
DRAFT ENVIRONMENTAL ASSESSMENT FOR MAXIMUM REMOVAL OF INVASIVE COMMON CARP FROM LAKE MATTAMUSKEET AND ASSOCIATED CANALS.

Date: March 29, 2021

This draft Environmental Assessment (EA) is being prepared to evaluate the effects associated with the proposed action and complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (43 CFR Part 46; 516 DM 8) and U.S. Fish and Wildlife Service (550 FW 3) regulations and policies. NEPA requires examination of the effects of proposed actions on the natural and human environment. Other applicable statutes, executive orders and regulation compliance are addressed in Appendix A.

Proposed Action

The U.S. Fish and Wildlife Service (Service or UFWS) is proposing a maximum removal of invasive common carp (*Cyprinus carpio*) (hereafter referred to as carp) on the Mattamuskeet National Wildlife Refuge (NWR, refuge) in accordance with the refuge's Comprehensive Conservation Plan and EA (FWS 2008) (CCP/EA), the refuge's Habitat Management Plan (FWS 2017) (HMP) and the Lake Mattamuskeet Watershed Restoration Plan and addendum (NCCF 2018). The proposed action will remove 99% of carp in Lake Mattamuskeet as part of restoring the ecosystem integrity. The carp removal would be conducted within the boundaries of the refuge in the 40,276-acre (16,299 hectare) Lake Mattamuskeet and associated canals (Figure 1).

The proposed action directly supports the following goals and objectives from the refuge's CCP, HMP and the Lake Mattamuskeet Watershed Restoration Plan and Addendum (LMWRP).

CCP:

Objective 1-1: Migratory Waterfowl – Annually provide the foraging, sanctuary, and other biological needs for 200,000+ migratory waterfowl.

Objective 1-2: Fish – Continue to protect fish and their habitats and expand cooperation with universities and other agencies to monitor fish population status; increase applied research especially with regard to baseline surveys and Carp management.

Objective 2-1: Open Water Habitat – Maintain 40,276 acre (16,299 hectare) as open water habitat in Lake Mattamuskeet and associated canals. In addition, cooperate with the North Carolina Department of Environment and Natural Resources to develop and implement a SAV monitoring program for the lake.

HMP:

Goal 4.1: Maintain good water quality and healthy SAV communities in the 40,276 acre (16,299 hectare) Lake Mattamuskeet.

HMP

Objective 4.1.4: Remove 75% of common carp biomass for the purpose of promoting SAV growth and restoration and improving water clarity.

Lake Mattamuskeet Watershed Restoration Plan:

Goal: Restore water quality and clarity: Reduce nutrients, sediments and phytoplankton blooms, promote the growth of SAV and remove the lake from the NC 303(d) list of impaired waters; Establish and maintain SAV within the lake; Enhance and maintain the health of the lake's natural resources (waterfowl and wildlife).

Objective: Determine how to effectively improve and meet water quality standards within the watershed;
Actions: Evaluate water quality monitoring results within the lake watershed; perform carp biomass removal.

A proposed action is often iterative and evolves over time during the process as the agency refines its proposal and learns more from the public, Native American Tribes, and other agencies. Therefore, the final proposed action may be different from the original proposed action. The final decision on the proposed action will be made after the conclusion of the public comment period for the EA.

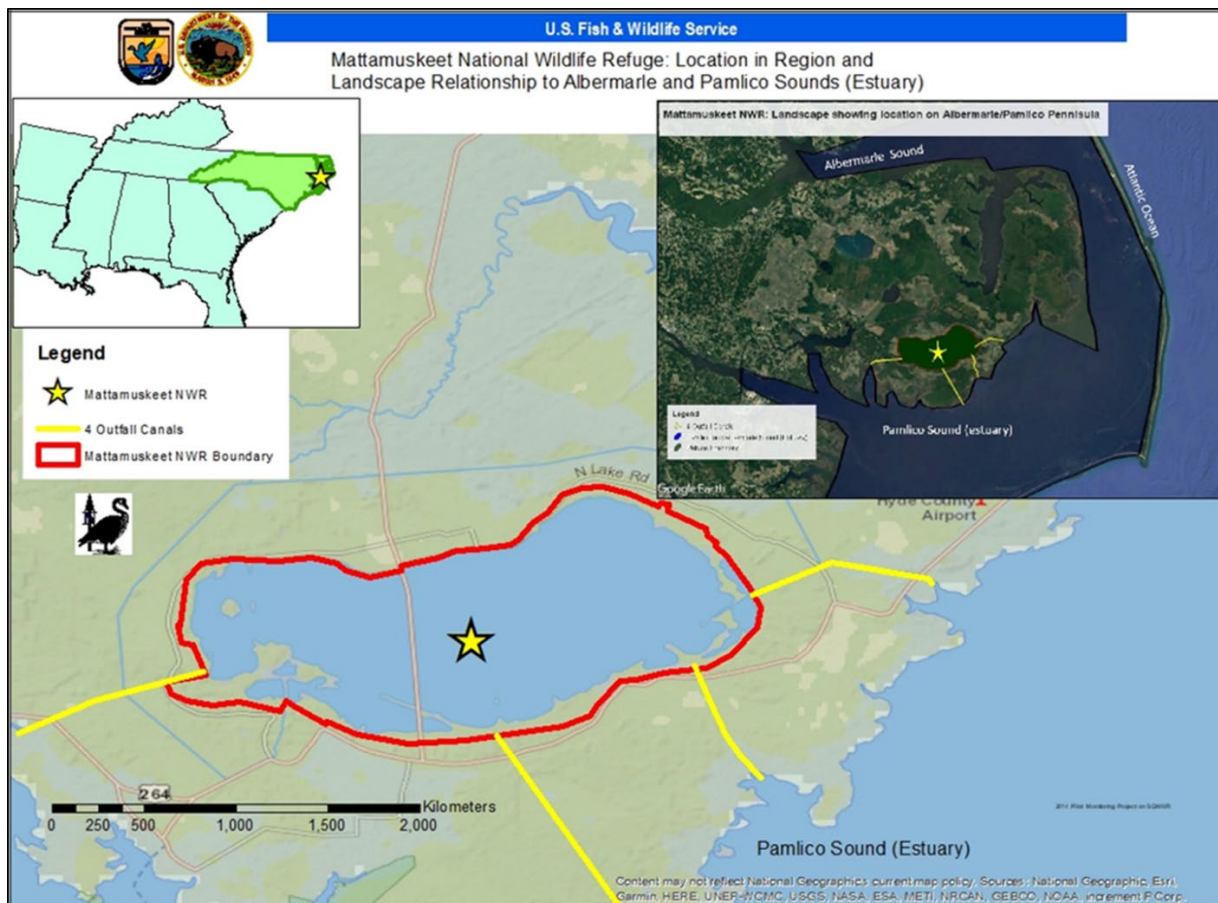


Figure 1. Location of Mattamuskeet NWR in the U. S. Department of Interior Southeast Regions, in relation to the Albemarle and Pamlico Sounds (estuaries) and the four outfall canals that convey water to the Albemarle-Pamlico Sound via one-way tide gates. The proposed action to remove carp would occur within the refuge boundary (red line).

Background

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the NWRS Administration Act of 1966 (NWRSA), as amended by the National Wildlife Refuge System Improvement Act (NWRZIA) of 1997 (16 U.S.C. 668dd et seq.), Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations (CFR) and Fish and Wildlife Service Manual.

Mattamuskeet NWR was established in 1934 pursuant to:

- 16 U.S.C. 742f (a) (4) (Fish and Wildlife Act of 1956)
- 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929)
- 48 Statute 195 (National Industrial Recovery Act 1934)
- Executive Order 6924 (December 18, 1934)

The primary purpose of the refuge is:

...as a refuge and breeding ground for birds and wild animals, and (2) that such portions as the Secretary of Agriculture [Interior] may deem proper be reserved for use as a shooting area, to be operated under a cooperative agreement or lease...With regard to the waters...the Secretary of Agriculture [Interior]...may enter into a cooperative agreement or lease...said waters may be used for fishing purposes... (Executive Order 6924, dated December 18, 1934)

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. 16 USC 715d (Migratory Bird Conservation Act of 1929)

...for the development, advancement, conservation, and protection of fish and wildlife resources... 16 U.S.C. 742f (a) (4) ... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to 742f (b) (1) (Fish and Wildlife Act of 1956)

The 50,180-acre (20,307-hectare) refuge is dominated by the 40,276-acre (16,299-hectare) lake, which is a shallow basin ranging from 0.1 to 3 feet (0.03-to 1meter) deep. Historically, the lake's vegetation was dominated by submerged aquatic vegetation (SAV), which was the primary food source for wintering waterfowl in the area. Collectively, annual wintering waterfowl populations on the lake often exceeded 250,000 ducks, geese, and swans. Unfortunately, due to excessive nutrients and an overabundance of carp, the lake conditions began to decline in the early 1990's in both quality and clarity. During this period of decline, water quality monitoring documented increases in nutrients, harmful algae blooms, and turbidity in the lake. With the decline in water quality and clarity there was an almost complete loss of SAV. By 2017, SAV was largely absent within the lake.

