Marsh Restoration and Nutria Damage Reduction Environmental Assessment

Lead Agency: U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

Cooperating Agency: U.S. Department of Interior
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office

Agencies Consulted: State of Maryland
Department of Natural Resources

State of Delaware
Department of Natural Resources and Environmental Control

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ACRONYMS

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BNWR	Blackwater National Wildlife Refuge
CDFG	California Department of Fish and Game
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulations
DDNREC	Delaware Department of Natural Resources and Environmental Control
DFS	Delmarva Fox Squirrel
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act of 1973
FLIR	Forward Looking Infrared
IWDM	Integrated Wildlife Damage Management
ISI	Invasive Species International
MEPA	Maryland Environmental Policy Act
MDNR	Maryland Department of Natural Resources
MOU	Memoranda of Understanding
NDDTC	National Detector Dog Training Center
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
SOP	Standard Operating Procedures
T&E	Threatened and Endangered
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USDI	United States Department of Interior
USGS	United States Geological Survey
WMA	Wildlife Management Area
WS	Wildlife Services

CHAPTER 1: PURPOSE AND NEED FOR ACTION

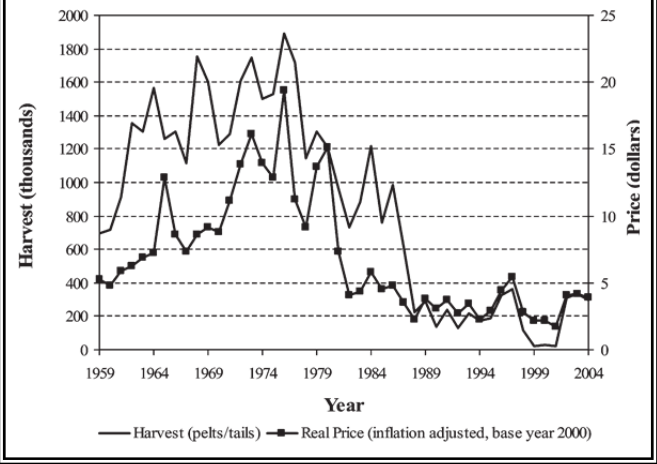
1.1 PURPOSE

Across the world, as human populations have expanded, wildlife species have been introduced into new areas, and land has been transformed to meet human needs. These changes often increase the potential for conflicts between wildlife and people that result in damage to resources and threaten human health and safety. One encroachment on native ecosystems is the introduction of non-native, invasive species into native environments. Invasive species often compete with native plants and wildlife and can threaten biodiversity. The number of invasive species introduced in the history of the United States has been estimated at 50,000 species (Pimentel et al. 2005). Some introduced invasive species benefit society, such as corn, wheat, cattle, poultry, and other food items. Nearly 98% of the food system in the United States is derived from introduced, invasive species (USBC 2001, Pimentel et al. 2005). Other invasive species have caused considerable economic and environmental damage in the United States and worldwide. Pimentel et al. (2005) estimated invasive species cause nearly $120 billion in environmental damages and losses in the United States annually. Of particular concern are the impacts of invasive species on threatened and endangered (T&E) species worldwide. Invasive species negatively impact nearly 42% of the species listed as T&E in the United States (Wilcove et al. 1998, Pimentel et al. 2005). Worldwide nearly 80% of wildlife populations at risk of extinction are threatened or negatively impacted by invasive species (Pimentel et al. 2005).

One of those species introduced into the United States that can negatively impact biodiversity has been the intentional and unintentional release of nutria (*Myocastor coypus*). Nutria are a large, dark colored, semi-aquatic rodent that are native to South America and are similar in appearance to the native muskrat (*Ondatra zibethicus*). Nutria were valued for their fur and most introductions into the United States occurred from nutria that escaped fur farms or were released as a source for fur trapping (Carter and Leonard 2002). The first attempts to establish a population of nutria in the United States occurred at Elizabeth Lake in California during 1899 for fur farming (Carter and Leonard 2002). Most established populations in the United States occurred from nutria that escaped fur farms in the 1930s and 1940s, which coincides with the introduction of nutria into the Chesapeake Bay area where populations became established (Carter and Leonard 2002). The purpose of this Environmental Assessment (EA) is to evaluate alternative approaches to addressing the loss of marshland habitat associated with the introduction of nutria into the Chesapeake Bay area (USFWS 2001, Southwick Associates 2004).

The first recorded introduction of nutria into the Chesapeake Bay occurred in 1943 during attempts to stimulate the local fur farming economy (Willner et al. 1979, Maryland Department of Natural Resources 1997). Although nutria were introduced to support the fur industry, private fur trappers and hunters were not able to harvest enough nutria to keep pace with the population growth rate. The global demand for nutria pelts can be very sporadic with fur markets and the profits from nutria pelts declining for a variety of reasons, such as fashion trends, United States exchange rates, and the political and economic trends in consumer nations. As shown in Figure 1.1, the harvest of nutria and the prices paid for nutria pelts has declined (Dedah et al. 2010).

Figure 1-1. Annual Nutria Harvest and Average Real Price per Pelt from 1959 to 2004 (Dedah et al. 2010).



The United States Fish and Wildlife Service (USFWS) and the Maryland Department of Natural Resources (MDNR) began to address increasing and expanding nutria populations along the Eastern Shore of Maryland and the loss of marsh habitat associated with nutria foraging and digging during the 1980s and 1990s (Bounds et al. 2003). Initial efforts included the establishment of rebates (*i.e.*, bounties) to trappers that removed nutria, seeking recommendations from other professionals on eradication efforts, and the formation of a multi-agency task force. In addition, the Maryland General Assembly required the MDNR to develop and implement a program to eradicate nutria in Maryland. In 1995, the MDNR and the United States Geological Survey conducted research on the Blackwater National Wildlife Refuge to evaluate the recovery of marsh vegetation if nutria were removed. Using fencing to exclude nutria, the researchers found marsh vegetation recovered quickly but habitats outside the fencing continued to be lost (Bounds et al. 2003). In 1997, the Nutria Control/Marsh Restoration Pilot Project Partnership was formed by the MDNR and the USFWS which initially consisted of 17 partners comprised of federal, state, and private organizations. Today, the Partnership has grown to 26 partners.

The goals established by the Partnership were to: (1) determine the feasibility of eradicating nutria on Maryland's Eastern Shore; (2) restore marsh habitats; (3) and promote public understanding of the importance of preserving Maryland's wetlands. To meet those goals, the Partnership developed a project outline consisting of two phases. The initial phase (Phase I) consisted of a 3-year pilot project at three sites consisting of the Blackwater National Wildlife Refuge (federal property), Fishing Bay Wildlife Management Area (state property), and Tudor Farms, Inc. (private property) in Dorchester County, Maryland. The objectives of Phase I of the project were to: (1) establish an estimate of nutria populations and densities at the three sites; (2) monitor nutria behavior and movement in response to removal efforts, and (3) evaluate the reproductive and overall health of the nutria in response to removal efforts. Phase I of the project began in 2000 and was concluded in 2002.

As part of the Nutria Control/Marsh Restoration Pilot Project Partnership, a Partnership Management Team was established consisting of the USFWS, the MDNR, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program, the United States Army Corps of Engineers, the Cooperative Fish and Wildlife Research Unit of the United States Geological Survey (USGS), Tudor Farms, and the University of Maryland Eastern Shore. In 2002, the Partnership Management Team members began the implementation of Phase II of the project.

As part of the planning process during the development of alternative approaches to meeting the need for action associated with Phase II of the project and to evaluate the potential impacts to the human environment associated with implementation of those possible alternatives, the USFWS, in cooperation with the MDNR, the University of Maryland Eastern Shore, the USGS, and WS, prepared an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA). The objectives of Phase II to meet the need for marsh recovery were to:

- Establish an accurate estimate of nutria populations and densities in the three study areas identified under Phase I
- Determine the most effective damage reduction strategies (maximize capture/effort indices) to optimize removal and achieve population reduction
- Evaluate the effects of population reduction on home range and movement patterns of nutria
- Determine how intense population reduction affects nutria reproductive behavior and performance
- Ascertain if the health of the nutria population is influenced by intense harvest
- Monitor the effects of intense nutria harvest on vegetative response of native species
- Develop management recommendations to eradicate nutria in Maryland and provide

recommendations for action in other affected states

The EA evaluated the need for marsh recovery and the relative effectiveness of four alternatives to meet that proposed need, while accounting for the potential environmental effects of those activities (USFWS 2001). Comments from the public involvement process for the EA were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. After consideration of the analysis contained in the EA and review of public comments, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued. The Decision and FONSI selected the proposed action alternative which addressed a continued research phase with potential for the operational use of methods and techniques based on the findings of the research component (USFWS 2001).

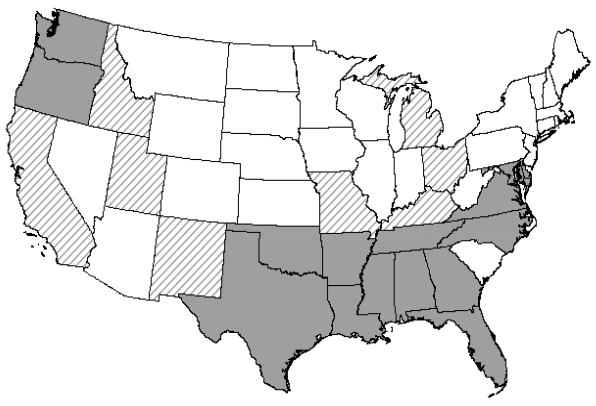
Changes in the need for action and the affected environment have prompted WS and cooperating agencies to initiate this new analysis to address marsh recovery and nutria removal efforts. This EA will address more recently identified changes and will assess the potential environmental impacts of program alternatives based on a new need for action, primarily a need to address marsh recovery and nutria removal efforts in areas of the Chesapeake Bay that were not originally analyzed in the previous EA. In addition, this EA will: (1) facilitate planning between the cooperating agencies, (2) promote interagency coordination, (3) assist in determining if the proposed expanded marsh recovery efforts could have a significant impact on the environment for both humans and other organisms, (4) analyze several alternatives to address the new need for action and the identified issues, (5) clearly communicate to the public the analysis of individual and cumulative impacts of alternatives, and (6) document the analyses of the environmental consequences of the alternatives to comply with the NEPA.

1.2 NEED FOR ACTION

Wetlands are among the most biologically productive ecosystems in the world, yet over half the original wetlands in the United States have been lost or damaged (Mitsch and Gosselink 1993, Environmental Protection Agency 1995). The decline of wetlands is potentially due to several factors including human development, sea level rise, global warming, land subsidence, increased salinity, and pollution. Another factor contributing to the damage of wetland habitats is the introduction of nutria into the United States, especially in areas along the coastal United States where nutria have established populations.

A review of nutria distribution in the United States by Bounds (2000) and Carter and Leonard (2002) indicated that nutria have become established in at least 15 states (see Figure 1.2). One specific area where nutria have become established in the United States is the Chesapeake Bay. Nutria did not evolve in wetland ecosystems of the Chesapeake Bay; therefore, inherent biofeedback mechanisms that naturally control populations do not exist. Without natural regulation, nutria in the area of Chesapeake Bay were able to quickly exploit the native environments allowing for local populations to increase and expand quickly.

Figure 1.2 - Nutria in the United States (Bounds 2000)



Nutria primarily inhabit brackish or freshwater marshes, but are also found in swamps, rivers, ponds, and lakes. Nutria live in dense vegetation, in abandoned burrows, or in burrows they dig along

stream banks or shorelines (Wade and Ramsey 1986). Nutria are almost entirely herbivorous and eat animal material (mostly insects) incidentally. Freshwater mussels and crustaceans are occasionally eaten in some parts of their range. Marshes are generally wetlands frequently or continually inundated with water, characterized by emergent soft-stemmed vegetation that are adapted to saturated soil conditions. The emergent vegetation associated with marsh habitats often form thick, fibrous root mats that stabilizes the underlying soil and acts to catch soil sediments in the water.

The digging and feeding behavior of nutria can be destructive to marsh ecosystems. Nutria forage directly on the emergent vegetation and the vegetative root mat in a wetland, leaving a marsh pitted with digging sites and fragmented with deeply cut swimming canals. When the fibrous vegetative mat is compromised, emergent marshlands are quickly reduced to unconsolidated mudflats. The complete loss of emergent vegetation and root mats that occur from nutria are often called "*eat-outs*", where the foraging and digging behavior of nutria completely denude large areas of marsh vegetation. These damaged areas are denuded of most plant life and essentially become mud flats, providing fewer habitats for the spawning and production of fish and shellfish, birds and other aquatic mammals, and is the greatest direct impact of nutria (Haramis 1997, Haramis 1999, Southwick Associates 2004). The denuding of marsh vegetation can expose the soil and accelerate erosion associated with tidal currents and wave action along with a general lowering of existing elevation levels in marshlands. The loss of vegetation can also facilitate salt water intrusion into marsh interiors. Nutria also cause damage by eating lawn grasses found adjacent to aquatic habitats. Nutria are opportunistic feeders and eat approximately 25% of their body weight daily (LeBlanc 1994).

Burrowing activities of nutria can severely damage levees, dikes, earthen dams, and other structures. Additionally, nutria burrows can weaken flood control levees that protect low-lying areas. In some cases, tunneling in levees is so extensive that water will flow unobstructed from one side to the other, necessitating their complete reconstruction.

Nutria can also burrow into the styrofoam floatation under boat docks and wharves, causing these structures to lean and sink. Nutria burrow under buildings, which may lead to uneven settling or failure of the foundations. Burrows can weaken road beds, stream banks, dams, and dikes, which may collapse when the soil is saturated by rain or high water or when subjected to heavy objects on the surface (such as vehicles, farm machinery, or grazing livestock). Rain and wave action can wash out and enlarge collapsed burrows and compound the damage.

Nutria depredation on crops has also been documented (LeBlanc 1994). Crops that have been damaged include corn, milo (grain sorghum), sugar and table beets, alfalfa, wheat, barley, oats, peanuts, various melons, and a variety of vegetables from home gardens and truck farms. Nutria girdle fruit, nut, and shade trees and ornamental shrubs. They also dig up lawns and golf courses when feeding on the tender roots and shoots of sod grasses. Gnawing damage to wooden structures is also common.

Nutria were first introduced into the Chesapeake Bay area around 1943 from releases and escapes from fur farms near the Blackwater National Wildlife Refuge. Once introduced into a native environment, nutria were able to exploit the available resources and populations begin to increase and expand rapidly. Nutria are prolific breeders with breeding occurring as early as four to seven months of age with breeding occurring throughout the year. Nutria can produce up to three litters per year with litters averaging four to five young but litter sizes of 13 offspring have been reported. Offspring of nutria are capable of surviving without their mother after four days of nursing. Willner et al. (1979) estimated female nutria produced 8.1 young per year in Maryland.

As an example of the potential for a rapid growth rate, the population of nutria at the 10,000 acre

Blackwater Unit of the Chesapeake Marshlands National Wildlife Refuge Complex increased from less than 150 nutria in 1968 to as many as 50,000 nutria in 1998 (USFWS 2001). This dramatic increase in the nutria population at the Blackwater Unit coincided with a rapid decline in marsh vegetation and the deterioration of marsh habitat within the Unit. The Blackwater Unit was losing between 500 and 1,000 acres of wetland habitat per year from nutria damage with greater losses occurring over the entire Chesapeake Bay National Wildlife Refuge Complex and Fishing Bay estuary (G. Carowan, USFWS, pers. comm. 2000). Currently, the Blackwater Unit of the Chesapeake Bay National Wildlife Refuge estimates that up to 5,000 acres of wetland habitat was lost due to nutria (Suzanne Baird Refuge Manager, USFWS pers. comm. 2012). The loss of marsh vegetation and habitat can have adverse effects on the ability of Chesapeake Bay to meet native wildlife needs and maintain a healthy ecosystem. Based on the damage rates historically experienced at the Blackwater Unit, Southwick Associates (2004) estimated that nutria had the capacity to destroy about 0.33% of the Chesapeake Bay's coastal marshes annually and about 17.1% in a 50-year period. The resulting loss of marsh vegetation and elevation totals thousands of acres each year and the associated saltwater intrusion complicates marsh recovery.

Tiner and Burke (1995) estimated that 65% of Chesapeake Bay coastal marshes have been lost since the 1700s and the effects from nutria add adverse pressures on an already fragile ecosystem. Marshes help maintain environmental quality by purifying natural waters, filtering nutrients, chemicals, organic pollutants and sediments, and producing food which supports aquatic and terrestrial life. In addition, marsh vegetation helps minimize erosion by increasing sediment stability and reducing wave action and velocity (Dean 1979). Coastal wetlands also provide protection from storm damage to residential and commercial areas further inland and provide flood control. Thus, the remaining marshes in the Chesapeake Bay have become increasingly valuable as a public resource because the distribution and functional health of this habitat has been reduced (Southwick Associates 2004).

The natural resources of Chesapeake Bay are highly valued by the public and contribute to the local economies of surrounding States. The marshes of Chesapeake Bay are used for multiple purposes including: fishing, hunting, trapping, bird watching, wildlife viewing/photography, berry and timber harvest, agriculture, and livestock production. Chesapeake Bay is a valuable resource to birds and other wildlife, including waterfowl, shorebirds, migratory songbirds, and T&E species. About 348 species of birds have been recorded in the Chesapeake Bay area and almost half of those regularly use marshes (Tiner and Burke 1995). About one million waterfowl winter on Chesapeake Bay which represents 35% of all waterfowl in the Atlantic Flyway (Chesapeake Bay Program 1990). These marshes also serve as important spawning or nursery sites for many fin-fish and shellfish.

The major tributaries of Chesapeake Bay account for about 90% of the striped bass (*Morone saxatilis*) spawned on the East Coast (Bergren and Lieberman 1977). Metzgar (1973) found that 44 fish species in Chesapeake Bay used marshes for spawning, nursery, and feeding. Goodger (1985) found that in Maryland, the Eastern oyster and white perch complete their entire life cycles in estuarine waters. The Chesapeake Bay provides over $60 million annually in commercial finfish and shellfish landings. In 1995, the catch of blue crab (*Callinectes sapidus*), Maryland's most abundant and valuable shellfish, was 40.3 million pounds valued at $29 million (Holiday and O'Bannon 1996). The Chesapeake Marshlands National Wildlife Refuge Complex estuary supports one of the most important blue crab nurseries in Chesapeake Bay. In addition, State residents spent $568 million directly on recreational fishing, according to the USFWS (2006) Survey on Fishing, Hunting and Wildlife-Associated Recreation with a total economic impact to Maryland of $727 million.

As more and more acres of Chesapeake Bay marsh are lost, the resulting declines in commercially and recreationally-valuable wildlife species can be detrimental to local economies (Southwick Associates 2004). Chesapeake Bay marshes are recognized as some of the most important wetlands in the United

States and have received global recognition as *"Wetlands of International Importance"* under the 45-nation Ramsar Convention Treaty (Tiner and Burke 1995). Loss of critical wetlands affects the health of the Chesapeake Bay ecosystem that can impact state and local economies and decrease fish and wildlife productivity.

Marsh losses from nutria-related damage at the current rate and the financial losses to the State of Maryland alone and its citizens cost millions of dollars annually (see Table 1.1), including the potential loss of 31 jobs per year and up to 1,628 jobs over a 50-year period (Southwick Associated 2004). In 2001, Southwick Associated (2004) estimated that nutria-related economic damages in Maryland exceeded $5 million and estimated over a 50-year period that the economic damages associated with nutria in Maryland would exceed $251 million. More than 7,500 jobs and hundreds of millions of dollars in state and federal tax revenues are directly related to wildlife related activities in Chesapeake Bay (Southwick Associates 2004). The overall economic benefits to Maryland and Delaware from hunting waterfowl and other wildlife species dependent upon marshes are estimated at more than $300 million annually (USFWS 1995). The losses in environmental services provided by wetlands, and the associated social losses add another layer to the economic damages associated with nutria (Southwick Associates 2004).

Table 1.1 - Potential Nutria-Related Economic Damages Occurring in Maryland, 2001†

	Economic Damages					
Year	**Retail Sales[1]**	**Multiplier Effects[2]**	**Salaries[3]**	**State Tax Revenues[3]**	**Federal Tax Revenues[3]**	**TOTAL**
2001	$1,403,379	$2,870,402	$692,062	$85,656	$96,281	**$5,147,780**
2051	$72,942,499	$132,688,854	$35,987,235	$4,454,115	$5,006,599	**$251,079,302**

† adapted from Southwick Associates (2004); potential nutria-related economic damages to commercial and sport fisheries, hunting and wildlife watching, including the dockside value and processing value-added losses for commercial fisheries

[1] Results represent the potential decrease in the state economy associated with nutria damage

[2] Multiplier effect for commercial fishing

[3] Estimate of the commercial fishery's state and federal tax revenues, plus associated costs

Another important economic consideration for the Chesapeake Bay area is wildlife viewing which consists of wildlife watching, photography and feeding. The USFWS generated estimates of the economic impacts created in Maryland by wildlife viewers and their expenditures in "*The 2001 National and State Economic Impacts of Wildlife Watching*" (Caudill 2003). Overall, Maryland was the 9th highest ranked state in the United States during 2001 in regards to the volume of economic activity attributable to watchable wildlife recreation and third after California and Florida in terms of economic impacts created by non-residents visiting the state to view, feed, or photograph wildlife[1]. For the Chesapeake Bay area, Southwick Associates (2004) estimated that revenue from wildlife watching totaled $15 million annually.

To address the economic and ecological effects associated with a burgeoning nutria population at the Blackwater Unit of the Chesapeake Bay National Wildlife Refuge Complex and surrounding areas in Maryland, the USFWS and the cooperating agencies evaluated various alternative approaches to address the need to reduce nutria damage to wetland habitats and the issues associated with those activities (USFWS 2001). The alternative approach selected to address nutria damage outlined a three part approach, which included public involvement and outreach, research on the life history of nutria in Maryland and damage management strategies, and using the findings of the research to implement an operational program to reduce nutria damage (USFWS 2001).

[1] Until better data becomes available, it is assumed that 20% of statewide wildlife watching is associated with the Chesapeake Bay and its marshlands (Southwick Associates 2004).

Between 2000 and 2002, the number of members in the Nutria Control/Marsh Restoration Pilot Project Partnership increased from 17 to 26 members and the initial research phase investigating nutria physiological and behavioral characteristics in Maryland (Phase I) was completed. Between 2002 and 2006, WS and cooperating agencies implemented Phase II of the project by employing methods and strategies to remove nutria from approximately 100,000 acres of wetlands in Dorchester County. In 2007, the Partnership entered into Phase III of the project which expanded efforts to remove nutria in portions of Talbot, Caroline, Somerset, and Wicomico Counties in Maryland. In total, approximately 500,000 acres throughout the entire Delmarva Peninsula were identified as supporting nutria populations or contained habitat where nutria populations could become established. The distribution of wetland habitats and riparian habitats in those counties would allow the establishment of core nutria populations and provides dispersal corridors that facilitate the establishment of satellite populations. Nutria are also known to have occurred on the western shore of the Chesapeake Bay along the Patuxent and Potomac Rivers, although none have been reported since 2000.

Currently, those nutria populations that were considered to be of moderate to high-density on approximately 150,000 wetland acres in those Counties have been reduced to nearly zero. As high-density nutria populations have been suppressed, the emphasis of Phase III has shifted from large-scale aggressive reduction of high-density populations in those counties to a focused detection and removal of low-density nutria populations on the remaining 350,000 acres of potential nutria habitat in those counties.

Previous researchers in Europe and the United States found that nutria control and eradication becomes more difficult as population densities decrease (Lowery 1974, Gosling et al. 1988, Gosling and Baker 1989, Ras 1999) and nutria are eliminated from an area (Bounds et al. 2003)[2]. One of the challenges is the need to continually monitor previously trapped areas for sign of reinvasion. Initially, research focused on determining the feasibility of landscape level eradication of nutria in a logical and systematic approach across southern Dorchester County in Maryland to recover nutria damaged marsh vegetation (Bounds and Carowan 2000, Bounds et al. 2000). Data gathered during prior research efforts helped determine the sex and/or age of the nutria to be targeted, the best time of the year to conduct operational damage reduction efforts, and the most effective damage reduction strategies/methods. Current monitoring methods (*e.g.*, intensive ground search, shoreline surveys, detector dogs) are extremely time consuming and subject to bias from seasonal changes in vegetation, daily tidal fluctuations, and worker burnout.

In 2009, Invasive Species International (ISI) was requested by the Partnership Management Team to conduct an independent review of the current project. Based on recommendations by ISI, the following goals were determined to be critical to the successful implementation of the project mission (Chesapeake Bay Nutria Eradication Project Strategic Plan 2011):

- The Management Team and field staff decisions and activities are guided by a well-defined operational plan
- Access to private land is secured
- Tools and tactics for detection and removal are effective, efficient and selective at all population densities
- Stakeholders are aware and supportive of project
- Institutional support is strong and long term funding needs are met

[2]Trapping to eradicate requires that traps be set and checked well beyond the point at which nutria are no longer captured. As nutria populations decline, trapping becomes more difficult (Lowry 1974, Gosling and Baker 1989, Ras 1999) and costs can far exceed market price. Systematic and monitored trapping, based on an understanding of population ecology, ultimately was successful in Great Britain (Gosling 1989).

- A dedicated and committed field team is developed and retained
- Progress toward mission achievement is subject to regular internal and external scrutiny and confirmed independently

Despite the previous success of nearly eliminating high-density nutria populations on 150,000 acres of wetland habitat along the eastern shore of the Chesapeake Bay, the need to identify existing populations and prevent the continued proliferation of nutria into new areas and becoming re-established in areas where densities were reduced, the current project would need to expand into the remaining southern Maryland eastern shore counties, the western shore of Chesapeake Bay in Maryland, and Delaware. In addition, as nutria densities across the Chesapeake Bay are reduced, a need arises to identify and evaluate effective and efficient surveillance and monitoring methods as nutria become more difficult to locate. The status of nutria populations in remaining marshes is unknown, but given the distribution of tidal waterways, drainage ditches, ponds and waterfowl impoundments throughout the Delmarva Peninsula, it is likely that nutria have expanded and currently maintain populations throughout the Peninsula. Nearly 350,000 acres of habitat spread across the eastern shore in the initial core area surrounding the Blackwater Unit of the Chesapeake Bay National Wildlife Refuge Complex remain to be surveyed for nutria. The development of this EA analyzes the continuing need to remove nutria as part of marsh restoration efforts, alternatives to expand the removal of nutria, and effects of reducing nutria-related damage in the five southern Maryland eastern shore counties, the western shore of Chesapeake Bay, and Delaware watersheds.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

Actions Analyzed

This EA evaluates the need for nutria damage management to reduce damage and threats of damage to wetlands in the Chesapeake Bay and the surrounding watersheds where nutria are established or pioneering. This EA discusses the issues associated with conducting nutria removal and surveillance in the Chesapeake Bay and the surrounding watersheds to meet the need for action and evaluates different alternatives to meet that need while addressing those issues.

The Management Team has identified several objectives that would be incorporated into the alternatives. The relative degree to which each alternative allows those objectives to be met will be considered when deciding which alternative to implement. The objectives of the cooperating agencies in meeting the need for action are as follows:

- Eradicate nutria from the Delmarva Peninsula
- Identify the most effective methods for nutria eradication
- Refine systematic depopulation strategies
- Explore new detection and attraction techniques
- Explore new eradication tools
- Document and highlight marsh recovery following nutria eradication
- Provide natural resource managers nationwide with critical information for eradicating nutria through publications and development of a website
- Educate the public about the value of wetlands, the economic and ecological impacts of nutria, and the importance of the Chesapeake Bay Nutria Eradication Project

The alternatives discuss how methods would be employed to manage damage and threats associated with nutria as part of marsh recovery efforts. Therefore, the actions evaluated in this EA are the use of those

methods available under the alternatives and the employment of those methods to manage or prevent damage and threats associated with nutria from occurring.

Under the alternatives analyzed in detail where efforts would be made to remove nutria from the Maryland and Delaware portions of the Delmarva Peninsula, the USFWS and WS, along with the MDNR and the Delaware Department of Natural Resources and Environmental Control (DDNREC), would continue to participate in the Nutria Control/Marsh Restoration Pilot Project Partnership. In addition, the USFWS would be the primary funding mechanism for activities conducted under the alternatives. Funding was original provided to the USFWS through enactment of Public Law 105-322 which authorized the Secretary of the Interior to provide assistance to the State of Maryland for a pilot program to develop measures to eradicate or control nutria and recover marsh damaged by nutria (Bounds et al. 2000, USFWS 2001). In addition, the USFWS and WS could also be involved with the removal of nutria on properties owned or managed by the USFWS under the appropriate alternatives. WS would be the primary federal agency involved with the removal of nutria on private properties in Maryland and Delaware. WS could also provide assistance with the removal of nutria on properties under federal, state, or municipal ownership or management. The MDNR and the DDNREC could also provide assistance and conduct nutria removal on properties they own or manage as well as provide assistance to private property owners in their respective states. If the alternative which would discontinue the current nutria removal project was selected, no funding or assistance would be provided by the USFWS and/or WS. However, the MDNR and the DDNREC could continue to provide assistance with the removal of nutria in their respective states.

Federal, State, County, City, and Private Lands

Under three of the alternatives, the cooperating agencies could continue to provide nutria damage management activities on federal, state, county, municipal, and private land in Maryland and Delaware when a MOU, cooperative service agreement, or other comparable document has been signed between a cooperating agency and the appropriate resource owner or manager.

Native American Lands and Tribes

WS and the cooperating agencies would only conduct damage management activities when requested by a Native American Tribe and only after a Memorandum of Understanding (MOU) or cooperative service agreement has been signed between a cooperating agency and the Tribe requesting assistance. Therefore, the Tribe would determine when assistance is required and what activities would be allowed. Because Tribal officials would be responsible for requesting assistance and determining what methods would be available to alleviate damage, no conflict with traditional cultural properties or beliefs would be anticipated. Those methods available to alleviate damage associated with nutria on federal, state, county, municipal, and private properties under the alternatives analyzed in this EA would also be available for use to alleviate damage on Tribal properties when the use of those methods have been approved for use by the Tribe requesting assistance. Therefore, the activities and methods addressed under the alternatives would include those activities that could be employed on Native American lands, when requested and agreed upon.

Period for which this EA is Valid

If the analyses in this EA indicates an Environmental Impact Statement (EIS) is not warranted, this EA would remain valid until WS and the cooperating agencies determine that a new need for action, changed conditions, new issues, or new alternatives having different environmental impacts must be analyzed. At that time, this analysis and document would be reviewed and supplemented pursuant to the NEPA.

Review of the EA would be conducted to ensure that the EA is sufficient. If the alternative analyzing no involvement in nutria damage activities is selected, no additional analyses or monitoring of activities would occur based on the lack of involvement by the cooperating entities. The monitoring of activities ensures the EA is complete and still appropriate to the scope of nutria damage management activities conducted based on the alternative selected.

Site Specificity

As mentioned previously, activities associated with the alternatives would only be conducted when a MOU, cooperative service agreement, or a comparable document has been signed by the cooperating entities and the appropriate resource owner or manager.

This EA analyzes the potential impacts of implementing each of the alternatives on all private and public lands in Maryland currently under MOU, cooperative service agreement, and in cooperation with the appropriate public land management agencies. This EA also addresses the potential impacts of implementing the alternatives on areas where additional agreements may be signed in the future in Maryland and Delaware. Because the program's goals and directives are to remove nutria from the Chesapeake Bay area, within the constraints of available funding and workforce, it is conceivable that additional nutria removal and surveillance efforts could occur. Thus, this EA anticipates the potential expansion of activities based on the identification of additional nutria populations in the Bay area and analyzes the impacts of such efforts as part of the program.

Although some of the sites where nutria could occur can be predicted, all specific locations or times where nutria populations would occur in any given year cannot be predicted. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever nutria damage and the resulting management actions occurs and are treated as such.

Chapter 2 of this EA identifies and discusses issues relating to the removal of nutria in the Chesapeake Bay area. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS (see Chapter 3 for a description of the Decision Model and its application). Decisions made using the model would be in accordance with WS' directives[3] and those standard operating procedures (SOPs) described in this EA as well as relevant laws and regulations.

The analyses in this EA are intended to apply to any action that may occur in any locale and at any time in the Chesapeake Bay area. In this way, the cooperating agencies believe the intent of the NEPA with regard to site-specific analysis has been achieved and that this is the only practical way for cooperating agencies to comply with the NEPA and still be able to accomplish the objectives.

