come to the area to take advantage of the high quality recreation and, thus, positively affect the economy of the area. Deer hunting would also contribute to the reduction of vehicle damage and human injury from collisions between deer and vehicles.

Increased hunting opportunities would increase the number of licenses and duck stamps sold, as well as the amount of locally purchased hunting supplies. Because an increase in hunting opportunities on the refuge will not affect the refuge's non-consumptive users, there will not be a negative impact on the contributions already made to the local economy already by non-consumptive users.

Additional Opportunity Action Alternative (Entire State Season)

There would be an increase in disturbance to soil surface and vegetation under this alternative. Other refuge environments would not be significantly impacted by an increase in hunter activity. The refuge expects impacts to air and water quality to be minimal and only due to refuge visitors' automobile and off-road vehicle emissions and run-off on road and trail sides. The effect of these refuge-related activities, as well as other management activities, on overall air and water quality in the region are anticipated to be relatively negligible, compared to the contributions of industrial centers, power plants, and non-refuge vehicle traffic. Existing State water quality criteria and use classifications are adequate to achieve desired on-refuge conditions; thus, implementation of the proposed action would not impact adjacent landowners or users beyond the constraints already implemented under existing State standards and laws. Because an increase in hunter numbers will negatively affect other recreational users, visitation for other activities than hunting would decrease. Visitation for hunters would increase to a point, and then would most likely stabilize as hunt quality and success decline. As a result, visitor use of restaurants, lodging, service stations, and other facilities would decline. Hunters are not as likely to take an interest in other tourist industry activities as the wildlife observer, and would not be as likely to visit other attractions, thereby creating a negative effect on the tourist industry.

D. Other Past, Present, Proposed, and Reasonably Foreseeable Hunts and Anticipated Impacts

No Action Alternative

There would be no additional hunts opening in the hunt program and therefore, the cumulative effect of this alternative is not expected to be significant.

Proposed Action Alternative

Cumulative effects on the environment result from incremental effects of a proposed action when these are added to other past, present, and reasonably foreseeable future actions. While cumulative effects may result from individually minor actions, they may, viewed as a whole, become significant over time.

The implementation of any of the proposed actions described in this assessment includes actions relating to the refuge hunt program. These actions would have both direct and indirect effects (e.g., new site inclusion would result in increased public use, thus increasing littering, noise, and vehicular traffic); however, the cumulative effects of these actions are not expected to be significant during the next 15 years.

Additional Opportunity Action Alternative (Entire State Season)

There would be significant direct and indirect effects of the action under this alternative in terms of increased public use, littering, noise, vehicular traffic, etc. These cumulative effects could potentially become significant over time.

E. Anticipated Impacts if Individual Hunts are Allowed to Accumulate

No Action Alternative

Blackwater NWR opened the refuge deer hunt program in 1985 to assist with crop depredation issues in Dorchester County and to provide a wildlife-dependent recreational use. Because this alternative does not allow for additional hunts, there is no anticipated impact of accumulated hunts.

Proposed Action Alternative

Blackwater NWR opened the refuge deer hunt program in 1985 to assist with crop depredation issues in Dorchester County and to provide a wildlife-dependent recreational use. The cumulative impact analysis has looked at each type of hunting allowed on refuge lands and has discussed the impacts associated with individual hunt programs. In this section, potential impacts of accumulated hunts will be addressed.

The following table shows the refuge hunting seasons, along with the dates when these seasons are open. The total number of days in which hunting occurs is 77. This is 21% of the year. The remainder of the year is available for refuge visitors to enjoy the other five priority public uses identified in the National Wildlife Refuge System Improvement Act of 1997.

Refuge Hunt	Hunt Season	Hunt Days
White-Tail/Sika	Late September – Late January	53
Wild Turkey	April – May	10
Migratory Waterfowl	Mid-October – Late January	22

Although hunting seasons occasionally overlap, they are usually spread out in space and in time so that accumulating impacts do not occur. For example, deer hunting does not occur at the same time or in the same location as waterfowl hunting.

U.S. Fish and Wildlife Service staff recognize that all uses of refuge lands create some impact to refuge wildlife and their habitats. These uses, when taken together, have the potential to create accumulating impacts as the number of refuge uses increases. Because of this potential, refuge uses are limited to those uses which have been formally determined to be compatible with the purposes for which the refuge was established and with the Mission of the National Wildlife Refuge System. When these formal compatibility determinations are reviewed (every ten to

fifteen years) possible accumulating impacts that may have occurred in succeeding years will be considered and will be addressed as necessary. Accumulated impacts are not expected to have significant impacts.