The mission of the NWRS, as outlined by the NWRSA, and as amended by the NWRZIA, is to:

"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans"

The NWRZIA mandates the Secretary of the Interior is administering the System to:

- Provide for the conservation of fish, wildlife, and plants, and their habitats within the NWRS;

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- Ensure that the biological integrity, diversity, and environmental health of the NWRS are maintained for the benefit of present and future generations of Americans;
 - Ensure that the mission of the NWRS described at 16 U.S.C. §668dd(a)(2) and the purposes of each refuge are carried out;
 - Ensure effective coordination, interaction, and cooperation with owners of land adjoining refuges and the fish and wildlife agency of the States in which the units of the NWRS are located;
 - Assist in the maintenance of adequate water quantity and water quality to fulfill the mission of the NWRS and the purposes of each refuge;
 - Recognize compatible wildlife-dependent recreational uses as the priority general public uses of the NWRS through which the American public can develop an appreciation for fish and wildlife;
 - Ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; and
 - Monitor the status and trends of fish, wildlife, and plants in each refuge.

Therefore, it is a priority of the Service to provide a healthy aquatic ecosystem by restoring SAV and improving water quality and clarity in Lake Mattamuskeet for the benefit of Service trust species and priority resources of concern. Species of concern include wintering and migratory waterfowl, long-legged wading birds (breeding and wintering), nesting ospreys (*Pandion haliaetus*), anadromous and catadromous fish that depend on a healthy lake ecosystem to complete their life cycles. In addition, removal of invasive carp is a priority when deemed compatible with the purposes for which the refuge was established and the mission of the NWRS.

Historically, Lake Mattamuskeet has been a healthy aquatic system dominated by thick beds of SAV including wild celery (*Vallisneria americana*), sago pondweed (*Stuckenia pectinate*), southern naiad (*Najas guadalupensis*), redhead grass (*Potamogeton perfoliatus*), and algae (*Chara* spp and *Nitella* spp). In shallow lake systems such as Lake Mattamuskeet (averaging just one meter in depth), an abundance of SAV is a critical component of the aquatic ecosystem as it stabilizes substrate, prevents wind-driven re-suspension of fine sediments, and constitutes critical habitat and food sources for birds, fish, and invertebrates (Geist & Hawkins, 2016).

Today, the Lake Mattamuskeet substrate is barren, having suffered a total loss of all SAV (Moorman et al., 2017). Declines in SAV were first observed in the late 1990's and by 2017 refuge staff were unable to locate a single plant during the annual SAV survey (USFWS 2018). A summary of monitoring data collected since 1981 indicates that SAV declines in the lake were attributed to poor water quality and clarity, mainly regarding observed increases in nitrogen and phosphorous content, followed by lake-wide eutrophication and an overabundance of invasive carp. The feeding behavior of carp (rooting on the bottom sediments in search of invertebrates) can uproot SAV and disturb and re-suspend sediments and nutrients in the water column (Miller 2006). This increases turbidity and decreases water clarity for sunlight penetration. Similar to other plants, SAV requires sunlight to germinate and for photosynthesis.

In 2016, the N.C. Division of Water Resources listed the lake on the 303(d) list of impaired waters due to high pH and chlorophyll-*a*, both of which are indicators for cyanobacteria harmful algal blooms (cyanoHABs) which produce cyanotoxins (USEPA 2016, USFWS 2019). In 2020, during a revision to update waterfowl objectives for the refuge, calculations determined that the absence of SAV and associated invertebrates and seeds in the lake, compared to values from the literature, resulted in a loss of over 20,000,000 energy use days (EUDs) for waterfowl (Hagy 2020, McCain et al., 2019, Bauer 2018, Gross 2018). The need for maximum carp removal is to improve water quality and clarity in the lake and restore SAV.

The removal of invasive carp from impaired aquatic systems is commonly utilized as a management tool and has repeatedly been associated with increased water clarity, reduced nutrient concentrations, and reestablishment of SAV (Knopik & Newman, 2018; Weber & Brown, 2009). Carp were first recognized as a problematic species in Lake Mattamuskeet in the 1940s, when they were identified as a major contributor to increased turbidity that prevented the growth and survival of SAV. This led to a significant effort to remove carp and restore SAV to the lake during the 1940s and 1950s (Cahoon, 1953). These early efforts to restore the lake were ultimately successful, with water clarity increasing from less than 0.16 m to over 0.6 m and SAV expanding to an estimated 16,000 acres (6,475 hectares) of the lakebed. The SAV thrived over the next 60 years until the most recently observed decline began in the 1990s. In addition, during this period, there was an increase in excessive nutrients and sediments entering the lake and carp easily accessed the lake through the four outfall canals.

Purpose and Need for the Proposed Action

The purpose of this proposed action is to remove invasive carp within Lake Mattamuskeet, including through use of commercial fishing, in compliance with the refuge purpose(s) and establishing legislation. The need for this action is to restore habitat quality within the lake and improve the lake's biological integrity, diversity, and environmental health; and implement the CCP (USFWS 2008), HMP (USFWS 2017) and LMWRP and Addendum (NCFC 2018).

Alternatives

Two alternatives were analyzed: Alternative A, Continue Current Management (No Action Alternative) and Alternative B, Implement a maximum removal of invasive carp for Mattamuskeet NWR (Proposed Action).

Alternative A –Continue Current Management (No Action Alternative)

Under Alternative A, a maximum invasive carp removal will not occur and refuge management will continue without changes. The carp population will continue to exist and SAV will not be restored. Lake Mattamuskeet will remain in a hyper-eutrophic, algae dominated system with poor water quality and clarity. The management actions will not be implemented to meet the goals and objectives in the refuge's CCP, HMP and LMWRP. In addition, the lake will remain on the state's 303d list for impaired waters.

Alternative B – Implement a Maximum removal of invasive carp on Mattamuskeet NWR (Proposed Action)

Under the Proposed Action Alternative B, the refuge will implement a maximum removal of invasive carp from Mattamuskeet NWR. The carp removal would be conducted within the boundaries of the refuge in the 40,276-acre (16,299-hectare) Lake Mattamuskeet and associated canals (Figure 1). This will include commercial fishing opportunities to remove carp under a special use permit with special conditions. The proposed action is in accordance with the goals and objectives in the refuge's CCP/ EA (FWS 2008), the refuge's HMP (FWS 2017) (HMP) and the LMWRP and addendum (NCCF 2018). The goal of the proposed action is to remove 99% of carp in the lake and restore ecosystem integrity (i.e. improve water quality and clarity, re-establish submerged aquatic vegetation (SAV), and improve native fish assemblage diversity). In addition, the carp removal will contribute to the removal of the lake from the state's 303d list for impaired waters.

An integrated pest management (IPM) and adaptive approach will be employed including multifaceted carp removal techniques and best management practices found successful at other carp removal locations and historically successful during the 1950's carp removal project. Some of these techniques include commercial fishing under special use permits, modified unified methods, trapping and installing carp barriers to prevent reentry of carp into the lake from the Pamlico Sound. This approach is informed by population information from long-term lake studies and experience from past removal projects. In addition, any new techniques, such as genetic control of carp (Erickson 2020), that become available and approved will be included with the tools to eradicate carp from the lake. Current methods of carp removal are:

1) Carp barriers will be placed at priority locations to prevent ingress of new carp to the lake from the Pamlico Sound and prevent seasonal migrations of carp from the lake into the main refuge canals. The refuge has four outfall canals that connect the lake to Pamlico Sound. These four canals are the main source of new adult carp entering the lake. Although adult carp can survive the brackish water (20 ppt) in the Pamlico Sound, they require freshwater for breeding and for the eggs and larvae to survive. Each of the four outfall canals have a tide gate that opens when the head pressure is greater on the lakeside. This prevents the saltier sound water from entering the lake but allows drainage of lake water into the sound. To prevent the passage of carp, two layers of carp exclusion fences will be installed at the tide gates of each outfall canal. One will be installed on the concrete structures that support the tide gate and a second barrier will be placed near the tide gate. This double barrier will provide biosecurity and prevent entry of new carp, but still allow safe passage for smaller bodied diadromous fish and crustaceans including alewife (*Alosa pseudoharengus*), American eel (*Anguilla rostrate*) and blue crabs (*Callinectes sapidus*). Refuge staff and contractors will install carp barriers.