Summary of Public Involvement

Issues related to the removal of nutria as conducted under the alternatives were initially developed by the Management Team during the development of the previous EA (USFWS 2001). Issues were defined and preliminary alternatives were identified through the scoping process. In addition, the previous EA was made available for public review and input to identify additional issues and alternatives (USFWS 2001). During the scoping process for the previous EA, a total of 1,909 letters were sent to the public, private non-profit groups, state and local government agencies, conservation groups, and technical experts to request input during the development of the previous EA. In addition, notices inviting public participation were also published in *The Baltimore Sun*, *Washington Post*, *The Daily Times*, *The Daily*

[3]At the time of preparation, WS' Directives could be found at the following web address: http://www.aphis.usda.gov/wildlifedamage.

Banner, *Dorchester Star*, *Star Democrat*, *Times-Record*, and *Chesapeake Publishing*. Public service announcements were also broadcast by: Maryland Public Television, WAAI/WTDK Radio Station at 100.9 FM and 107.1 FM, WCEM/AM-WCEM Radio Station at 106.1 FM and 1240 AM, WBOC-TV Channel 16, WMDT-TV Channel 47 News, WCEI Radio Station, Shore Good to Know - local newsletter by Connective Electric, Falcon Cable TV Public Service Announcement, and Comcast Cable TV. Information was also solicited through media such as: the Dorchester Chamber of Commerce, Dorchester County Tourism Office, Dorchester County Library, Refuge Net, the Refuge's Website at sii.fws.gov, Refuges Special Events, and the Blackwater Unit of the Chesapeake Bay National Wildlife Refuge Complex Website. A 30-day comment period was provided for initial public input. From the initial public involvement outreach, 36 letters and postcards were received from individuals and groups interested in providing input to the development of this EA. The letters received were considered in the analysis with substantive and relevant information being incorporated into the EA.

As part of the process, and as required by the Council on Environmental Quality (CEQ), this document will be noticed to the public through legal notices published in local print media, through the GovDelivery stakeholder registry, and by posting the EA on the APHIS website at http://www.aphis.usda.gov/wildlifedamage/nepa.

Cooperating agencies will provide for a minimum of a 30-day comment period for the public and interested parties to provide new issues, concerns, and/or new alternatives. Through the public involvement process, the cooperating agencies will clearly communicate to the public and interested parties the analyses of potential environmental impacts on the quality of the human environment. New issues or alternatives raised after publication of public notices would be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a final Decision or publication of a notice of intent to prepare an EIS.

1.4 RELATIONSHIP OF THIS EA TO OTHER ENVIRONMENTAL DOCUMENTS

Nutria Marsh Damage Reduction EA: The Chesapeake Bay Field Office of the USFWS, in cooperation with several other agencies, previously completed an EA that evaluated the removal of nutria from portions of Chesapeake Bay to restore marsh habitat (USFWS 2001). The previous EA evaluated the removal of nutria at the Blackwater Unit of the Chesapeake Bay National Wildlife Refuge Complex, Fishing Bay Wildlife Management Area, and Tudor Farms. In addition the EA evaluated the potential removal of nutria along the eastern shore of the Bay in Maryland. The original marsh restoration program consisted of public outreach, a 3-year nutria research project, and the removal of nutria under an operational program based on the findings of the research project. Pertinent information available in that EA has been incorporated by reference into this EA.

***Chesapeake Bay Nutria Eradication Project: Strategic Plan*:** The Nutria Management Team developed a strategic plan based on the independent review by the ISI of the previous program. The ISI report made several recommendations to enhance the nutria project. In response to the ISI recommendations, the Nutria Management Team identified several overall goals of the project to successfully implement the mission statement. The mission statement of the Nutria Management Team as outlined in the Plan is "[t]*o eradicate nutria from the Delmarva Peninsula by December 2015 and prevent their reestablishment*" (Nutria Management Team 2011). To meet the objectives of the Plan, this EA evaluates the issues associated with the implementation of alternatives to meet the objectives in the Plan to achieve complete removal of nutria from the peninsula and to prevent re-establishment of populations.

Proposal to Permit Take as Provided Under the Bald and Golden Eagle Protection Act Final Environmental Assessment: The EA developed by the USFWS evaluated the issues and alternatives

associated with permitting the "*take*" of bald eagles and golden eagles as defined under the Bald and Golden Eagle Protection Act. The preferred alternative in the EA evaluated the authorized disturbance of eagles which constitutes "*take*" as defined under the Bald and Golden Eagle Protection Act, authorizes the removal of eagle nests where necessary to reduce threats to human safety, and evaluated the issuance of permits authorizing the lethal take of eagles in limited circumstances. A Decision and FONSI was made for the preferred alternative in the EA (USFWS 2010).

***Delaware Wildlife Action Plan*:** The Plan represents a comprehensive strategy for conserving native wildlife and habitats within the State (DDNREC 2006). The Plan addresses the degradation of wetlands from excessive herbivory associated with nutria. The Plan states that nutria "[i]*mpacts have been minimal to date, but enormous damage has occurred nearby in Maryland. Nutria have begun colonizing Delaware relatively recently, so impacts may increase substantially*." The Plan calls for the monitoring or nutria populations, assessing the potential for degradation of key habitats associated with nutria feeding on marsh vegetation, and developing adaptive management approaches to address nutria damage, if necessary (DDNREC 2006).

1.5 AUTHORITY OF FEDERAL AND COMMONWEALTH AGENCIES

The authority of the agencies as those authorities relate to conducting nutria removal and land management are discussed by agency below:

WS' Legislative Authority

The primary statutory authorities for WS' program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). The WS program is the lead federal authority in managing damage to agricultural resources, natural resources, property, and threats to human safety associated with wildlife. WS' directives define program objectives and guide WS' activities to manage wildlife damage management.

United States Fish and Wildlife Service Authority

The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitats. Responsibilities are shared with other federal, state, tribal, and local entities; however, the USFWS has specific responsibilities for the protection of T&E species under the Endangered Species Act (ESA), migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters that the USFWS administers for the management and protection of those resources. The USFWS also manages lands under the National Wildlife Refuge System.

The mission of the National Wildlife Refuge System is "*to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans*" as stated in the October 9, 1997 National Wildlife Refuge Improvement Act. The Blackwater Unit of the Chesapeake Bay National Wildlife Refuge Complex was established under the authority of the Migratory Bird Conservation Act on January 23, 1933 to provide habitat for migrating and wintering birds. Additional lands have been added under the authorities of the ESA, North American Marshlands Conservation Act, the Refuge Administration Act, and the Refuge Recreation Act to add wetland habitats for migratory birds, and for the protection of the bald eagle, the Delmarva fox squirrel, and other endangered species.

Maryland Department of Natural Resources Legislative Authority

The MDNR, with the guidance of the Wildlife Advisory Commission, is specifically charged by the General Assembly with the management of the state's wildlife resources (Annotated Code of Maryland, Title 10, Subtitle 2). The primary statutory authorities include the protection, reproduction, care, management, survival, and regulation of wild animal populations regardless of whether the wild animals are present on public or private property in Maryland (Annotated Code of Maryland, Title 10, Subtitle 2, 10-202 through 10-212).

As the agency responsible for managing the wildlife resources in the state, the MDNR has the authority to reduce wildlife populations in any county, election district, or other identifiable area of the state, when thorough investigation reveals that such populations are seriously injurious to agricultural or other interests in the affected area (Annotated Code of Maryland, Title 10, subtitle 2, 10-206).

Maryland statues provide for the conservation of the soil, water and related resources to preserve natural resources (Code of Maryland Regulations, Agric.§ 8-102 et seq.), including wildlife and wildlife habitat. Maryland also has many directives that consider wildlife and natural resources. For example, the MDNR is in charge of implementing the Governor's policy of conserving biodiversity on state-owned lands containing forests. A state wildlands preservation system seeks to preserve wildland areas in their natural condition for future Maryland residents (Code of Maryland Regulations, Nat. Res. §5-1203). Maryland also has statutory provisions for cooperative management efforts. The state is part of the Interstate Environmental Compact, which authorizes cooperative efforts to protect the environment (Code of Maryland Regulations, Nat. Res. §3-501). The Chesapeake Bay Critical Area Protection Program was implemented on a cooperative basis between local and state government to protect Chesapeake Bay (Code of Maryland Regulations, Nat. Res. §8-1801 et seq.).

Delaware Department of Natural Resources and Environmental Control Legislative Authority

The DDNREC, under the direction of the Wildlife Advisory Commission, is specifically charged by the General Assembly with the management of the state's wildlife resources. The primary statutory authorities include the protection, reproduction, care, management, survival, and regulation of wild animal populations regardless of whether the wild animals are present on public or private property in Delaware.

United States Geological Survey-Patuxent Wildlife Research Center

The Maryland Cooperative Fish and Wildlife Research Unit of the Biological Resources Division of the USGS is a scientific research institution dedicated to the development of scientific information required that provides a biological foundation for effectively conserving and managing biological resources. The USGS is a member of the Nutria Management Team and has conducted research evaluating the use of exclosures where nutria were excluded from accessing marsh habitat (Haramis 1997, Haramis 1999).

1.6 COMPLIANCE WITH LAWS AND STATUTES

Several laws and regulations pertaining to the removal of nutria to restore marsh habitat are discussed below:

National Environmental Policy Act

All federal actions are subject to the NEPA (Public Law 9-190, 42 U.S.C. 4321 et seq.). The USFWS and WS follows CEQ regulations implementing the NEPA (40 CFR 1500 et seq.) and each agency implements guidelines as part of the decision-making process. Those laws, regulations, and guidelines generally outline five broad types of activities to be accomplished as part of any project: public involvement, analysis, documentation, implementation, and monitoring. The NEPA also sets forth the requirement that all major federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated in part by CEQ through regulations in 40 CFR, Parts 1500-1508.

Pursuant to the NEPA and CEQ regulations, this EA documents the analyses resulting from federal actions, informs decision-makers, and the public of reasonable alternatives capable of avoiding or minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of the NEPA are infused into federal agency actions. This EA was prepared by integrating as many of the natural and social sciences as warranted, based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Endangered Species Act

Under the ESA, all federal agencies will seek to conserve T&E species and will utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). Section 7 consultations would be conducted with the United States Fish and Wildlife Service (USFWS) to use the expertise of the USFWS to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency will use the best scientific and commercial data available*" (Sec.7 (a)(2)).

Public Law 105-322: Nutria Eradication and Control Pilot Program

Public Law 105-322 was approved by the United States Congress on October 30, 1998 authorizing the Secretary of the Interior to provide financial assistance to the State of Maryland for a pilot program to develop measures to eradicate or control nutria and recover marsh damaged by nutria. The Secretary of the Interior was required to institute a pilot program consisting of management, research, and public education activities carried out in accordance with the document titled *"Marsh Restoration: Nutria Control in Maryland Pilot Program Proposal"* (Bounds et al. 2000).

Public Law 108-16: Nutria Eradication and Control Act of 2003

Public Law 108-16 authorized the Secretary of the Interior to provide funding to the State of Maryland and to the State of Louisiana to develop programs that would implement measures to eradicate or control nutria and restore marshland habitat destroyed by nutria.

National Historic Preservation Act of 1966, as Amended

The NHPA and its implementing regulations (36 CFR 800) require federal agencies to initiate the section 106 process if an agency determines that the agency's actions are undertakings as defined in Sec. 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further

obligations under section 106. None of the methods described in this EA that might be used operationally causes major ground disturbance, any physical destruction or damage to property, any alterations of property, wildlife habitat, or landscapes, nor involves the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used under the alternatives are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, the site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

Noise-making methods, such as firearms, that are used at or in close proximity to historic or cultural sites for the purposes of removing nutria have the potential for audible effects on the use and enjoyment of historic property. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage problem, which means such use, would be to the benefit of the historic property. A built-in mitigating factor for this issue is that virtually all the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by the Section 106 of the NHPA would be conducted as necessary in those types of situations.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort had been made to protect the items and the proper authority had been notified.

Invasive Species - Executive Order 13112

Executive Order 13112 establishes guidance to federal agencies to prevent the introduction of invasive species, provide for the control of invasive species, and to minimize the economic, ecological, and human health impacts that invasive species cause. The Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law: 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations and provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education of invasive species.

Environmental Justice - Executive Order 12898

Environmental Justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Executive Order 12898 requires federal agencies to make Environmental Justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. A critical goal of the Order is to improve the scientific basis for decision-making by conducting assessments that identify and prioritize environmental health risks and procedures for risk reduction.

Protection of Children from Environmental Health and Safety Risks - Executive Order 13045

Children may suffer disproportionately from environmental health and safety risks, including the development of their physical and mental status. Because the agencies make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that alternative analyzed might have on children.

Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33; P.L. 92-583, October 27, 1972; 86 Stat. 1280)

This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for federal approval, each state's plan was required to define boundaries of the coastal zone, identify uses of the area to be regulated by the state, determine the mechanism (criteria, standards or regulations) for controlling such uses, and develop broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varied depending on whether the federal action involved a permit, license, financial assistance, or a federally authorized activity. As appropriate, a consistency determination would be conducted to assure management actions would be consistent with state's Coastal Zone Management Program.

Maryland Endangered Species Act

Maryland has two laws that protect T&E species of plants and animals (Annotated Code of Maryland, Nat. Res. §10-2A-01 to 09; 4-2A-01 to 09.) Species are listed based on the best scientific and commercial data available and recognizes the Section 7 Consultations completed by WS.

Maryland Environmental Policy Act

Maryland has a *"little NEPA"* requiring assessment of major proposed agency impacts on biological resources. The Maryland Environmental Policy Act (MEPA) requires state agencies to prepare environmental effects reports for each proposed state action that significantly affects the quality of the human environment (Annotated Code of Maryland, Nat. Res. §1-301 et seq.). In addition to MEPA, other statutes require mitigation or consideration of environmental harm. For example, a cumulative impact assessment is required periodically for the state's non-tidal marshes (Annotated Code of Maryland, Nat. Res. §5-908). The MDNR had input throughout the development of this EA, and therefore, this EA satisfies Maryland's MEPA requirements.

Maryland Exotic Species Control

Maryland also has provisions designed to control the introduction and spread of exotic species. For example, a permit from the Forest, Park and Wildlife Service is required before any wildlife may be imported or possessed for release into the wild (COMAR §08.03.09.04).

1.7 DECISIONS TO BE MADE

Based on agency relationships, MOUs, and legislative authorities, WS is the lead agency for this EA, and therefore, responsible for the scope, content, and decisions made. WS would be the primary entity

removing nutria under the alternatives where the removal of nutria is evaluated. The USFWS would serve as the primary funding authority for the proposed alternative. As the authority for the management of wildlife populations in their respective states, the MDNR and the DDNREC were involved in the development of the EA and provided input throughout the EA preparation process to ensure an interdisciplinary approach according to the NEPA and agency mandates, policies, and regulations.

Based on the scope of this EA, the decisions to be made are: 1) should the cooperating agencies continue to work toward removing nutria from the Chesapeake Bay areas, 2) should the cooperating agencies expand the current nutria removal project into other areas of the Chesapeake Bay where nutria are present or could be present, 3) which alternative would most effectively meet the objectives established by the Management Team, and 4) would the proposed action alternative or any of the alternatives result in adverse impacts to the environment requiring the preparation of an EIS.

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of SOPs, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues. Additional descriptions of affected environments will be incorporated into the discussion of the environmental effects in Chapter 4.

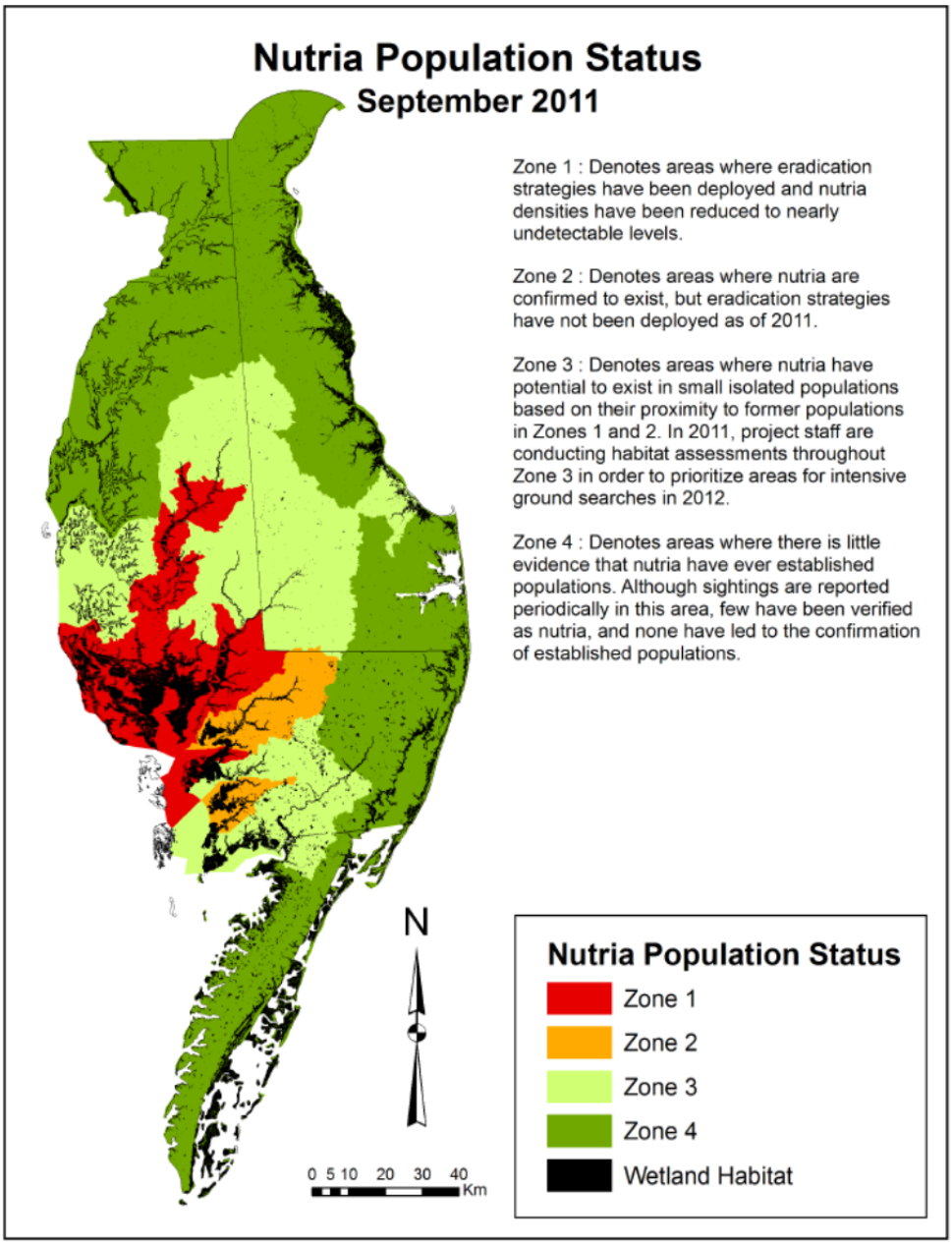
2.1 AFFECTED ENVIRONMENT

Damage or threats of damage caused by nutria can occur wherever nutria occur. However, nutria damage management would only be conducted by WS and the USFWS on properties owned or managed by the USFWS, and WS would only conduct damage management activities under the alternatives when requested by a landowner or manager and only on properties where a MOU, cooperative service agreement, or other comparable document has been signed between WS and a cooperating entity.

Nutria primarily inhabit brackish or freshwater marshes, but are also found in swamps, rivers, ponds, and lakes. They live in dense vegetation, in abandoned burrows, or in burrows they dig along stream banks or shorelines (Wade and Ramsey 1986). The environment affected by the proposed action would be the Chesapeake Bay marshes in Maryland and selected Delaware watersheds occupied by nutria. Discussion of the affected environment and potential impacts has been addressed in the EA developed previously to address nutria damage in Maryland (USFWS 2001).

Suitable habitat where nutria could be located in the Delmarva Peninsula are found in Figure 2.1. Nutria may also be found on the west shores of Chesapeake Bay. Upon receiving a request for assistance, nutria removal efforts under the alternatives, except Alternative 4, could be conducted on private, federal, state, county, and municipal lands in Maryland and Delaware as part of marsh recovery efforts.

Figure 2.1 – Areas of the Delmarva Peninsula where nutria could be found



2.2 ISSUES ASSOCIATED WITH NUTRIA DAMAGE MANAGEMENT ACTIVITIES

Issues are concerns of the public and/or professional community raised regarding potential adverse effects that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process for Issues associated with the removal of nutria as part of marsh restoration efforts along the eastern shore of Chesapeake Bay were identified during the development of the previous EA addressing marsh restoration efforts (USFWS 2001). New issues related to managing damage associated with nutria in the Chesapeake Bay area were developed by the USFWS and WS, in consultation with the Nutria Management Team.

This EA will also be made available to the public for review and comment to identify additional issues.

The issues as those issues relate to the possible implementation of the alternatives, including the proposed action, are discussed in detail in Chapter 4. The issues analyzed in detail in the EA are the following:

Issue 1 - Effectiveness of Damage Management Methods

The effectiveness of any damage management program could be defined in terms of losses or risks potentially reduced or prevented, how accurately practitioners' diagnosis the problem and the species responsible for the damage, and then how actions are implemented to correct or mitigate risks or damages. To determine that effectiveness, the USFWS and WS must be able to complete management actions expeditiously to minimize harm to non-target animals and the environment, while at the same time, using methods as humanely as possible within the limitations of current technology, funding, and workforce. The most effective approach to resolving any damage problem is to use an adaptive approach which may call for the use of several management methods simultaneously or sequentially (Courchamp et al. 2003).

The purpose behind adaptive damage management is to implement methods in the most effective manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment[4]. Efficacy is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of the personnel using the method and, for WS' personnel, the guidance provided by WS' directives and policies.

A common issue raised is that the use of lethal methods is ineffective because additional nutria are likely to return to the area which creates a financial incentive to continue the use of only lethal methods. This assumes nutria only return to an area where damage was occurring if lethal methods are used. However, the use of non-lethal methods is also often temporary which could result in nutria returning to an area where damage was occurring once those methods are no longer used.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

The issue of non-target species effects, including effects on T&E species arises from the use of those methods available under each of the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife.

The ESA states that all federal agencies *"...shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act"* [Sec. 7(a)(1)]. Intra-agency consultation within the USFWS would ensure compliance with the ESA and would ensure that *"any action authorized, funded or carried out by such an agency...is not likely to jeopardize the continued existence of any endangered or threatened species…Each agency shall use the best scientific and commercial data available"* [Sec. 7(a)(2)].

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or minimization measures. As part of the scoping process and to facilitate interagency cooperation, the USFWS conducted an intra-agency consultation under Section 7 during the development of this EA which is further discussed in Chapter 4.

[4]The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

An additional issue often raised is the potential risks associated with employing methods to manage damage caused by target species. Methods have the potential to have adverse effects on human safety. Employees of the USFWS and WS would use and recommend only those methods under each of the alternatives which are legally available, targeted for nutria, and are effective at resolving the damage associated with nutria under each of the alternatives. Still, some concerns exist regarding the safety of methods despite their legality, selectivity, and effectiveness. As a result, this EA analyze the potential for proposed methods to pose a risk to members of the public or employees of the USFWS and WS. In addition to the potential risks to the public associated with methods, risks to employees are also an issue. Employees are potentially exposed to damage management methods as well as subject to workplace accidents. Selection of methods, as part of an integrated approach, would include consideration for public and employee safety.

Methods available to alleviate damage and threats associated with nutria are considered non-chemical methods. Mechanical methods could include live-traps, rotating-jawed traps, cable restraints, shooting, or the recommendation that a local population of nutria be reduced through the use of hunting and/or trapping.

The primary safety risk of most non-chemical methods occurs directly to the applicator or those persons assisting the applicator. However, risks to others do exist when employing non-chemical methods, such as when using firearms. Most of the methods available to address nutria damage would be available for use under any of the alternatives and could be employed by any entity, when permitted. Risks to human safety from the use of methods will be further evaluated as this issue relates to the alternatives in Chapter 4. A complete list of methods available to alleviate damage associated with nutria is also provided in Chapter 3 of this EA.

Issue 4 - Effects on the Socio-cultural Elements and Economics of the Human Environment

One issue is the concern that the proposed action or the other alternatives would result in the loss of aesthetic benefits to the public, resource owners, or people associated with nutria in the area where damage management activities occur. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly subjective in nature, dependent on what an observer regards as beautiful.

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The public share a similar bond with animals and/or wildlife in general and in modern societies a large percentage of households have indoor or outdoor pets. However, some people may consider individual wild animals as "*pets*" or exhibit affection toward those animals, especially people who enjoy viewing wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife.

Wildlife populations provide a wide range of social and economic benefits (Decker and Goff 1987). Those benefits include direct benefits related to consumptive and non-consumptive uses, indirect benefits derived from vicarious wildlife related experiences, and the personal enjoyment of knowing wildlife

exists and contributes to the stability of natural ecosystems (Bishop 1987). Direct benefits are derived from a personal relationship with animals and may take the form of direct consumptive use (*i.e.*, using parts of or the entire animal) or non-consumptive use (*e.g.*, viewing the animal in nature or in a zoo, photographing) (Decker and Goff 1987).

Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Public attitudes toward wildlife vary considerably. Some people believe that all wildlife should be captured and translocated to another area to alleviate damage or threats to protected resources. Some people directly affected by the problems caused by wildlife strongly support removal. Individuals not directly affected by the harm or damage may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Some people totally opposed to wildlife damage management want WS to teach tolerance for damage and threats caused by wildlife, and that wildlife should never be killed. Some people who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. Those human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Some individuals are offended by the presence of non-native species, such as nutria. To such people those species represent pests which are nuisances and which upset the natural order in ecosystems. Their overall enjoyment of other animals is diminished by what they view as a destructive presence of such species. They are offended because they feel that those species proliferate in such numbers and appear to remain unbalanced.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate damage management for societal benefits could be compatible with animal welfare concerns, if "*…the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

According to the AVMA (2013), suffering is described as a *"…highly unpleasant emotional response usually associated with pain and distress."* However, suffering *"…can occur without pain…,"* and *"…pain can occur without suffering…"* Because suffering carries with it the implication of a time frame, a case could be made for *"…little or no suffering where death comes immediately…"* (California Department of Fish and Game 1991).

Defining pain as a component in humaneness appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*…probably be causes for pain in other animals…*" (AVMA 2013). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (California Department of Fish and Game 1991).

Pain and suffering, as it relates to methods available for use to manage nutria has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the

complexity of defining suffering, since *"…neither medical nor veterinary curricula explicitly address suffering or its relief"* (California Department of Fish and Game 1991).

The AVMA states "*...euthanasia is the act of inducing humane death in an animal*" and "*... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness*" (Beaver et al. 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and invasive animals. The AVMA has stated that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress- free death may not be possible*" (Beaver et al. 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering. The issue of humanness and animal welfare are further discussed as it relates to the methods available for use under the alternatives in Chapter 4. SOPs to alleviate pain and suffering are discussed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

Additional issues were also identified by Nutria Management Team during the scoping process of this EA that were considered but will not receive detailed analyses for the reasons provided. The following issues were considered but will not be analyzed in detail:

Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area

A concern was raised that an EA for an area as large as the Chesapeake Bay would not meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other regulatory agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. Although the Nutria Management Team can predict some of the possible locations or types of situations and sites where nutria damage would occur, the program cannot predict the specific locations or times at which affected resource owners would determine a damage problem has become intolerable to the point that they request assistance or allow access to their property.

Lead agencies have the discretion to determine the geographic scope of their analyses under the NEPA (Kleppe v Sierra Club, 427 U.S. 390, 414 (1976), CEQ 1508.25). Ordinarily, according to APHIS procedures implementing the NEPA, WS' individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c)). The intent in developing this EA is to determine if the alternatives could potentially have significant individual and/or cumulative impacts on the quality of the human environment that would warrant the preparation of an EIS. This EA addresses impacts for managing damage to marshland habitat associated with nutria in the Chesapeake Bay area to analyze individual and cumulative impacts and to provide a thorough analysis.

In terms of considering cumulative effects, one EA analyzing impacts for the entire Chesapeake Bay area provides a more comprehensive and less redundant analysis than multiple EAs covering smaller areas. If a determination is made through this EA the alternatives might have a significant impact on the quality of the human environment, then an EIS would be prepared.

Cost Effectiveness of Management Methods

The CEQ does not require a formal, monetized cost benefit analysis to comply with the NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. However, the methods determined to be most effective and that prove to be the most cost effective would receive the greatest application under the alternatives. As part of an integrated approach, evaluation of methods would continually occur to allow for those methods that are most effective at resolving damage or threats to be employed under similar circumstance where nutria are causing damage or pose a threat. Additionally, management operations may be constrained by cooperator funding and/or objectives and needs. The cost effectiveness of methods and the effectiveness of methods are linked. The issue of cost effectiveness as it relates to the effectiveness of methods is discussed further in Chapter 4.

Nutria Removal Should Occur By Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce nutria damage for property owners when deemed appropriate by the resource owner. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to initiate an agreement with a government agency. In particular, landowners may prefer to use WS because of security and safety issues.

Effects from the Use of Lead Ammunition in Firearms

Questions have arisen about the deposition of lead into the environment from ammunition used in firearms to lethally take nutria. As described in Chapter 4, the lethal removal of nutria with firearms by WS to alleviate damage or threats could occur using a rifle or shotgun. In an ecological risk assessment of lead shot exposure in non-waterfowl birds, ingestion of lead shot was identified as the concern rather than just contact with lead shot or lead leaching from shot in the environment (Kendall et al. 1996).

The take of nutria using firearms by the USFWS and WS occurs from the use of rifles and shotguns. When employing shotguns, non-toxic shot has been and will continue to be used to lethally remove nutria. To reduce risks to human safety and property damage, only shots with a safe backdrop are taken. Nutria that are removed using rifles would occur within areas where retrieval of all nutria carcasses for proper disposal is highly likely.

However, deposition of lead into soil could occur if, during the use of a rifle, the projectile passes through a nutria, if misses occur, or if the nutria carcass is not retrieved. Laidlaw et al. (2005) reported that, because of the low mobility of lead in soil, all of the lead that accumulates on the surface layer of the soil is generally retained within the top 20 cm (about 8 inches). In addition, concerns occur that lead from bullets deposited in soil from shooting activities could lead to contamination of water, either ground water or surface water. Stansley et al. (1992) studied lead levels in water that was subjected directly to high concentrations of lead shot accumulation because of intensive target shooting at several shooting ranges. Lead did not appear to "*transport*" readily in surface water when soils were neutral or slightly alkaline in pH (*i.e.*, not acidic), but lead did transport more readily under slightly acidic conditions. Although Stansley et al. (1992) detected elevated lead levels in water in a stream and a marsh that were in the shot "*fall zones*" at a shooting range, the study did not find higher lead levels in a lake into which the stream drained, except for one sample collected near a parking lot where it was believed the lead contamination

was due to runoff from the parking lot, and not from the shooting range areas. The study also indicated that even when lead shot is highly accumulated in areas with permanent water bodies present, the lead does not necessarily cause elevated lead contamination of water further downstream. Muscle samples from two species of fish collected in water bodies with high lead shot accumulations had lead levels that were well below the accepted threshold standard of safety for human consumption (Stansley et al. 1992).

Craig et al. (1999) reported that lead levels in water draining away from a shooting range with high accumulations of lead bullets in the soil around the impact areas were far below the "*action level*" of 15 parts per billion as defined by the Environmental Protection Agency (EPA) (*i.e.*, requiring action to treat the water to remove lead). The study found that the dissolution (*i.e*., capability of dissolving in water) of lead declines when lead oxides form on the surface areas of the spent bullets and fragments (Craig et al. 1999). Therefore, the transport of lead from bullets or shot distributed across the landscape is reduced once the bullets and shot form crusty lead oxide deposits on their surfaces, which serves to naturally further reduce the potential for ground or surface water contamination (Craig et al. 1999). Those studies suggest that, given the very low amount of lead being deposited and the concentrations that could occur from activities to reduce nutria damage using firearms, as well as most other forms of dry land hunting in general, lead contamination of water from such sources would be minimal to nonexistent.