Additional Opportunity Action Alternative (Entire State Season)

Under this alternative, the refuge would be open to hunting 150 days per year. There would be overlap in time and space between different hunting opportunities. The uses under this alternative have a higher potential of creating accumulating impacts. Accumulating impacts will be reviewed when formal compatibility determinations are reviewed and addressed as necessary.

V. Consultation and Coordination

This final Environmental Assessment for turkey and waterfowl hunting tiers from the Chesapeake Marshlands National Wildlife Refuge Complex final CCP/EA which was approved and signed in August 2006. During the planning process for writing the CCP, the staff met on several occasions with federal, state and non-governmental organizations to offer them opportunities to assist in the ongoing planning. The draft CCP and EA were made available for public review during the summer of 2005. Extensive media coverage in local newspapers informed the public about the availability of these documents. The Complex held 14 open house in four counties and sent workbooks to 3000 homes and organizations regarding the CCP scoping meetings. There were three open houses to discuss any issues and concerns held by the public. There has been considerable media attention since the publication of the draft plan and many people have called or written to learn more about the hunting program. Most of the comments received regarding the proposed hunts were positive and in support of opening the refuge to these new hunt opportunities (see Chesapeake Marshlands NWRC Comprehensive Conservation Plan for more details). Maryland DNR was consulted during the preparation of this assessment.

VI. Regulatory Compliance

Comprehensive Conservation Plan

A draft CCP/EA which identified and evaluated three alternatives for a public hunt program at Chesapeake Marshlands NWRC was distributed for public review and comment in summer 2005. The Final CCP for Chesapeake Marshlands NWRC was issued in August 2006, when the Regional Director determined that the implementation of modified Alternative B (presented in this EA as Alternative D), would not have a significant impact on the quality of the human environment in accordance with section 102 (2) (c) of the National Environmental Policy Act. It was determined that an Environmental Impact Statement was not required and a Finding of No Significant Impact was signed on January 17, 2006.

Hunt Plan

Refuge staff prepared a Hunt Plan in January 2006.

Federal Rule Making

Before turkey and waterfowl hunting will be allowed on the refuge, the Code of Federal Regulations will be amended to authorize the hunting of migratory game birds and big game (turkey) on Chesapeake Marshlands NWRC.

Compatibility Determination

Compatibility determinations were written and approved on January 26, 2006 for waterfowl hunting and for big game hunting (white-tailed deer, sika deer, and eastern wild turkey) at Chesapeake Marshlands NWRC. Hunting (with some restrictions) was found to be compatible with both the mission of the System and the purposes for which the refuges were established. The compatibility determinations were published in the final CCP for Chesapeake Marshlands NWRC.

National Environmental Policy Act Documentation

This Environmental Assessment meets the NEPA requirements.

Endangered Species Act Section 7 Evaluation

A Section 7 Biological Evaluation for the proposed hunt program at Chesapeake Marshlands NWRC was completed on January 24, 2006.

Coordination with the State of Maryland

We consulted with Maryland Department of Natural Resources in the development of the hunt program at Chesapeake Marshlands NWRC. Official comments from the State were received on July 13, 2005 and September 21, 2005.

Outreach Plan

An outreach plan was written and implemented. Information about the proposed opening of the refuge to waterfowl and archery deer hunting was made available to media, Federal, State and local officials, refuge visitors, adjacent landowners, and sportsmen's groups via the internet, traditional press, kiosk postings, meetings, and one-on-one conversations.

News Release

This amended Environmental Assessment was available for public review at the refuge headquarters, 2145 Key Wallace Drive, Cambridge, MD 21613; at the Blackwater NWR Visitor Center; and at the Cambridge Public Library. The availability of the document was announced in local newspapers.