2) Commercial fishing, with power boats and fishing gear (such as haul nets, pound nets, etc..), would be utilized to remove carp from the refuge owned portions of Lake Mattamuskeet and associated canals. Although bait will be used to attract carp to the nets, baiting will not occur during the waterfowl hunting season. This action would potentially be conducted year round under Commercial Special Use Permits (SUPs) with special conditions. However, the refuge maintains a seasonal closure of the lake and associated canals as a waterfowl sanctuary area. This area is closed to the public to protect wintering waterfowl from human disturbance from October 1 to March 1.

In addition, there are five culverts along the Highway 94 Causeway that are popular fishing areas for bank fishing. One or two culverts at a time will be temporarily closed to allow commercial netting of carp. This will rotate amongst the culverts throughout the year because carp tend to become trap-shy and leave an area after a disturbance from netting. The other three culverts will remain open for recreational bank fishing. In addition, permanent pound nets will be placed near the tide gates in the four outfall canals. These netted areas will be closed to the public. However, when active carp removal is not being conducted, access on the tide gates and along the remaining portions of the outfall canals away from the pound nets will remain open during the sport fishing seasons. In addition, other bank fishing opportunities for subsistence fishing will continue along refuge canals as identified in the Refuge Sport Fishing Regulations. Please see the Compatibility Determination for Commercial Fishing for additional information.

3) External carp contractors will implement the modified-unified-method (MUM) of carp control, which uses a combination of sound speakers and electric panels to herd and push fish into massive nets. This technique has been shown to be extremely effective at removing carp in large systems, capable of removing densities up to 85% (Tony Havernek, pers. comm.). The merchantable carp will be distributed to the permitted commercial fishermen and the unmerchantable carp will be buried on the refuge. Any remaining carp not harvested from the MUM technique will continued to be captured by commercial fishermen under the SUPs. However, baiting will not occur during the waterfowl hunting season.

This alternative will restore the ecological integrity of the lake (i.e. improving water quality and clarity, and SAV restoration). Furthermore, this fulfills the Service's mandate under the NWRSA of 1997 and goals and objectives in the refuge's CCP, HMP and LMWRP.

Affected Environment and Environmental Consequences

The refuge consists of approximately 50,180 acres (20,307 hectares) in Hyde County, North Carolina. The centerpiece of Mattamuskeet NWR is the 40.276-acre (16,299- hectare) Lake Mattamuskeet. The lake's size and strategic location along the Atlantic Flyway make it the area's premiere overwintering site for migratory waterfowl (Figures 1). Historically, the SAV in Lake Mattamuskeet provided over 34,000,000 energy use days of forage habitat for diverse populations of waterfowl, other migratory birds and fish species. The priority species and identified resources of concern (ROCs) (FY 2020 Memo from NWRS Chiefs for biological planning and identifying ROCs on refuges) for the lake include tundra swans (*Cygnus columbianus*), and dabbling ducks (e.g., American wigeon (*Mareca Americana*) and gadwall (*Mareca strepera*). Other priority waterfowl species include diving ducks (e.g., canvasback (*Aythya valisineria*) and redhead (*Aythya americana*)). Lake Mattamuskeet also provides year-round habitat and food resources for a plethora of wetland-dependent wildlife, namely nesting habitat for osprey (*Pandion haliaetus*) and great blue heron (*Ardea herodias*) rookeries and resting and feeding areas for long-legged wading birds and shorebirds. Beneath the surface, Lake Mattamuskeet supports several economically and ecologically valuable freshwater fish, such as largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and bluegill (*Lepomis macrochirus*). Lake Mattamuskeet is connected to the Pamlico Sound through four main drainage canals (Figure 1). This unique connection creates a corridor for diadromous fish and crustacean species to utilize lake habitats including: the identified ROCs alewife (*Alosa pseudoharengus*) and other priority fish including the American eel (*Anguilla rostrata*), and blue crab (*Callinectes sapidus*) which are highly regarded for their relatively large size. This level of biodiversity has long promoted a healthy stream of public interest, attracting over 58,000 visitors annually who utilize the refuge for educational and recreational activities such as hunting, fishing, crabbing, and wildlife observation (Frew et al., 2018). Collectively, Lake Mattamuskeet's rich history, cultural significance, and biodiversity make it a unique and invaluable public destination for Hyde County and North Carolina. However, since the 1990s, due to excessive nutrients and high turbidity, the clear water and abundance of SAV has shifted to an algal dominated, hyper-eutrophic system with high turbidity, poor water quality and an overabundance of invasive carp. In 2017, the majority of the SAV is largely absent from the lake.

For more information regarding the affected environment, please see Section 2.2.1 *Lake Mattamuskeet* of the refuge's Habitat Management Plan is incorporated herein by reference (USFWS 2017).

The resources in Table 1 below either (1) do not exist within the project area or (2) would either not be affected or only negligibly affected by the proposed action

Table 1. Potential for Adverse Impacts from Proposed Action and Alternatives

Resources	Not Applicable: Resource does not exist in project area	No/Negligible Impacts: Exists but no or negligible impacts	Greater than Negligible Impacts: Impacts analyzed in this EA
Species to Be Hunted/Fished	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Non-Target Wildlife and Aquatic Species	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Threatened and Endangered Species and Other Special Status Species	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat and Vegetation (including vegetation of special management concern)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Geology and Soils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Air Quality	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Floodplains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wilderness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visitor Use and Experience	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cultural Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Refuge Management and Operations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Socioeconomics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all Federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The Service is unaware of any reasonably foreseeable impact associated with the proposed action that will impact minority and low income populations.

The refuge has completed the Section 106 compliance under the Regional Archeologist. Neither of these alternatives will have any impacts to cultural resources. Carp removal is not expected to cause ground disturbance. Any activity that might cause an effect to a historic property would be subject to a case-by-case Section 106 review. If a future action should cause ground disturbance, the Service will follow all regulations and policies related to cultural and historic resources.

This section analyzes the environmental consequences of each alternative on the affected resources, including direct and indirect effects. This EA only includes the written analyses of the environmental consequences on a resource when the impacts on that resource could be more than negligible and therefore considered an

“affected resource”. Any resources that will not be more than negligibly impacted by the action have been dismissed from further analyses and are not included here.

Tables 2-6 provide, for each resource of the refuge:

1. A brief description of the relevant general features of the affected environment;
2. A description of relevant environmental trends and planned actions;
3. A brief description of the affected resources in the proposed action area;
4. Impacts of the proposed action and any alternatives on those resources, including direct and indirect effects.

Table 2. Affected Natural Resources and Anticipated Impacts

Wildlife
<p><i>Affected Environment Description</i></p> <p>The refuge and its surrounding waters support many species of resident and migratory fish and wildlife. Of these, 48 species are fish (CCP/EA 2008), 145 are birds, 48 are reptiles and amphibians, and 40 are mammals. The refuge supports wildlife species that are important from both a regional and a national standpoint. Its large size and vegetative diversity make the refuge a haven for species that require aquatic and wetland habitats.</p> <p>The refuge is situated roughly at the midpoint of the Atlantic Flyway and is a popular and valuable feeding and resting area for numerous species of wintering waterfowl. Tundra swans, coots, and more than 25 species of ducks winter either on the refuge or in the sounds and rivers adjacent to the refuge. Populations of migratory waterfowl peak during the months of November through February.</p> <p>Lake Mattamuskeet provides over 40,000 acres (16,299 hectares) of open water for resting, feeding, and escape cover. The most prevalent wintering species are found in Lake Mattamuskeet, moist-soil units and refuge marshes and include Northern pintail, green-winged teal, gadwall, American widgeon, mallard, and American black duck. Other species wintering or migrating on the refuge and surrounding waters may include blue-winged teal, ring-necked duck, Northern shoveler, greater scaup (<i>Aythya marila</i>), lesser scaup (<i>A. affinis</i>), canvasback (<i>A. va/isineria</i>), ruddy duck (<i>Oxyura jamaicensis</i>), redhead (<i>A. Americana</i>), bufflehead (<i>Bucephala albeola</i>), hooded merganser (<i>Lophodytes cucul/atus</i>) and red-breasted merganser (<i>Mergus serrator</i>). Tundra swan numbers increased steadily to a peak of over 30,000 birds counted during the mid-Winter Survey in 2008. Since this time, mid-winter counts have decreased to under 10,000 swans recorded in 2016 with a significant decline in the numbers of swan observed on the Lake. This could potentially be attributed to the loss of submerged aquatic vegetation that has occurred during this period.</p> <p>Although celebrated primarily for its waterfowl, Mattamuskeet NWR also provides habitat for formerly listed species such as the bald eagle and peregrine falcon. During the summer months, the refuge provides important habitat for breeding ospreys, herons, wood ducks and other migratory birds species.</p>
<p><i>Environmental Trends and Planned Actions</i></p> <p>When the refuge was established in 1934, a consent decree was issued to maintain existing gravity flow in existing canals for drainage from surrounding agricultural lands into the lake. Since the 1990s, there was a gradual decline in the SAV in the lake. Over these past 30 years, Lake Mattamuskeet has shifted from a clear water, SAV dominated system to a hyper-eutrophic, high turbidity, poor water quality, and algal dominated system. In 2016, the lake was listed as 303d for impaired waters. In 2017, the SAV disappeared from the lake. The deterioration of the lake is due to excessive nutrients and total suspended solids entering the lake and the over-abundance of invasive common carp. In addition, the tide gates at the four outfall canals operate with head pressure to allow water to flow from the lake</p>

into the Pamlico Sound. Subsequently, due to higher water levels in the Pamlico Sound, the tide gates remain closed for longer periods of time thus reducing water flow out of the lake.