Since nutria can be lethally remove at any time in Maryland using a firearm, assistance provided by the USFWS and/or WS with removing nutria would not be additive to the environmental status quo since those nutria removed using firearms could be lethally removed by the entities experiencing damage using the same method in the absence of any involvement. The amount of lead deposited into the environment may be lowered by involvement in nutria damage management activities by the USFWS and WS due to efforts to ensure projectiles do no pass through but are contained within the nutria carcass which limits the amount of lead potentially deposited into soil from projectiles passing through the carcass. The proficiency training received by employees of WS and USFWS in firearm use and accuracy increases the likelihood that nutria are lethally removed humanely in situations that ensure accuracy and that misses occur infrequently which further reduces the potential for lead to be deposited in the soil from misses or from projectiles passing through carcasses. In addition, WS' involvement ensures nutria carcasses lethally removed using firearms would be retrieved and disposed of properly to limit the availability of lead in the environment and ensures nutria carcass are removed from the environment to prevent the ingestion of lead in carcasses by scavengers. Based on current information, the risks associated with lead bullets that are deposited into the environment from activities due to misses, the bullet passing through the carcass, or from nutria carcasses that may be irretrievable would be below any level that would pose any risk from exposure or significant contamination.

A Site Specific Analysis Should be Made for Every Location Where Nutria Damage Management Would Occur

The underlying intent for preparing an EA is to determine if a proposed action might have a significant impact on the human environment. The EA development process is issue driven, meaning issues that were raised during the interdisciplinary process and through public involvement that are substantive, are used to drive the analysis and determine the significance of the environmental impacts of the proposed action and the alternatives. Therefore, the level of site specificity must be appropriate to the issues listed.

The analysis in this EA was driven by the issues raised during the scoping process during the development of the EA. In addition to the analysis contained in this EA, WS' personnel use the WS Decision Model (Slate et al. 1992) described in Chapter 3 as a site specific tool to develop the most appropriate strategy at each location. The WS Decision Model is an analytical thought process used by WS' personnel for evaluating and responding to wildlife damage management requests.

As discussed previously, one EA analyzing impacts for the entire Chesapeake Bay area would provide a more comprehensive and less redundant analysis than multiple EAs covering smaller areas and allows for a better cumulative impact analysis. If a determination is made through this EA that the alternatives developed to meet the need for action could result in a significant impact on the quality of the human environment, then an EIS would be prepared.

Cultural and American Indian Concerns

The National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq*.) and the NEPA require the consideration of impacts on cultural resources listed on or eligible for listing on the National Register of Historic Places. The Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) requires specific actions when Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony are excavated or discovered on federal lands.

The mission of the cooperating agencies is to conserve, protect, and enhance fish and wildlife and their habitat for the continuing benefit of people. Little to no adverse effect on the cultural resources are anticipated from the proposed action or any of the alternatives analyzed in this EA. The effects of marsh restoration would be minimal to historic sites as no ground disturbance would occur. Should a presently unknown site be found during implementation of any of the action alternatives, work would be discontinued until the site was evaluated by qualified archaeologists.

While aesthetic/visual quality is not a criterion for historic significance, it is an important consideration for cultural reasons. For visitors who find natural-appearing conditions and native wildlife more visually pleasing than damaged marshes and mudflats or exotic species, the project would improve the visual cultural and aesthetic quality of the area.

CHAPTER 3: ALTERNATIVES

Chapter 3 contains a discussion of the alternatives which were developed to meet the need for action discussed in Chapter 1 and to address the identified issues discussed in Chapter 2. Alternatives were developed for consideration based on the need for action and issues after discussion with the Management Team. The alternatives will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences). Chapter 3 also discusses alternatives considered but not analyzed in detail, with rationale. SOPs for the removal of nutria are also discussed in Chapter 3.

The following four alternatives were identified by the Management Team and cooperating agencies to meet the need for action and to address the issues identified:

- **Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)**
- **Alternative 2 – Expand the Current Nutria Removal Project (Proposed Alternative)**
- **Alternative 3 – Provide Only Technical Assistance on Nutria Removal**
- **Alternative 4 – Discontinue the Current Nutria Removal Project**

3.1 DESCRIPTION OF THE ALTERNATIVES

The following alternatives were developed to meet the need for action and address the identified issues

associated with managing damage caused by nutria in the Chesapeake Bay area:

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)) and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with the Council on Environmental Quality (CEQ) (1981) definition and would continue the current nutria removal project as part of marsh restoration efforts in the Chesapeake Bay (USFWS 2001).

The goals established by the Partnership under the current nutria removal project were to: (1) determine the feasibility of eradicating nutria on Maryland's Eastern Shore; (2) restore marsh habitats; (3) and promote public understanding of the importance of preserving Maryland's wetlands. To meet those goals, the Partnership developed a project outline consisting of several phases. The initial phase (Phase I) consisted of outreach efforts that would enlist public and governmental cooperation and support which would be crucial for the successful completion of the project. Phase II implemented a 3-year pilot project in Dorchester County, Maryland at three sites consisting of the Blackwater National Wildlife Refuge (federal property), Fishing Bay Wildlife Management Area (state property), and Tudor Farms, Inc. (private property). The objectives of Phase II of the project were to: (1) establish an estimate of nutria populations and densities at the three sites; (2) monitor nutria behavior and movement in response to removal efforts, and (3) evaluate the reproductive and overall health of the nutria project in response to removal efforts. Phase II of the project began in 2000 and was concluded in 2002.

WS and cooperating agencies implemented Phase III of the project beginning in 2002 by employing methods and strategies to remove nutria from approximately 100,000 acres of wetlands in Dorchester County, Maryland. In 2007, the Partnership expanded efforts to remove nutria in portions of Talbot, Caroline, Somerset, and Wicomico Counties in Maryland. In total, approximately 500,000 acres in those counties were identified as supporting nutria populations or contained habitat where nutria populations could become established. Currently, those nutria populations that were considered to be of moderate to high-density on approximately 150,000 wetland acres in those Counties have been reduced to nearly zero. As high-density nutria populations have been suppressed, the emphasis of Phase III has shifted from large-scale aggressive reduction of high-density populations in those counties to a focused detection of low-density nutria populations on the remaining 350,000 acres of potential nutria habitat in those counties. Therefore, under this alternative, the continuation of the current program would focus on identifying and removing those nutria in the remaining 350,000 acres of potential nutria habitat in those counties and continuing to monitor areas were nutria have been previously removed to ensure nutria do not become re-established.

Under this alternative, WS would be the primary entity removing nutria; however, the USFWS and the consulting agencies could take removal actions on properties they own or manage to remove nutria or could request the assistance of WS. Nutria would only be removed by WS from those areas where the appropriate landowner has agreed through an MOU, cooperative service agreement, or another comparable document to allow removal activities. Under this alternative, WS could respond to requests for assistance by: 1) taking no action, if warranted, 2) providing only technical assistance to property owners or managers on actions they could take to reduce damages caused by nutria, or 3) providing technical assistance and/or direct operational assistance to a property owner or manager experiencing damage. Funding could occur through federal appropriations or from cooperative funding. The adaptive approach to managing damage associated with nutria would integrate the use of the most practical and effective methods to remove nutria as determined by site-specific evaluation to reduce damage for each request.

Property owners or managers where nutria have been identified as occurring would be provided with information regarding the use of effective and practical non-lethal and lethal techniques. Property owners or managers may choose to implement WS' recommendations on their own (*i.e.*, technical assistance), use contractual services of private businesses, use volunteer services of private organizations, use the services of WS (*i.e.*, direct operational assistance), take the management action themselves, or take no further action. WS would provide technical and operational assistance using and/or recommending nutria damage management methods after applying the WS Decision Model (Slate et al. 1992, USFWS 2001).

WS' Decision Model is the implementing mechanism for a damage management program under the this alternative that is adapted to an individual damage situation that allows for the broadest range of methods to be used to address damage or the threat of damage in the most effective, most efficient, and mostly environmentally conscious way available. When a request for direct operational assistance is received to remove nutria, WS conducts site visits to assess damage or threats, identifies the cause of the damage, and applies the Decision Model described by Slate et al. (1992) to apply methods to resolve or prevent damage using those methods available. The use of the Decision model by WS' employees under this alternative is further discussed below. In addition, preference is given to non-lethal methods by WS when practical and effective (WS Directive 2.101).

Non-lethal methods available under this alternative to the USFWS and WS would include: cage traps, restraining cables, foot-hold traps, exclusionary devices, and locator dogs. However, in most cases, nutria live-captured using non-lethal methods would be euthanized. Lethal methods considered by WS and the USFWS include: live-capture followed by euthanasia, rotating-jawed traps, submersion sets using foot-hold traps, and shooting. Although zinc phosphide was addressed as a possible method in the previous EA (USFWS 2001), zinc phosphide has not previously been used and is no longer being considered as a method available under the current program. Listing methods neither implies that all methods would be used or recommended by WS or the USFWS to resolve requests for assistance nor does listing of methods imply that all methods would be used to resolve every request for assistance. The most appropriate response would often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. For example, if an entity requesting assistance has already attempted to alleviate damage occurring using non-lethal methods, WS would not necessarily employ those same non-lethal methods since those methods have been proven to be ineffective.

Euthanasia of live-captured nutria would occur by gunshot. Gunshot is a conditionally acceptable[5] method of euthanasia considered appropriate by the AVMA for free-ranging wildlife (AVMA 2013).

Technical Assistance Recommendations

Under this alternative, the USFWS and WS would provide technical assistance to those persons requesting nutria damage management as part of an integrated approach to managing damage. Technical assistance would occur as described in Alternative 3 of this EA.

Operational Damage Management Assistance

Operational damage management assistance includes damage management activities that are directly conducted by or supervised by personnel of the USFWS and/or WS. On properties owned or managed by the USFWS, activities could be conducted by the USFWS and/or WS. As state previously, WS would be

[5]The AVMA (2013) defines conditional acceptable as "...[methods] *that by the nature of the technique or because of greater potential for operator error or safety hazards might not consistently produce humane death or are methods not well documented in the scientific literature".*

the primary federal agency conducting nutria removal activities on private and municipal properties when a request for direct operational assistance is received. Operational damage management assistance provided by WS may be initiated when the problem cannot effectively be resolved through technical assistance alone and there is a written MOU, cooperative service agreement, or other comparable document between WS and the entity requesting assistance. The initial investigation by WS would define the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem.

Educational Efforts

Education is an important element of activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, the USFWS and WS provides lectures, courses, and demonstrations to producers, homeowners, state and county agents, colleges and universities, and other interested groups. The USFWS and WS frequently cooperate with other entities in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that other wildlife professionals and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

The National Wildlife Research Center (NWRC) functions as the research program of WS by providing scientific information and the development of methods for wildlife damage management that are effective and environmentally responsible. Research biologists with the NWRC work closely with wildlife managers, researchers, and others to develop and evaluate wildlife damage management techniques. NWRC biologists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

WS' Decision Making Procedures

WS' personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model (WS Directive 2.201) and described by Slate et al. (1992). WS' personnel are frequently contacted after requesters have tried or considered methods and found them to be impractical, too costly, or inadequate for effectively reducing damage. WS' personnel assess the problem and then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a damage management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model, most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions, including WS.

Nutria Damage Reduction Strategies and Methodologies

WS would be the primary agency conducting nutria removal efforts under this alternative. The USFWS and state wildlife agency could conduct nutria removal activities on properties they own or manage or

could request assistance from WS. WS would use the formalized decision model (Slate et al. 1992, USFWS 2001), to determine the most appropriate implementation strategy to reduce nutria damage. This procedure would consider implementation of safe and practical methods for the prevention and reduction of damage caused by nutria, based on local problem analysis, environmental and social factors, and the informed judgment of trained personnel. In selecting management techniques for specific damage situations, consideration is given to:

- natural history of nutria,
- vulnerability to management strategies;
- other land uses (such as recreational and commercial uses);
- feasibility of implementing strategies;
- status of non-target species (including T&E species);
- local environmental conditions such as terrain, vegetation, and weather;
- potential legal restrictions;
- humaneness;
- cost of reduction strategies[6].

Methods Available for Use

Methods that would be available under this alternative are regarded as mechanical methods and chemical methods. Most methods available to manage damage associated with nutria would be available under all the other alternatives since their use is not restricted or limited to use by the USFWS and/or WS only. Kendrot and Sullivan (2009) indicated that current trapping and hunting methods (with dogs) are effective at reducing nutria populations to very low numbers. During early research on removing nutria from 40-acre trapping units, about 90% to 95% of nutria could be removed during the first four weeks of trapping/hunting in each unit. Based on previous activities to remove nutria under this alternative, the use of trapping methods and hunting with dogs would continue to be the main tool for removing nutria under this alternative.

Under this alternative, methods would be employed adaptively to remove nutria using the Decision Model, which would allow methods to be employed and adjusted to achieve removal of nutria. As nutria densities decline in an area, detecting and removing nutria becomes more difficult. Adjustments in the use of methods could lead to improvements in effectiveness and efficiency. For example, nutria often congregate into stands of *Phragmites* vegetation or three square bulrush (*Schoenoplectus americanus*) stands when it is windy or when water bodies are frozen[7]. Focusing on placing traps in areas of habitat which nutria may be occupying at particular times could greatly improve effectiveness and efficiency. There is also benefit in modifying existing methods to enhance effectiveness based on nutria behavior. For example, raft-mounted traps were used very effectively to capture nutria (Gosling and Baker 1989). Nutria will often use feeding platforms and rafts to feed and loaf out of the water. Determining why, when, and where nutria are most likely to use rafts and pads could greatly enhance effectiveness.

Additional information on specific methods is discussed by method below:

Cage Traps are designed to live-capture animals, and would be used to capture nutria for tagging and release or later disposition. Cage traps are generally constructed of a metal frame and covered with

[6]The cost of management in this proposal may be a secondary concern because of overriding environmental and legal considerations (i.e., E O 13112 and PL 105-322.)

[7]There would be merit in developing predictive models of frozen areas and making preparations so that remaining open water areas where nutria congregate during "freezes" could be identified and targeted with intensive trapping.

welded wire or are constructed of plastic. The trap's appearance is similar to a large rectangular box. When cage traps are set, one end of the trap is opened to allow an animal to enter the door. Cage traps are usually baited with an attractant to lure target species into the trap. Bait is placed past the "*pan*" which acts as the trigger for the trap holding the door open. Once the animal enters the trap and steps on the pan, the pan is tripped causing the door to close behind the animal. One advantage of using cage traps is the ease of release of nutria or non-target animals. Disadvantages are that the traps are heavy and are relatively bulky to carry and maneuver.

Foot-hold traps can be effectively used to live-capture a variety of mammals. Despite the numerous damage management methods developed, trapping remains the most effective method of removing beaver and other aquatic rodents (Hill 1976, Hill et al. 1977, Wigley 1981, Weaver et al. 1985).

Foot-hold traps are either placed in travel ways, or beside trails used by the target species and the traps sets are baited. Placement of traps is contingent upon the habits of the respective target species, habitat conditions, and presence of non-target animals. Effective trap placement and use of appropriate lures contributes to the foot-hold traps selectivity. An additional advantage is that foot-hold traps can allow for the on-site release or the translocation of animals since the animal is live-captured. The use of foot-hold traps requires more workforce than some methods, but they are valuable tool in resolving many damage problems. Also, it is easier to deploy more foot-hold traps than cage traps and foot-hold traps are easier to conceal than cage traps.

Foothold traps can also attached to a submersion cable that is anchored at the trap set and in deep water. The trap is attached to the cable with a locking mechanism that allows the trap to slide down the cable, but prevents the captured animal from returning to the surface. In this type of foothold set, death from drowning or submersion hypoxia occurs in a short time.

Snares are capture devices comprised of a cable formed in a loop with a locking device and placed in travel ways. Most snares are also equipped with a swivel to minimize cable twisting and breakage. Snares are easier than foot-hold traps to keep operational during periods of inclement weather and snares set to catch an animal around the body or foot are a live-capture method.

Shooting is selective for target species and may involve the use of spotlights and either a shotgun or rifle. Shooting is an effective method to remove small numbers of individuals in damage situations, especially where trapping is not feasible. Shooting is utilized as a lethal damage management option because it offers more selectively than some other methods. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment.

WS' personnel receive firearms safety training to use firearms while performing their duties. Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To help ensure safe use and awareness, WS' employees who use firearms during official duties are required to attend an approved firearm safety training course and to remain certified for firearm use must attend a safety training course in accordance with WS Directive 2.615. As a condition of employment, WS' employees who carry and use firearms are subject to the Lautenberg Domestic Confiscation Law, which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence (18 USC § 922(g)(9)).

Rotating-jawed traps are designed to cause the quick death of the animal that activates the trap. Rotating-jawed traps are used exclusively in aquatic habitats, with placement depths varying from a few inches to several feet below the water surface. The MD DNR allows rotating-jawed traps with a jaw spread of eight inches or less to be set above ground in wetlands. Rotating-jawed traps with jaw spreads

exceeding eight inches must be set partially or totally submerged in water. Placement is in travel ways created or used by the target species with the animal captured as it travels through the trap and activates the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing the traps. Rotating-jawed traps present a minor risk to most non-target animals because of the placement in aquatic habitats and below the water surface.

Colony Traps or underwater box traps can be very effective in ponds and marshes (Novak 1987a). This type of trap requires more time and effort to set, but can be very effective if the correct size is used. The trap is cheap, simple, and easy to make. The trap is cumbersome to carry and must be staked down for proper use. The traps can be easily made from stovepipe, but some of the most effective versions are variations to this. The doors are hinged at the top or there are funnel entrances to allow easy entry from either end, but no escape out of the box. Death from drowning occurs in a short time. Colony traps are effective and relatively inexpensive to purchase, and easy to construct (Miller 1994). The trap design also allows for multiple catches. Such a trap can be made in most farm shops in a few minutes.

Dogs are trained to detect, "*flush*" or pursue nutria from dense vegetation to allow trappers and hunters the ability to capture, shoot or harvest and dogs can greatly increase hunting success[8]. Specially trained dogs, particularly retrievers, are often used by local hunters and are under the direct control of the trainer so as not to pursue non-target species. The use of dogs assists personnel locate nutria which probably would not have been found otherwise. Trained dogs have been effective in detecting nutria scats and scent (*i.e*., scat, urine), as well as nutria themselves while not harassing or pursuing non-target species such as muskrat and deer.

Project staff has initiated a relationship with the USDA, APHIS-National Detector Dog Training Center (NDDTC) in Athens, Georgia. The NDDTC trains dogs and handlers in the scent detection of agricultural contraband, drugs, explosives and invasive species for federal, state, and local government agencies. Two objectives for enhancing the nutria dog program include: 1) increasing the rigor of training and certification of existing and future nutria hunting dogs and handlers, and 2) developing a protocol for training specialized scat sniffing dogs that would provide reliable detection of nutria sign which may remain in an area even if the nutria has left the immediate vicinity (Chesapeake Bay Nutria Eradication Project Strategic Plan 2011).

Tracking nutria are surgically sterilized, radio-tagged and released in an effort to attract or detect any remaining nutria in selected habitats and to improve the capability to catch the last few remaining nutria. Judas nutria would be released in areas where nutria are thought to be absent and located by radio telemetry four to seven times per week. Judas nutria would then be recaptured and GPS data was downloaded to a GIS for interpretation and analysis. By correlating Judas nutria movements with field signs observed by project staff, the ability to develop a better understanding of the movements, landscape use, and behaviors of nutria would be obtained.

This is apparently the first time this approach has been used in nutria management, but has been used successfully to eradicate feral goats, pigs and other gregarious mammals from islands around the world (USDA 2010). Therefore, as with the development of all new tools, standard operating procedures will be established and regularly reviewed to ensure that their application is effective. Ostensibly, much could be learned from the use of Judas nutria which can be application for later and wider use, if this method is properly designed and rigorously evaluated.

[8]As nutria population densities decline, it has become increasingly difficult to locate remaining animals. Dogs have proven to be a reliable and efficient detection tool.

Nutria Detection Rafts (NDR) are a floating platform comprised of a 24"x24" piece of plywood affixed to a 2"x24"x24" piece of closed cell ethafoam; a 2" hole would be drilled in the platform to allow a pole to be driven through the platform and into the mud. A rim of 2"x4" lumber would be affixed around the edge of the top of the raft to prevent bedding material (straw or local vegetation) from blowing or washing off. On one side, a 12" cutaway in the rim would provide easy access to the platform for swimming nutria. A trap stabilizer would also be placed in this opening to support a rotating-jawed trap which could be deployed in the event nutria began using the raft; an eyebolt would provide a trap attachment point. NDRs would be placed based on previous captures and along likely travel corridors. A small amount of bedding material and nutria urine would be applied to each raft and checked for evidence of nutria (scat) every 2-3 weeks.

Based on similar applications, the NDR survey technique shows great promise for detecting nutria in low density areas. A similar raft based survey technique has been developed to control mink in the UK. This new method should greatly enhance staff efficiency by allowing the detection of nutria across large areas with minimal effort relative to other survey methods. While it will not fully replace other survey methods, (some interior marshes are ineffectively monitored by rafts), it should aide in determining which areas are in greatest need of more intensive inspection.

Trap monitors are devices that send a radio signal to a receiver if a set trap is disturbed and alerts field personnel that an animal may be captured. Trap monitors can be attached directly to the trap or attached to a string or wire and then placed away from the trap in a tree or shrub. When the monitor is hung above the ground, it can be detected from several miles away, depending on the terrain in the area. There are many benefits to using trap monitors, such as saving considerable time when checking traps, decreasing fuel usage, prioritizing trap checks, and decreasing the need for human presence in the area.

Night vision and Forward Looking Infrared (FLIR) equipment would aid in locating wildlife at night when wildlife may be more active. Night vision and FLIR equipment could be used during wildlife surveys and in combination with shooting to remove wildlife at night. WS' personnel most often use this technology to target mammals in the act of causing damage or likely responsible for causing damage. The use of those methods allows WS to conduct activities at night when human activities are minimal; thereby, reducing risks to human safety.

Lures and attractants would be used to locate isolated individuals and small groups of nutria to quickly remove them. This would be facilitated by lures to attract nutria to capture devices, "*to bring the nutria to us*", instead of "*us going to the nutria*". Captive facilities have been designed to allow nutria urine to be collected which is then used in an effort to attract nutria to trapping sites. Auditory lures could also be used within the project area. Nutria vocalizations could prove to be important when nutria are at low densities and/or colonizing new areas. Recorded nutria vocalizations, from fixed or hand-held points, may prove be a useful tool to locate nutria at low population densities.

The ability to attract nutria to a detection device or harvest tool is paramount to the success of the project and cannot be overstated (Chesapeake Bay Nutria Eradication Project Strategic Plan 2011). To deploy these instruments precisely in the exact pathway of all nutria is physically impossible. Attractants that capitalize on nutria behavioral responses to various stimuli could increase effective range and probability of interception. Additionally, attractants derived through analytical testing could increase selectivity and target particular classes or status groups of nutria that are crucial to imploding existing populations.

Strategies and Methodologies Considered but Deemed Impractical or Ineffective at the Present Time

Several additional methods are available or could become available to address damage caused by nutria;

however, some methods have been found to be impractical or ineffective based on previous activities conducted under this alternative or from research findings. Those methods that are available but would not be used under the alternative would include:

Zinc phosphide is registered to reduce nutria damage (EPA Reg. No. 56228-6), and is applied to bait (*e.g.*, carrots, sweet potatoes, apples, pears) on rafts or the ground in marshes and canals. The maximum amount of bait [0.6% active ingredient (a.i.)] that can be place on large rafts (4 feet by 4 feet) spaced ¼ to ½ mile apart is 10 lbs. On small waterways, four pieces of bait can be placed on rafts that are at least 6 inches by 6 inches. Rafts must be anchored appropriately for the size of the raft and the body of water, considering factors such as size, depth, winds, current, and potential for flooding. Rafts can be located near burrows and runways used by nutria or near places where these animals are causing damage. Bait may also be placed on the ground beside burrows or runways used by nutria. However, only two to five pieces of bait can be placed on the ground at the location.

Harassment Activities have generally proven ineffective in resolving aquatic rodent damage problems (Jackson and Decker 1993). Also, removal of food supplies to discourage nutria activity is generally not feasible nor ecologically desirable.

Exclusion has only proven effective at prohibiting nutria herbivory on small (30 x 30 meter) sample areas in studies conducted to evaluate the relative impact of nutria herbivory on wetland vegetation. Protecting marsh habitats at the landscape scale with exclusionary fences is not feasible and is not being considered as an alternative method.

Repellents are generally chemical methods that when ingested or contacted produce an aversive response (*e.g.*, unpalatable, induces nausea) that discourages feeding or disperses wildlife from on area. No repellents are registered for nutria damage reduction at this time.

Reproductive inhibitors would reduce the reproductive potential of nutria through chemical or surgical methods. A review of research evaluating chemically and surgically induced reproductive inhibition as a method for controlling nuisance aquatic rodents is contained in Novak (1987b). Although these methods were effective in reducing beaver reproduction by up to 50%, the methods were not practical or were too expensive for large-scale application.

Under this strategy, nutria would be surgically sterilized or contraceptives administered to limit their ability to produce offspring. However, at present, there are no chemical or biological contraceptive agents registered by the EPA, FDA or MDA for nutria and the use of immunocontraceptives is only in the realm of research. A nutria contraceptive, chemosterilant or immunocontraceptive, if delivered to enough individuals, could temporarily suppress local breeding populations by inhibiting reproduction. Reduction of local populations would result from natural mortality combined with reduced fecundity. No nutria would be killed directly with this method, however, treated and untreated nutria would continue to cause damage. Populations of nutria outside of the treatment area would probably be unaffected.

Contraceptive measures for mammals can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (the use of contraceptive vaccines). These techniques would require that nutria receive either single, multiple, or possibly daily treatment to successfully prevent conception. The use of this method would be subject to approval by federal and state agencies. This strategy was not considered in detail because: (1) it would take many years of implementation before the nutria population would decline, and therefore, damage would continue at the present unacceptable levels for years; (2) surgical sterilization would have to be conducted by licensed veterinarians, would therefore be extremely expensive and labor-intensive; (3) it is difficult to effectively

live trap or chemically capture the number of nutria that would need to be sterilized to effect an eventual decline in the population over large areas, and (4) no chemical or biological agents for sterilizing nutria have been approved for use by state and federal regulatory authorities.

Fumigants are generally used inside burrows where the product produces a toxic gas that fills the inside of burrows. Several fumigants are registered for controlling burrowing rodents but none are registered for use to manage damage associated with nutria; in marsh habitat nutria generally do not burrow extensively. Some fumigants, such as aluminum phosphide and carbon monoxide, may have potential as nutria control agents but their efficacy has not been scientifically demonstrated. In addition, these methods are neither practical nor legal because they are not registered for this purpose.

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

Under this alternative, the USFWS and WS would continue removing nutria as described under Alternative 1; however, the scope of the activities would be expanded to include areas outside of the five county core areas of Dorchester, Talbot, Caroline, Somerset, and Wicomico Counties along the eastern shore of Chesapeake Bay in Maryland. In addition, several methods have been identified that could be employed under an expanded project or could be further evaluated for inclusion in an expanded project.

As stated previously, project emphasis has shifted from large-scale reduction of high-density populations to a more focused detection and removal of low-density nutria populations. As the need for focusing on targeting high-density populations of nutria shifts to targeting small, isolated populations and verification of prior removal efforts, new tools and methods are needed to detect nutria at low densities. During 2010, an initial evaluation of methods to detect nutria at low densities was conducted in the core five county area of Maryland to detect nutria in areas where nutria were previously removed. Nutria densities outside of the initial core area of Maryland under an expanded program are also likely to be isolated low density populations. Therefore, the development of new methods to detect isolated low density populations would be a critical component of reliable delimiting surveys conducted in areas with unknown nutria densities. In addition, to be completely successful, areas where nutria have been removed previously must be continually monitored for sign that nutria have become re-established in those areas either from nutria that were missed during removal activities or from nutria that pioneer from nearby areas.

Under the expanded project alternative, operational activities would rely on several phases, including a survey phase, intensive removal (knock-down) phase, low-density (mop-up) phase, verification phase, and a surveillance phase. The survey phase of the project would serve to define the spatial distribution and relative abundance of nutria populations throughout the Chesapeake Bay to facilitate prioritizing activities. The intensive removal phase would begin upon the discovery of nutria in an area with the focus being on a rapid reduction of the local population as close to a zero density as possible. The low-density phase would focus on the detection and removal of individual nutria that either eluded captured during the initial intensive removal phase or have entered after the initial intensive removal phase. The verification phase would involve verifying that complete removal of nutria has been achieved. The surveillance phase would be the continual monitoring required in areas presumed to be free of nutria to ensure nutria do not become re-established.

As stated previously, observer-based survey methods (*e.g.*, intensive ground searching, shoreline surveys, detector dogs) can be time consuming and subject to bias from seasonal changes in vegetation, daily tidal fluctuations, and worker burnout. Therefore, more passive, reliable methods to detect nutria would be required to facilitate effective and efficient surveillance and monitoring. One method that was evaluated on a limited basis in 2010 to determine applicability and effectiveness was the use of floating platforms

referred to as nutria detection rafts. The detection rafts would be used as a low maintenance method for detecting nutria over a broad area with reduced staff effort.

The nutria detection rafts evaluated in 2010 were constructed using 24″ x 24″ piece of plywood affixed to a 2″ x 24″ x 24″ piece of closed cell ethafoam. A rim of 2″ high lumber was affixed around the edge of the top portion of the plywood to prevent bedding material (straw or local vegetation) from blowing or washing off the platform. On one side, a 12″ cutaway in the rim provided access to the platform by swimming nutria. A trap stabilizer was placed on the edges of the cutaway to support a rotating-jawed trap which could be used in the event nutria were detected using the raft. An eyebolt was affixed to the rim of the platform to allow a rotating-jawed trap to be secured to the platform using a cable. In addition, a 2″ hole was drilled into the platform to allow a pole to be inserted through the platform and into the mud below to secure the platform in place. A small amount of bedding material was placed on the platform and nutria urine was applied to each raft. Rafts were checked for evidence of nutria (*e.g.*, scat) every two to three weeks. A limited number of rafts were deployed during 2010 and were successful in identifying areas where nutria were present in areas where nutria had previously been removed. For example, the platforms were placed in an area on the lower Nanticoke River near Quantico Creek in Maryland. During subsequent checks of the platforms, nutria scat was found indicating nutria were present in the area. Staff of WS conducted intensive ground searches using detector dogs in the nearby areas and located the core area of nutria activities. Those nutria were successfully removed by trapping.

Although modification of the measurements and limited design changes could occur to the raft to enhance effectiveness, the general design of the raft would remain similar. The use of rafts to detect the presence of nutria would increase the efficiency of staff by allowing the detection of nutria across large areas with minimal effort relative to other survey methods. The rafts would aide in identifying areas where more intensive inspections for nutria would be required. However, not all marsh habitats where nutria could be found would be suitable for raft use (*e.g.*, some interior marshes are ineffectively monitored by rafts). The use of rafts to capture nutria once nutria have been identified in an area could also decrease non-target capture. The rafts are generally placed in water and away from the shoreline which limits access to the platform; however, rafts could be anchored to the shoreline where nutria may exit and enter water bodies. In addition, the placement of a rotating-jawed trap in the cutaway of the platform would require a non-target to swim up to the platform and attempt to lift itself out of the water and onto the top of the platform.

Further evaluation of the platforms is needed to determine the seasonal efficacy of the raft since anecdotal evidence noted during 2010 seems to indicate nutria may use the platforms more during the winter compared to the summer months since evidence of nutria using the platforms was essentially absent during the summer months but nutria use of the platforms appeared to increase as cooler temperatures occurred in the fall and winter. As the water temperature cools, the nutria may seek out warmer, dry loafing sites which the platforms could provide.

Another method being considered to detect nutria at low-density is the use of Global Positioning System (GPS) collars and radio transmitters to locate nutria. During a recent research project, wild nutria were live-captured, surgically sterilized, an abdominal radio transmitter was implanted, and the nutria were released. A subsample of nutria were also fitted with a GPS collar in addition to an abdominal radio transmitter. The nutria were released into areas where other wild nutria were thought to be absent. Those nutria with abdominal radio transmitters were located by radio telemetry four to seven times per week. The GPS collars obtained location data every 90 minutes for approximately four weeks until the unit's battery died. Nutria were then recaptured and GPS data was downloaded for interpretation and analysis.

