

## Chapter 2



USFWS

*Eastern B-Pool during spring, prior to draw-down for shorebird feeding*

## **Alternatives, Including the Service-preferred Alternative**

## Introduction

This chapter presents three alternatives for all aspects of Refuge management, including habitat management and public use, for the next 15 years. They each represent a range of strategies and actions for achieving the Refuge purpose, vision and goals and addressing the issues introduced in Chapter 1.

Alternative A represents the “no action” alternative required by the National Environmental Policy Act (NEPA). It describes our current Refuge management, and serves as a baseline for comparing and contrasting our other two alternatives.

Alternative B, the Service-preferred alternative, represents the planning team’s recommended strategies and actions for achieving Refuge purposes, vision and goals and responding to public issues. This alternative focuses on enhancing the conservation of wildlife through habitat management, as well as providing additional visitor opportunities on the Refuge such as a proposed expansion of the deer hunt, new hiking trails, and a new, medium-sized headquarters/visitor contact station (HQ/VCS) at a new location. This alternative withdraws a 1974 proposal to designate select areas on the Refuge as wilderness, and instead proposes that these areas be classified as Research Natural Areas. We determine this alternative to be the environmentally-preferred alternative.

Alternative C prominently features additional management that aims to restore (or mimic) natural ecosystem processes or function to achieve Refuge purposes. This alternative focuses on using management techniques that would encourage forest growth and includes an increased focus toward the previously proposed wilderness areas. Strategies proposed may allow the 1974 proposed wilderness areas at Long Island, Green Hills, and Landing Cove (2,165 acres) to again meet minimum criteria, and then manage accordingly. In addition, development of a large headquarters/visitor contact station that can provide office space for the Service’s Virginia Ecological Services Field Office is proposed. This alternative also emphasizes the enhancement of visitor opportunities on the Refuge by improving fishing opportunities and establishing more trails for wildlife observation and photography.

At the end of this chapter you will find a table that provides a summary of all three alternatives. This table (Table 2.1) clearly compares how each alternative addresses key issues through different strategies and/or actions.

## Formulating Alternatives

Alternatives are packages of complementary objectives and strategies designed to meet the Refuge purposes, vision and goals and the mission of the Refuge System. Before designing alternatives, management goals, objectives and strategies must first be developed.

One of the first steps in the planning process is developing Refuge goals. Goals are broad statements that describe the desired future conditions of the Refuge in a qualitative, rather than a quantitative manner. They are intentionally broad statements so they can cover a range of alternatives. Each goal is directed toward achieving the Refuge vision and purposes, while also providing the foundation to develop management objectives.

Once we developed our goals, we began to establish a range of possible management objectives that would help in meeting our goals. Objectives define our future management desires, but define them in a way that is more quantifiable. Objectives typically vary among the alternatives and provide us with a basis for identifying management strategies and evaluating our success. Service guidance in “Writing Refuge Management Goals and Objectives: A Handbook” (USFWS 2004) recommends that objectives should possess, to the extent possible, five properties to be “SMART”: (1) specific (2) measurable (3) achievable (4) results-oriented (5) time-fixed.

Each objective is often accompanied by a rationale explaining its context and why we think it is important. In some instances, objectives will not meet all of the SMART criteria; however, it is important to remember the CCP is a long-term (15-year) management plan, and that objectives may be further defined in subsequent step-down plans. We will use the objectives within the alternative selected for the final CCP to write Refuge step-down plans. We will measure our success on how well we achieve those objectives.

Strategies are identified to accomplish each objective. Strategies are specific actions, tools, techniques or a combination of those that are used to help meet the objectives. The strategies listed under each alternative represent the potential actions to be implemented. Some strategies could be re-evaluated and revised under Refuge step-down plans.

## **Actions Common to All of the Alternatives**

All of the alternatives share some common actions. Rather than repeating them in each alternative, we have grouped many actions here to avoid redundancy and confusion. Some actions are required by law or policy, or represent actions that recently have gone through public review, and agency review and approval. There are also administrative actions that would not likely change under any scenario. Some of these actions may also be critical to achieve the Refuge's purposes, vision and goals.