In a multi-stakeholder effort to improve water quality in Lake Mattamuskeet, the Mattamuskeet Technical Working Group, NCWRC, Hyde County, North Carolina Coastal Federation (NCCF), and local stakeholders collectively drafted the Lake Mattamuskeet Watershed Restoration Plan, which was released in 2018 (NCCF, 2018). The plan includes Best Management Practices (BMPs) and strategies aimed to improve Lake Mattamuskeet's water quality and restore SAV to the lakebed. Among these, two strategies were identified as priority actions necessary for successful restoration of the lake: a reduction in carp biomass and a reduction in external nutrient loading from runoff. While existing research and results from Lamb (2020) suggest that carp removal alone is significant enough to cause drastic improvements in ecosystem health, it was agreed that a multifaceted approach would yield the highest probability of long-term success. These efforts compliment the goals outlined in the Mattamuskeet NWR's HMP, which calls for the removal of 75% of the standing carp biomass for the purpose of promoting SAV restoration and improving water clarity (USFWS 2017).

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur and the waterfowl sanctuaries will remain closed during the winter months. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the Alternative A, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

Commercial fishing for carp removal will occur on a temporary basis, year round, including during the osprey breeding season. The osprey nests and heron rookeries will continue to be monitored to avoid

disturbances from recreational fishermen, as well as commercial fishermen (if allowed). The SUP will include special conditions to address excessive disturbance (such as flushing birds off the nest for long periods of time) if it occurs. Based on monitoring, restrictions may include adjustments to when fishermen can access a specific area (e.g. early mornings only), zoning areas and complete closure of an area during critical nesting periods. Additional restrictions will include prohibiting anchoring or tying onto cypress trees.

Openings of selected portions of the waterfowl sanctuary for commercial fishing during the winter months will include access for power boating to remove carp and access for boat launching facilities utilizing refuge roads. This will likely have minor effects since the majority of waterfowl are not using the lake for feeding because of the loss of SAV. Power boating is used as a means to access the lake for commercial fishing. Because the lake is shallow – 0.1 to 0.9 meters deep, only small boats can be utilized. The degree of wildlife disturbance is predicated on the species, time of year, behavioral activity, level of visitation, boat type, boat operator, and the juxtaposition between boaters and wildlife. The lack of SAV in the lake alters the geography of waterfowl use of the refuge, primarily the lake. Thus, allowing commercial fishing to occur on a temporary basis during the closed season may be considered depending on waterfowl use of the lake during a particular winter. In addition, during the winter months, external carp contractors will implement the modified-unified-method (MUM) of carp control, which uses a combination of sound speakers and electric panels to herd and push fish into massive nets. Carp removal during the winter months and with these various techniques will maximize removal efforts and fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and LMWRP to restore SAV and a healthy aquatic ecosystem.

The short term, direct impacts of commercial fishing during the spring and summer months are minor and would include acute responses of breeding ospreys, herons and other wildlife species to disturbance (noise and rapid movement) from boating (Korchegen and Daulgren 1992, Bouffard 1982). The nesting birds may temporarily leave the nest in response to the boating. Waterbird behavior and the effects from motorized boating was studied with a determination that adverse behavior varied by species. In this study, buffer areas were suggested to be 180 meters for wading birds to reduce impacts (Rodgers and Schwikert 2002). The lake is open for recreational boating between March 1st – October 31st. These impacts are considered to be negligible and minor because the lake will be temporarily and spatially zoned from carp removal to minimize disturbance to the nesting birds.

During the winter season, the short term, direct impacts are immediate responses of waterfowl and other wildlife species to disturbance (noise and rapid movement) from boating such as flushing and dispersing to other areas on the lake. These impacts are considered to be negligible and minor because the lake will be temporarily and spatially zoned for carp removal and the majority of waterfowl are not using the lake for foraging because of the loss of SAV.

The direct, long-term impacts include maximizing carp removal, which results in direct and indirect benefits to habitat including decreasing turbidity and increasing water clarity in the lake. These improved conditions in water quality and clarity will promote SAV restoration. The SAV restoration is

the indicator for a healthy lake ecosystem. The return of SAV will restore an important habitat for waterfowl, native fish and other aquatic species. Improvements in the habitat will provide higher quality waterfowl hunts and fishing opportunities to the public. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Subsequently, this action will attribute to removing the lake from the 303d list for impaired waters.

While it is clear that minor impacts to native wildlife will occur, refuge staff will monitor any disturbance and quickly identify any changes that lead to significant adverse impacts to wildlife and habitat. The level of use is not automatically tied to the number of special use permits issued. Weather and economics are important factors in the numbers of visits each year to the refuge by commercial fishermen. If it is documented during monitoring that the level of disturbance is unacceptable and/or impacts to wildlife have significantly increased, refuge staff will reevaluate this action and consider implementing additional measures to reduce wildlife impacts.

Aquatic Species

Affected Environment Description

Submerged aquatic and emergent vegetation in the lake provide an important nursery habitat and refuge for migratory fish, blue crabs, and other aquatic invertebrates. Anadromous fish and blue crabs can enter the lake through the water control structures when the gates are open. In addition, resident finfish require aquatic habitat of adequate depth and structure, good water quality, appropriate salinity levels, and access to the particular habitats in which they spawn.

Environmental Trends and Planned Actions

When the refuge was established in 1934, a consent decree was issued to maintain existing gravity flow in existing canals for drainage from surrounding agricultural lands into the lake. Since the 1990s, there was a gradual decline in the SAV in the lake. Over these past 30 years, Lake Mattamuskeet has shifted from a clear water, SAV dominated system to a hyper-eutrophic, high turbidity, poor water quality, and algae dominated system. In 2016, the lake was listed as 303d for impaired waters. In 2017, the SAV disappeared from the lake. The deterioration of the lake is due to excessive nutrients and total suspended solids entering the lake and the over-abundance of invasive common carp. In addition, the tide gates at the four outfall canals operate with head pressure to allow water to flow from the lake into the Pamlico Sound. Subsequently, due to higher water levels in the Pamlico Sound, the tide gates remain closed for longer periods of time thus reducing water flow out of the lake.

A study conducted on the impacts that carp have on the aquatic environment King, D. R., and Hunt, G. S. (1967) determined that the growth of submerged vegetation was retarded with high populations of carp through actions of uprooting and feeding. However, according to NCWRC Fisheries Biologist Kevin Dockendorf (personal Communication 2020), drag seine activity may influence SAV beds in any growth stage. On an annual basis, the refuge will continue to monitor SAV as a tool to evaluate SAV improvement and also identify areas to protect from drag seines.

In a multi-stakeholder effort to improve water quality in Lake Mattamuskeet, the Mattamuskeet Technical Working Group, NCWRC, Hyde County, North Carolina Coastal Federation (NCCF), and local stakeholders collectively drafted the Lake Mattamuskeet Watershed Restoration Plan, which was released in 2018 (NCCF, 2018). The plan includes Best Management Practices (BMPs) and strategies aimed to improve Lake Mattamuskeet's water quality and restore SAV to the lakebed. Among these, two strategies were identified as priority actions necessary for successful restoration of the lake: a reduction in carp biomass and a reduction in external nutrient loading from runoff. While existing research and results from Lamb (2020) suggest that carp removal alone is significant enough to cause drastic improvements in ecosystem health, it was agreed that a multifaceted approach would yield the highest probability of long-term success. These efforts compliment the goals outlined in the Mattamuskeet NWR's HMP, which calls for the removal of 75% of the standing carp biomass for the purpose of promoting SAV restoration and improving water clarity (USFWS 2017).

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the “no action” alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The maximum carp removal, including the use of power boats and nets, would occur on a year-round temporary basis. The commercial fishing would be closely monitored and would require a SUP with special conditions to minimize disturbance. The commercial fishing is only for carp removal. All other fish will be released back into the lake. The carp barriers would be placed on the four outfall canals and in major refuge canals. The barriers will prevent new carp from entering the lake, but the spacing between the bars on the barriers will allow passage for native fish and crabs.