Preliminary information gathered indicated that nutria fitted with collars and transmitters were effective in locating other nutria, including other nutria fitted with tracking devices as well as other untracked nutria. Information also indicated that nutria frequently move long distances in short periods of time. One nutria was tracked moving 6.5 miles in approximately 48 hours while another nutria was recorded moving nearly three miles in six hours. Some tracked nutria congregated into groups despite being released miles apart from each other. By correlating nutria movements with field signs observed in the field, project staff was able to develop a better understanding of nutria movements, landscape use, and behavior of nutria.

Detector dogs have been an integral component of the surveillance and monitoring activities conducted previously. To enhance the use of detector dogs in locating nutria, initial contact was made with the National Detector Dog Training Center (NDDTC) within the USDA-APHIS. The NDDTC is responsible for training dogs and handlers in the detection of scent from agricultural contraband, drugs, explosives, and invasive species for federal, state, and local government agencies. To enhance the use of detector dogs, dogs and dog handlers could be trained by the NDDTC as part of efforts to increase the rigor of training and certification of dogs and handlers. In addition, protocols could be developed for training specialized scat sniffing dogs to enhance the ability to detect the presence of nutria that remain in an area even if nutria have left the immediate vicinity.

As part of the expanded program, the cooperating agencies would participate in a Landowner Committee with the goal of gaining landowner cooperation as the project expands into new areas. Private landowners are a critical stakeholder group that contributes to the success of removal efforts by allowing project staff access to their properties to remove nutria. As indicated by the limited use of GPS collars and radio transmitters, nutria often travel long distances in search of other nutria. Private landowners who refuse access provide source areas for nutria to expand into surrounding areas after removal efforts have occurred. Overall, landowner support has been strong throughout the core area in those five counties in Maryland, with very few landowners refusing access. Of concern, are landowners in outlying areas who are unfamiliar with nutria and the damage caused by nutria and may be more reluctant to cooperate in removal efforts. The intent of the Committee would be to establish a network of landowners throughout the Chesapeake Bay area that can aid in the establishing landowner cooperation as the project expands.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

Under this alternative, the USFWS and WS would provide those cooperators requesting assistance with managing damage and threats associated with nutria with technical assistance only. Technical assistance could provide those cooperators experiencing damage or threats associated with nutria with information, demonstrations, and recommendations on available and appropriate methods available. The implementation of methods and techniques to resolve or prevent damage would be the responsibility of the requester with no direct involvement by the USFWS and WS. In some cases, WS may provide supplies or materials that are of limited availability for use by private entities (*e.g.*, loaning of cage traps). Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to managing damage; those strategies would be based on the level of risk, need, and the practicality of their application. WS would use the Decision Model to recommend those methods and techniques available to the requestor to manage damage and threats of damage. Those persons receiving technical assistance from the USFWS and/or WS could implement those methods recommended, could employ other methods not recommended, could seek assistance from other entities, or take no further action.

Under a technical assistance only alternative, the USFWS and WS would recommend an integrated

approach similar to the Alternative 1; however, the USFWS and WS would not provide direct operational assistance under this alternative. Recommendation of methods and techniques by WS to resolve damage would be based on information provided by the individual seeking assistance. Only those methods legally available for use by the appropriate individual would be recommend or loaned. Those methods described under Alternative 1 would also be available to those persons experiencing damage or threats associated with nutria except for rotating-jawed traps larger than five inches in diameter which would be illegal to possess or use in the State of Delaware unless permitted by executive order by the Secretary of DDNREC.

The USFWS and WS regularly provide technical assistance to individuals, organizations, and other federal, state, and local government agencies for managing nutria damage. Technical assistance includes collecting information about the nature and extent of the damage, and previous methods that the cooperator has attempted to use to resolve the problem. The USFWS and WS would then provide information on appropriate methods that the cooperator may consider to resolve the damage themselves. Types of technical assistance projects may include a visit to the affected property, written communication, telephone conversations, or presentations to groups such as homeowner associations or civic leagues.

This alternative would place the immediate burden of operational damage management work on the resource owner, other governmental agencies, and/or private businesses. Those persons experiencing damage or are concerned with threats posed by nutria could seek assistance from other governmental agencies, private entities, or conduct damage management on their own. Those persons experiencing damage or threats could take action using those methods legally available to resolve or prevent nutria damage as permitted by federal, state, and local laws and regulations or those persons could take no action.

Alternative 4 – Discontinue the Current Nutria Removal Project

Under this alternative, the USFWS and WS would discontinue all activities associated with nutria removal in the Chesapeake Bay. The USFWS and WS would no longer be involved with any aspect of nutria damage management in the Chesapeake Bay. All requests for assistance received by the USFWS and WS to resolve damage caused by nutria would be referred to the appropriate state wildlife agency, other governmental agencies, and/or private entities.

Despite no involvement by the USFWS and WS in removing nutria in the Bay area, those persons experiencing damage caused by nutria or the state wildlife agencies could continue to resolve damage by employing those methods legally available since the take of nutria could occur despite the lack of involvement by the USFWS and WS, except in Delaware where the nutria is currently considered a protected species with no take permitted. All methods described would be available for use by those persons experiencing damage or threats except that the use of rotating-jawed type instant-kill traps larger than five inches in diameter are illegal to possess or use in the State of Delaware unless permitted by executive order by the Secretary of DDNREC.

Therefore, under this alternative, those persons experiencing damage or threats of damage could contact the USFWS or WS but would immediately be referred to the appropriate state wildlife agency and/or other entities, the requester could contact other entities for information and assistance with managing damage, could take actions to alleviate damage without contacting any other entity, or could take no action.

3.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

In addition to those alternative analyzed in detail, several alternatives were identified by the management team but will not receive detailed analyses for the reasons provided. Those alternatives considered but not analyzed in detail include:

Bounties

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by most state agencies as well as most wildlife professionals for many years (Latham 1960, Hoagland 1993). The cooperating agencies concur with those agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties. Bounties are often ineffective at controlling damage over a wide area, such as Chesapeake Bay. The circumstances surrounding the take of animals are typically arbitrary and completely unregulated because it is difficult or impossible to assure animals claimed for bounty were not taken from outside the area where damage was occurring. In addition, the USFWS and WS do not have the authority to establish a bounty program. The MDNR is prohibited from paying out bounties (COMAR 10-107).

Nutria Damage Should be Managed by Hunters and Trappers

The jurisdiction for managing most resident wildlife rests with the MDNR and the DDNREC, as appropriate, who have the authority to request other agencies' assistance in achieving management objectives. The authority of the USFWS and WS to remove nutria and restore marsh habitat occurs under Executive Order 13112. Currently, the MDNR manages nutria as a furbearer but nutria are legally defined as an un-protected species (COMAR §10-101(s)). If deemed necessary, the MDNR has the option and authority to reduce restrictions on trapping or hunting to provide for more harvest opportunities for sportsmen and women. Although there is no closed season for nutria in Maryland, most private trappers and hunters are not able to provide year-round site-specific nutria damage reduction. That option, however, remains open to entities experiencing damage or the threat of damage.

In Delaware, nutria are currently considered a protected species with no hunting or trapping season. The take of nutria by private individuals in Delaware is currently prohibited.

Non-lethal Methods Implemented Before Lethal Methods

This alternative would require that all non-lethal methods or techniques described in this EA be applied to areas where nutria are present to prevent further damage. If the use of all non-lethal methods fails to prevent further damage, lethal methods would be employed. Non-lethal methods would be applied to every request for assistance regardless of severity or intensity of the damage until deemed inadequate to resolve damage. This alternative would not prevent the use of lethal methods by those persons experiencing nutria damage. The only non-lethal methods currently available would be exclusion devices and surgical sterilization. Surgical sterilization is addressed further under an alternative where only reproductive inhibitors would be available for use. The use of surgical sterilization and the rationale for not considering sterilization in detail are addressed below under that alternative.

Non-lethal methods would likely be limited to the use of exclusion devices, where marshland habitat is fenced to prevent nutria from accessing areas. However, to be effective, large areas would be required to be fenced to prevent nutria feeding and allow for restoration of marsh habitat. The use of fencing can be labor intensive to transport to areas and install, would require continuous surveillance to ensure timely repairs, and can be difficult to maintain due to the corrosive nature of the marsh environment and the tidal

flows. Fencing could also prevent other native wildlife from accessing areas. If fencing failed to effectively exclude nutria from an area, then lethal methods could be employed under this alternative.

Since exclusion methods would have to be employed over large geographical areas to prevent foraging on marsh vegetation and would require consistent surveillance to ensure fencing is adequately maintained to exclude nutria, this alternative was not considered in detail.

Use of Non-lethal Methods Only by WS

Under this alternative, the USFWS and WS would implement non-lethal methods only to address the loss of marsh habitat associated with nutria. Only those methods discussed in the EA that are considered non-lethal would be employed by the USFWS and WS. No lethal take of nutria would occur under this alternative. The use of lethal methods could continue to be used under this alternative by other entities, such as state wildlife agencies and private property owners. Exclusionary devices can be effective in preventing access to resources in certain circumstances. Exclusion is most effective when applied to small areas to protect high value resources. However, exclusionary methods are neither feasible nor effective for excluding nutria across large areas. The non-lethal methods used or recommended by the USFWS and WS under this alternative would be identical to those identified in any of the alternatives.

In situations where non-lethal methods were impractical or ineffective to alleviate damages, the USFWS and WS could refer requests for information regarding lethal methods to the state wildlife agencies, other governmental agencies, local animal control agencies, or private businesses or organizations.

Property owners or managers could conduct management using any method that is legal. Property owners or managers might choose to implement non-lethal recommendations, implement lethal methods, or request assistance from a private or public entity other than the USFWS or WS. Property owners/managers frustrated by lack of assistance with the full range of damage management techniques may try methods not recommended or use illegal methods (*e.g.*, poisons). In some cases, property owners or managers may misuse some methods or use some methods in excess of what is necessary which could then become hazardous and pose threats to the safety of humans and non-target species.

The proposed action, using an integrated damage management approach, incorporates the use of non-lethal methods when addressing requests for assistance. In those instances where non-lethal methods would effectively resolve damage from nutria those methods would be used or recommended under the proposed action. Since non-lethal methods would be available for use under the alternatives analyzed in detail, this alternative would not add to the analyses.

Trap and Translocate Nutria Only

Under this alternative, all requests for assistance would be addressed using live-capture methods or the recommendation of live-capture methods. The translocation of nutria to other areas following live-capture generally would not be effective or cost-effective. Translocation is generally ineffective because nutria are highly mobile and can easily return to damage sites from long distances and translocation would most likely result in nutria damage at the new location. Also, hundreds of nutria would need to be captured and translocated to solve some damage problems; therefore, translocation would be unrealistic. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of the stress to the translocated animal, poor survival rates, threat of spreading diseases, and the difficulties that translocated wildlife have with adapting to new locations or habitats (Nielsen 1988).

Executive Order 13112 states that each Federal agency whose actions may affect the status of invasive

species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species. In addition, translocation would be illegal in Maryland, without approval of the MDNR (COMAR §08.03.09.03). Any decisions on translocation of nutria would be coordinated with the MDNR and the DDNREC, as appropriate.

Reducing Damage by Managing Nutria Populations through the Use of Reproductive Inhibitors

Under this alternative, the only method available to resolve requests for assistance would be the recommendation and the use of reproductive inhibitors to reduce or prevent reproduction in nutria responsible for causing damage. Reproductive inhibitors are often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et al. 1997). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (*e.g.*, longevity, age at onset of reproduction, population size and biological/cultural carrying capacity), habitat and environmental factors (*e.g.*, isolation of target population, cover types, and access to target individuals), socioeconomic, and other factors.

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or contraception (reversible). Sterilization could be accomplished through: 1) surgical sterilization (vasectomy, castration, and tubal ligation), 2) chemosterilization, and 3) through gene therapy. Contraception could be accomplished through: 1) hormone implantation (synthetic steroids such as progestins), 2) immunocontraception (contraceptive vaccines), and 3) oral contraception (progestin administered daily).

Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species.

Currently, no reproductive inhibitors are available for use to manage most mammal populations. Given the costs associated with live-capturing and performing sterilization procedures on nutria and the lack of availability of chemical reproductive inhibitors for the management of nutria populations, this alternative was not evaluated in detail. In addition, the use of a reproductive inhibitor, including surgical sterilization procedures would allow nutria to continue to cause damage. If a chemical reproductive inhibitor becomes available to manage nutria populations and has proven effective in reducing localized populations, the use of the inhibitor could be evaluated under the proposed action as a method available that could be used in an integrated approach to managing damage. This EA would be reviewed and supplemented to the degree necessary to evaluate the use of the reproductive inhibitor as part of an integrated approach described under the proposed action. Currently, the only reproductive inhibitor that is registered with the EPA for a mammal species is Gonacon™, which is registered for use on white-tailed deer (*Odocoileus virginianus*).

3.3 STANDARD OPERATING PROCEDURES FOR NUTRIA DAMAGE MANAGEMENT

SOPs improve the safety, selectivity, and efficacy of wildlife damage management activities. SOPs would be incorporated into activities conducted by WS when addressing nutria damage in the Chesapeake

Bay area.

Some key SOPs pertinent to the proposed action and alternatives include the following:

- The WS Decision Model, which is designed to identify effective wildlife damage management strategies and their impacts, would be consistently used and applied when addressing nutria damage.

- All WS' personnel who use firearms would be trained according to WS' Directives.

- WS would employ methods and conduct activities for which the risks of hazards to public safety and hazard to the environment have been determined to be low. Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

- Non-target animals live-captured in traps would be released unless it is determined that the animal would not survive and/or that the animal could not be released safely.

3.4 ADDITIONAL STANDARD OPERATING PROCEDURES SPECIFIC TO THE ISSUES

Several additional SOPs are applicable to the alternatives and the issues identified in Chapter 2 including the following:

Issue 1 - Effectiveness of Damage Management Methods

- The appropriateness and effectiveness of methods and techniques would be applied based on the WS Decision Model using site specific inputs.

- The Nutria Management Team would continually monitor the results of methods employed to ensure those methods deemed appropriate and most effective are used to resolve nutria damage.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

- When conducting removal operations via shooting, identification of the target would occur prior to application.

- As appropriate, suppressed firearms would be used to minimize the noise associated with the discharge of a firearm.

- Personnel would use lures, trap placement, and capture devices that are strategically placed at locations likely to capture a target animal and minimize the potential of non-target animal captures.

- Personnel would use physical barriers, guide sticks, and trigger configurations to minimize the potential for non-target animal captures in accordance with SOP and consultation with USFWS.

- Any non-target animals captured in cage traps, cable restraints, foothold traps, or any other restraining device would be released whenever it is possible and safe to do so.

- Live-traps would be checked frequently to ensure non-target species would be released in a timely manner to ensure survival.

- Carcasses of nutria retrieved after damage management activities have been conducted would be disposed of in accordance with WS Directive 2.515.

- The USFWS and the state wildlife agencies have been consulted to evaluate activities to resolve nutria damage to ensure the protection of T&E species.

- The Nutria Management Team would monitor activities conducted under the selected alternative, if activities are determined to have no significant impact on the environment and an EIS is not required, to ensure those activities do not negatively impact non-target species.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

- Damage management activities would be conducted professionally and in the safest manner possible. Whenever possible, damage management activities would be conducted away from areas of high human activity. If this is not possible, then activities would be conducted during periods when human activity is low (*e.g.*, early morning), whenever possible.

- Shooting would be conducted during time periods when public activity and access to the control areas are restricted. Personnel involved in shooting operations would be fully trained in the proper and safe application of this method.

- Carcasses of nutria retrieved after damage management activities would be disposed of in accordance with WS Directive 2.515.

Issue 4 - Effects on the Socio-cultural Elements and Economics of the Human Environment

- All methods or techniques applied to remove nutria would be agreed upon by entering into a cooperative service agreement, MOU, or comparable document prior to the implementation of those methods.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

- Personnel would be well trained in the latest and most humane devices/methods for removing nutria.

- Personnel would check methods frequently to ensure nutria captured would be addressed in a timely manner to minimize the stress of being restrained.

- Use of euthanasia methods would follow those recommended by WS' directives (WS Directive 2.505) and the AVMA (AVMA 2013).

- The NWRC is continually conducting research to improve the selectivity and humaneness of wildlife damage management devices used by personnel in the field.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative to address the need for action described in Chapter 1 and the issues described in Chapter 2. This chapter analyzes the environmental consequences of each alternative as that alternative relates to the issues identified. The following resource values in the state are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, critical habitats (areas listed in T&E species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. Those resources will not be analyzed further.

The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur as a result of any of the proposed alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

This section analyzes the environmental consequences of each alternative in comparison to determine the extent of actual or potential impacts on the issues. Therefore, the no action alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The analysis also takes into consideration mandates, directives, and the procedures of the USFWS, WS, and state wildlife agencies.

Issue 1 - Effectiveness of Damage Management Methods

A common issue when addressing damage is the effectiveness of the methods being employed to resolve the damage. Therefore, methods being employed to resolve damage must be effective at resolving damage or threats within a reasonable amount of time to prevent further loss. The issue of method effectiveness as it relates to each alternative analyzed in detail is discussed below.

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

The effectiveness of the current marsh restoration program would be dependent upon numerous factors such as: 1) the skill of the field specialists, 2) cooperation of the affected agencies, and 3) the careful and skilled use of proven tools. The current management methods that could be used include foot-hold traps, kill traps, colony traps, cage traps, snares, shooting, and dogs based on research findings and circumstances in the field. Some factors that may influence effectiveness cannot be predicted, such as weather, nutria behavior, and accessibility of areas where nutria occur.

The marsh restoration program would be based on the systematic application of intense harvest pressure using hunting and trapping as the primary removal techniques. With nearly 500,000 acres of wetland on the Delmarva Peninsula the first step towards implementing a systematic trapping program would be to break potential nutria habitat into manageable work units. Two removal strategies have been implemented dependent on the geographic distribution of marsh habitats: the progressive sweep and the simultaneous removal. Between 2003 and 2008, project personnel depopulated nutria from nearly 150,000 acres of wetland habitat out of 365,644 acres available along the Eastern Shore of Maryland (see Table 4-1; Kendrot and Sullivan 2009). Based on the success of operations, the program moved into other known high density nutria populations in Maryland. In 2007, project staff depopulated Ellis Bay WMA, Deal Island WMA, and areas in Somerset County. In 2008, depopulation was initiated on the

Choptank River and continued into 2009 (Kendrot and Sullivan 2009). Based on monitoring information and assuming that trapping removed a similar percentage of the existing population each year, the population in 2008 when compared to 2003 had been reduced by 99.7% making the current program effective (Kendrot and Sullivan 2009).

Table 4-1. Acreage of wetlands available as nutria habitat and acreage depopulated of nutria by County and FY on Maryland portion of Delmarva Peninsula.

COUNTY	Available Wetlands	2003 Zone A	2004 Zone B	2005 Zone C	2006 Zone D	2007 Zone E	2008 Zone F	Total Trapped
Dorchester	134,985	29,005	29,152	16,325	25,337	5,554	625	**105,998**
Somerset	105,548	-	-	-	-	16,885	7,168	**24,053**
Wicomico	32,795	-	-	-	-	13,523	-	**13,523**
Talbot	12,657	-	-	-	-	-	3,662	**3,662**
Caroline	6,695	-	-	-	-	-	1,906	**1,906**
Queen Anne	9,794	-	-	-	-	-	-	**0**
Kent	6,012	-	-	-	-	-	-	**0**
Cecil	7,119	-	-	-	-	-	-	**0**
Worchester	50,039	-	-	-	-	-	-	**0**
TOTAL	**365,644**	**29,005**	**29,152**	**16,325**	**25,337**	**35,962**	**13,361**	**149,141**

Traps, snares, and shooting have been proven effective methods for removing nutria (Kendrot and Sullivan 2009). The top five methods accounting for the most nutria captured during the initial depopulation phase were rotating-jawed traps, shooting, foot-holds traps on submersion cables[9], dogs and staked foot-hold (see Table 4-2; Kendrot and Sullivan 2009).

Table 4-2. Number of nutria taken by method during the initial trapping phase, September 2002 through December 2008.

	Year								
Method	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**TOTAL**
Rotating-jawed Trap	214	3,294	1,612	320	132	776	1,041	81	**7,470**
Shooting	17	486	735	39	7	15	14	0	**1,313**
Foot-hold (submersion)	0	46	448	111	114	52	143	13	**927**
Foot-hold (staked)	96	322	36	0	0	0	5	1	**460**
Dog†	0	0	245	154	43	12	14	5	**473**
Snare	0	57	5	4	1	15	23	0	**105**
Floating Rotating-jawed Trap	10	34	34	5	1	2	9	2	**97**
Hand Caught*	5	42	15	2	1	0	1	0	**66**
Platform Trap (Foothold)	0	20	6	2	8	1	17	7	**61**
Platform Trap (Rotating-jawed)	0	0	0	0	0	4	11	0	**15**
Cage Trap*	0	5	0	3	0	0	0	0	**8**
Spotlight/Shooting	0	5	1	0	0	0	0	0	**6**
TOTAL	**342**	**4,311**	**3,137**	**640**	**307**	**877**	**1,278**	**109**	**11,001**

†Dogs were used to located and flush nutria which were lethally taken by gunshot

*Nutria live-captured by hand or in cage traps were euthanized by gunshot

In the early stages of removing nutria from new areas, traps have been checked more frequently (daily or

[9]Submersion foot-hold techniques were incorporated into trapping methodologies in 2004 and replaced the staked foothold trap in most cases.

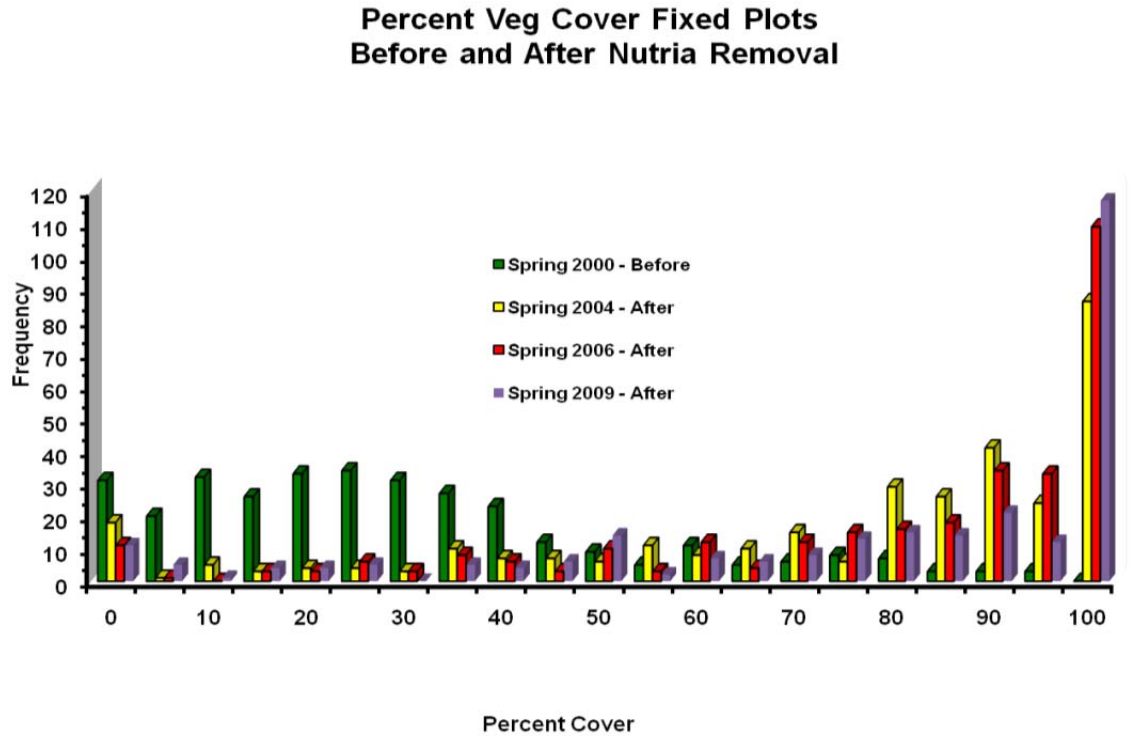
every other day) to ensure that productive sets remain in working order. As capture rates decline due to lower nutria densities, the trap-checking interval would increase (up to 96 hours) to allow personnel to establish multiple traplines. When using live-capture methods, traps would be checked at least every 24 hours. Any live captured nutria would be euthanized in accordance with AVMA (2013) standards. Traps and snares would be placed either in nutria travel lanes or baited with a nutria's preferred food or lure to attract the animal. Effective trap and snare placement contributes to the selectivity for capturing target animals. Shooting is an effective and selective method when personnel are on site. Nutria could also be captured in cage traps and colony traps; however, they may not be practical because of transporting traps through marsh areas can be difficult.

Dogs are effectively used to locate nutria in thick marshy vegetation where nutria can be flushed and pursued. Training and maintaining suitable dogs would require considerable skill (Chesapeake Bay Nutria Eradication Project Strategic Plan 2011). Nutria management specialists, using their own dogs, are employed that have the proper specialized experience, and who have first-hand knowledge of the analysis/damage management area. This is an effective method that is available to reduce nutria damage in remote terrain, such as that found in some marsh areas (Kendrot and Sullivan 2009).

Removing nutria to reduce damage and protect marsh vegetation has been demonstrated to be beneficial to the marshes (Haramis 1997, Haramis 1999, Kendrot and Sullivan 2009). Haramis (1999) noted that removing nutria has the potential to increase marsh vegetation and recover the marsh to more natural conditions, and that it would assist with management objectives for invasive species. Sport harvest, not part of the current program, would have removed nutria randomly from various designated locations. Because the current program removes nutria in a systematic manner to reduce or eradicate populations, the action can allow marshes to recover, while minimizing the number of muskrats or other non-target species removed.

As illustrated below, nutria damaged marshes recovered rapidly and dramatically in response to removal of nutria (see Figure 4-1 and Figure 4-2; Kendrot and Sullivan 2009). As nutria populations approach zero, marsh surface swim channels were reclaimed by rhizome growth from three square bulrush. The resulting network of new roots trapped sediments that filled in swim channels eliminating the primary route of erosion for organic soils dislodged by nutria foraging habits. These observations were confirmed by quantitative vegetation studies conducted by researchers at Patuxent Wildlife Research Center which showed a dramatic recovery in areas extensively damaged by nutria (see Figure 4-1; Haramis, USGS, unpublished data). As shown in Figure 4-1, as nutria were removed from the 300 study plots, the vegetative coverage of the plots increased as vegetation recovered. Before nutria removal in the spring of 2000, only 18.2 % of 300 plots had more than 50% vegetative cover. In the spring of 2009 after nutria were removed in 2004, the number of plots with more than 50% vegetative coverage had reached 83.6% of the 300 plots.

Figure 4-1. Distribution of 300 study plots in percent cover categories before (2000) and after (2004) nutria eradication at BNWR (M. Haramis, USGS, unpolished data)



Additionally, private landowners and marsh users have reported observing improvements in vegetative cover, marsh integrity, and water quality in areas where nutria had been removed (Kendrot and Sullivan 2009). Figures 4-2 illustrates the potential for damaged marsh to recover, provided substrates do not erode or settle to the point that inundation prevents regrowth (Kendrot and Sullivan 2009). Coincidentally, muskrat sign in the area depicted in Figure 4.2a was virtually absent in 2007 when nutria were abundant in the area. However, after nutria removal, intense muskrat activity was noted throughout the marsh (Kendrot and Sullivan 2009).

Figure 4.2a - Damage to marsh habitat occurring from nutria prior to removal activities, May 2007.

Figure 4.2b – Recovery of marsh habitat after nutria removal activities, June 2009.

Overall, the effectiveness of the current program for marsh restoration and native species recovery is than recovery that could occur under Alternative 3 and Alternative 4, because methods known to be effective are used by skilled field specialists, with the cooperation of various agency experts (*i.e*., USFWS, MDNR). When compared to the cost of rebuilding marsh, which can cost thousands of dollars per acre, the cost of protecting marsh through the removal of nutria averages between $60 and $70 per acre (Maryland Nutria Project - Project Summary 2009).

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

Ultimately, the proposed program is based on the needs to restore marsh habitat in Chesapeake Bay in Maryland and in Delaware by reducing nutria damage to marsh vegetation, and the management objectives of the resource management agencies. The effectiveness of the proposed nutria damage reduction program is dependent upon the same factors as Alternative 1 which depends on the: 1) skill of the field specialists, 2) cooperation of the affected agencies, 3) careful and skilled use of proven tools, and 4) areas (watersheds) where operational nutria removal activities can be conducted. The proposed management methods are foot-hold traps, rotating-jawed traps, colony traps, cage traps, restraining cables, NDR, Judas nutria, improved lures and attractants, telemetry, shooting, and dogs based on circumstances in the field; zinc phosphide use is not being proposed under this alternative. As with Alternative 1, some factors that may influence effectiveness cannot be predicted, such as weather, nutria behavior, and accessibility of the marsh. However, the most effective approach to resolving most wildlife damage would be to integrate the use of several methods simultaneously or sequentially. Overall, the effectiveness of the proposed action alternative would be rated as high when compared to the other alternatives, because methods known to be effective would be used by skilled field specialists, with the cooperation of various agency experts.

As used in Alternative 1, traps, restraining cables, shooting, and dogs would be effective methods for removing nutria. In the early stages of removing nutria from an area, traps would be checked more frequently (daily or every other day) to ensure that productive sets remain in working. As in Alternative 1, as capture rates decline, the trap-checking interval would likely increases (up to 96 hours) to allow personnel to initiate setup on a new plot and any live captured nutria would be euthanized in accordance with AVMA (2013) standards. However, additional monitoring methods would be implemented to help

detect any remaining nutria to be removed and standard removal methods would be used.

As in Alternative 1, sport harvest would have removed nutria randomly from various designated locations. Because the proposed action would continue to take nutria in a systematic manner to reduce or eradicate populations in Maryland and Delaware in selected watersheds, it is reasonable to assume that this action would likely have a greater beneficial effect on recovering marshes.

Monitoring previously trapped populations remains one of the programs biggest challenges. With 150,000 acres of habitat spread across five counties, returning to these areas on a regular basis requires an exhaustive effort that inhibits expansion into new areas. Expansion into new areas is necessary to reduce the risk of reinvasion of the nutria-free zone. Thus, these priorities compete for limited staff resources and time. Additionally, many private landowners restrict access during the hunting season from September to the end of January.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

Under this Alternative, the USFWS nor WS would not conduct any operational marsh restoration activities and would only provide technical assistance and advice on potential for the use of various methods to restore Chesapeake Bay marsh habitats. The effectiveness of nutria damage reduction would be dependent upon the careful and skilled use of the appropriate combinations of proven tools. The MDNR allows nutria to be removed at any time within the state, including the ability of landowners or managers to remove nutria from properties they own or manage. However, Alternative 3 would likely result in a less effective and organized effort to restore Chesapeake Bay marsh vegetation.

Chesapeake marsh degradation would likely continue or increase under Alternative 3 since it would be difficult for the MDNR, the DDNREC, and landowners to devote the required time, resources, and expertise to adequately address nutria problems. Non-lethal methods for preventing nutria vegetation destruction would not be practical, and the MDNR, the DDNREC, and landowners would be required to conduct lethal control efforts to address marsh restoration objectives without direct assistance from WS and/or the USFWS. The overall efficacy of this Alternative would largely depend on whether the MDNR, the DDNREC, and landowners would be able to establish an equally prompt and effective program.

Sport harvest would likely be part of this Alternative would remove nutria randomly from various locations and without a well-organized, systematic approach to reducing or eradicating nutria in Maryland and Delaware; therefore, Alternative 3 would not likely be as effective as Alternative 1 or Alternative 2 for recovering Chesapeake Bay marshes.

Alternative 4 – Discontinue the Current Nutria Removal Project

Under this alternative, the USFWS and WS would not take any further action to restore marsh habitat or reduce nutria damage. Nutria could continue to be removed in Maryland at any time using firearms and during the annual trapping season for nutria. In Delaware, no removal activities could be conducted since nutria are currently considered a protected species in the state. The effectiveness of nutria damage reduction is dependent upon the use of the appropriate strategies and combinations of proven tools by sportsmen. It is anticipated that about the same numbers of nutria would be taken as in the past by private trappers or hunters. The strategy, the use of traps, snares and shooting, has proven to be an effective method for removing nutria. However, this strategy of using private fur trappers and hunting has not previously kept the nutria population at a level where marsh damage can be prevented.