Some strategies do not specifically interconnect with any of the seven goals developed for the CCP. For example, the strategies and actions related to cultural, archaeological and historic resources may not fit under habitat or public use goals, but are important nonetheless, and would be actions common to all alternatives.

Actions in this section are not inflexible decisions -- the public may comment on any or all of the actions in this section. Additional rationale and measurable objectives for newly proposed actions and strategies would be found under the other, more detailed alternatives.

## **Refuge Step-down Plans**

All of the alternatives schedule the completion of these step-down management plans as shown:

### **■ Habitat Management Plan (HMP)**

The HMP is being written in conjunction with the CCP, and is expected to be finished in calendar year 2010. This Plan serves as an "umbrella document" under which other Refuge Habitat Plans operate, and will carry out the habitat goals and objectives of the CCP. The HMP will include marsh and water management, forest management, and cropland management.

### **■ Inventory and Monitoring Plan (IMP)**

An approved IMP exists for Back Bay NWR, but it needs amending/updating. Revisions will be completed within two years of the finalized HMP. A considerable number of inventory and monitoring strategies are included in Goals 1 and 4 of the CCP.

### **■ Fire Management Plan (FMP)**

An FMP (and accompanying EA) was written and approved in 2002, as mandated by the Service. The Fire Plan addresses wildland and prescribed fire events with guidelines on the level of protection needed to ensure safety, protect facilities and resources, and restore and perpetuate natural processes. This plan is expected to meet the needs of the Refuge for fire management.

### **■ Hunting Plan**

The 1998 Refuge Hunting Plan provides justification and the framework for the annual Refuge deer and hog hunt. The need for adequate, efficient controls on both deer and feral hog populations is explained in this Plan. Because of adoption

of Virginia Department of Game and Inland Fish (VDGIF) Cyberdata hunter selection process, many administrative changes to Refuge Hunt operations have occurred which required that this Plan be amended. An amended version was completed and approved in July 2006. In the proposed action, we propose to fully analyze the potential of adding waterfowl hunting and expanding the area of deer and hog hunting in through a complete and separate NEPA analysis. The refuge intends to begin this analysis within 3 years of CCP approval. We will need to work closely with the state to pull together data necessary to complete this analysis.

■ Integrated Disease Prevention and Control Plan

This Plan was amended and approved in January 2007. It is a comprehensive plan that includes recent concerns about avian influenza, West Nile virus and chronic wasting disease.

■ Public Use Plan

This Plan was amended and approved in 1990, with addendums in 1992 and 1994. Updating this plan is required to account for approved changes in the final CCP. Revisions will be completed within 3 years of CCP approval, and will be consistent with recent visitor services policies developed by the Service.

**Cultural Resources**

- Within 5 years of CCP approval, develop a study comparable to the 1989 Goodwin report for lands subsequently acquired and within the acquisition boundary. This will assist refuge management, especially in: avoiding inadvertent facility location and impact of habitat work on areas sensitive for archaeological sites; helping to avoid inadvertent acquisition of historic structures; identifying Archaeological Resources Preservation Act (ARPA) law enforcement issues; and broadening the Refuge's potential historic interpretation coverage to the Pungo area.
- Within 5 years of CCP approval, establish ARPA training for refuge officers, proactive development of an ARPA response team (law enforcement officers, archaeologist, and Assistant United States Attorney), and site monitoring during normal law enforcement rounds. Monitor the Bay Trail site, and consider slight relocation of the trail to avoid the historic site in the long term.
- With 5-8 years of CCP approval, develop a program of monitoring, assessment, and protection and/or data recovery of sites susceptible to erosion.
- Within 5-7 years of CCP approval, upgrade the storage and security of the antique waterfowling equipment collection. If a new facility is built or the existing facility upgraded, security, climate control, storage, and display of this collection will be included in design of the facility.
- Within 8 years of CCP approval, develop a shipwreck site reporting and study protocol. Thanks to effective and timely professional networking among maritime archaeologists, studies of storm-revealed wreck sites here and elsewhere in the region have been valuable. These studies have always been performed gratis by United States Navy (USN), National Oceanic and Atmospheric Administration (NOAA), and State Historic Preservation Office (SHPO) staff, as well as academic professionals and maritime archaeological societies. These wrecks are a trust resource, just as are the terrestrial sites; however, the most effective treatment of them is to monitor their locations, study them as they appear, and recover them with beach material if they are at risk of further erosion, looting and/or damage by visitors. A systematic and proactive team approach would be beneficial to handling this issue at Back Bay, as well as at other refuges where historic wrecks appear. A Regional Memorandum of Understanding (MOU) , or series of MOUs, with agencies and