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Appendix Response to Public Comments

The Draft Comprehensive Conservation Plan and Environmental Assessment for the Chesapeake Marshlands National Wildlife Refuge Complex were available for public review and comment from May 3, 2005 through July 5, 2005. The draft CCP/EA included a hunt plan and the three alternatives for hunting outlined in the EA. The proposed alternative in the draft CCP/EA for hunting was to open the Refuge to turkey and waterfowl hunting. The availability of the draft CCP/EA was announced in the Federal Register, numerous local newspapers, and on the refuge complex's website. The Service received comments from the public and responses to substantive comments are included in Appendix A of the Chesapeake Marshlands NWRC Comprehensive Conservation Plan (2006). Chesapeake Marshlands NWRC then completed an opening package for turkey and waterfowl hunting in January 2006. The hunt opening package included an Environmental Assessment tiered from the CCP/EA which was released for public comment period in December 2005. The availability of the hunt EA was announced in local newspapers and the document was available in the Cambridge Public Library and at the Blackwater NWR Visitor Center. No comments were received during the public review and comment period. The Service has also solicited public comment for the revised Hunting Program Environmental Assessment. The 30-day review period began on February 21, 2007 and ended on March 23, 2007. Copies of the documents were placed in the Cambridge Public Library and at the Blackwater National Wildlife Refuge Visitor Center, and news releases announcing its availability for comment were placed in local newspapers.

Two comments by the public were received, one of which was in favor of the Proposed Action to implement the 2007 Sport Hunt Plan which would allow portions of the Chesapeake Marshlands NWRC to turkey and waterfowl hunting. One comment, by the Humane Society of the United States (HSUS), was against opening Chesapeake Marshlands National Wildlife Refuge Complex to new hunting opportunities. Comments by the HSUS are summarized and responded to below.

The HSUS states that the "FWS is failing to provide adequate notice and the opportunity to comment" on the document. The Service solicited comments regarding the opening of Chesapeake Marshlands NWRC to turkey and waterfowl hunting on three different occasions. The revised hunt EA was available for a 30-day review period from February 21, 2007 to March 23, 2007.

The HSUS states that the Service has not provided adequate time to sufficiently analyze the ramifications of allowing hunting. The Service notes the comment.

The HSUS states the Service is not fulfilling the objective of managing federal lands primarily for the benefit of wildlife "in part because of the recreational hunting that the agency is allowing on Refuges." The Service notes the comment.

The HSUS states that the Refuge Improvement Act does not allow for sport hunting on Refuges unless it is "compatible with the purposes for which the Refuge and Refuge System were established." The Service has followed its regulations for determining that both turkey and waterfowl hunting are compatible on Chesapeake Marshlands NWRC and compatibility determinations for big game and waterfowl hunting were signed by the U.S. Fish and Wildlife

Service Region 5 Regional Chief of the National Wildlife Refuge System and are included in the CCP which was approved on August 8, 2006.

The HSUS states that the Service must ensure the availability of sufficient funds before approving hunting on the refuge under the statutes of the Refuge Recreation Act. Sufficient funds are available to implement the 2007 Sport Hunt Plan for Chesapeake Marshlands NWRC as stated within the hunt plan on pages 6 and 7.

The HSUS states that the Service's objective of preparing refuge hunting packages by May 1, 2007 is "undertaking a haphazard, single-minded exercise so it can allow hunting on these Refuges." The Service notes the comment.

The HSUS states that the environmental assessment fails to take into account the "cumulative impacts on the Refuge System from the FWS's decision to expand hunting throughout the System." The Service notes the comment.

The HSUS states that the Service has not completed the Refuges 2003 Plan and Environmental Impact Statement (EIS). The Service notes the comment.

The HSUS feels that an EIS should be prepared. The Service notes the comment.

The HSUS states that the Service did not identify all relevant environmental concerns or take a "hard look" at the impacts on the Refuge System as a whole of expanding hunting on Refuges. The Service notes the comment.

The HSUS states that the Service must provide "some analysis of the cumulative impacts on the Refuge System from expanding or allowing hunting at all these Refuges." The Service has provided such a cumulative impact analysis in this EA.

The HSUS states that the Service relies on the Migratory Bird Hunting Framework for the analysis of cumulative impacts to migratory birds and that the framework process "ignores the adverse and cumulative impacts to migratory birds from non-migratory bird hunting and ignores the impacts migratory bird habitat from hunters." The Service notes the comment.

The HSUS states that the Service does not adequately analyze the impacts of hunting to imperiled Refuge wildlife. The Service notes the comment.

The HSUS states that the Service may "not unduly narrow the purpose and need for hunting in the Refuge." The Service notes the comment.