If no action is taken, marsh loss is expected to continue, leading to thousands of acres of marsh being lost

over the next several decades. Nutria would likely continue to damage the marsh and the wetlands would continue to degrade with little overall effectiveness to this strategy.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

As discussed previously, a concern is often raised about the potential impacts to non-target species, including T&E species, from the use of methods to resolve damage caused by nutria. The potential effects on the populations of non-target wildlife species, including T&E species, are analyzed below.

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

It is WS policy that all traps and trapping devices are set in a manner which minimize the chances of capturing non-target species and non-target animals captured are released alive, if it is determined that they are physically able to survive (WS Directive 2.450). Some non-target animals have been captured and killed by the current program (see Table 4-3); however, the numbers are generally low and some species have benefitted from the current program (*e.g.*, muskrats). Nutria damage marsh habitat and some species' populations (*e.g.*, muskrat) decline if nutria expand their range and densities. The food habits and preferred aquatic habitats of nutria and muskrats overlap, which can lead to competition for resources between nutria and muskrats. Given the larger size and feeding habits of nutria, muskrats are often excluded from areas where nutria densities are high. In areas where nutria populations have been reduced, muskrat populations have rebounded relatively quickly (Kendrot and Sullivan 2009).

Table 4-3. Non-target Species Take by WS, FY 2007-FY 2011.

Species	Fiscal Year					Total	Species	Fiscal Year					Total
	2007	2008	2009	2010	2011			2007	2008	2009	2010	2011	
Barred Owl	0	0	1	0	0	**1**	**Norway Rat**	0	0	0	1	0	**1**
Beaver	0	2	2	0	1	**5**	**Opossum**	0	8	1	0	1	**10**
Bittern	3	1	1	1	0	**6**	**River Otter**	6	11	5	2	1	**25**
Black Duck	2	6	8	0	0	**16**	**Painted Turtle**	0	6	0	1	1	**8**
Canada Goose	6	1	0	0	0	**7**	**Pied-billed Grebe**	0	0	1	0	0	**1**
Carp	0	12	0	1	6	**19**	**Raccoon**	119	243	78	27	24	**491**
Catfish	0	0	1	1	0	**2**	**Red Bellied Turtle**	0	7	2	1	0	**10**
Clapper Rail	1	0	1	0	0	**2**	**Red Fox**	3	7	3	0	1	**14**
Cooper's Hawk	0	0	2	0	0	**2**	**Red-winged Blackbird**	0	0	2	0	0	**2**
American Coot	0	1	1	0	0	**2**	**Rice Rat**	1	3	10	0	0	**14**
Cottontail Rabbit	1	2	2	0	0	**5**	**Striped skunk**	0	4	1	0	0	**5**
Diamondback Terrapin	6	0	0	1	0	**7**	**Snapping Turtle**	27	113	18	11	6	**175**
Feral Cat	0	1	0	0	0	**1**	**Turkey Vulture**	0	1	0	1	0	**2**
Great Blue Heron	4	2	0	2	1	**9**	**Unknown Duck**	1	1	0	0	0	**2**
Great Horned Owl	1	0	0	0	0	**1**	**Unknown rail**	3	2	0	0	0	**5**
Greater Yellowlegs	0	1	0	0	0	**1**	**Virginia Rail**	3	2	2	0	0	**7**
Green-wing Teal	1	0	1	0	1	**3**	**Vole**	0	1	0	0	0	**1**
Mallard	6	18	21	0	1	**46**	**Wood Duck**	1	3	7	3	0	**14**
Turtles	3	1	0	0	0	**4**	**Woodchuck**	0	1	1	0	0	**2**
Muskrat	155	202	221	33	69	**680**							

Since muskrats and other non-target species occupy the same habitat type and are found in areas occupied by nutria, they are more vulnerable to capture. However, the overall impact to the muskrat population is beneficial because interspecific competition from nutria is reduced and marsh habitats are recovered. In addition, by restoring marsh habitats, fisheries, native wildlife and vegetation benefit. The USFWS also

has a Trust Responsibility (*e.g.*, migratory birds and T&E species, interjurisdictional fish, wetlands) to protect lands they administer (*e.g.*, National Wildlife Refuges) for the purposes for which the area was established and this responsibility benefits from removing negative effects of nutria on marsh habitats.

Methods would be employed in a responsible manner to avoid capturing or harassing non-target species. Shooting is highly selective and does not pose a risk to T&E species or other non-target animals when conducted by professional field specialists trained in firearm use and trained to identify target and non-target species. The use of kill traps, snares and colony traps could capture and kill some muskrats, and dogs used to flush nutria do not pose a threat to T&E species or other non-target species because they are trained and under the close supervision of dog handlers.

Coincidentally, muskrat sign in the area depicted in the photographs (Figure 4-2) was virtually absent in 2007 when nutria were abundant. However, after nutria eradication, intense muskrat activity was noted throughout the recovered marsh, providing further evidence that nutria can have profound impacts on plant and animal communities.

Impacts on T&E Species: Special measures are taken to avoid adverse impacts to T&E species. The list of federally-listed and state-listed species in Maryland and Delaware are provided in Appendices B, C, and D. The USFWS, in conjunction with WS, initiated a Section 7 Consultation for nutria damage management in January, 2012. Following a Formal Section 7 Consultation, the USFWS issued a Biological Opinion on March 8, 2013 (Appendix E). Since the Consultation included the proposed expansion of the Chesapeake Bay Nutria Project, the resulting Biological Opinion also applies to the currently implemented Alternative. The following is a summary of the Biological Opinion.

The USFWS concurred with No Effect determinations for piping plover (*Charadrius melodus*), roseate tern (*Sterna dougallii dougallii*), red knot (*Calidris canutus rufa*), bog turtle (*Clemmys muhlenbergii*), Canby's dropwort (*Oxypolis canbyi*), seabeach amaranth (*Amaranthus pumilus*), small whorled pogonia (*Isotria medeoloides*), and Hirst Brothers' panic grass (*Dichanthelium hirstii*). Additionally, the USFWS concurred with Not Likely to Adversely Affect determinations for dwarf wedge mussel (*Alasmidonta heterodon*), Puritan tiger beetle (*Cicindela puritan*), Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*), sensitive joint vetch (*Aeschynomene virginica*), and swamp pink (*Helonius bullata*).

Based on limited prior take, the USFWS made a determination of Likely to Adversely Affect the Delmarva fox squirrel (*Sciurus niger cinereus*). However, the Service noted that no Delmarva fox squirrels have been captured since additional avoidance measures were undertaken in 2003. Anticipated take of squirrels were further examined due to the possible expansion of the Chesapeake Bay Nutria Project.

Delmarva Fox Squirrel (DFS)

Residential development, sea level rise, timber harvest, hunting, predation, disease, pests and vehicle strikes constitute threats to the DFS (USFWS 2012). No critical habitat has been listed for the DFS; therefore, none will be affected. Potential impacts to DFS may result from capture in traps, snares, and use of dogs. Impacts that may occur include direct mortality of individual DFS, as well as harm and harassment. Since there is no resemblance between a DFS and a nutria, there is little chance that a DFS will be mistakenly shot by a trapper.

The Service anticipates that incidental take of DFS will likely occur through direct mortality and injury as a result of trapping. The actual extent of take (number of individual DFS taken) resulting from these harvest measures is difficult to quantify based on existing information. Since systematic trapping began in earnest in September 2002 (a period of approximately ten months), 294,515 trap-nights resulted in the

capture of two DFS. Since restrictions were placed on trapping in 2003, no DFS have been taken. However, the more intensive (less restrictive) trapping measures needed to eradicate nutria from its remaining refugia may again result in the incidental take of the DFS. Based on past experience, it is reasonable to anticipate that up to three (3) DFS per year may be taken by the Chesapeake Bay Nutria Project. Therefore, the Service has issued an incidental take permit with the following stipulations.

WS will implement the following measures to reduce potential take of Delmarva fox squirrels:

- When trapping within 50 meters of potential DFS habitat is deemed essential to meet project objectives, live traps will be used when temperatures are expected to remain above 40 degrees F. When live-trapped, DFS are less likely to succumb to the cold. [Note: DFS habitat is defined as mature forest habitat within their 3 mile range.]
- When temperatures are expected to be below 40 degrees F, triggers on lethal traps that are set within 50 meters of forest habitat will be adjusted to allow for through passage and survival of small mammals, including the DFS.
- Corn or other baits that would be attractive to the DFS will not be used in live or kill traps within 50 meters of forested habitat.
- Modify trap sets to reduce the potential for capture, injury, and death of DFS.
- Use handheld GPS navigation devices to determine when Chesapeake Bay Nutria Project staff are within the three mile DFS habitat range.
- Based on Chesapeake Bay Nutria Project staff experience, dogs trained for nutria detection are used on the Chesapeake Bay Nutria Project but are not viewed to be problems for the DFS.

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

The impacts to non-target species under this Alternative would be similar to Alternative 1 but the effects would also be seen in Delaware and, as with Alternative 1 all non-target animals but would be released if they are capable of surviving. Under the proposed program, some non-target species, primarily turtles, may be captured and released unharmed or killed. The overall impact to the muskrat and other non-target populations is anticipated to be beneficial because interspecific competition from nutria would be reduced and marsh habitats could be recovered. In addition, by restoring marsh habitats, fisheries, native wildlife and vegetation would benefit from the proposed action.

As with Alternative 1, damage reduction devices/techniques (traps, snares, baits, dogs, shooting) would be used in a manner to avoid capturing or harassing non-target species. Shooting is highly selective and does not pose a risk to T&E species or other non-target animals when conducted by professional field specialists trained in firearm use and trained to identify target and non-target species. The use of kill traps, snares and colony traps could capture and kill some muskrats. Dogs (trained retrievers) used to flush nutria do not pose a threat to T&E species or other non-target species because they are trained and under the close supervision of dog handlers.

Impacts on T&E Species: Impacts to T&E species would be similar to Alternative 1 to include project expansion into Delaware.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

Alternative 3 would not allow any WS or USFWS operational marsh restoration in Chesapeake Bay, therefore WS nor the USFWS would not take any non-target species under this alternative. The MDNR or DDNREC may have to allocate staff time and resources to protect marsh habitat because WS or the

USFWS could no longer assist with an operational program. Only technical assistance or self-help information would be provided. The impacts to non-target species under this Alternative could be greater or lesser depending on the implementation of technical assistance recommendations, skill of those using management methods and the numbers of persons using management methods. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of toxicants which could lead to unknown risks to non-target species populations. Hazards to wildlife could therefore be greater under this alternative if toxicants that are less selective or that cause secondary poisoning are used by frustrated entities. The overall impact to non-target species populations could also be greater because interspecific competition from nutria that are not removed as effectively or not at all because of lack of resources.

Impacts on T&E Species (Endangered Species Act Compliance) – WS would not have any direct impact on T&E species. Risks to T&E species from increased private efforts will vary depending upon the training and level of experience of the individual(s) conducting the nutria damage management. As stated above, frustrated individuals may resort to use of unsafe or illegal methods like poisons which may increase risks to listed species. Risks to T&E species may be lower with this Alternative than with Alternative 4 because WS could advise individuals as to the potential presence of State and federally listed species and could facilitate consultation with the appropriate agency, but risks would probably be higher under this Alternative than Alternatives 1 or 2.

Alternative 4 – Discontinue the Current Nutria Removal Project

Under this alternative, no non-target species would be removed by WS or USFWS personnel. Private fur trappers and hunters remove species other than nutria during the regulated furbearer harvest season, primarily muskrats. However, as nutria continue to proliferate in Maryland and Delaware, it is likely that muskrat populations will further decline and be replaced by nutria. Muskrats and other native wildlife occupy the same habitat type and are found in areas occupied by nutria.

Impacts on T&E Species (Endangered Species Act Compliance) - No impact would occur to T&E species from WS or USFWS personnel activities under this alternative. Under this alternative, the threat to T&E species would be from private trappers and hunters inadvertently capturing or killing a T&E species. The level to which T&E species may be affected by this alternative depends on the expertise and precautions to avoid T&E species that private trappers implement. A "No Action" alternative would continue the *status quo* where nutria would be trapped or hunted by private entities.

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

A common concern is the potential adverse effects methods available could have on human health and safety. The threats to human safety of methods available under the alternatives are evaluated below by each of the alternatives.

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

The current program is an IWDM program with the objective to restore marsh habitat by protecting marsh vegetation while safe guarding public and pet health and safety, and guided by agency policies, directives, cooperative agreements, MOUs and federal and state laws. Only appropriate chemical and non-chemical methods to minimize nutria damage problems are used and agency personnel are be aware of the risks to humans and pets. Agency use of pesticides is regulated by the EPA through the FIFRA, by state law and the MDA, and by agency directives and policies. Along with effectiveness, cost and social acceptability, risk is an important criterion for selection of an appropriate damage management strategy.

Determination of risks to non-target animals, humans and pets, and agency personnel is thus an important prerequisite for successful application of strategies. APHIS concludes that the methods described and analyzed in this EA have negligible impacts on the environment and public and pet health and safety when used according to directives, policies, laws, and label directions. The greatest risks to public health and safety from the current program's use of mechanical methods are incurred by the agency personnel who apply the methods. For these reasons, the risks posed to the public and domestic pets from the current program are negligible.

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

As in Alternative 1, the proposed program would use an IWDM approach to reduce nutria damage and protect marsh vegetation while safe guarding public and pet health and safety, and guided by agency policies, directives, cooperative agreements, MOUs and federal and state laws. Only appropriate non-chemical methods to minimize nutria damage problems would be used and agency personnel would be aware of the risks to humans and pets. Along with effectiveness, cost and social acceptability, risk is an important criterion for selection of an appropriate damage management strategy. APHIS concludes that the methods described and analyzed in this EA have negligible impacts on the environment and public and pet health and safety when used according to directives, policies, laws, and label directions. The greatest risks to public health and safety from the proposed use of mechanical and chemical methods are incurred by the agency personnel who apply the methods. For these reasons, the risks posed to the public and domestic pets from the proposed action are negligible.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

Under this alternative, WS or the USFWS would not engage in direct operational use of any mechanical damage management methods. Risks to human safety from WS or the USFWS' use of firearms, traps, snares and dogs would not exist because WS and the USFWS would not be conducting operational activities. However, WS or the USFWS would provide technical advice to those persons requesting assistance. Potential impacts would be variable depending upon the training and experience of the individuals conducting the damage management activity. Landowners/resource managers could use information provided by WS or the USFWS, or implement damage reduction methods without WS or USFWS technical assistance. Hazards to humans and property could be greater under this alternative if persons conducting management activities are poorly or improperly trained. Negative impacts to public safety resulting from the improper use of methods should be less than Alternative 4 when WS technical advice is followed.

Alternative 4 – Discontinue the Current Nutria Removal Project

Under this alternative, no WS or USFWS personnel would be conducting marsh restoration operations. Therefore, no risk to the public or pets could occur from the use of nutria damage reduction strategies by WS or USFWS personnel would occur. The MDNR and DDNREC would not have direct oversight of private trappers or hunters and the only regulations that private trappers or hunters would have to adhere to are MDNR and DDNREC policies and trapping regulations.

Issue 4 - Effects on the Socio-cultural Elements and Economics of the Human Environment

Another concern often raised is the potential impact the alternatives would have on the aesthetic value that people often regard for wildlife. The effects of the alternatives on this issue are analyzed below by alternative.

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

The natural resources of a healthy Chesapeake Bay are highly valued by the public and they make an important contribution to the economic well-being of Maryland and to the quality of life of Maryland residents. Maryland's marshes are used for multiple purposes including: fishing, hunting, trapping, bird watching, wildlife viewing/photography, berry and timber harvest, agriculture and livestock production. Chesapeake Bay is a significant socio-economic factor in Dorchester County, Maryland and the northeastern United States. Fur trapping is a major source of supplemental income to many residents, particularly farmers and watermen. The current program has had a positive effect on the muskrat population, and thus, a positive effect on the income of fur trappers.

Although nutria were introduced to support the fur industry, private fur trappers and hunters have not kept pace with the animal's ability to reproduce. Fur markets and the profits from nutria pelts have been subject to fluctuations due to a variety of factors and the outlook for this trend is to continue. Therefore, a systematic and well organized nutria damage reduction and marsh recovery program was needed to curtail vital marsh loss and recover habitats and ecosystems vital to native wildlife populations.

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

The analysis of the socio-economic of this Alternative would be similar to Alternative 1. The natural resources of a healthy Chesapeake Bay are highly valued by the public and they make an important contribution to the economic well-being of Maryland, Delaware and the northeastern United States, and to the quality of life of Maryland and Delaware residents. Chesapeake Bay marshes are used for multiple purposes including: fishing, hunting, trapping, bird watching, wildlife viewing/photography, berry and timber harvest, agriculture and livestock production.

Chesapeake Bay is a significant socio-economic factor in the northeastern United States. The proposed action would have positive effects on native wildlife and plant population, and thus, a positive effect on native ecosystems and potentially tourism. Therefore, a systematic and well organized nutria damage reduction and marsh recovery program is needed to curtail vital marsh loss and recover habitats and ecosystems vital to native wildlife populations and potentially local economies.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

The analysis of the socio-economic benefits of this Alternative would be lower than Alternatives 1 or 2. The natural resources of a healthy Chesapeake Bay are highly valued by the public and they make an important contribution to the economic well-being of Maryland, Delaware and the northeastern United States, and to the quality of life of Maryland and Delaware residents. Chesapeake Bay marshes are used for multiple purposes including: fishing, hunting, trapping, bird watching, wildlife viewing/photography, berry and timber harvest, agriculture and livestock production.

Chesapeake Bay is a significant socio-economic factor in the northeastern United States. The technical assistance only Alternative is anticipated to have lower positive effects on native wildlife and plant populations, and thus, a continued degradation on native ecosystems and few socio-economic benefits to local economies.

Alternative 4 – Discontinue the Current Nutria Removal Project

The natural resources of Chesapeake Bay are highly valued by the public and they make a significant contribution to the economic well-being of Maryland and Delaware, and to the quality of life of Maryland and Delaware residents. However, under the no marsh restoration alternative, nutria would continue to damage marsh vegetation, contributing to the marsh loss and its associated socio-economic implications.

Alternative 4 would also not allow coordination with other resource managers to meet the needs of the area and develop a nutria damage reduction or marsh recovery program. Other resource needs would not be considered during private trappers or hunters activities.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

As discussed previously, a common issue often raised is concerns about the humaneness of methods available under the alternatives for resolving nutria damage to marshland habitat. The issues of method humaneness relating to the alternatives are discussed below.

Alternative 1 – Continue the Current Nutria Removal Project (No Action Alternative)

Under the proposed action, WS would integrate methods using WS' Decision Model as part of technical assistance and direct operational assistance. Methods available under the proposed action could include non-lethal and lethal methods integrated into direct operational assistance conducted by WS. Under this alternative, non-lethal methods would be used by WS which are generally regarded as humane. Non-lethal methods would include resource management methods (***e.g.***, crop selection, limited habitat modification, modification of human behavior), exclusion devices, frightening devices, cage traps, foothold traps, nets, and repellents.

As discussed previously, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal. People may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering.

Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane because the resulting fate is the death of the animal. Others believe that certain lethal methods can lead to a humane death. Others believe most non-lethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. With the multitude of attitudes on the meaning of humaneness and the varying perspectives on the most effective way to address damage and threats in a humane manner, agencies are challenged with conducting activities and employing methods that are perceived to be humane while assisting those persons requesting assistance to manage damage and threats associated with wildlife. The goal of WS is to use methods as humanely as possible to effectively resolve requests for assistance to reduce damage and threats to human safety. WS would continue to evaluate methods and activities to minimize the pain and suffering of methods addressed when attempting to resolve requests for assistance.

Some methods have been stereotyped as "*humane*" or "*inhumane*". However, many "*humane*" methods can be inhumane if not used appropriately. For instance, a cage trap is generally considered by most members of the public as "*humane*". Yet, without proper care, live-captured wildlife in a cage trap can be treated inhumanely if not attended to appropriately.

Therefore, the goal is to effectively address requests for assistance using methods in the most humane way possible that minimizes the stress and pain to the animal. Overall, the use of resource management methods, harassment methods, and exclusion devices are regarded as humane when used appropriately. Although some concern arises from the use of live-capture methods, the stress of animals is likely temporary.

Although some issues of humaneness could occur from the use of cage traps, foothold traps, nets, and repellents, those methods, when used appropriately and by trained personnel, would not result in the inhumane treatment of wildlife. Concerns from the use of those non-lethal methods are from injuries to animals while restrained and from the stress of the animal while being restrained or during the application of the method. Pain and physical restraint can cause stress in animals and the inability of animals to effectively deal with those stressors can lead to distress. Suffering occurs when action is not taken to alleviate conditions that cause pain or distress in animals.

If nutria are to be live-captured, methods would be checked frequently to ensure nutria captured are addressed timely and to prevent injury. Although stress could occur from being restrained, timely attention to live-captured wildlife would alleviate suffering. Stress would likely be temporary.

Under the proposed action, lethal methods could also be employed to reduce damage to marshland habitat caused by nutria. Lethal methods would include live-capture followed by euthanasia, rotating-jawed traps, submersion sets using foothold traps, cable restraints, and shooting. WS' use of euthanasia methods under the proposed action would follow those required by WS' directives (WS Directive 2.430) and recommended by the AVMA for use on free-ranging wildlife under field conditions (AVMA 2013).

An issue when dealing with nutria is the use of foothold traps to create drowning sets and the humaneness of drowning. There is considerable debate and disagreement among animal interest groups, veterinarians, wildlife professionals, fur trappers, and nuisance wildlife control specialists on this issue. The debate centers on an uncertainty as to whether the drowning animals are rendered unconscious by high levels of CO_2 and are thus insensitive to distress and pain (Ludders et al. 1999).

The AVMA identifies drowning as an unacceptable method of euthanasia (Beaver et al. 2001, AVMA 2013), but provides no literature citations to support this position. Ludders et al. (1999) concluded drowning is not euthanasia based on the animals not dying from CO_2 narcosis, and reported CO_2 narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Ludders et al. (1999) showed death during drowning is from hypoxia and anoxia; thus, animals experience hypoxemia. Ludders et al. (1999) concluded that animals that drown are distressed because of stress related hormones, epinephrine and norepinephrine, and therefore drowning is not euthanasia.

Carbon dioxide (CO_2) causes death in animals by hypoxemia and some animals (cats, rabbits, and swine) are distressed before death (Beaver et al. 2001). Even though those animals are distressed, the AVMA (Beaver et al. 2001) states this death is an acceptable form of euthanasia. Thus, the AVMA does not preclude distress or pain in euthanasia. In fact, the AVMA supports inducing hypoxemia-related distress when necessary to reduce total distress, because reducing total distress is a more humane death.

Death by drowning in the classical sense is caused by the inhalation of fluid into the lungs and is referred to as "wet" drowning (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that all submerged beaver do not die from wet drowning, but die of CO_2-induced narcosis, and the AVMA has stated the use of CO_2 is acceptable (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that after beaver were trapped and entered the water, they struggled for two to five minutes, followed by a period of reflexive responses. Andrews et al. (1993) stated that with some techniques that

induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1982) stated it is unknown how much conscious control actually existed at this stage and they stated anoxia may have removed much of the sensory perception by five to seven minutes post submersion.

However, Gilbert and Gofton (1982) have been criticized because levels of CO_2 in the blood were not reported (Ludders et al. 1999) and there was insufficient evidence that the beaver in their study were under a state of CO_2 narcosis when they died (letter from V. Nettles, D.V.M., Ph.D., Southeastern Cooperative Wildlife Disease Study, to W. MacCallum, MDFW, June 15, 1998). Adding to the controversy, Clausen and Ersland (1970) did measure CO_2 in the blood for submersed restrained beaver, yet none of the beaver in their study died, so Clausen and Ersland (1970) could not determine if beaver died of CO_2 narcosis. Clausen and Ersland (1970) demonstrated that CO_2 increased in arterial blood while beaver were submersed and CO_2 was retained in the tissues. While Clausen and Ersland (1970) did measure the amounts of CO_2 in the blood of submersed beaver, they did not attempt to measure the analgesic effect of CO_2 buildup to the beaver (letter from V. Nettles, D.V.M., Ph.D., Southeastern Cooperative Wildlife Disease Study, to W. MacCallum, MDFW, June 15, 1998). When beaver are trapped using foothold traps with intent to "*drown*", the beaver are exhibiting a flight response. Gracely and Sternberg (1999) reported that there is stress-induced analgesia resulting in reduced pain sensitivity during fight or flight responses. Environmental stressors that animals experience during flight or fight activate the same stress-induced analgesia (Gracely and Sternberg 1999).

The use of drowning trap sets has been a traditional wildlife management technique in trapping aquatic mammals, such as beaver and muskrat. Trapper education manuals and other wildlife damage management manuals written by wildlife biologists recommend drowning sets for foothold traps set for beaver (Howard et al. 1980, Randolph 1988, Bromley et al. 1994, Dolbeer et al. 1994, Miller and Yarrow 1994). In some situations, drowning trap sets are the most appropriate and efficient method available to capture beaver and muskrat. For example, a drowning set attachment should be used with foothold traps when capturing beaver to prevent the animals from injuring themselves while restrained, or from escaping (Miller and Yarrow 1994). Animals that drown die relatively quickly (*e.g.*, within minutes) versus the possible stress of being restrained and harassed by people, dogs, and other wildlife before being euthanized. Drowning sets make the captured animal and trap less visible and prevents injury from the trapped animal (*i.e.*, bites and scratches) to people who may otherwise approach a restrained animal. Furthermore, the sight of dead animals may offend some people. Drowning places the dead animal out of public view. Some sites may be unsuitable for rotating-jawed traps or snares because of unstable banks, deep water, or a marsh with a soft bottom, but those sites would be suitable for foothold traps.

Given the short time period of a drowning event, the possible analgesic effect of CO_2 buildup, the minimal if any pain or distress on drowning animals, the AVMA acceptance of hypoxemia as euthanasia, the AVMA acceptance of a minimum of pain and distress during euthanasia, and the acceptance of catching and drowning muskrats approved by International Humane Trapping Standards (Fur Institute of Canada 2000), we conclude that drowning, though rarely used by WS, is acceptable. We recognize some people would disagree.

Research and development by WS has improved the selectivity and humaneness of management techniques. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations where non-lethal damage management methods are not practical or effective. Personnel from WS are experienced and professional in their use of management methods. Consequently, management methods are implemented in the most humane manner possible under the constraints of current technology. Most of those methods discussed in this EA to alleviate nutria damage

in the Chesapeake Bay could be used under any of the alternatives by those persons experiencing damage regardless of direct involvement by the USFWS or WS. Therefore, the issue of humanness associated with methods would be similar across any of the alternatives since those methods could be employed. Those persons who view a particular method as humane or inhumane would likely continue to view those methods as humane or inhumane under any of the alternatives. SOPs that would be incorporated into activities to ensure methods are used by WS as humanely as possible are listed below in Chapter 3.

Alternative 2 - Expand the Current Nutria Removal Project to Restore Marsh Habitat (Proposed Alternative)

The issues of humaneness of methods under this alternative are likely to be perceived to be similar to humaneness issues discussed under the Alternative 1, since those methods available for use under Alternative 1 would also be available under this alternative.

Alternative 3 – Provide Only Technical Assistance on Nutria Removal

The issues of humaneness of methods under this alternative are likely to be perceived to be similar to humaneness issues discussed under the proposed action. This perceived similarity is derived from WS' recommendation of methods that some people may consider inhumane. WS would not directly be involved with damage management activities under this alternative. However, the recommendation of the use of methods would likely result in the requester employing those methods. Therefore, by recommending methods and thus a requester employing those methods, the issue of humaneness would be similar to the proposed action.

WS would instruct and demonstrate the proper use and placement of methodologies to increase effectiveness in capturing nutria and to ensure methods are used in such a way as to minimize pain and suffering. However, the efficacy of methods employed by a cooperator would be based on the skill and knowledge of the requestor in resolving the threat to safety or damage situation despite WS' demonstration. Therefore, a lack of understanding of the behavior of nutria or improperly identifying the damage caused by nutria along with inadequate knowledge and skill in using methodologies to resolve the damage or threat could lead to incidents with a greater probability of being perceived as inhumane. In those situations, the pain and suffering are likely to be regarded as greater than those discussed in the proposed action.

Alternative 4 – Discontinue the Current Nutria Removal Project

Under this alternative, current efforts to remove nutria from the core area of Maryland would be discontinued. The USFWS and WS would no longer be involved with removing nutria to alleviate marsh damage in the Chesapeake Bay area. Those persons experiencing damage associated with nutria could continue to use those methods legally available. Those methods would likely be considered inhumane by those persons who would consider methods proposed under any alternative as inhumane. The issue of humaneness would likely be directly linked to the methods legally available to the general public since methods are often labeled as inhumane by segments of society no matter the entity employing those methods.

The humaneness of methods would be based on the skill and knowledge of the person employing those methods. A lack of understanding of the target species or methods used could lead to an increase in situations perceived as being inhumane to wildlife despite the method used. Despite the lack of involvement by the USFWS and WS under this alternative, those methods perceived as inhumane by certain individuals and groups would still be available to the general public to use to resolve damage

caused by nutria.

4.2 CUMULATIVE IMPACTS OF THE PROPOSED ACTION BY ISSUE

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternative 1 and Alternative 2, the USFWS and WS would address damage associated with nutria either within the geographical scope of the current project (Alternative 1) or by expanding the current project to include the entire Chesapeake Bay area (Alternative 2). WS would be the primary federal agency conducting direct operational nutria damage management in the Chesapeake Bay area under Alternative 1 and Alternative 2. However, other federal, state, and private entities could also be conducting nutria damage management in the Bay area.

WS does not normally conduct direct damage management activities concurrently with such agencies or other entities in the same area, but may conduct nutria damage management activities at adjacent sites within the same time frame. In addition, commercial companies may conduct nutria damage management activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of damage management program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and private entities. Through ongoing coordination and collaboration between the Nutria Management Team, activities of each agency and other entities are discussed and coordinated. Nutria damage management activities in the Bay area would be monitored to evaluate and analyze activities to ensure they are within the scope of analysis of this EA.

The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur as a result of any of the proposed alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders including the Clean Air Act and Executive Order 13514.

Issue 1 - Effectiveness of Damage Management Methods

As discussed in Chapter 2, the effectiveness of any damage management program could be defined in terms of losses or risks potentially reduced or prevented which is based on how accurately practitioner's diagnosis the problem, the species responsible for the damage, and how actions are implemented to correct or mitigate risks or damages. The most effective approach to resolving any damage problem is to use an adaptive integrated approach which may call for the use of several management methods simultaneously or sequentially (Courchamp et al. 2003).

Effectiveness is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of the personnel using the method and, for WS' personnel, the guidance provided by WS' Directives and policies. Correlated with the effectiveness of methods at reducing or alleviating damage or threats is the costs associated with applying methods to reduce damage or threats. If methods are ineffective at reducing or alleviating damage or if methods require re-application after initially being successful, the costs associated with applying those methods increases. An analysis of cost-effectiveness in many wildlife damage management situations is difficult or impossible to determine because the value of benefits may not be readily calculable and personal perspectives differ about damage.

As part of an integrated approach to managing nutria damage, the USFWS and WS has the ability to adapt methods to damage situations to effectively reduce or prevent damage from occurring. Under the proposed integrated approach, all methods, individually or in combination, could be employed as deemed appropriate through WS' Decision Model to address requests for assistance. WS' objective when receiving a request for assistance under the proposed action is to reduce damage and threats to human safety or to prevent damage from occurring using an integrated approach to managing nutria damage. Therefore, under the proposed action, the USFWS and WS would employ methods adaptively to achieve that objective.

CEQ does not require a formal, monetized cost-benefit analysis to comply with the NEPA (40 CFR 1508.14) and consideration of this issue is not essential to making a reasoned choice among the alternatives being considered.

As stated in this EA, WS only provides assistance after a MOU, cooperative service agreement, or other comparable document has been signed by WS and the requesting entity in which all methods used to address nutria causing damage are agreed upon. Methods employed to manage nutria damage, whether non-lethal or lethal, are often temporary with the duration dependent on many factors discussed in the EA. WS employs only those methods as agreed upon by the requestor after available methods are discussed.

The objective of the USFWS and WS is to respond to areas where nutria are found with the most effective methods and to provide for the long-term solution to the problem using WS' Decision Model to adapt methods in an integrated approach to managing waterfowl damage that is agreed upon by the cooperator.

Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species

Potential effects on non-target species from conducting nutria damage management arise from the use of non-lethal and lethal methods to alleviate or prevent those damages. The use of non-lethal methods during activities to reduce or prevent damage caused by nutria has the potential to exclude, disperse, or capture non-target wildlife. However, the effects of non-lethal methods are often temporary and often do not involve the take (killing) of non-target wildlife species.

The use of lethal methods or those methods used to live-capture target species followed by euthanasia also have the potential to impact non-target wildlife through the take (killing) or capture of non-target species. Capture methods used are often methods that are set to confine or restrain target wildlife after being triggered by a target individual. Capture methods are employed in such a manner as to minimize the threat to non-target species by placement in those areas frequently used by target wildlife, using baits or lures that are as species specific as possible, and modification of individual methods to exclude non-targets from capture. Most methods described in Chapter 3 are methods that are employed to confine or restrain wildlife that are subsequently euthanized using humane methods. With all live-capture devices, non-target wildlife captured could be released on site if determined to be able to survive following release. SOPs are intended to ensure take of non-target wildlife is minimal during the use of methods to capture target wildlife.

The use of firearms and euthanasia methods are essentially selective for target species since identification of an individual is made prior to the application of the method. Euthanasia methods are applied through direct application to target wildlife. Therefore, the use of those methods would not impact non-target species.

The methods described in the alternatives all have a high level of selectivity and can be employed using

SOPs to ensure minimal impacts to non-target species. A total of 1,608 non-target wildlife were lethally taken by WS during all nutria damage management activities from FY 2007 through FY 2011, while 1010 animals were live-captured and released unharmed. The cumulative take of those species were evaluated in Chapter 4 of this EA. Based on the methods available to resolve nutria damage, WS does not anticipate the number of non-targets taken to reach a magnitude where declines in those species' populations would occur. Therefore, take under the proposed action of non-targets would not cumulatively impact non-target species. The USFWS and WS have reviewed the T&E species listed and has determined that nutria damage management activities proposed by WS would not likely adversely affect T&E species, except as noted for the DFS. However, the issuance of an incidental take permit and ongoing communication with the USFWS would ensure that cumulative impacts remain neglible. Cumulative impacts would be minimal on non-targets from any of the alternatives discussed**.**

Issue 3 - Effects of Damage Management Methods on Human Health and Safety

All non-chemical methods described under the Alternatives are used within a limited time frame, are not residual, and do not possess properties capable of inducing cumulative adverse impacts on human health and safety. All non-chemical methods are used after careful consideration of the safety of those persons employing methods and to the public. All capture methods are employed where human activity is minimal to ensure the safety of the public. Capture methods also require direct contact to trigger ensuring that those methods, when left undisturbed would have no effect on human safety. All methods are agreed upon by the requesting entities which are made aware of the safety issues of those methods when entering into a MOU, cooperative service agreement, or other comparable document between WS and the cooperating entity. SOPs also ensure the safety of the public from those methods used to capture or take wildlife. Firearms used to alleviate or prevent damage, though hazards do exist, are employed to ensure the safety of employees and the public.

Personnel employing non-chemical methods would continue to be trained to be proficient in the use of those methods to ensure safety of the applicator and to the public. Based on the use patterns of non-chemical methods, those methods would not cumulatively impact human safety.

The USFWS and WS has received no reports or documented any adverse effects to human safety from nutria damage management activities conducted from FY 2002 through FY 2011. No cumulative adverse effects from the use of those methods discussed in Chapter 4 are expected.

Issue 4 - Effects on the Socio-cultural Elements and Economics of the Human Environment

The activities of the USFWS and WS would result in the removal of nutria from those areas where damages were occurring. Therefore, the aesthetic value of nutria in those areas where damage management activities were being conducted would be reduced. However, for some people, the aesthetic value of a more natural environment would be gained by reducing nutria densities, including the return of native species that may be suppressed or dispersed by nutria.

Some people experience a decrease in aesthetic enjoyment of wildlife because they feel that overabundant species are objectionable and interfere with their enjoyment of wildlife in general. Continued increases in numbers of individuals or the continued presence of nutria may lead to further degradation of some people's enjoyment of any wildlife or the natural environment. The actions of the USFWS and WS could positively affect the aesthetic enjoyment of wildlife for those people that are being adversely affected by the target species identified in this EA.

Issue 5 - Humaneness and Animal Welfare Concerns of Methods

WS continues to seek new methods and ways to improve current technology to improve the humaneness of methods used to manage damage caused by wildlife. Cooperation with individuals and organizations involved in animal welfare continues to be an agency priority for the purpose of evaluating strategies and defining research aimed at developing humane methods.

All methods not requiring direct supervision during employment (*e.g.*, live traps) would be checked and monitored to ensure any wildlife confined or restrained are addressed in a timely manner to minimize distress of the animal. All euthanasia methods used for live-captured nutria would be applied according to AVMA guidelines for free-ranging wildlife. Shooting would occur in limited situations and personnel would be trained in the proper use of firearms to minimize pain and suffering of nutria taken by this method.

The USFWS and WS would employ methods as humanely as possible by applying measures to minimize pain and that allow wildlife captured to be addressed in a timely manner to minimize distress. Through the establishment of SOPs that guide the USFWS and WS in the use of methods to address nutria damage, the cumulative impacts on the issue of method humaneness are minimal. All methods would be evaluated continually to ensure SOPs are adequate to ensure those methods continue to be used to minimize suffering and that wildlife captured are addressed in a timely manner to minimize distress.

4.3 ADDITIONAL ANALYSES OF POTENTIAL CUMULATIVE IMPACTS

Irreversible and Irretrievable Commitments of Resources

Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on Sites or Resources Protected under the National Historic Preservation Act

Actions of the USFWS and WS are not undertakings that could adversely affect historic resources.

4.4 SUMMARY OF THE CUMULATIVE IMPACTS ANALYSIS

No significant cumulative environmental impacts are expected from any of the four alternatives, including the proposed action. Under the proposed action, nutria would be located and removed by integrating methods and techniques by WS and the cooperating agencies. No risk to public safety is expected when activities are provided and accepted by requesting individuals in the technical assistance only alternative, under the current program alternative, and the proposed action alternative since only trained and experienced personnel would conduct and recommend damage management activities. There is a slight increased risk to public safety when persons who reject assistance and recommendations in Alternative 3 and Alternative 4 and conduct their own activities. In all Alternatives, however, it would not be to the point that the impacts would be significant. Although some persons would likely be opposed to the removal of nutria, the analysis in this EA indicates that an integrated approach would not result in significant cumulative adverse impacts on the quality of the human environment.

Table 4-2 presents the major conclusions drawn from the analysis. All of the alternatives would result in no significant adverse impacts on the quality of the human environment.

The effectiveness of the alternatives, given no significant impact in any of the other evaluation criteria, is

probably the most important evaluation criterion (issue) in this assessment because of the need to restore marsh habitat by reducing nutria damage and recover damaged marshes. The effectiveness of any of the alternatives would determine the likelihood that the alternative would help to achieve the objectives of the proposal to prevent further decline of marsh habitat, while other measures are ongoing to reduce the invasive, non-native nutria populations.

Table 4-2. Summary of Impacts

Issue	Alt 1. No Action Current Program	Alt 2. Proposed Action Expanded Program	Alt 3. Technical Assistance Only	Alt. 4. No Program
Effectiveness	Likely to reduce nutria damage and protect marsh habitat in Maryland only	Most likely to reduce nutria damage and protect marsh habitat in Maryland and Delaware	Low to moderate. This alternative would only allow WS and the USFWS to provide technical assistance to those wanting to control nutria.	Lowest
Non-target Species	Low risks	Low risks	None from agency personnel	None from agency personnel
T&E Species	No adverse effect	No adverse effects	No adverse effects from agency personnel	No adverse effects from agency personnel
Humaneness	Some people opposed to capture and killing of any wildlife. Methods to minimize pain and suffering would be used.	Some people opposed to capture and killing of any wildlife. Methods to minimize pain and suffering would be used.	Some people opposed to capture and killing of any wildlife. May be more or less humane depending on the methods used and expertise of those applying the method(s).	Could be considered more humane for nutria because of no WS or USFWS actions; only sport action. No program to protect native marsh habitats
Public and Pet Safety	Low risk	Low risks	Low-moderate	Low moderate
Socio-economic	Positive benefit to socio-economic considerations in Maryland	Highest positive socio-economic benefits to residents of Maryland and Delaware and potentially the Chesapeake Bay Area	Potential positive benefits, however dependent on the methods used, skill of those applying the method and the persistence of those applying the method(s).	Lowest positive benefit
Cumulative Impacts	Low	Low	Low	None from agency personnel

CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

5.1 LIST OF PREPARERS

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APPENDIX A
LITERATURE CITED

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APPENDIX B
FEDERAL THREATENED AND ENDANGERED LIST

Summary of Animals listings

Status	Species
E	Amphipod, Hay's Spring Entire (*Stygobromus hayi*)
E	Bat, Indiana Entire (*Myotis sodalis*)
E	Darter, Maryland Entire (*Etheostoma sellare*)
T	Sea turtle, green except where endangered (*Chelonia mydas*)
E	Sea turtle, hawksbill Entire (*Eretmochelys imbricata*)
E	Sea turtle, Kemp's ridley Entire (*Lepidochelys kempii*)
E	Sea turtle, leatherback Entire (*Dermochelys coriacea*)
E	Squirrel, Delmarva Peninsula fox Entire, except Sussex Co., DE (*Sciurus niger cinereus*)
E	Sturgeon, shortnose Entire (*Acipenser brevirostrum*)
T	Tiger beetle, Northeastern beach Entire (*Cicindela dorsalis dorsalis*)
T	Tiger beetle, Puritan Entire (*Cicindela puritana*)
T	Turtle, bog (=Muhlenberg) northern (*Clemmys muhlenbergii*)
E	Wedgemussel, dwarf Entire (*Alasmidonta heterodon*)
E	Whale, finback Entire (*Balaenoptera physalus*)
E	Whale, humpback Entire (*Megaptera novaeangliae*)
E	Whale, North Atlantic Right Entire (*Eubalaena glacialis*)

Summary of Plant listings

Status	Species
E	Bulrush, Northeastern (*Scirpus ancistrochaetus*)
E	Dropwort, Canby's (*Oxypolis canbyi*)
E	Gerardia, sandplain (*Agalinis acuta*)
E	Harperella (*Ptilimnium nodosum*)
T	Joint-vetch, Sensitive (*Aeschynomene virginica*)
T	Pink, swamp (*Helonias bullata*)
T	Amaranth, seabeach (*Amaranthus pumilus*)
T	Beaked-rush, Knieskern's (*Rhynchospora knieskernii*)
T	Pogonia, small whorled (*Isotria medeoloides*)

APPENDIX C
MARYLAND THREATENED AND ENDANGERED LIST

Common Name	Scientific Name	Status
Fishes:		
Shortnose sturgeon	*Acipenser brevirostrum*	E
Maryland darter	*Etheostoma sellare*	E
Reptiles:		
Green turtle	*Chelonia mydas*	T
Hawksbill turtle	*Eretmochelys imbricata*	E
Leatherback turtle	*Dermochelys coriacea*	E
Loggerhead turtle	*Caretta caretta*	T
Atlantic ridley turtle	*Lepidochelys kempi*	E
Bog turtle	*Clemmys muhlenbergii*	T
Birds:		
Bald eagle	*Haliaeetus leucocephalus*	T
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Mammals:		
Indiana bat	*Myotis sodalis*	E
Delmarva fox squirrel	*Sciurus niger cinereus*	E
Blue whale	*Balaenoptera musculus*	E
Finback whale	*Balaenoptera physalus*	E
Humpback whale	*Megaptera novaeangliae*	E
Right whale	*Eubalaena spp.*	E
Sei whale	*Balaenoptera borealis*	E
Sperm whale	*Physeter catodon*	E
Mollusks:		
Dwarf wedge mussel	*Alasmidonta heterodon*	E
Arthropods:		
Hay's spring amphipod	*Stygobromus hayi*	E
American burying beetle	*Nicrophorus americanus*	E
Puritan tiger beetle	*Cicindela puritana*	T
Northeastern beach tiger beetle	*Cicindela dorsalis dorsalis*	T
Plants:		
Northeastern bulrush	*Scirpus ancistrochaetus*	E
American chaffseed	*Schwalbea americana*	E
Smooth coneflower	*Echinacea laevigata*	E
Canby's dropwort	*Oxypolis canbyi*	E
Sandplain gerdardia	*Agalinis acuta*	E
Harperella	*Ptilimnium nodosum*	E
Sensitive joint-vetch	*Aeschynomene virginica*	T
Seabeach pigweed	*Amaranthus pumilus*	T

Swamp pink	*Helonius bullata*	T
Small-whorled pogonia	*Isotria medeoloides*	T

T = Threatened
E = Endangered

APPENDIX D
DELAWARE THREATENED AND ENDANGERED LIST

Birds

- Pied-billed Grebe (*Podilymbus podiceps*)
- Northern Harrier (*Circus cyaneus*)
- Broad-winged Hawk (*Buteo platypterus*)
- Black-Crowned Night-Heron (*Nycticorax nycticorax*)
- Yellow-Crowned Night-Heron (*Nyctanassa violacea*)
- American Kestrel (*Falco sparverius*)
- Red Knot (*Calidris canutus*)
- Piping Plover (*Charadrius melodus*)
- Short-eared Owl (*Asio flammeus*)
- American Oystercatcher (*Haematopus palliatus*)
- Black Rail (*Laterallus jamaicensis*)
- Upland Sandpiper (*Bartramia longicauda*)
- Black Skimmer (*Rynchops niger*)
- Henslow's Sparrow (*Ammodramus henslowii*)
- Common Tern (*Sterna hirundo*)
- Forster's Tern (*Sterna forsteri*)
- Least Tern (*Sterna antillarum*)
- Cerulean Warbler (*Setophaga cerulea*)
- Hooded Warbler (*Setophaga citrina*)
- Swainson's Warbler (*Limnothlypis swainsonii*)
- Sedge Wren (*Cistothorus platensis*)

Reptiles

- Leatherback Turtle (*Dermochelys coriacea*)
- Kemp's Ridley Turtle (*Lepidochelys kempii)*
- Green Turtle (*Chelonia mydas*)
- Loggerhead Turtle (*Caretta caretta*)
- Bog Turtle (*Clemmys muhlenbergii*)
- Corn Snake (*Elaphe guttata guttata*)
- Eastern Scarlet Snake (*Cemophora coccinea*)
- Redbelly Watersnake (*Nerodia erythrogaster)*

Amphibians

- Eastern Mud Salamander (*Pseudotriton montanus montanus)*
- Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*)
- Barking Treefrog (*Hyla gratiosa*)

Mammals

- Little Brown Bat (*Myotis lucifugus*)
- Northern Long-eared Bat (*Myotis septentrionalis*)

- Delmarva Fox Squirrel (*Sciurus niger cinereus*)
- Blue Whale (*Balaenoptera musculus*)
- Fin Whale (*Balaenoptera physalus*)
- Humpback Whale (*Megaptera novaengliae*)
- North Atlantic Right Whale (*Eubalaena glacialis*)
- Sei Whale (*Balaenoptera borealis*)
- Sperm Whale (*Physeter macrocephalus*)

Fish

- Glassy Darter(*Etheostoma vitreum*)
- Blueridge Sculpin (*Cottus caeruleomentum*)
- Bridled Shiner (*Notropis bifrenatus*)
- Ironcolor Shiner (*Notropis chalybaeus*)
- Atlantic Sturgeon (*Acipenser oxyrhynchus*)
- Shortnose Sturgeon (*Acipenser brevirostrum*)
- Blackbanded Sunfish (*Enneacanthus chaetodon*)

Mollusks

- Yellow Lampmussel *(Lampsilis cariosa*)
- Eastern Lampmussel (*Lampsilis radiata*)
- Dwarf Wedgemussel (*Alasmidonta heterodon*)
- Eastern Pondmussel (*Ligumia nasuta*)
- Brook Floater (*Alasmidonta varicosa*)
- Triangle Floater (*Alasmidonta undulata*)
- Tidewater Mucket (*Leptodea ochracea*)

Insects

- Little White Tiger Beetle (*Cicindela lepida*)
- White Tiger Beetle (*Cicindela dorsalis*)
- Seth Forest Scavenger Beetle (*Hydrochus ~~sp.~~spangleri*)
- Burgundy Bluet (*Enallagma dubium*)
- Pale Bluet (*Enallagma pallidum*)
- Baltimore Checkerspot (*Euphydryas phaeton*)
- Banner Clubtail (*Gomphus apomyius*)
- Laura's Clubtail (*Stylurus laurae*)
- Midland Clubtail (*Gomphus fraternus*)
- Sable Clubtail (*Gomphus rogersi*)
- Black-tipped Darner (*Aeshna tuberculifera*)
- Taper-tailed Darner (*Gomphaeschna antelope*)
- Black Dash (*Euphyes conspicua*)
- Frosted Elfin (*Incisalia irus*)
- Treetop Emerald (*Somatochlora provocans*)
- Bethany Beach Firefly (*Photuris bethaniensis*)
- Hessel's Hairstreak (*Mitoura hesseli*)
- King's Hairstreak (*Satyrium kingi*)
- Aralia Shoot Borer Moth (*Papaipema araliae*)

- Dark Stoneroot Borer Moth (*Papaipema duplicatus*)
- Maritime Sunflower Borer Moth (*Papaipema maritima*)
- Pitcher Plant Borer Moth (*Papaipema appassionata*)
- Yellow Stoneroot Borer Moth (*Papaipema astuta*)
- Elfin Skimmer (*Nannothemis bella*)
- Rare Skipper (*Problema bulenta*)
- Brown Spiketail (*Cordulegaster bilineata*)
- Sely's Sundragon (*Helocordulia selysii*)
- Marbled Underwing (*Catocala marmorata*)
- Ulalume Underwing (*Catocala ulalume*)
- Mulberry Wing (*Poanes massasoit massasoit*)
- Chermock's Mulberry Wing (*Poanes massasoit chermocki*)

APPENDIX E
USFWS BIOLOGICAL OPINION

MEMORANDUM

DATE: March 8, 2013

FROM: Julie Slacum, Chief, Division of Strategic Resource Conservation, CBFO

TO: Dan Murphy, Chief, Division of Habitat Conservation, CBFO

RE: Formal Intra-Service Section 7 Consultation; Expansion of the Chesapeake Bay Nutria Project's nutria eradication activities throughout the entire Delmarva Peninsula and Calvert and Saint Mary's Counties on the western shore of Maryland

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) on the effects of the expanded Chesapeake Bay Nutria *(Myocastor coypus)* Project's nutria eradication activities on the endangered Delmarva fox squirrel (*Sciurus niger cinereus*, DFS). The geographic scope of the project (previously limited to a portion of the Delmarva Peninsula) has been expanded to include all of the Delmarva Peninsula in Maryland, Delaware, and Virginia and Calvert and Saint Mary's Counties on the western shore of the Chesapeake Bay in Maryland. This Intra-Service consultation was facilitated by an updated Biological Evaluation provided by the Service's Chesapeake Bay Field Office (CBFO) Division of Habitat Conservation on December 6, 2012. In addition to the effects on DFS, that document evaluates project effects on the other listed species in the affected geographic area; a summary of these effects is provided below. This BO is written in accordance with Section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 *et seq.).* A complete administrative record of this consultation is on file at the CBFO. The CBFO is the lead Service office on the Nutria Management Team, responsible for managing the Chesapeake Bay Nutria Project. Other Federal participants in the eradication program covered by this consultation are the Chesapeake Marshlands National Wildlife Refuge Complex (CMNWRC) and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service Wildlife Services (APHISWS).

I. CONSULTATION HISTORY

The consultation history is provided in Appendix A.

II. BIOLOGICAL OPINION

HISTORY AND DESCRIPTION OF ACTIONS

Project History

The Service previously reviewed two Intra-Service Section 7 Evaluation Requests submitted on March 29, 2001 for this project. One request, submitted by CMNWRC was for nutria control actions on Federal lands; the other request from the CBFO was for authorization of nutria control activities on non-Federal lands. The analysis area for the purposes of the initial Section 7 consultation was Dorchester County, Maryland. The Service concurred on a "no effect" determination for DFS (*Sciurus niger cinereus*, DFS), and "not likely to adversely affect" determinations for bald eagle, piping plover (*Charadrius melodus*), northeastern beach tiger beetle (*Cincidela dorsalis dorsalis*), Puritan tiger beetle (*Cicindela puritana*), dwarf wedge mussel (*Alasmidonta heterodon*), and swamp pink (*Helonias bullata*).

Despite these determinations, incidental captures of two Federally-listed species, DFS and bald eagle, occurred in 2002 and 2005 (bald eagle only in 2005). Section 7 Consultation was reinitiated both times resulting in a September 24, 2003 BO and a June 2, 2005 Amendment to the BO. As a result, measures were put in place to minimize the take of both species and incidental take limits were increased after careful analysis of the status of each species. In addition, terms and conditions to be followed were outlined in order to minimize the potential for future take of both species. Since 2005, no DFS have been taken and the bald eagle take limit has not been exceeded, with only one eagle captured and released alive in 2009. The bald eagle has since been delisted and is covered under the Bald and Golden Eagle Protection Act. However, the project continues to adhere to eagle capture minimization measures outlined in the BO and Amendment to the BO.

The purpose of this BO is to expand the geographic scope of Section 7 coverage for the project to include the entire Delmarva Peninsula and Calvert and Saint Mary's Counties in Maryland. Expansion of the project is necessary in order to eradicate nutria from the region.

Project Description

Formerly known as the Maryland Nutria Project, the Chesapeake Bay Nutria Project is one of a small number of highly successful exotic invasive species eradication programs in the United States. Since the project began in 2000, nutria have been eradicated from over 160,000 acres of wetland habitat in Dorchester, Wicomico, Somerset, Talbot, and Caroline Counties in Maryland. The eradication goal of this project is to eliminate nutria from the Western Shore of the Chesapeake Bay (Calvert and Saint Mary's Counties) in Maryland and the entire Delmarva Peninsula, including the state of Delaware and the eastern shore of Virginia (Accomack and Northampton Counties).

Since 2003, the project goals outlined in the original strategy were largely achieved. In summary: nutria were effectively eradicated from the original Nutria Eradication Zone (NEZ) located in Dorchester County, Maryland; the knowledge gained in the NEZ enabled the Project

to refine its techniques and begin to apply what was learned to the eradication of nutria in other Maryland marshes.

It has been conservatively estimated that the project has an additional 350,000 acres of wetland habitat to inspect for the presence of nutria. Additionally, until nutria are confirmed to be eradicated, monitoring efforts must continue in previously-trapped marshes to detect individuals that were missed during the initial phase of trapping or that migrated from un-trapped areas. In 2009, the Chesapeake Bay Nutria Project underwent an external project review by a team of experts in exotic invasive species eradication in order to provide an authoritative and independent assessment of what has been achieved and to recommend the future direction, approaches, and priorities. A peer-reviewed report of findings was received in early 2010. Results of the project review highlight the importance of consistent and dependable funding. The Project Review Team also noted that, as of 2009, the project has been engaged in what they refer to as the "Knockdown Phase" rather than what was considered to be the Eradication Phase. According to the Team, the Chesapeake Bay Nutria Project have just begun the Eradication Phase, the most difficult milepost in an eradication project, whereby the large source populations are eliminated and the project moves into low density areas. This is the point when many exotic invasive species eradication projects lose their support from funders, the end result being re-infestation.

The economic and ecological health of the Chesapeake Bay and Delmarva coastal region is closely tied to the health of its wetlands. The infestation of this exotic invasive rodent beginning in the 1930's has resulted in the degradation of thousands of acres of wetlands. Since introduction, nutria have destroyed almost one-half of the marshland on the Blackwater National Wildlife Refuge Unit (Blackwater NWR) totaling 5,000 acres. The total marsh acreage lost throughout the remainder of the Chesapeake Bay and Delmarva region may be as high as hundreds of thousands of acres.

The destruction of wetlands by nutria is costing the Maryland economy an estimated $4 million per year in lost environmental services resulting from the degradation of agricultural lands, commercial fisheries, water quality, recreational opportunities, and property. A recent report for the State of Maryland (The Nutria Management Team, 2011) estimates that by 2050 the economy will lose $30 million per year if nutria destruction of wetlands is left unchecked. Hunting, fishing, ecotourism, and commercial fishing are vitally important to the economy of the Chesapeake Bay area and healthy marshes are the foundation of this ecosystem. In addition to these economic values, wetlands provide coastal residents protection against flooding and play a critical role in cleaning the Chesapeake Bay by filtering storm runoff and absorbing excess nutrients.

In the late 1990's, the Maryland Nutria Project Partnership, a group of 22 Federal, State, and private organizations, began to investigate the potential for eradicating nutria in Maryland. In 2000, Federal funding was obtained to initiate a study to develop an eradication strategy in Maryland. By 2002, the study phase was completed and eradication measures began.

The nutria eradication project is overseen by the Nutria Management Team, consisting of the Service's CBFO, CMNWRC, APHISWS, the Maryland Department of Natural Resources (MDNR), the U.S. Geological Survey (USGS), the University of Maryland Eastern Shore (UMES), and Tudor Farms.

The eradication plan is being implemented by well-trained APHISWS personnel who implement the population reduction program and perform monitoring activities to measure the effectiveness of the eradication program and remove residual nutria populations.

The project has expanded beyond the initial NEZ of approximately 100,000 acres. The original NEZ consists of Blackwater NWR, state-owned Fishing Bay Wildlife Management Area (WMA), privately owned Tudor Farms, and other nearby Dorchester County private lands. Except for monitoring activities, the project is finished in the NEZ and continues to expand outside of Dorchester County into nutria-infested marshes in Wicomico, Somerset, Talbot, and Caroline Counties, the ultimate goal being to eradicate nutria from the Delmarva Peninsula portion of the Chesapeake Bay, Delaware Bay, and Atlantic coastal Bays.

Location of Future Nutria Eradication Activities

To date, eradication measures have been employed in Caroline, Dorchester, Somerset, Talbot, Wicomico, and Worcester Counties in Maryland, and Kent County in Delaware. In order to fully eradicate nutria from the region, it will be necessary for the project to continue to expand detection efforts and, if warranted, eradication activities into the remaining Maryland eastern shore counties of Queen Anne's, Kent, and Cecil, two western shore Maryland counties, Calvert and St. Mary's, the Virginia portion of Delmarva, and New Castle and Sussex Counties in Delaware.

The challenge ahead is for the project to continue to expand into surrounding marshlands while preventing re-infestation of previously trapped habitats on State, Federal, and private lands. This will require the trapping team to work in much larger areas and expand the trapping zone on a much broader front. Given the distribution of tidal waterways, drainage ditches, ponds and waterfowl impoundments throughout the Delmarva Peninsula, it is likely that nutria remain in hundreds of locations. Nearly 350,000 acres of wetland habitat spread across the Delmarva Peninsula remain to be inspected and thousands of acres will need to be trapped. Our goal is to complete this stage by 2015.

The known extent of the nutria population on the Delmarva Peninsula as of January 2012 is illustrated in Figure 1. The Chesapeake Bay Nutria Project divided the peninsula into four zones depending on our current understanding of nutria occurrence. Zone 1 (red) shows areas that have already been treated and nutria numbers have been reduced almost if not completely to zero. Zone 1 is subject to periodic monitoring to detect individuals that were missed or migrated in from un-treated zones. Very little actual removal of animals occurs in Zone 1. In Zone 2 (orange) nutria are known to occur, but eradication measures have yet to begin. In Zone 2 on the Delmarva Peninsula, the Chesapeake Bay Nutria Project expects to employ most or all of our

removal measures as needed within the next Fiscal Year (FY2013). Based on our understanding of nutria presence, Calvert and Saint Mary's Counties, Maryland, are also considered to be in Zone 2, however, eradication measures may not begin there within the next year. Zone 3 (light green) has the potential to support nutria based on existing habitat and proximity to Zone's 1 and 2. Zone 4 (dark green) signifies areas where there is no evidence that nutria were ever established, but still need to be assessed. It is expected that minimal if any removal measures will be employed in much of Zone 4, but it is not outside the realm of possibility that some areas within this zone will require treatment.

Eradication Methods

The eradication program is based on the systematic application of intense harvest pressure using shooting and trapping as the primary removal techniques. With nearly half a million acres of wetland habitats on the Delmarva Peninsula the first step towards implementing a systematic trapping program is to break potential nutria habitat into manageable work units. A Geographic Information System (GIS) was used to overlay a grid of 40 acre trapping units on a map of the Delmarva Peninsula. Two removal strategies are implemented dependent on the geographic distribution of marsh habitats: the progressive sweep and the simultaneous removal.

The progressive sweep is used in areas dominated by large contiguous blocks of marsh habitat as in Blackwater NWR and Fishing Bay WMA. Wildlife Specialists are assigned a row of trapping units and trapping is initiated in a single column, such that a continuous band of intensive trapping activity stretches across the marsh, bridging non-nutria habitat (uplands or open water) on either side. Wildlife specialists use handheld Global Positioning System (GPS) receivers to ensure that they trap in assigned units. As each column of trapping units is depopulated, specialists move forward to the next un-trapped unit in a coordinated fashion. Each trapping unit undergoes four stages of trapping activity: set-up, tending, blockade, and trap removal. As trapping progresses through the tending phase and into the blockade phase, the specialists initiate set up of the next adjacent trapping unit. As a result, a swath of trapping activity is spread across the marsh, 3 to 4 trapping units in depth, with trapping intensity heaviest on the leading edge.

The simultaneous removal strategy is deployed in riparian areas where smaller marshes distributed linearly along rivers do not facilitate the progressive sweep strategy. In these areas, sections of river frontage are assigned to specialists and entire areas are trapped in a simultaneous approach. In both techniques, a plot is considered to be depopulated after two weeks pass without a capture. Data is collected to measure trapping effort (number of trap nights) on each unit and to document the location, age, and sex of each nutria captured. Species information on each non-target capture also is collected.

During winter months, when freezing conditions impede trapping efforts, hunting and shooting is used to facilitate population reduction. Areas that are hunted heavily are also trapped once weather conditions permitted.

Following depopulation, trapping units are periodically monitored for signs of nutria activity. The primary techniques used to detect residual populations are: intensive ground searches

documented with GPS tracks, searches with detection dogs, and false beds. Upon each survey, specialists determine the population status based on the kind and amount of sign discovered.

In January of 2004, two wildlife specialists began using dogs to find and detect nutria. The utility of detection dogs for finding nutria at low densities became quickly apparent and the management team developed a policy to encourage specialists to procure and train dogs. Currently 6 wildlife specialists employ 8 dogs on the project.

The following traps and trap set types are utilized:

Maryland and Delaware

- Body gripping traps with a jaw spread of less than 8 inches are set submerged, partially exposed, or completely exposed in wetland or aquatic habitats, including on nutria detection platforms. This is considered a lethal set type and is checked at least once every 96 hours.
- Body gripping traps with a jaw spread greater than 8 inches are set submerged or partially exposed in aquatic habitats. This is considered a lethal set type and is checked at least once every 96 hours.
- Coilspring foothold traps with a jaw spread of up to 6" (various makes and models) attached to a submersion cable in aquatic habitats. This is considered a lethal set type and is checked at least once every 96 hours.
- Cable restraints (snares) are used in some instances for the live capture of nutria. This is considered a live restraint capture device and is checked once per calendar day.
- Cage or box traps. This is considered a live restraint capture device and is checked once per calendar day.

Other methods that are employed:

- Shooting with .22 caliber rimfire rifles or pistols.
- Shooting with 12 gauge shotguns loaded with steel shot of #4 or larger.
- Hunting with the use of trained nutria detector dogs. Dogs are trained to chase only nutria and do not attack the animal but bring it to bay where it can be dispatched with firearms. Dogs that cannot be trained to chase only nutria are removed from the project.

[Note: All submerged body gripping traps used in Virginia must be checked once every 72 hours while partially submerged and land-set body gripping traps and all other trap types must be checked once every 24 hours.]

Traps are set in trails, ditches, along waterways and at approaches to real and simulated nutria beds and haul-outs, on floating support frames, and floating platforms. Specialists utilize both "blind" sets in natural travel ways, and lured sets using urine collected from captive animals, scat, gland lure, disturbed earth, and cut vegetation to attract nutria to trap locations. Traps are typically set "on sign" but in low density areas where nutria are suspected but not confirmed,

specialists utilize understanding of nutria behavior and movement patterns to set "possibility" sets that are likely to capture nutria moving through the area.