The modified-unified-method (MUM) of carp control uses a combination of sound speakers and electric panels to herd and push fish into massive nets. This technique has been shown to be extremely effective at removing carp in large systems, capable of removing densities up to 85% (Tony Havernek, pers. comm.). The merchantable carp will be distributed to the permitted commercial fishermen and the nonmerchantable carp will be buried on the refuge. Any remaining carp not harvested from the MUM technique will continued to be captured by commercial fishermen under the SUPs. However, baiting will not occur during the waterfowl hunting season.

The short term, direct impacts are immediate responses of native fish species to disturbance (noise and rapid movement) from boating, non-target captures in fishing gear and during the MUM to remove carp. Commercial fishing and the MUM will have a negative impact on the common carp population in the lake, but positive impacts on sport fishery populations. A study on the effects of removing carp at East Okoboji Lake in Iowa (Rose and Moen 1953) found that this led to increases in game fish and higher catch rates. The effects of commercial netting on sport fish Timmons, T. J., Hoffnagle, R. S., and Soldo, J. B. (2011) found that commercial types of seine netting had little impact on game fish.

These impacts are considered to be negligible and minor because only carp will be removed from the lake. All other species will be released back into the lake. The nonmerchantable carp will be buried on site. The carp barriers will provide fish passage for native fish and blue carps. The commercial fishermen will be operating under a SUP and closely monitored.

The direct, long-term impacts include maximizing carp removal, which results in direct and indirect benefits to habitat including decreasing turbidity and increasing water clarity in the lake. These

improved conditions in water quality and clarity will promote SAV restoration. The SAV restoration is the indicator for a healthy lake ecosystem. The return of SAV will restore an important habitat for waterfowl, native fish and other aquatic species. Improvements in the habitat will provide higher quality waterfowl hunts and fishing opportunities to the public. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP (2019) to restore SAV and a healthy aquatic ecosystem and benefit aquatic species. Subsequently, this action will attribute to removing the lake from the 303d list for impaired waters.

The refuge will monitor the effects of seine netting on non-target species, and all non-target species will be released back into the lake. The permitted commercial fishermen will be required to submit catch data (e.g., pounds of carp, number of non-target species released (alive and dead)) on a weekly basis. In addition, commercial fishermen will be periodically checked by refuge staff and law enforcement to ensure permit guidelines are followed.

Threatened and Endangered Species

Affected Environment Description

The refuge supports a number of species of special status. The state endangered American peregrine Falcon (*Falco peregrinus anatum*) will use a variety of habitats on the refuge. The federally endangered red wolf (*Canis rufus*) occurs on the refuge but has not been documented along the perimeter of the lake. There is more suitable habitat for the red wolf in other areas on the refuge. The federally threatened eastern black rail (*Laterallus jamaicensis jamaicensis*) uses marsh habitats and has not been recorded on the refuge, but there is suitable habitat and it may occur on the refuge. The following federally threatened species may occur but have not been documented on the refuge: sensitive joint vetch (*Aeschynomene virginica*), rough-leaf loostrefe (*Lysimachia asperulaefolia*), rufa red Knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*). There is suitable habitat for federally endangered northern long-eared bat (*Myotis septentrionalis*) but this species has not been documented on the refuge and should not be affected by the carp removal project. The American alligator (*Alligator mississippiensis*) is listed as threatened due to similarity in appearance (TSA) to other listed crocodilian species and does occur on the refuge. Bald eagles (*Haliaeetus leucocephalus*) are frequently observed on the refuge, and there is one documented nest on the refuge, Although there may be some minor temporary disturbance from noise, the nest is not located at the carp removal location. The carp removal operation will occur in the lake, the four outfall canals and along the perimeter of the lake to haul fish from nets.

The Service consulted with the Raleigh Ecological Services Field Office pursuant to Section 7 of the Endangered Species Act and received concurrence. The Proposed Action was determined to be “Not likely to adversely affect species or critical habitat” for all federally listed species in the area.

Environmental Trends and Planned Actions

When the refuge was established in 1934, a consent decree was issued to maintain existing gravity flow in existing canals for drainage from surrounding agricultural lands into the lake. Since the 1990s, there was a gradual decline in the SAV in the lake. Over these past 30 years, Lake Mattamuskeet has shifted from a clear water, SAV dominated system to a hyper-eutrophic, high turbidity, poor water quality, and cyanobacteria dominated system. In 2016, the lake was listed as 303d for impaired waters. In 2017, the SAV disappeared from the lake. The deterioration of the lake is due to excessive nutrients and total suspended solids entering the lake and the over-abundance of invasive common carp. In addition, the tide gates at the four outfall canals operate with head pressure to allow water to flow from the lake into the Pamlico Sound. Subsequently, due to higher water levels in the Pamlico Sound, the tide gates remain closed for longer periods of time thus reducing water flow out of the lake.

In a multi-stakeholder effort to improve water quality in Lake Mattamuskeet, the Mattamuskeet Technical Working Group, NCWRC, Hyde County, North Carolina Coastal Federation (NCCF), and local stakeholders collectively drafted the Lake Mattamuskeet Watershed Restoration Plan, which was released in 2018 (NCCF, 2018). The plan includes Best Management Practices (BMPs) and strategies aimed to improve Lake Mattamuskeet’s water quality and restore SAV to the lakebed. Among these, two strategies were identified as priority actions necessary for successful restoration of the lake: a reduction in carp biomass and a reduction in external nutrient loading from runoff. While existing

research and results from Lamb (2020) suggest that carp removal alone is significant enough to cause drastic improvements in ecosystem health, it was agreed that a multifaceted approach would yield the highest probability of long-term success. These efforts compliment the goals outlined in the Mattamuskeet NWR's HMP, which calls for the removal of 75% of the standing carp biomass for the purpose of promoting SAV restoration and improving water clarity (USFWS 2017).

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the "no action" alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

Under Alternative B, there will be minimal expected impacts to threatened and endangered species. Limited habitat disturbance in emergent zones around the perimeter of the lake for carp removal will occur, which could have minimal effects on peregrine falcons or bald eagles. Black rails have not been documented on the refuge, so carp removal should have no impact on that species.

Vegetation: Submerged Aquatic Vegetation

Affected Environment Description

Historically, Lake Mattamuskeet has been a healthy system dominated by thick beds of SAV, including wild celery (*Vallisneria americana*), sago pondweed (*Stuckenia pectinate*), southern naiad (*Najas guadalupensis*), redhead grass (*Potamogeton perfoliatus*), and the algae (*Chara* spp), and (*Nitella* spp). In shallow lake systems such as Lake Mattamuskeet (averaging just four feet in depth), an abundance

of SAV is a critical component of ecosystem health as it stabilizes substrate, prevents wind-driven re-suspension of fine sediments, and constitutes critical habitat and food sources for birds, fish, and invertebrates (Geist & Hawkins, 2016).

Environmental Trends and Planned Actions

Today, the Lake Mattamuskeet substrate is barren, having suffered a total loss of all SAV (Moorman et al., 2017). Declines in SAV were first observed in the late 1990's and by 2017 refuge staff were unable to locate a single plant during the annual SAV survey. A summary of monitoring data collected since 1981 indicates that SAV declines in the lake were attributed to poor water quality and clarity, mainly regarding observed increases in nitrogen and phosphorous content, followed by lake-wide eutrophication. In 2016, the N.C. Division of Water Resources listed the lake on the 303(d) list of impaired waters due to high pH and chlorophyll-*a*, both of which are indicators for cyanobacteria harmful algal blooms (cyanoHABs) which produce cyanotoxins (USEPA 2016, USFWS 2019). Further monitoring efforts confirmed that three cyanotoxins, cylindrospermopsin, microcystin, and saxitoxin were present in the lake, with cylindrospermopsin concentrations bordering federal limits for recreation contact (Moorman et al., 2018). In 2020, during a revision to update waterfowl objectives for the refuge, the absence of SAV and associated invertebrates and seeds in the lake, compared to values from the literature, resulted in a loss of over 20,000,000 energy use days (EUDs) for waterfowl (Table 1; Hagy 2020, McCain et al., 2019, Bauer 2018, Gross 2018).

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the “no action” alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The preferred action alternative will remove an invasive species resulting in improvements in water quality, clarity, promote conditions for SAV restoration and provide a healthier aquatic ecosystem. The SAV restoration is the indicator for a healthy lake ecosystem. The return of SAV will restore an important habitat for waterfowl, native fish and other aquatic species. Improvements in the habitat will provide higher quality waterfowl hunting, fishing, wildlife observation and photography for the public. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Subsequently, this action will attribute to removing the lake from the 303d list for impaired waters.