The HSUS states that the Service has not adequately studied, developed and described alternative uses to the available Refuge resources. The planning process for the Chesapeake Marshlands NWRC Comprehensive Conservation Plan includes a draft vision statement and goals, the continued collection of information on important fish and wildlife populations and habitats, the involvement of the public in identifying the issues and opportunities that the plan must address, the analysis of a reasonable range of management alternatives based on those issues and refuge

resources, a draft EA for public review and comment, and a CCP that reflects public comment and the alternative chosen by our Regional Director. The alternatives described in this EA are tiered from the CMNWRC CCP which was signed by the Regional Director on August 8, 2006.

The HSUS states that the Service fails to examine non-lethal management of wildlife and explain why non-lethal management practices are not included in the alternative being analyzed. The Service notes the comment.

The HSUS asks the Service to “consider and provide an analysis of a ‘Non-Consumptive Use’ Alternative.” Alternative A in the CMNWRC EA is a “no-action” alternative in which the Refuge Complex does not open to turkey and waterfowl hunting. The CMNWRC EA analyzes this alternative.

The HSUS states that the Service has “failed to meaningfully involve the public in its NEPA review process for allowing hunting at the Refuges.” The draft CCP and EA were made available for public review during the summer of 2005. Extensive media coverage in local newspapers informed the public about the availability of these documents. The Complex held 14 open house in four counties and sent workbooks to 3000 homes and organizations regarding the CCP scoping meetings. There were three open houses to discuss any issues and concerns held by the public. There has been considerable media attention since the publication of the draft plan and many people have called or written to learn more about the hunting program.

The HSUS states that the Service must complete a Section 7 evaluation. Chesapeake Marshlands NWRC completed an Intra-Service Section 7 Biological Evaluation as part of the hunt plan and assessment.

The HSUS states that the Service has compromised the biological integrity of refuges by allowing hunting and that the Service does not consider impacts of hunters on non-consumptive users. The HSUS also claims that hunting and the number of hunters is decreasing and the Service has not capitalized on potential economic gain that would come from non-consumptive users. The Service notes these comments.

The HSUS comments on the opening of Chesapeake Marshlands NWRC to deer hunting. The Refuge deer hunting program began in 1985 and so is not considered in this hunt plan or EA. These documents only analyze opening the Refuge Complex to turkey and waterfowl hunting.

The HSUS states that the EA does not “elaborate as to the species of duck that may be harvested.” The CMNWRC EA does state that hunters must comply with state regulations which dictate the number and species of ducks that may be harvested.

The HSUS states that woodcock, American black ducks, pintail, greater and lesser scaup, and king rails should not be hunted because their populations are declining. The Service relies on the Migratory Bird Sport Hunting Frameworks to set hunting regulations of migratory birds annually. The Frameworks are based on the best biological information available.

The HSUS states that the ability of hunters to correctly identify most waterfowl species is “deplorable.” The Service notes the comment.

The HSUS states that spring turkey hunting will disturb females during the nesting season and increase the potential for nest predation. The HSUS also states that a hunt during the spring would be “both reckless and potentially detrimental to a wide range of non-target species.” The Service notes the comment.

The HSUS states that the environmental assessment makes “no effort to assess the impacts of this spring hunt on any aspect of the Refuge or its visitors.” The environmental assessment considers and analyzes the impacts of the spring turkey hunt on Refuge facilities, environment and community, non-targeted wildlife, migratory birds, and other wildlife-dependent visitors on pages 20 through 29.

The HSUS states that hunting has a “major, detrimental effect on wildlife viewing opportunities.” The Service notes the comment.

The HSUS states that the environmental assessment does not consider temporal or monetary investments necessary to isolate consumptive and non-consumptive users on the Refuge. The Service notes the comment.

The HSUS states that in the cumulative impacts analysis, the environmental assessment states in the beginning that cumulative effects “may result from individually minor action, they may, viewed as a whole, become substantial over time,” and then later, states “...the cumulative effects of these actions are not expected to be substantial.” The HSUS feels these two statements are contradictory. The Service disagrees. The first statement is the context for why a cumulative impact analysis is conducted and the second statement is the Service’s conclusion after the analysis is completed.

The HSUS states that the environmental assessment does not justify the cumulative impacts of hunting on targeted wildlife species. The Service notes the comment.