Non-target animal captures are minimized by altering trap trigger and pan configurations, placing jump sticks or obstructions designed to block non-target access to traps, and selectively avoiding areas used by non-target species.

Specific measures to reduce the potential for take of the DFS as outlined in earlier Section 7 Consultations will continue to be employed. These measures also decrease the likelihood that other non-target species will be captured.

- When trapping within 50 meters of potential DFS habitat is deemed essential to meet project objectives, live traps will be used when temperatures are expected to remain above 40 degrees F. When live-trapped, DFS are less likely to succumb to the cold. [Note: DFS habitat is defined as mature forest habitat within their 3 mile range.]
- When temperatures are expected to be below 40 degrees F, triggers on lethal traps that are set within 50 meters of forest habitat will be adjusted to allow for through passage and survival of small mammals, including the DFS.
- Corn or other baits that would be attractive to the DFS will not be used in live or kill traps within 50 meters of forested habitat.
- Use zinc phosphide only in habitats that are not frequented by DFS.
- When placed within 50 meters of DFS habitat, sets containing zinc phosphide will be placed only on platforms surrounded by at least 5 meters of open water.
- Based on Chesapeake Bay Nutria Project staff experience, dogs trained for nutria detection are used on the Chesapeake Bay Nutria Project but are not viewed to be problems for the DFS.

Coordination between personnel in the Service's CBFO Division of Strategic Resource Conservation (Endangered Species Program) and the Division of Habitat Conservation at CBFO, and APHIS, has resulted in the above project approach which minimizes potential take while allowing a successful nutria control program to move forward.

The top five methods accounting for the most nutria during the initial depopulation phase are body-gripping traps, shooting, footholds set on submersion cables, dogs, and staked footholds accounting for 68%, 12%, 8%, 4%, and 4% of the total catch of nutria respectively. Submersion foothold techniques were incorporated into trapping methodologies in 2004 and replaced the staked foothold trap in most cases. Zinc phosphide and other toxins have yet to be employed by the project.

While the same suite of tools is used by Wildlife Specialists during monitoring activities, the proportion of nutria captured with the various methods differs from the initial depopulation effort. While body-gripping traps still account for the most animals, submersion footholds and dogs contribute to a much larger percentage of capture. One possible explanation for the

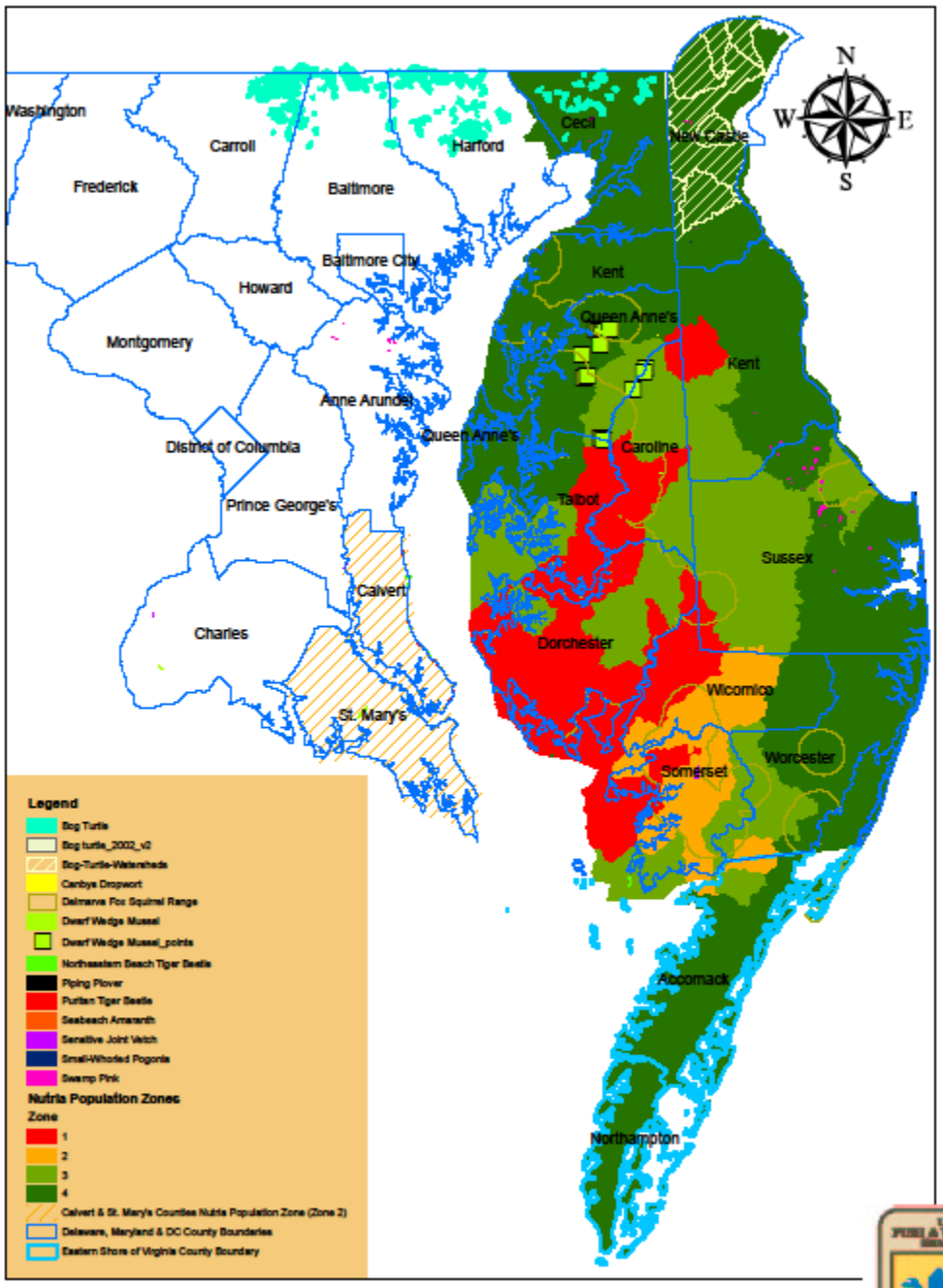
increased importance of submersion footholds is that nutria at low population densities move greater distances along waterways in search of other nutria and therefore are more vulnerable to footholds set at false beds created along waterways.

In recent years remnant and increasingly dispersed nutria populations have become harder to detect. The project has been experimenting with various species-specific lures and attractants to detect and remove nutria at low densities in order to ensure successful eradication. Staff currently are deploying several thousand 2”x24”x24” nutria detection rafts throughout the area of operations in previously trapped areas as monitoring tools and in future trapping locations in order to delineate the extent of infestation and to identify areas that require treatment. A low maintenance method for detecting nutria over a broad area with reduced effort, the floating detection rafts can be outfitted with lures, attractants, cameras, and hair snares in order to detect nutria and with body gripping conibear traps with or without lures and attractants in order to remove nutria once they are detected.

STATUS AND LOCATION OF THE 14 FEDERALLY LISTED ENDANGERED, THREATENED & CANDIDATE SPECIES IN THE PROJECT AREA

Listed and Candidate Species in the Project Area	Species Status	County/State Locations of Listed and Candidate Species in the Project Area	Zones of Occurrence
Piping Plover *(Charadrius melodus)*	T	Worcester, MD; Sussex, DE; Accomack & Northampton, VA	3, 4
Roseate Tern *(Sterna dougallii dougallii)*	E	Accomack & Northampton, VA	4
Red Knot *(Calidris canutus rufa)*	Candidate	Accomack & Northampton, VA; Kent & Sussex, DE; Worcester, MD	3,4
DFS *(Sciurus niger cinereus)*	E	Sussex, DE; Caroline, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico and Worcester, MD; Accomack, VA	1, 2, 3, 4
Bog Turtle *(Clemmys muhlenbergii)*	T	Cecil, MD; New Castle, DE	4
Dwarf Wedge Mussel *(Alasmidonta heterodon)*	E	Caroline, Queen Anne's, Saint Mary's, Talbot MD	1, 2, 3, 4
Puritan Tiger Beetle *(Cicindela puritana)*	T	Calvert, Kent, and Cecil, MD	2, 4
Northeastern Beach Tiger Beetle *(Cicindela dorsalis dorsalis)*	T	Calvert & Somerset, MD; Accomack & Northampton, VA	2, 3, 4
Canby's Dropwort *(Oxypolis canbyi)*	E	Queen Anne's County, MD	4
Sensitive Joint Vetch *(Aeschynomene virginica)*	T	Somerset & Calvert, MD	2
Seabeach Amaranth *(Amaranthus pumilus)*	T	Sussex, DE; Accomack & Northampton, VA	4
Swamp Pink *(Helonias bullata)*	T	Cecil & Dorchester, MD; Statewide, DE	1,3, 4
Small Whorled Pogonia *(Isotria medeoloides)*	T	New Castle, DE	4
Hirst Brothers' Panic grass *(Dichanthelium hirstii)*	Candidate	has not defined county-level range in Delaware	1,2,3,4

Federally Listed Endangered, Threatened & Candidate Species in the Chesapeake Bay Nutria Project Action Area



December 19, 2012

0 15 30 60 Miles

Based on the current understanding of nutria distribution in the region, the Chesapeake Bay Nutria Project expects to be implementing very little direct animal removal (e.g. trapping, hunting, etc.) in Zone 4 (see Figure 1), which covers much of the Delaware Bay shoreline, Atlantic and Virginia Coast of the Delmarva peninsula, all of Cecil and Kent Counties in Maryland, and New Castle County in Delaware. Therefore, impacts to species that occur solely in Zone 4 are not anticipated. These species include the roseate tern, bog turtle, Canby's dropwort, seabeach amaranth, small whorled pogonia, and Hirst Brothers' Panic grass.

The following federally endangered, threatened and candidate species occur in one or more of the four nutria population zones:

Red Knot

The red knot is located in Zones 3 and 4. Zone 3 includes a portion of Prime Hook NWR. The eastern property boundary of Prime Hook NWR is located near Delaware Bay. At Prime Hook NWR they have "migrating and feeding red knots in spring and fall, primarily along the refuge coast, but sometimes they also use the impoundments. They are generally restricted to the overwash and beach areas but occasionally may use mudflats." (USFWS, 2012). In addition, by mid May migrating red knots arrive at Delaware Bay to feed on horseshoe crab eggs which gives them the needed energy to finish their migration. In late May or early June they leave Delaware Bay to complete their spring migration (USFWS, 2006).

The nutria is a wetland species and does not use red knot habitat which is overwash and beach areas or mudflats, as stated in the above paragraph. Also, the Chesapeake Bay Nutria Project expects to be implementing very little direct animal removal (e.g. trapping, hunting, etc.) in Zone 4, which covers much of the Delaware Bay shoreline. As a result, the Chesapeake Bay Nutria Project will have no effect on the red knot.

Piping Plover & Seabeach Amaranth

There is a nesting record for the piping plover in Zone 3 at the Prime Hook NWR. Nutria were historically reported at Prime Hook, however, there has been no evidence of nutria in recent years. Prime Hook NWR holds the only record of piping plover in Zones 1, 2, and 3. Other records of piping plover are located in Zone 4 (area where there is little evidence that nutria have ever established populations). As a result, the Chesapeake Bay Nutria Project does not expect any impacts to the piping plover.

The Chesapeake Bay Nutria Project does not expect to be encountering any coastal beach species such as nesting piping plovers and seabeach amaranth. "Piping plover nests are situated above the high tide line on coastal beaches, sandflats at the ends of sandspits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover areas cut into or between dunes. They may also nest on areas where suitable dredge material has been deposited." (USFWS, 1996). "Seabeach amaranth is an annual plant native to the barrier island beaches of

the Atlantic Coast." (USFWS, 1996). Because nutria, a wetland species, are not known to inhabit coastal beaches, the Chesapeake Bay Nutria Project will have no effect on the piping plover and seabeach amaranth.

Should this nutria eradication project require more intensive and invasive access to locations where roseate tern, bog turtle, Canby's dropwort, seabeach amaranth, small whorled pogonia, Hirst Brothers' Panic grass, red knot and piping plover are known to occur, the Chesapeake Bay Nutria Project will re-initiate this Section 7 consultation in order to address potential effects to these endangered, threatened and candidate species. Regardless of this, Chesapeake Bay Nutria Project staff will be provided with photographs of these species and will be required to avoid them if they are encountered in the field and report the location of sightings to the Service.

The DFS, dwarf wedge mussel, puritan tiger beetle, northeastern beach tiger beetle, sensitive joint vetch and swamp pink are found in Zones 1, 2, and 3, where there is greater potential that eradication measures will be employed. As a result, these species require a more in-depth project impact analysis.

Delmarva fox squirrel

The DFS is located in Zones 1, 2, 3, and 4. This is the only mammal in the project area and is "likely to be adversely affected" by this nutria eradication project. Take limits and measures to minimize take of the DFS are outlined in the September 24, 2003 BO. Since then, no DFS have been captured or otherwise harmed by the Chesapeake Bay Nutria Project. The Chesapeake Bay Nutria Project has adhered to the terms of the September 24, 2003 BO as the Chesapeake Bay Nutria Project expanded into new territory on the Delmarva peninsula. Effects of the expanded Chesapeake Bay Nutria Project and anticipated "take" are being reexamined as part of this current consultation.

Dwarf Wedge Mussel

Dwarf wedge mussels occur in Zones 1, 2, 3 and 4 in Caroline, Queen Anne's, and Talbot Counties on the Delmarva peninsula and Saint Mary's County on the western shore of Maryland. In all cases, they are found well upstream of the emergent marshes frequented by nutria. While there is a low likelihood that eradication measures will occur in dwarf wedge mussel streams, Chesapeake Bay Nutria Project staff may need to inspect them to rule out the presence of nutria. In the case of dwarf wedge mussel populations, staff will be informed and provided with dwarf wedge mussel maps and/or GIS system points for their handheld GPS navigation devices, and they will avoid the use of zinc phosphide as well as any nutria control measures causing significant siltation in the stream reaches where dwarf wedge mussels are known to occur.

Puritan Tiger Beetle

Puritan tiger beetles nest on bare, steep cliffs and adults forage on beaches (USFWS, 1993) in Zone 2 on the Chesapeake Bay Shoreline of Calvert County. They also are found in Zone 4 in

Cecil and Kent Counties in Maryland. Only the adults may be affected by nutria eradication activities. Chesapeake Bay Nutria Project staff may be required to access isolated wetlands by walking or boating along beaches inhabited by puritan tiger beetles. However, since this will involve a small number of people making only a few visits to any given site and adult tiger beetles can fly out of the path of occasional pedestrians, this activity is unlikely to adversely affect Puritan tiger beetles.

Northeastern Beach Tiger Beetle

Northeastern beach tiger beetles nest and forage on beaches (USFWS, 1994) in Zone 2 on the Chesapeake Bay shoreline of Calvert County, Maryland, Zone 3 in Somerset County, Maryland, and in Zone 4 in Accomack and Northampton Counties in Virginia. Chesapeake Bay Nutria Project staff may be required to access isolated wetlands by walking or boating along beaches inhabited by Northeastern beach tiger beetles. In the event that such access is necessary, time of year restrictions will be enforced during summer months when the adult Northeastern beach tiger beetles are basking, feeding, mating and nesting (USFWS, 1994).

Sensitive Joint Vetch

The majority of sensitive joint vetch is found in the marsh interior (USFWS, 1995) in Zone 2 in Calvert and Somerset Counties in Maryland. Chesapeake Bay Nutria Project staff will be provided with photographs, maps and/or GIS points for their handheld GPS navigation devices, and will be required to avoid it if it is encountered in the field and report the location of sightings to the Service.

Swamp Pink

Swamp pink is located in Zone 1 in Dorchester County Maryland, Zone 3 and 4 in Delaware, and Zone 4 in Cecil County, Maryland. Swamp pink is limited to shady scrub-shrub and forested wetland areas (USFWS, 2012). Nutria habitat consists of marshes so no direct effects to swamp pink will occur during the Chesapeake Bay Nutria Project eradication activities. Chesapeake Bay Nutria Project Staff will be provided with photographs, maps and/or GIS points for their handheld GPS navigation devices, and will be required to avoid it if it is encountered in the field and report the location of sightings to the Service.

Explanation of Actions and Effect Determination

Listed and Candidate Species in the Project Area	Actions to Minimize Affects to Endangered and Threatened Species	*Effect Determination
Piping Plover *(Charadrius melodus)*	Nutria inhabit marshes. Piping plovers inhabit coastal beaches.	NE
Roseate Tern *(Sterna dougallii dougallii)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE
Red Knot *(Calidris canutus rufa)*	Nutria inhabit marshes. Red knots inhabit overwash and beach areas or mudflats.	NE
DFS *(Sciurus niger cinereus)*	See pages 27-28.	LTAA
Bog Turtle *(Clemmys muhlenbergii)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE
Dwarf Wedge Mussel *(Alasmidonta heterodon)*	Staff will be provided with maps and/or GIS points & will avoid zinc phosphide use & any nutria control measures causing siltation in dwarf wedge mussel streams.	NLTAA
Puritan Tiger Beetle *(Cicindela puritan)*	Adult tiger beetles can fly out of the path of occasional pedestrians.	NLTAA
Northeastern Beach Tiger Beetle *(Cicindela dorsalis dorsalis)*	Time of year restrictions will be enforced during summer months (June 1 – August 31 of any year).	NLTAA
Canby's Dropwort *(Oxypolis canbyi)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE

Sensitive Joint Vetch *(Aeschynomene virginica)*	Staff will be provided with photographs, maps and/or GIS points and will be required to avoid it if it is encountered in the field.	NLTAA
Seabeach Amaranth *(Amaranthus pumilus)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE
Swamp Pink *(Helonius bullata)*	Staff will be provided with photographs, maps and/or GIS points, and will be required to avoid it if it is encountered in the field.	NLTAA
Small Whorled Pogonia *(Isotria medeoloides)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE
Hirst Brothers' Panic grass *(Dichanthelium hirstii)*	Located in Zone 4 (area where there is little evidence that nutria have ever established populations).	NE

* NE – No Effect; NLTAA – Not Likely to Adversely Affect; LTAA– Likely to Adversely Affect

STATUS OF SPECIES/CRITICAL HABITAT

This section summarizes DFS biology and ecology as well as information regarding habitat suitability, threats to the species, and recovery goals and objectives. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of the species. Based upon best available scientific information, the Service has no information to suggest that any other listed species may be adversely affected by the proposed action described above.

Species /Critical Habitat Description -- DFS are large, heavy-bodied tree squirrels with full, fluffy tails. The DFS is a subspecies of fox squirrel (*Sciurus niger)*, a species found throughout the eastern United States. The DFS resembles the gray squirrel (*Sciurus carolinensis*), however, gray squirrels are smaller, their tails are not as full, and their dorsal area is not as uniformly colored as DFS. Fox squirrels are more cursorial, less agile, slower, and more deliberate in their movements than are gray squirrels (Dozier and Hall, 1944). When a fox squirrel moves from one tree to another, it usually descends to the ground rather than leaping from tree to tree as do gray squirrels.

In 1967, the DFS was listed as a federally endangered species due primarily to its disappearance from 90% of its former range. The dramatic decrease of this species is attributed to habitat loss resulting from forest clearing and changing land use patterns throughout its range (Taylor, 1973), and possible over-hunting in the past. No critical habitat has been designated for this species.

Life History of the Species -- The DFS inhabits mature hardwood and mixed pine forests in the agricultural landscapes of the Delmarva Peninsula. Suitable DFS habitat consists of large (greater than 12" dbh) hard and soft mast producing trees such as oak *(Quercus* spp.*)*, hickory *(Carya* spp.*)*, beech, and pine *(Pinus* spp.*)* (Taylor, 1976). Generally, DFS prefer forest stands with large trees, an expansive canopy, and sparse understory (Taylor, 1976, Dueser *et al.,* 1988, Paglione, 1996). The large (mature) trees provide sites for cavity and leaf nests as well as mast, while the sparse understory is thought to enhance DFS foraging efficiency. Forest edge habitat is used extensively by DFS (Taylor, 1976, Flyger and Smith; 1980, and Paglione, 1996) and the association of agricultural fields with forest edge may play an important role in the suitability of habitat for DFS. Agricultural crops such as corn, wheat, soybeans, oats, and other crops are readily used by DFS to supplement their diet when available (Allen, 1943; Brown and Yeager, 1945; Bakken, 1952; Taylor, 1976; Paglione, 1996).

DFS use tree cavities (Allen, 1952; Nixon and Hansen, 1987) to provide maximum safety for young (nesting) and protection from cold and wet weather (shelter). They also construct nests of leaves and twigs (Dozier and Hall, 1944; Allen, 1952) which may vary from small day shelters and feeding platforms to large, well insulated rearing nests (Weigl *et al.,* 1989). Nests are generally found in crotches of tree trunks, in tangles of vines, on a trunk, or situated towards the ends of larger branches (B.J. Larson, Chincotegue National Wildlife Refuge, pers. comm.).

Most mating occurs in late winter and early spring (Lustig and Flyger, 1976). Gestation lasts approximately 44 days (Asdell, 1964) and most young are born in February, March, and April. There is a smaller breeding period and birth peak in July and August. Litter size is one to six [mean: 4 (Dozier and Hall, 1944); mean: 2.25 (Lustig and Flyger, 1976); mean: 1.7 (Larson, 1990)]. Young are dependent on their mothers for approximately 3 months (Moore, 1957). To protect breeding squirrels and their young, the recommended time of year restrictions for habitat disturbance are from January 1 through May 15, and July 1 through September 15.

Diets of southeastern fox squirrels and DFS include mast from a variety of trees, pine buds, staminate cones, pine seeds, berries, fungi, and insects (Moore, 1957; Ha, 1983; Weigl *et al.,* 1989; Larson, 1990; Humphrey and Jodice, 1992). During much of the year, mast from mature trees (primarily from oak, hickory, beech, walnut) is a primary component of the fox squirrel diet (Weigl *et al.,* 1989). During the spring, DFS feed extensively on tree buds and flowers, and will consume large quantities of fungi, insects, fruit, seeds, and occasionally bird eggs and young (USFWS, 1983). At Chincoteague National Wildlife Refuge (CHNWR), (Larson, 1990) found that DFS switched from reliance on pine and oak mast in the fall/early winter to heavy use of soft mast hardwoods (primarily maple) in the late winter and spring months. Like other southeastern fox squirrels, DFS feed largely on mature green pine cones during late summer and early fall until acorns and other hard mast become available in the fall (Moore, 1957; Ha, 1983; Weigl *et al.,* 1989; Kantola and Humphrey, 1990; Larson 1990). By late summer, DFS are often in poor condition due to low food availability in the spring and early summer (Kantola, 1986; Weigl et al., 1989; Larson, 1990). Further, although pine-seed crops are subject to failure, the magnitude of their year-to-year variation is not as great as acorn crops. Thus, pine seeds may be particularly important to squirrels during years of acorn mast failure (Kantola and Humphrey, 1990).

Home range sizes for the DFS are related to habitat type, and variation within the subspecies is substantial. Flyger and Smith (1980) estimated mean home range size for DFS in an agricultural landscape (described as "a mixture of woodland and fields of corn or soybeans with narrow wooded strips 20-25 m wide between fields" with relatively open understory) as 30 ha, while home range for the CHNWR population varies from 1.4 to 12.8 ha, with a mean of 4.1 ha (Larson, 1990). Home ranges also vary by season and sex of the animal. Male home ranges are usually larger (average 5.88 - 28.47 ha varying on location and season) than females (4.5 to 13.62 ha) (Paglione, 1996). This sex variation was especially pronounced in spring and early summer periods. Similar sexual differences in DFS home ranges were also found at CHNWR, with an average of 2.08 ha for females and 5.45 ha for males (Pednault-Willett, 2002).

Home range sizes of other southeastern fox squirrels range from 9 to 19 ha for females and 20-32 ha for males (Hilliard, 1979; Edwards, 1986; Weigl *et al., 1*989; Kantola and Humphrey, 1990). Average home ranges of southeastern fox squirrels are generally larger (>15 ha; Hilliard, 1979; Edwards, 1986; Weigl *et al.,* 1989) than those of midwestern fox squirrels (5 ha or less; Ha, 1983). In general, this larger home range has been considered an adaptation to patchy landscapes (Ha, 1983; Mace and Harvey, 1983), and unpredictable seasonal food supply found in

southeastern forests (Ha, 1983; Weigl *et al.,* 1989; Paglione, 1996). Weigl *et al.* (1989) found that food supplies had the greatest influence on the ecology of southeastern fox squirrels, often affecting the size and location of their home range. Patterns of use within the home range have received relatively little study (Loeb and Moncrief, 1993). However, Steele (1988) found that fox squirrels in North Carolina used much of their home range in July, but in August space use was reduced by more than 50% as squirrels began to feed extensively in selected longleaf pine trees.

Density estimates for the DFS include 0.7-0.98 DFS/ha at the CHNWR (Pednault-Willett, 2002) and a range of 0.36 DFS/ha to 1.29 DFS/ha (Paglione, 1996) from two sites at Blackwater NWR. The high density at the Blackwater NWR site was attributed to the presence of "exceptional habitat composed of large mature pines and mixed hardwoods, with a clear understory and adjacent agricultural fields" (Paglione, 1996). Density estimates for other southeastern fox squirrels vary from 8.4 squirrels/km^2 (0.08 squirrels/ha, Humphrey *et al.,* 1985), 15.3-17.71 squirrels/km^2 (0.15-0.18 squirrels/ha, Tappe, 1991), to 20.0 squirrels/km^2 (0.20 squirrels/ha, Hilliard, 1979). Weigl *et al.* (1989) reported a mean density of 0.05 fox squirrels/ha (highest annual density of 0.35/ha) in North Carolina; they inferred from the low densities generally exhibited by southeastern fox squirrels, that preservation of large habitat blocks would be necessary to support viable populations. Gray squirrels, potential competitors with fox squirrels, can reach densities of 15/ha (Gurnell, 1983).

Distribution and Status -- Historically, DFS were distributed throughout the Delmarva Peninsula and into southeastern Pennsylvania and southern New Jersey (Taylor, 1976). At the time of listing, in 1968, the range had decreased to only 10% of its original size on the Delmarva and remnant populations occurred in only four Maryland counties: Kent, Queen Anne's, Talbot, and Dorchester. Today, remnant populations continue in those counties but are also known to occur in Caroline County, Maryland and western Sussex County, Delaware (USFWS, 2003) and new sightings have occurred in areas where DFS were not previously reported. Translocations have figured prominently in the recovery program and DFS have been successfully reintroduced to 11 sites within their historical range in Maryland, Delaware, and Virginia. The 2012 Delmarva Peninsula Fox Squirrel 5-Year Review states "The squirrel's known range now covers ten counties: eight in Maryland and one each in Delaware and Virginia." (USFWS, 2012). With the addition of the populations at translocation sites, DFS now occupy a total of 134,778 acres of occupied forest (USFWS, 2012).

The DFS range (Figure 2) is thus considered to be expanding. The increasing size of the species' distribution, both the remnant portions and the portions established through translocations, indicate the species occupies a greater geographic area and occurs in a larger number of sites than at the time of listing. Monitoring of seven benchmark sites, where local populations were monitored within the existing range, indicates that populations within the range are generally stable (Duesser, 1999; USFWS, 2003). Comparisons of landowner surveys made in 1972 and 1985 also suggest a stable trend in populations within its range. Of 54 sites originally surveyed, one previously unoccupied site gained DFS and one previously occupied site lost DFS (Therres and Willey, 1988). However, the original landowner survey did not include areas where the

Service has documented new populations of DFS. Based on the expanded range and evidence of stable populations within its range, we consider the status of DFS to be increasing and the 2012 Delmarva Peninsula Fox Squirrel 5-Year Review (USFWS, 2012) recommends delisting the DFS. More information about the distribution and status of the DFS can be found in the 2012 Delmarva Peninsula Fox Squirrel 5-Year Review at: http://www.fws.gov/chesapeakebay/EndSppWeb/DFS/StatusReview.html

Threats to the Species – Development, sea level rise, timber harvest, hunting, predation, disease, pests and vehicle strikes constitute threats to the DFS and their habitats but none of these threats pose an extinction risk to the DFS (USFWS, 2012). The following information concerning these threats is taken from the 2012 Delmarva Peninsula Fox Squirrel 5-Year Review (USFWS, 2012).

Residential development can negatively affect DFS through direct loss of forest habitat, degradation of habitat near homes or roads (the extent of these effects are still being investigated), and potential isolation of populations if developments are constructed in areas needed for dispersal.

The effects on DFS occupying woodlands adjacent to agricultural lands that have been converted to residential developments include the loss of agricultural food sources and possible habitat degradation caused by disturbance emanating from home sites (e.g., incursions by dogs and cats).

The DFS is not a coastal species in that it does not depend on coastal habitats specifically, and this moderates its vulnerability to sea level rise compared to other marsh-dependent species. However, it does occur in forest blocks along the edge of the Chesapeake Bay where sea level rise has occurred in the past and will occur in the future.

The major threats posed by timber harvests are: (1) the prevalence of short-rotation timber harvests where trees are harvested before they mature enough to become DFS habitat, and (2) harvest rates that exceed growth rates and result in a continual decline of mature forest.

The threat posed by short-rotation pine timber harvests has largely been eliminated by the transfer of the 58,000 acres to the State of Maryland to be managed for sawtimber and wildlife habitat, along with state management of other areas previously harvested for pulpwood. In addition, the timber harvest rates on private lands across the eight Maryland counties have declined dramatically in the past several years. And, importantly, the transfer of the Chesapeake and Glatfelter timber lands to Maryland and Delaware will provide significant long-term conservation benefits for the DFS.

Overhunting has been posited as a factor in the original decline of this species. Hunting of DFS was banned in 1972. Removal of hunting pressure, combined with other factors, may have allowed renewed population growth and expansion of the squirrel's range to its current extent.

Predators of the DFS include red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), red-tailed hawks (*Buteo jamaicensis*), bald eagles (*Haliaeetus leucocephalus*), and possibly domestic pets and feral animals (e.g., cats and dogs).

Documentation of disease in DFS is uncommon. The cause of death was described for 15 of 63 animals submitted to the Madison Health Lab, and of these 15 animals only 5 were documented as succumbing to infectious disease; the only diseases identified were leptospirosis and erysipelas, both of which are bacterial infections. In addition, there is no documentation of mange or rabies in DFS, and there is no evidence or suspicion of disease-related declines in any local population.

Gypsy moth and pine bark beetle outbreaks can decimate mature forest stands, although the affected stands will eventually regenerate. However, gypsy moth control through monitoring and spraying appears to have reduced this threat on the Eastern Shore; infestations in the last several years have diminished in acreage and were primarily in other parts of the State (Maryland Forest Health Highlights 2007, 2008, 2009).

Pine bark beetle infestations necessitated salvage cuts for a total of 2,000 acres scattered across Somerset, Dorchester, and Worcester Counties in the early 1990s, but monitoring and control efforts appear to have reduced this threat as well. An analysis of forest pest risk across counties in the Chesapeake Bay watershed found that most areas on the Eastern Shore where DFS occur have relatively low risk for insect infestations, with most having 3.8 to 10 percent of their area considered to be at risk.

Vehicle strikes are a relatively common source of DFS mortality. Like with other species, the probability of DFS being hit by vehicles is dependent on the density of DFS in the area and the proximity of the road to habitat.

The 2012 Delmarva Peninsula Fox Squirrel 5-Year Review (USFWS, 2012) analyzed the aforementioned threats to the DFS and concluded that the DFS was sufficiently abundant and well distributed to withstand these threats.

Recovery Goals and Objectives -- The following provides information on the current recovery goals and objectives for downlisting or delisting the species that are outlined in both the DFS Recovery Plan (USFWS, 1993) and the DFS Status and Recovery Plan Update (USFWS, 2003).

For the reclassification of the DFS from endangered to threatened, ecological requirements and distribution within the natural range must be fully understood, the seven benchmark populations must be stable or expanding for at least five years and ten new colonies must be established within the historical range. The DFS will be considered for delisting when (besides having met the reclassification criteria) the following elements have been achieved: (1) five post-1990 colonies are established outside the remaining natural range, (2) periodic monitoring shows that 80% of translocated populations have persisted over the full period of recovery, and at least 75% of these populations are not declining, (3) mechanisms that ensure perpetuation of suitable

habitat at a level sufficient to allow desired distribution is in place within all counties in which the species occurs, and (4) mechanisms are in place to ensure protection and monitoring of new populations, to allow for expansion, and to provide inter-population corridors to permit gene flow among populations (USFWS, 1993).