Water Resources

Affected Environment Description

Historically, Lake Mattamuskeet was a shallow, clear water lake with an abundance of SAV. Lake Mattamuskeet drains to the Pamlico Sound through four outfall canals. Each of the four outfall canals have a tide gate that opens when the head pressure is greater on the lakeside. This prevents the saltier sound water from entering the lake but allows drainage of lake water into the Pamlico Sound. Subsequently, due to higher water levels in the Pamlico Sound, the tide gates remain closed for longer periods of time thus reducing water flow out of the lake. The Albermarle and Pamlico Sounds are recognized as an estuary of national significance.

Environmental Trends and Planned Actions

Changing weather patterns, whether it results from anthropogenic or natural sources, is expected to affect a variety of natural processes and associated resources. However, the complexity of ecological systems means that there is a tremendous amount of uncertainty about the impact climate change will actually have. In particular, the localized effects of climate change are still a matter of much debate. The combination of increased frequency and severity of hurricanes in northeastern NC and sea level rise resulting in higher water levels in the Pamlico Sound could dramatically reduce the amount and quality of freshwater lakes and wetland habitats in the area. As a result, waterfowl and other wildlife species would be forced into smaller areas of suitable habitat or forced to leave the area. Concentrating waterfowl and other wildlife into smaller areas also has the potential to more readily allow disease to spread and increase mortality.

Since the 1990s, increased turbidity of the lake is at least partially attributable to the loss of SAV and an overabundance of invasive carp. In 2016, the N.C. Division of Water Resources listed the lake on the 303(d) list of impaired waters due to high pH and chlorophyll-*a*, both of which are indicators for cyanobacteria harmful algal blooms (cyanoHABs) which produce cyanotoxins (USEPA 2016, USFWS 2019). Further monitoring efforts confirmed that three cyanotoxins, cylindrospermopsin, microcystin, and saxitoxin were present in the lake, with cylindrospermopsin concentrations bordering federal limits for recreation contact (Moorman et al., 2018). During high lake head pressure on the tide gates, this water drains through the four outfall canals into the Albermarle-Pamlico Sound.

According to the Tar-Pamlico Nutrient Strategy (NCDEQ 2020), since the 1980s, nutrient-related pollution has created water quality problems in the Pamlico estuary. Excess amounts of nutrients like nitrogen and phosphorus have caused problems including low oxygen levels, extensive fish kills and harmful algal blooms. In response to these issues, North Carolina developed the Tar-Pamlico nutrient strategy, a set of rules designed to equitably regulate sources of nutrient pollution in the basin including wastewater, stormwater, and agricultural nutrient sources. The rules also protect riparian buffers and mandate training for professionals that apply fertilizer. The rules went into effect in 2000-2001 and seek to reduce nitrogen levels in the estuary by 30%, cap phosphorus levels at a 1991

baseline, and remove the Pamlico estuary from North Carolina's impaired waters list. The Reducing bottom disturbance from carp and restoring the SAV and water quality in Lake Mattamuskeet will also benefit the downstream Albemarle-Pamlico estuary of national significance and the two federally listed sturgeon species that depend on it.

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the "no action" alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The preferred action alternative will remove an invasive species resulting in improvements in water quality, clarity, promote conditions for SAV restoration and provide a healthier aquatic ecosystem. The SAV restoration is the indicator for a healthy lake ecosystem. The return of SAV will restore an important habitat for waterfowl, native fish and other aquatic species. Improvements in the habitat will provide higher quality waterfowl hunting, fishing, wildlife observation and photography for the public. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Subsequently, this action will attribute to removing the lake from the 303d list for impaired waters.

Water Quality

Affected Environment Description

Historically, Lake Mattamuskeet was a shallow, clear water lake with an abundance of SAV. In shallow lake systems such as Lake Mattamuskeet (averaging just four feet in depth), an abundance of SAV is a critical component of ecosystem health as it stabilizes substrate, prevents wind-driven re-suspension of fine sediments, and constitutes critical habitat and food sources for birds, fish, and invertebrates (Geist & Hawkins, 2016).

Environmental Trends and Planned Actions

When the refuge was established in 1934, a consent decree was issued to maintain existing gravity flow in existing canals for drainage from surrounding agricultural lands into the lake. Since the 1990s, there was a gradual decline in the SAV in the lake. Over these past 30 years, Lake Mattamuskeet has shifted from a clear water, SAV dominated system to a hyper-eutrophic, high turbidity, poor water quality, and cyanobacteria dominated system. In 2016, the lake was listed as 303d for impaired waters. In 2017, the SAV disappeared from the lake. The deterioration of the lake is due to excessive nutrients and total suspended solids entering the lake and the over-abundance of invasive common carp. In addition, the tide gates at the four outfall canals operate with head pressure to allow water to flow from the lake into the Pamlico Sound. Subsequently, due to higher water levels in the Pamlico Sound, the tide gates remain closed for longer periods of time thus reducing water flow out of the lake.

In a multi-stakeholder effort to improve water quality in Lake Mattamuskeet, the Mattamuskeet Technical Working Group, NCWRC, Hyde County, North Carolina Coastal Federation (NCCF), and local stakeholders collectively drafted the Lake Mattamuskeet Watershed Restoration Plan, which was released in 2018 (NCCF, 2018). The plan includes Best Management Practices (BMPs) and strategies aimed to improve Lake Mattamuskeet's water quality and restore SAV to the lakebed. Among these, two strategies were identified as priority actions necessary for successful restoration of the lake: a reduction in carp biomass and a reduction in external nutrient loading from runoff. While existing research and results from Lamb (2020) suggest that carp removal alone is significant enough to cause drastic improvements in ecosystem health, it was agreed that a multifaceted approach would yield the highest probability of long-term success. These efforts compliment the goals outlined in the Mattamuskeet NWR's HMP, which calls for the removal of 75% of the standing carp biomass for the purpose of promoting SAV restoration and improving water clarity (USFWS 2017).

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration

Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Under the "no action" alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The preferred action alternative will remove an invasive species resulting in improvements in water quality, clarity, promote conditions for SAV restoration and provide a healthier aquatic ecosystem. The SAV restoration is the indicator for a healthy lake ecosystem. The return of SAV will restore an important habitat for waterfowl, native fish and other aquatic species. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Subsequently, this action will attribute to removing the lake from the 303d list for impaired waters.

TABLE 3. AFFECTED VISITOR USE AND EXPERIENCE

Visitor Use and Experiences

Affected Environment Description

The refuge will ensure that opportunities are provided within the NWRS for compatible wildlife-dependent recreational uses; these include hunting, fishing, wildlife observation and photography, environmental education and interpretation.

The Hyde County Chamber of Commerce lists the refuge as one of the area's main attractions. Historically, the refuge averages about 37,000 visitors per year. Visitors come to hunt, fish, observe wildlife and be present in nature. This provides local businesses and the county with many opportunities for ecotourism, hunting, fishing, photography and wildlife observation. Total expenditures were \$1.7 million with non-residents accounting for \$1.6 million or 90 percent of total expenditures. Expenditures on fishing activities accounted for 59 percent of all expenditures. Spending in the local area generates and supports economic activity within Hyde County.

Environmental Trends and Planned Actions Description

Visitation to the refuge has been increasing in recent years. Visitation for consumptive uses include hunting and fishing. Non-consumptive uses include wildlife observation and photography and environmental education. The contribution of recreational spending in local communities was associated with about 23 jobs, \$554,000 in employment income, \$115,000 in total tax revenue, and \$1.8 million in economic output (Caudill et.al 2019). Between 2016 to 2019, the refuge recorded an increase of 76,500 to 87,516 visitors. In 2020, the visitor number dropped to 78,247 due to the closure of Hyde County in April 2020 because of the Coronavirus Pandemic (USFWS 2020).

Wildlife-dependent recreation is an important socio-economic driver in this local area. People come from around the world to see the wintering migratory waterfowl, hunt fish and experience the wonders of Lake Mattamuskeet. The polluted conditions in the lake have reduced the quality of visitation on the refuge.

The preferred alternative will lead to the control of invasive common carp in Lake Mattamuskeet and address one of the top priority actions identified in the Lake Mattamuskeet Watershed Restoration Plan (2019). The project will be conducted concurrently with BMP's and ongoing stakeholder efforts to reduce nonpoint source nutrient loading to the lake, thus providing the maximum chance of success. Successful completion of this project will lead to an improvement in Lake Mattamuskeet's water quality, water clarity, and habitat quality and quantity by promoting the reemergence and successful restoration of SAV and ultimately the renewal of one of the premiere Atlantic Flyway overwintering waterfowl sites. This will improve quality opportunities for visitation to the refuge.

Visitor Use and Experiences

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP (2018) to restore SAV and a healthy aquatic ecosystem. Under the “no action” alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The maximum carp removal, including the use of power boats and nets, would occur on a year-round temporary basis. The commercial fishing would be closely monitored and would require a SUP with special conditions to minimize disturbance. Some areas, including culverts along the Highway 94 Causeway, outfall canals and zones in the lake will be temporarily or permanently closed to the public to conduct commercial fishing to remove carp. Although bait will be used to attract carp to the nets, baiting will not occur during the waterfowl hunting season. Zones in the lake with active commercial fishing to remove carp will be closed to the public. However, there is ample room in the 40,276 acre (16,299 hectare) lake to accommodate recreational fishing in other areas of the lake.

The deteriorated and polluted state of the lake reduces the quality of these visitor experiences. The refuge was required to post water warning signs at popular visitor locations to inform refuge visitors about the harmful algal blooms present in the lake. The removal of carp in addition to implementing BMPs in the LMWRP (2019) will improve water quality, help restore SAV and reduce harmful algae blooms in the lake. This will provide a healthier environment for the public and wildlife.

Short-term direct impacts are immediate responses to disturbance (noise and rapid movement) from boating. Power boating is used as a means to access the lake for commercial fishing as it is currently for recreational fishing. Because the lake is shallow – 0.1 to 0.9 meters deep, only small boats can be utilized. These boating activities result in a small amount of disturbance to wildlife and native fish, as they access different parts of the lake. In addition, some of the culverts along Highway 94 may be periodically closed, on a temporary basis, to recreational bank fishing to support this use as well. This use may also have a short-term indirect effect on other recreational users such as visitors engaged in wildlife observation in close proximity to commercial fishing activities.

As described under Alternative B impacts to wildlife and aquatic resources, long term impacts of maximizing carp removal will promote SAV restoration and lead to meeting planned goals and objectives and to removing the lake from 303d list for impaired waters which will not be achievable under Alternative A.” this will increase higher quality opportunities for hunting, fishing and wildlife observation for refuge visitors.

TABLE 4. REFUGE MANAGEMENT AND OPERATIONS

Refuge Management and Operations

Carp barriers will be placed on the tide gates in the four outfall canals and in major refuge canals to block carp breeding grounds. These barriers will require routine maintenance to remove debris. The refuge has five permanent staff members that share time between Mattamuskeet NWR, Swanquarter NWR and Cedar Island NWR. Additionally, three employees for the NC Coastal Refuge Complex work with all refuges in complex, including Mattamuskeet.

Environmental Trends and Planned Actions Description

As referenced in the draft Compatibility Determination for Commercial Fishing to Remove Carp, the administration and maintenance related to this use will not materially interfere with or detract from fulfillment of the refuge purpose(s) and the national wildlife refuge mission.

Anticipated Impacts

Alternative A (no action alternative):

Maximum removal techniques, including commercial fishing on a temporary basis, to remove invasive carp will not occur and additional work will not be required by the staff. Therefore, there are no short term impacts. However, for long term impacts, the refuge will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP (2018) to restore SAV and a healthy aquatic ecosystem. Under the “no action” alternative, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

The maximum carp removal, including the use of power boats and nets, would occur on a year-round temporary basis. The commercial fishing would be closely monitored and would require a SUP with special conditions to minimize disturbance. Some areas, including culverts along the Highway 94 Causeway, outfall canals and zones in the lake will be temporarily or permanently closed to the public to conduct commercial fishing to remove carp. Carp barriers will be placed on the tide gates in the four outfall canals and in major refuge canals to block carp breeding grounds. These barriers will require routine maintenance to remove debris. Implementation of this use on the refuge will involve staff time for maintenance, outreach, monitoring, equipment and improvements. A large amount of time is usually required when proposing a new use such as commercial fishing. Additional time is required to administer the program and enforce regulations with the issuance and monitoring of commercial SUPs. Monitoring of the use is carried out by refuge staff, refuge law enforcement officers, North Carolina Wildlife Resources Commission (NCWRC) fishery biologists and state game wardens associated with their normal duties. Facilities and/or materials needed to support this use include maintaining access roads, parking areas, gates, roadside pull-offs, signs, and boat launching areas. These activities and facilities support existing uses including recreational boating and fishing.

Boating and fishing account for vast majority of refuge visits each year. Refuge SUPS for commercial fishing are expected to average 10 or less each year.

MITIGATION MEASURES TO AVOID CONFLICTS

Alternative A– No Action Alternative

No mitigation is required. However, this alternative will not fulfill the refuge's goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem.

Alternative B – Proposed Action Alternative

While it is clear that adverse impacts to native wildlife will occur, refuge staff will monitor this use to quickly identify any changes that lead to significant adverse impacts to wildlife and habitat. The level of use is not automatically tied to the number of special use permits issued. Weather and economics are important factors in the numbers of visits each year to the refuge by commercial fishermen. The refuge would use an adaptive management approach for the carp removal, closely monitor and review the carp removal project and revise as necessary. If it is found during monitoring that the level of use has significantly increased and/or impacts to migratory waterfowl, wildlife and aquatic species have significantly increased, refuge staff will reevaluate this use and consider implementing additional measures to minimize wildlife impacts. In addition, news outlets and media will be used to communicate to the public about the carp removal and the benefits to the health of the lake.

In addition, waterfowl using the lake would be protected from incursions by commercial fishing by implementing selective fishing location and hourly restrictions. Commercial fishing areas and operating criteria within the waterfowl sanctuary will be included in the special conditions of all SUPs provided to commercial fishermen as a way to reduce impacts to wintering waterfowl.. The draft Compatibility Determination for commercial fishing to remove carp has been completed and will be open for public review at the same times as this draft EA. The public will be notified of any commercial fishing activities that are permitted during seasonal lake closures.

MONITORING

The commercial fishermen will be working under special conditions designated within a Commercial SUP. The SUP will be for only carp removal, and all non-target species will be accounted for and released back into the lake. On a weekly basis, the permitted fishermen will be required to report quantity of carp and any non-target species captured. There will also be spot checks at capture locations to ensure SUP conditions are being followed.

The refuge and NCWRC have conducted long term monitoring to document the aquatic health of the lake and effectiveness of management actions to inform future management actions. Since 2012, intensive water quality monitoring has been conducted in the lake and in each of the four outfall canals. In addition, two U.S. Geological Survey Continuous Water Quality Stations were installed in the east and west basins of the lake. Parameters collected include nutrients, turbidity, pH, chlorophyll a, dissolved oxygen, specific conductance, and secchi disk readings for water clarity. Since the early 1980s and during the summer months, the refuge conducts annual surveys for SAV and osprey productivity in the lake. From November through early March, the refuge conducts aerial and ground wintering migratory waterfowl surveys. Every fall, the NCWRC conducts annual fish surveys in the lake and canals to monitor sportfish.

Additional carp population monitoring will be conducted during and post removal efforts to document population declines and help inform management efforts. Post-carp eradication monitoring will continue >20 years to evaluate overall control efficacy. In addition, biosecurity protocols will be evaluated as part of this project as well. The ecosystem response monitoring will consist of on-going Refuge water quality monitoring (i.e. continuous water quality monitoring stations, Refuge canal monitoring, and state-sponsored fish/angler surveys).

SUMMARY OF FINDINGS AND CONCLUSIONS

The purpose of this EA is to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a Finding of No Significant Impact (FONSI). The term “significantly” as used in NEPA requires consideration of both the context of the action and the intensity of effects. This section summarizes the findings and conclusions of the analyses above so that we may determine the significance of the effects.

Alternative A (no action alternative):

Alternative A would result in no carp removal. This alternative will not meet the purpose and needs of the refuge and will not fulfill the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. In addition, the lake will remain on the 303d list for impaired waters.

Alternative B (preferred action alternative):

This alternative is the Service’s proposed action because we believe it offers the best opportunity to remove invasive common carp. This contributes towards the restoration of SAV with associated improved water quality and clarity and will greatly aid in the restoration of this ecosystem. Reducing bottom disturbance from carp and the resulting restoration of SAV will ensure both cleaner water in the lake and in water discharging into the Albemarle-Pamlico estuary from the lake. This will benefit Service trust species and priority resources of concern including wintering and migratory waterfowl (American black duck, northern pintail, tundra swan and other species), long-legged wading birds (breeding and wintering), nesting ospreys, anadromous and catadromous fish that depend on a healthy lake ecosystem to complete their life cycles. Restoring the SAV and water quality in Lake Mattamuskeet will also benefit the downstream estuary of national significance and the two federally listed sturgeon species that depend on it. In addition, Hyde County is working with East Carolina University on a model to increase tourism to Hyde County, an effort largely reliant on a healthy and thriving Lake Mattamuskeet ecosystem, which remains one of the primary economic drivers for the area. Improvements in the habitat will provide higher quality waterfowl hunts and fishing opportunities to the public. In addition, the maximum carp removal will contribute to meeting the goals and objectives in the CCP/EA (2008), the HMP (2017) and the LMWRP to restore SAV and a healthy aquatic ecosystem. Subsequently, this action will contribute to removing the lake from the 303d list for impaired waters.