ENVIRONMENTAL BASELINE

As defined in 50 CFR 402.02, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. The "action area" is defined as all areas affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action. The direct and indirect effects of the actions and activities resulting from the Federal action must be considered with the effects of other past and present Federal, state, or private activities, and the cumulative effects of certain future state or private activities within the action area.

Description of the Action Area. -- The environment affected by the action is primarily marshes occupied by nutria on the Delmarva Peninsula and in Calvert and Saint Mary's Counties on the western shore of Maryland. The Delmarva Peninsula is approximately 5,450 square miles in land area (Delmarva USA, 2013), Calvert County is 213 square miles (Calvert County, 2013) and Saint Mary's County is 357 square miles (United States Census Bureau, 2013). The total size of the project area is about 6,020 square miles in land area.

To be more specific, for the purposes of this consultation, the Service has determined that the action area for this project encompasses Calvert and Saint Mary's Counties on the western shore of Maryland; Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester Counties on the eastern shore of Maryland; the State of Delaware and Accomack and Northampton Counties in Virginia (Figure 3). This includes the initial areas of focus: Chesapeake Marshlands NWR Blackwater Unit, Fishing Bay WMA, and Tudor Farms, Inc., a total area of about 60,000 acres located in southern Dorchester County, Maryland, south of the Choptank River on the eastern side of the Chesapeake Bay (Figure 4). The BNWR contains 23,040 acres of tidal marsh and open water, wooded marshes, loblolly pine and hardwood forests, and agricultural lands located in Dorchester County, Maryland. Fishing Bay WMA adjoins BNWR, and comprises 24,960 acres of emergent tidal marsh, wet woodlands, and open water areas. Tudor Farms is a privately owned 7,040-acre mosaic of emergent tidal marsh, small agricultural fields, impoundments, wooded marshes, and loblolly pine and hardwood forests managed for wildlife.

Status of Species in Action Area

The DFS population continues to expand on the Delmarva Peninsula. According to the latest DFS 5-Year Review, "DFS distribution at the time of listing included four Maryland counties, whereas its current distribution includes ten counties. This expansion is the result of 11 successful translocations as well as discovery of new populations outside the area considered to be the species' range at the time of listing and recovery planning. The total area of occupied

forest is now 134,778 acres, which is approximately a five percent increase since the 2007 status review. The total range of the DFS now covers 28 percent of the Delmarva Peninsula. Using the acres of occupied forest and average density estimates of DFS for the different counties, we estimate that there are approximately 17,000 to 20,000 DFS distributed across the species' current range." (USFWS, 2012)

EFFECTS OF THE ACTION

Potential impacts to DFS may result from capture in traps, snares, use of dogs, and application of zinc phosphide. Impacts that may occur include direct mortality of individual DFS, as well as harm and harassment. Since there is no resemblance between a DFS and a nutria, there is little chance that a DFS will be mistakenly shot by a trapper.

Trapping-- Life history information concerning habitat frequented by the DFS suggests that they prefer forests with a sparse understory, an expansive canopy, and large hard and soft mast producing trees such as oak, hickory, beech, and pine (Taylor, 1976; Dueser et al., 1988; Paglione, 1996). However, the DFS captures during Phase II of the Maryland Nutria Project indicate that some overlap in habitat can be expected between the highly marsh-dependent nutria and predominantly forest-dependent DFS. Since the DFS may occasionally venture into marshlands on the edge of woods, future captures of DFS in traps deployed by the Chesapeake Bay Nutria Project are possible.

Dogs and Zinc Phosphide-- In the March 2001 Informal Section 7 evaluations, the use of dogs and the application of zinc phosphide were also evaluated for potential impacts to the DFS. As in the case of traps, the documents concluded that no effects were expected from these activities, primarily because the DFS was not expected to occur in marsh habitat. Based on what has been learned since the initiation of this project, there is potential for incidental take of DFS to occur through the application of zinc phosphide but not the use of dogs.

Cumulative Effects-- Cumulative effects include the effects of future State, Tribal, local, or private actions that may occur in the action area. Future federal actions that are unrelated to the proposed action are not considered in this BO because they require separate consultation pursuant to Section 7 of the ESA.

The potential for cumulative effects to DFS in the action area could result from development and associated habitat loss from other sources in those counties in addition to direct mortality of individuals. A recent status review concludes that these effects are not likely to threaten the DFS and are not considered to result in cumulative negative impacts within the proposed action area (USFWS, 2012).

CONCLUSION

After reviewing the current status of the DFS throughout its respective range and in the action area, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's BO that the Chesapeake Bay Nutria Project's nutria eradication activities are not likely to jeopardize the continued existence of the DFS. No critical habitat has been designated for the DFS, therefore, none will be affected.

III. INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the Endangered Species Act prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that incidental take of DFS will likely occur through direct mortality and injury as a result of trapping and application of zinc phosphide. The actual extent of take (number of individual DFS taken) resulting from these harvest measures is difficult to quantify based on existing information. Since systematic trapping began in earnest in September 2002 (a period of approximately ten months), 294,515 trap-nights resulted in the capture of two DFS. Since restrictions were placed on trapping in 2003, no DFS have been taken. However, the more intensive (less restrictive) trapping measures needed to eradicate nutria from its remaining refugia may again result in the incidental take of the DFS. Based on past experience, it is reasonable to anticipate that up to three (3) DFS per year may be taken by the Chesapeake Bay Nutria Project.

REASONABLE AND PRUDENT MEASURES

The measures described below are nondiscretionary, and must be implemented by the Chesapeake Bay Nutria Project as specified by the Terms and Conditions below. They become binding conditions of any grant or permit issued to the Chesapeake Bay Nutria Project in order for the exemption in Section 7(o)(2) to apply. The Chesapeake Bay Nutria Project has a continuing duty to regulate the activity covered by this incidental take statement. If the Chesapeake Bay Nutria Project (1) fails to adhere to the Terms and Conditions of the incidental

take statement through enforceable terms that are specified below, and/or (2) fails to assume and implement the Terms and Conditions, the protective coverage of Section 7(o)(2) may lapse. The Service considers the following reasonable and prudent measures to be necessary and appropriate to minimize take of DFS:

(1) Modify trap sets to reduce the potential for capture, injury, and death of DFS.

(2) Use zinc phosphide only in habitats that are not frequented by DFS.

(3) Use handheld GPS navigation devices to determine when Chesapeake Bay Nutria Project staff are within the three mile DFS habitat range.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the Act, the Chesapeake Bay Nutria Project must comply with the following Terms and Conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These Terms and Conditions are non-discretionary.

- When trapping within 50 meters of potential DFS habitat is deemed essential to meet project objectives, live traps will be used when temperatures are expected to remain above 40 degrees F. When live-trapped, DFS are less likely to succumb to the cold. [Note: DFS habitat is defined as mature forest habitat within a 3 mile range of occupied habitat.]
- When temperatures are expected to be below 40 degrees F, triggers on lethal traps that are set within 50 meters of forest habitat will be adjusted to allow for through passage and survival of small mammals, including the DFS.
- Corn or other baits that would be attractive to the DFS will not be used in live or kill traps within 50 meters of forested habitat.
- Use zinc phosphide only in habitats that are not frequented by DFS.
- When placed within 50 meters of DFS habitat, sets containing zinc phosphide will be placed only on platforms surrounded by at least 5 meters of open water.
- The CBFO will provide the Chesapeake Bay Nutria Project staff with the three mile DFS habitat range data, and the Chesapeake Bay Nutria Project staff will download the data to their handheld GPS navigation devices to determine when they are within the three mile DFS habitat range.

Reporting Requirements

X The applicants shall notify the Service upon completion of project at the address given below:

U.S. Fish and Wildlife Service
Chesapeake Bay Ecological Services Field Office
Endangered and Threatened Species Branch
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
(410) 573-4595

X Upon locating a dead or injured DFS, notification must be made to the nearest USFWS Law Enforcement Office:

Division of Law Enforcement
U.S. Fish and Wildlife Service
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
(410) 573-4514

The Service believes that no more than three (3) DFS may be incidentally taken as a result of the action over the course of one year. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Chesapeake Bay Nutria Project must immediately provide an explanation of the causes of the taking, and review with the CBFO the need for possible modification of the reasonable and prudent measures.

IV. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the Chesapeake Bay Nutria Project's request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount of extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Should you have questions or concerns regarding this BO, please contact Trevor Clark of this office at (410) 573-4527.

Enclosures

cc: Paul Phifer, Assistant Regional Director, Ecological Services, Hadley, MA
Martin Miller, Chief, Division of Threatened and Endangered Species, Hadley, MA
Glenn Therres, Maryland Department of Natural Resources, Annapolis, MD

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Appendix A. (Consultation History)

Date	Description
01/26/2012	Email from Dan Murphy (Chesapeake Bay Field Office, CBFO) asking Stephen Kendrot (APHIS/Chesapeake Bay Nutria Project) to send Trevor Clark (CBFO) the shape files for the nutria population status map.
01/26/2012	Email from Kendrot to Murphy stating that he will have Roy Hewitt (USFWS/Chesapeake Bay Nutria Project) send the map.
01/26/2012	Email from Hewitt containing the nutria population status map data.
02/02/2012	Email from Michelle Gray (APHIS) to Cherry Keller (CBFO) and Julie Slacum (CBFO) asking to meet with the CBFO to discuss the current status of Wildlife Services programs in Maryland and the surrounding states and to work out a plan for writing the BO.
02/03/2012	Email from Slacum to Gray stating that CBFO would be happy to meet with APHIS during the next several weeks and Clark would be the lead for the project with assistance from Keller.
02/06/2012	Email from Gray to Slacum asking if Slacum, Clark and Keller are available to meet and discuss this project on Wednesday, February 15, 2012.
02/07/2012	Email from Slacum to Gray stating that Keller and Clark are both available on the 14th and 16th.
02/08/2012	Email from Gray to Slacum, Keller and Clark asking if February 14, 2012 would work at 1 or 2 p.m. as a meeting date and time.
02/08/2012	Email from Clark to Gray**,** Keller and Slacum stating that the 14th works for a meeting date.
02/14/2012	Meeting at the CBFO with Gray, Tracy A. Willard (APHIS), Clark, Murphy and Keller to discuss why a new BO is needed, information CBFO needs to complete BO and the timeline for BO completion.
02/23/2012	Email from Murphy to Clark containing the draft 2003 BO for the Nutria Project.

03/09/2012 Email from Murphy to Craig Koppie (CBFO), Clark and Slacum asking about the required lethal-trap check frequency for eagles and if it can be changed to every 7 days.

03/14/2012 Email from Willard to Keller and Clark containing information regarding the nutria program.

06/06/2012 Email from Gray to Clark stating that Gray has contacted Wildlife Services again to see if they can now provide CBFO with the nutria project description.

06/07/2012 Email from Gray to Clark containing the project description for the nutria project.

06/13/2012 Email from Clark to Murphy asking Murphy to review the nutria project description from Gray.

06/14/2012 Email from Murphy to Clark stating the nutria project description should mention the Virginia part of Delmarva in addition to Maryland and Delaware; and funding permitting, they may be trapping in St. Mary's and Calvert County if nutria are confirmed there.

07/24/2012 Email from Gray to Clark following up on the status of the Delmarva Peninsula Fox Squirrel BO.

07/26/2012 Email from Murphy to Clark containing the draft 2003 BO for the Nutria Project.

07/27/2012 Meeting with Slacum, Clark, Keller and Murphy to discuss date for draft BO completion; the need to notify Virginia Ecological Services Field Office (VAFO) about the Chesapeake Bay Nutria Project; information needed to complete the BO; and assigning the task of providing the information needed to write the Intra-Service Section 7 Consultation to Murphy.

08/02/2012 Email from Clark to Kimberly Smith VAFO notifying her office of the possibility of future nutria eradication efforts in Accomack and Northampton Counties in Virginia.

08/06/2012 Email from Smith to Clark recommending that Clark use the VAFO online system to evaluate effects of the nutria project in Virginia and VAFO would appreciate receiving a copy of the final documents for the nutria project.

08/06/2012 Email from Clark to Smith stating that CBFO will send copies of the final documents to VAFO.

08/07/2012 Email from Murphy to Clark and Keller containing background/project description information for an Intra-Service Section 7 Consultation re-initiation for the Chesapeake Bay Nutria Project given the project's expanded geographic scope.

08/08/2012 Email from Keller to Murphy asking for the GIS layers for the zone map.

08/15/2012 Email from Murphy to Keller and Kendrot asking Kendrot to please send the shape files for the most recent version of the Nutria zone Map.

09/17/2012 Meeting with Clark, Keller and Murphy to discuss if endangered and threatened species data on the CBFO server is up to date; Clark will provide range maps for endangered and threatened species; Murphy will get GIS layers from Kendrot and will also ask Kendrot if Chesapeake Bay Nutria Project staff can use their handheld GPS navigation devices to avoid areas where endangered and threatened species are located.

09/17/2012 Clark received two emails from ecos-support@fws.gov containing the Official Species lists from the VAFO for the portion of the Chesapeake Bay Nutria Project that has the potential to occur in Accomack and Northampton Counties in Virginia.

09/17/2012 Email from Murphy to Keller wanting to meet with Keller and Clark to discuss where we are with the BO and what the next steps are.

09/19/2012 Email from Clark to Murphy asking two questions: If traps are set in forested areas, how will impacts to the DFS be avoided and could Murphy give his reasoning why bog turtles will not set off traps that will be used to catch nutria.

09/20/2012 Email from Murphy to Clark answering the two questions that Clark emailed to Murphy on September 19, 2012

09/20/2012 Email from Murphy to Clark and Keller containing the re-initiation of Intra Service Section 7 Consultation and Amendment to the BO for the Nutria Project as well as shape files for the trapping zones.

09/25/2012 Email from Clark to Murphy telling Murphy that the information needs to be entered into an Intra-Service Section 7 biological evaluation form.

09/26/2012 Email from Murphy to Clark containing the draft Intra-Service Section 7 biological evaluation form for the Chesapeake Bay Nutria Eradication Project.

10/02/2012 Email from Clark to Murphy asking Murphy for a more detailed description of each eradication method.

10/03/2012 Email from Murphy to Clark containing a more detailed description of each eradication method.

10/12/2012 Email from Clark to Murphy asking for GIS shape files for western shore of Maryland and received the files.

10/19/2012 Email from Clark to Murphy asking Murphy if the following statement in the draft BO was true: "Since then, no DFS have been taken and the bald eagle take limit has not been exceeded, with only one eagle captured and released alive since

2005." Also, asked Murphy if the remaining five southern Maryland eastern shore counties were Talbot, Caroline, Queen Anne's, Kent and Cecil.

11/02/2012 Email from Clark to Murphy asking if zinc phosphide and other toxins will be used for the nutria eradication.

11/05/2012 Email from Murphy to Clark stating that they still reserve the option to use zinc phosphide although they have yet to use it and they have not considered the use of any other toxins.

11/05/2012 Email from Gray to Clark inquiring about the status of the BO.

11/05/2012 Email from Murphy to Clark answering the questions from Clark's October 19, 2012 email.

11/06/2012 Email from Clark to Gray stating that the BO is in draft format and I will give it to my supervisor on Friday of this week.

11/06/2012 Email from Gray to Clark asking when will APHIS Headquarters have the opportunity to review the BO.

11/14/2012 Email from Clark to Murphy asking for a map showing the dwarf wedge mussel upstream locations in relation to the emergent marshes frequented by nutria and to send Clark the GIS layers for wetland habitat and rivers which are located on the nutria zone map. Also, Clark stated that after receiving the aforementioned information, the CBFO Endangered Species Program should have all of the information needed to complete the Nutria BO.

11/15/2012 Email from Clark to Gray stating that CBFO should have a final draft by December 10, 2012.

11/28/2012 Email from Murphy to Andy Moser (CBFO) and Clark containing the revised Intra-Service Section 7 biological evaluation form for the nutria project.

12/06/2012 Email from Murphy to Moser and Clark containing the second revisions to the Intra-Service Section 7 biological evaluation form for the nutria project based on Moser's comments.

12/06/2012 Email from Murphy to Moser and Clark asking to meet to discuss the BO.

12/10/2012 Meeting with Clark, Moser and Keller to discuss the take limit for DFS, revisions to the Intra-Service Section 7 Consultation for the Chesapeake Bay Nutria Project and the terms and conditions of the BO.

12/10/2012 Meeting with Murphy, Clark and Keller to discuss the definition of DFS habitat.

12/12/2012 Email from Clark to Gray stating that Clark will send the draft BO to Gray by December 17, 2012.

12/13/2012 Email from Gray to Clark stating that Gray is looking forward to seeing the BO.

12/21/2012 Email from Clark to Gray containing the draft Chesapeake Bay Nutria Project BO for the DFS.

12/26/2012 Gray received the draft Chesapeake Bay Nutria Project BO for the DFS via email.

01/29/2013 Meeting between Murphy and Clark to discuss the November 14, 2012 email message and a possible completion date for the Chesapeake Bay Nutria Project.

02/06/2013 Email from Clark to Murphy asking for the GIS layers for wetland habitat and rivers which are located on the nutria population status zone map.

02/07/2013 Email from Bill Wilmoth (APHIS/Chesapeake Bay Nutria Project) to Clark containing the GIS layers for wetland habitat and rivers which are located on the nutria population status zone map.

02/07/2013 Formal section 7 consultation was initiated for this project.

03/04/2013 Email from Gray to Clark containing a compilation of comments from the Wildlife Services (WS) Maryland and Virginia State Directors, the WS Deputy Director of Wildlife Operations, and from staff in APHIS' Policy and Program Development, Environmental and Risk Analysis Services office.

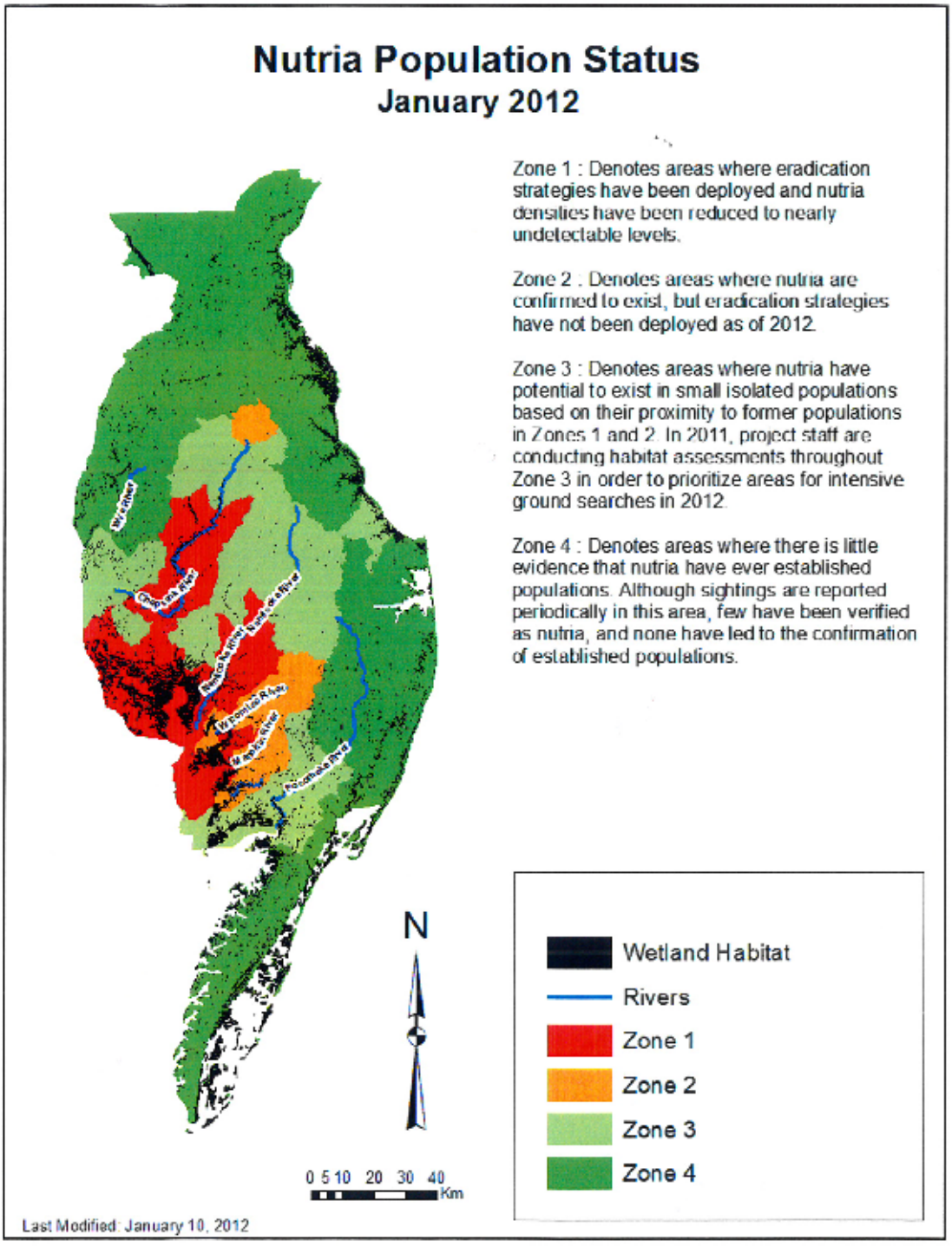

Figure 1. Nutria population status map

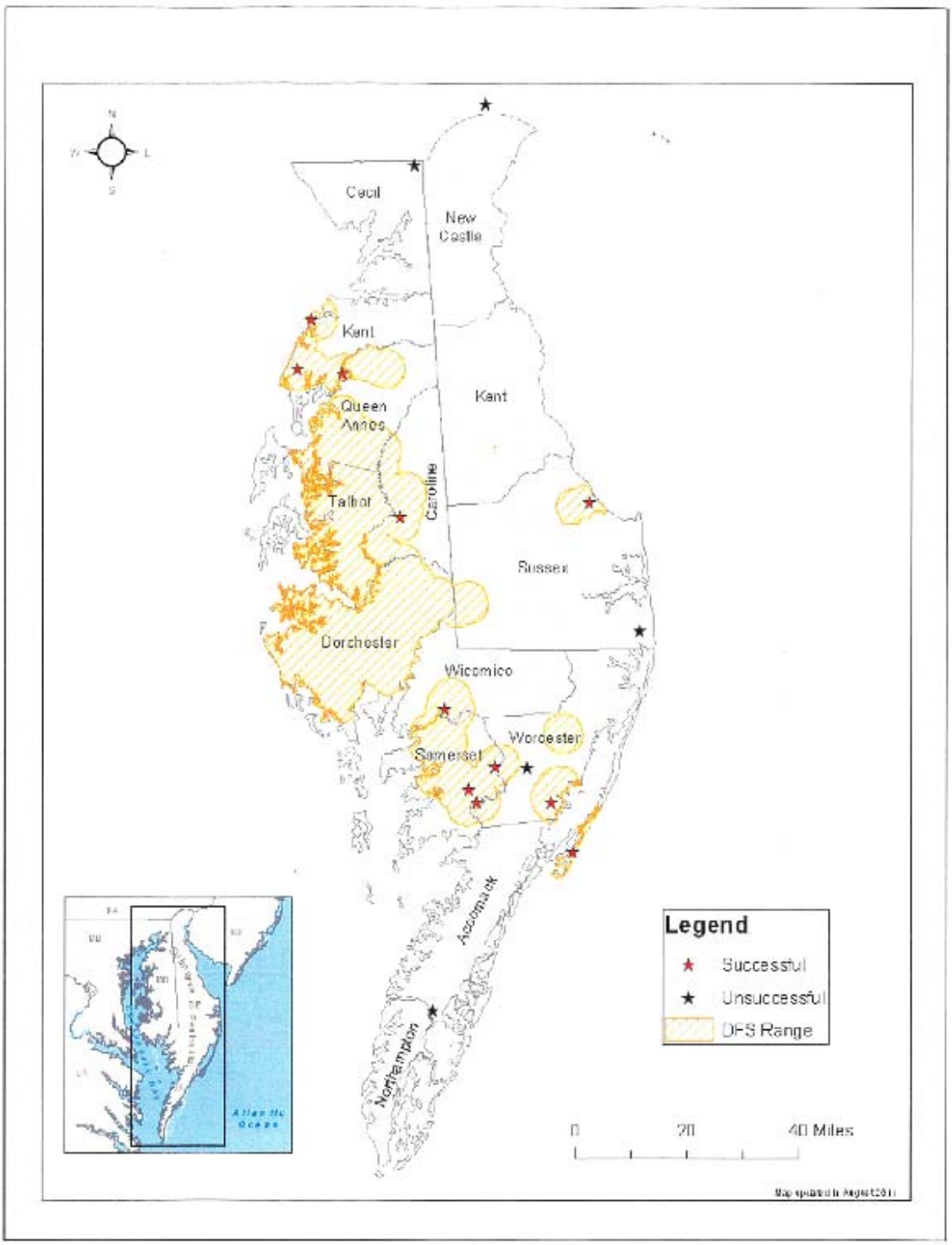

Figure 2. DFS range map

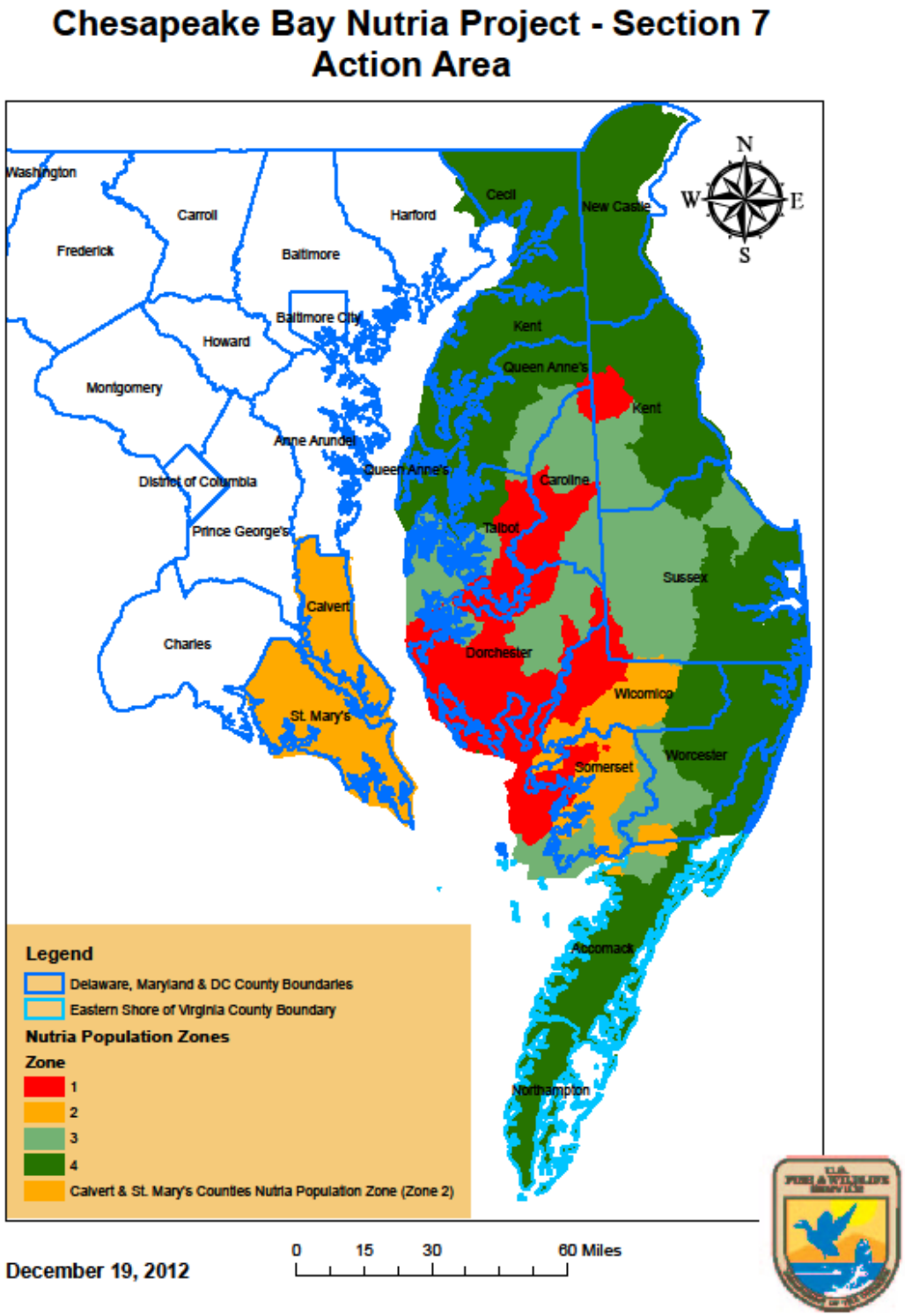

Figure 3. Chesapeake Bay Nutria Project action area

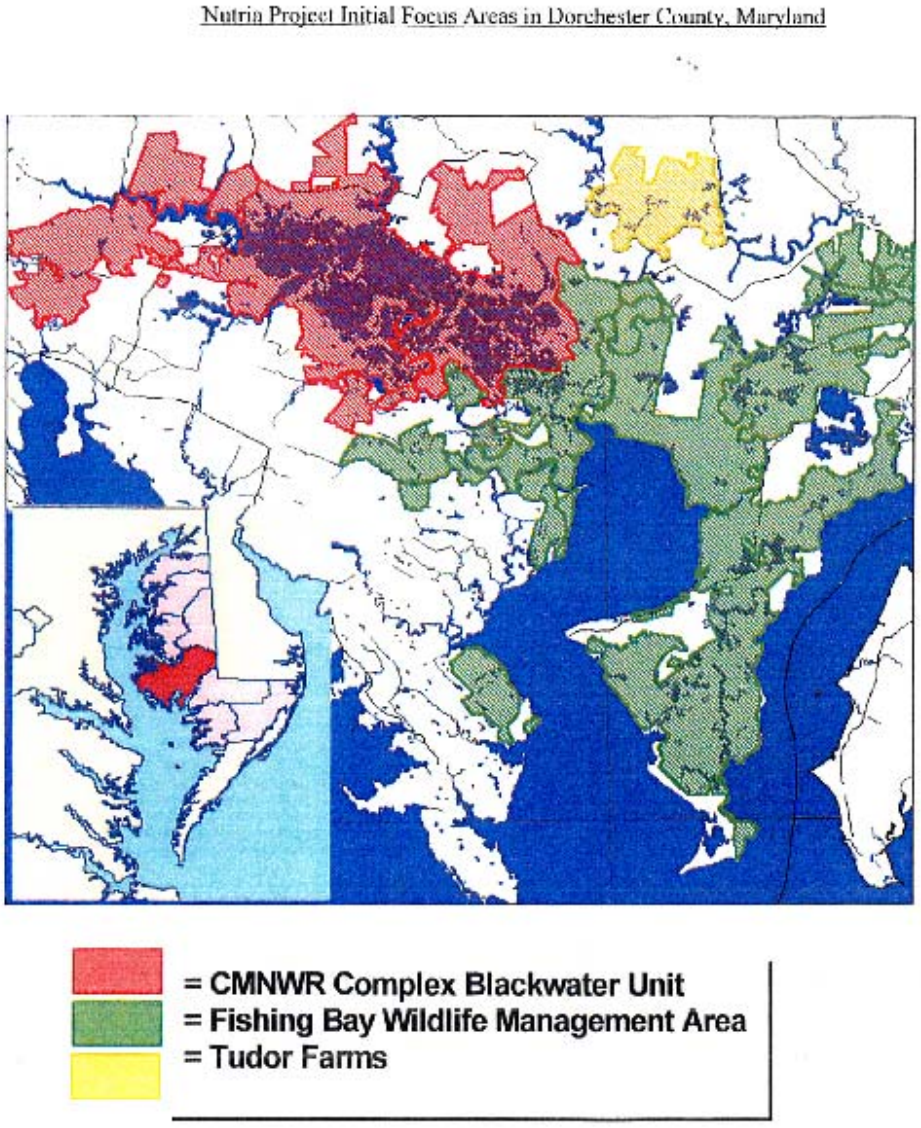

Figure 4. Chesapeake Bay Nutria Project's initial focus areas