In summary, no significant impacts would be anticipated to result from the implementation of the Proposed Action Alternative, maximum removal of carp in Lake Mattamuskeet. This alternative helps meet the purpose and needs of the Service as described above, because it improves the habitat conditions for Service trust species and provides higher quality experiences for wildlife-dependent recreation and meets the Service's priorities and mandates. In addition, refuge habitat objectives for migratory birds will be greatly enhanced by the restoration of SAV. The Service proposes that the Proposed Action meets compatibility requirements, including the purposes of the refuges and the mission of the NWRS. The draft CD developed for Commercial Fishing for Carp Removal will be open for public comments concurrently with this draft EA.

List of Sources, Agencies and Persons Consulted

Lake Mattamuskeet Watershed Restoration Technical Working Group

Lake Mattamuskeet Watershed Restoration Collaboration including local stakeholders and Hyde County

N.C Wildlife Resources Commission

Richard Kanaski, Regional Archaeologist, U.S. Fish and Wildlife Service South Atlantic-Gulf and Mississippi Basin Unified Regions

U.S. Fish and Wildlife Service Ecological Services, Raleigh Office

U.S. Fish and Wildlife Service Division of Migratory Birds

List of Preparers

Wendy Stanton, Wildlife Biologist, Mattamuskeet National Wildlife Refuge

State Coordination

The refuge has collaborated with the North Carolina Wildlife Resources Commission and Hyde County to develop the approved Lake Mattamuskeet Watershed Restoration Plan and Addendum. In addition, the refuge and NCWRC collaborate on the Mattamuskeet Watershed Restoration Technical Working Group that supports the goals and objectives for carp removal in the LMWRP (2019), the CCP/EA (2008) and the HMP (2017).

Tribal Consultation and Cultural Resources

Pursuant to the NEPA, the National Historic Preservation Act, the Fish and Wildlife Service's Native American Policy, Secretarial Order 3206 (American Indian Tribal Rights, Federal-Trust Responsibilities, and the Endangered Species Act), and Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), this action will have "no effect" upon any of the Refuge's historic properties, including the architectural ruins and canal system associated with the early 20th century town of New Holland. Due to the nature of the action, the undertaking is deemed to be routine maintenance. Section 106 is not triggered and consultation with the Tribes and the NC SHPO is not necessary. Note that should the scope or scale of the project change, further review by the U.S. Fish and Wildlife Service will be required.

Public Outreach

The LMWRP (2019) was a collaboration process with stakeholders representing private landowners, Hyde County, USFWS, NCWRC and local businesses that met regularly and included numerous public meetings and updates. In addition, following the approval of the LMWRP, a new Memorandum of Understanding between USFWS, NCWRC and Hyde County was approved to continue the collaboration to implement the LMWRP. One of the highest priorities in the LMWRP is carp removal. This Draft EA will be available for public review for 30 days. The public will be notified about the comment period by posting notifications at the refuge’s Visitor Center, on the refuge website, on the North Carolina Refuges Facebook page, and through an informational bulletin in local newspapers.

Determination

This section will be filled out upon completion of any public comment period and at the time of finalization of the Environmental Assessment.

- The Service’s action will not result in a significant impact on the quality of the human environment. See the attached **“Finding of No Significant Impact.”**
- The Service’s action **may significantly affect** the quality of the human environment and the Service will prepare an Environmental Impact Statement.

Signatures

Submitted by:

Project Leader Signature Date

Concurrence:

Regional Historic Preservation Officer Signature Date

Concurrence:

Refuge Supervisor Signature Date

Approved:

Regional Chief, National Wildlife Refuge System Signature Date

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APPENDIX A - OTHER APPLICABLE STATUTES, EXECUTIVE ORDERS & REGULATIONS

STATUTES, EXECUTIVE ORDERS, AND REGULATIONS
<p>Cultural Resources</p> <p>American Indian Religious Freedom Act, as amended, 42 U.S.C. 1996 – 1996a; 43 CFR Part 7</p> <p>Antiquities Act of 1906, 16 U.S.C. 431-433; 43 CFR Part 3</p> <p>Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa – 470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7</p> <p>National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810</p> <p>Paleontological Resources Protection Act, 16 U.S.C. 470aaa – 470aaa-11</p> <p>Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001-3013; 43 CFR Part 10</p> <p>Executive Order 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971)</p> <p>Executive Order 13007 – Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)</p>
<p>Fish & Wildlife</p> <p>Bald and Golden Eagle Protection Act, as amended, 16 U.S.C. 668-668c, 50 CFR 22</p> <p>Endangered Species Act of 1973, as amended, 16 U.S.C. 1531-1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450</p> <p>Fish and Wildlife Act of 1956, 16 U.S.C. 742 a-m</p> <p>Lacey Act, as amended, 16 U.S.C. 3371 et seq.; 15 CFR Parts 10, 11, 12, 14, 300, and 904</p> <p>Migratory Bird Treaty Act, as amended, 16 U.S.C. 703-712; 50 CFR Parts 10, 12, 20, and 21</p> <p>Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)</p>
<p>Natural Resources</p> <p>Clean Air Act, as amended, 42 U.S.C. 7401-7671q; 40 CFR Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 CFR Part 23</p> <p>Wilderness Act, 16 U.S.C. 1131 et seq.</p> <p>Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq.</p> <p>Executive Order 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999)</p>
<p>Water Resources</p>

Coastal Zone Management Act of 1972, 16 U.S.C.
1451 et seq.; 15 CFR Parts 923, 930, 933

Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. 1251 et seq.; 33 CFR Parts 320-330; 40 CFR Parts 110, 112, 116, 117, 230-232, 323, and 328

Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.; 33 CFR Parts 114, 115, 116, 321, 322, and 333

Safe Drinking Water Act of 1974, 42 U.S.C. 300f et seq.; 40 CFR Parts 141-148

Executive Order 11988 – Floodplain Management, 42 Fed. Reg. 26951 (1977)

Executive Order 11990 – Protection of Wetlands, 42 Fed. Reg. 26961 (1977)

APPENDIX B – EVIDENCE OF PUBLIC NOTICE

The following press release was electronically distributed to media (local newspapers) and an email distribution list and posted on the Refuge website for review.

For Immediate Release

March 29, 2021

Contact: Kendall Smith 252-926-4021 x43901

Wendy Stanton 252-926-4021 x43904

U.S. Fish and Wildlife Service Makes Available the Mattamuskeet Refuge Draft Environmental Assessment for Maximum Carp Removal from Lake Mattamuskeet and Draft Compatibility Determination for Commercial Fishing to Remove Carp from Lake Mattamuskeet for Public Review.

The U.S. Fish and Wildlife Service (Service) announces the availability of a draft Environmental Assessment for the Maximum Carp Removal from Lake Mattamuskeet and a draft Compatibility Determination for Commercial Fishing to remove Carp from the Lake. The proposed invasive carp removal project will be conducted on Mattamuskeet National Wildlife Refuge (Refuge). The Service is seeking comments on the benefits and impacts from maximum carp removal and commercial fishing as one of the tools to remove carp from Lake Mattamuskeet and the four outfall canals.

The National Environmental Policy Act (NEPA) requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. These actions include decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly-owned facilities. Using the NEPA process, the Refuge can evaluate the environmental and related social and economic effects of these proposed actions.

National Wildlife Refuges are required by law to determine the compatibility of any proposed or existing use with the mission of the National Wildlife Refuge System and the purpose for which a particular refuge was established. The mission of Mattamuskeet National Wildlife Refuge is to protect migratory birds and other native wildlife and their breeding grounds and habitat for the benefit of the American people,” stated Refuge Manager Kendall Smith. He added, “We want the community to be informed about the work being proposed and to have an opportunity to weigh in on the pros and cons of that work.”

If you wish to review the draft Environmental Assessment and draft Compatibility Determination, copies are available at the Coastal North Carolina National Wildlife Refuges website at <https://www.fws.gov/ncgatewayvc/>. Written comments may be sent to: Refuge Manager, Mattamuskeet National Wildlife Refuge 85 Refuge Rd, Swan Quarter, NC 27885 or emailed to mattamuskeet@fws.gov.

All comments must be submitted no later than close of business (4:00 PM) on April 29, 2021. If you need additional information or to request documents in alternative formats, please contact Refuge Manager Kendall Smith at 252-926-4021 x43901 or Wildlife Biologist Wendy Stanton at 252-926-4021 x43904.