institutions called to study wrecks would be an ideal approach—potentially including a mechanism for reimbursement of such partners for expenses incurred, or in-kind services such as temporary housing or on-refuge transportation in refuge vehicles or boats.

**Facilities and Equipment Management**

All of the alternatives would continue to manage Refuge facilities trail and other recreational assets, and equipment. Management of facilities and equipment include wetlands renovation, repair and maintenance of impoundment dikes, water control structures, pump station, canoes, boats and motors, docks, boat ramp and heavy equipment. In order to work on forested land that is located six to ten miles from the headquarters, the Refuge must also maintain and transport vehicles, tools (power and hand), and heavy equipment.

- Allot an annual budget of at least \$32,000 (FY 07 dollars) for facilities and equipment maintenance.
- Complete construction of new maintenance facility on New Bridge Road in accordance with FWS construction guidelines and specifications.

**Research**

All of the alternatives would continue to encourage and support research and management studies on Refuge land that are relevant to approved Refuge objectives. The Refuge would also consider research for other purposes that may not be directly related to Refuge-specific objectives, but contribute to the broader enhancement, protection, use, conservation, and management of native populations of fish, wildlife and plants, and their natural diversity within the region. All researchers would be required to submit a detailed research proposal following the guidelines established by Refuge staff. Refuge biologists and other Service staff would be asked to review and comment on research proposals. Special use permits would identify the schedules for progress reports, the criteria for determining when a project would cease and the requirements for publication or other final reports. All publications would acknowledge the Service and the role of Service staff in the particular research project.

- Encourage and support research and management studies unrelated to Refuge objectives, but which contribute to protection, use, conservation, and management of native populations of fish, wildlife and plants. Continue to participate with VDGIF in their study of feral hog natural history, population, and habitat use.
- Encourage and support research and management studies on Refuge land that are relevant to approved Refuge objectives.

**Refuge Fee Program**

- Collect an entrance fee from April through October and then suspend fee collection from November through March. The entrance station provides a checkpoint to inform about appropriate resource use and protection, and to provide another source for visitor information. Funds generated from the fee collection program are used to provide revenue enhancement for public use facility operation and maintenance, as well as for various habitat management projects that offer public use opportunities.
- Serve as a sales outlet for Federal Recreation passport sales, including the Service Duck Stamp.

**Beach Permittee Program**

For many years, Back Bay NWR was open to vehicular beach access and use by the general public. In 1969, with visitation reaching 348,000 yearly, it became evident the increased Refuge and beach use had resulted in environmental degradation and a serious conflict of the Refuge's intended purpose. In 1972, the Refuge beach was closed to all unauthorized vehicular traffic. In 1973, after a final ruling in the Federal Register, permits were issued for vehicular beach use only to property owners and businesses south of Back Bay NWR up to a point 1,600

feet south of the Currituck Lighthouse in North Carolina. These permits were issued to individuals providing proof of residency and businesses that required need for beach access to reach Virginia as recreational traffic was prohibited. All permits are grandfathered back to the Refuge and are not transferable after use is no longer needed, or after the permittee no longer meets the permit guidelines. Originally, approximately 100 permits were issued. That number has slowly dropped to the present day of 15 residential, 5 commercial, and 9 cooperator permits. No new permits may be authorized, so as permits expire, the number of permits will continue to decrease through attrition of this Refuge activity. The Refuge does however allow vehicular beach access use to co-operative agencies such as law enforcement and fire and rescue operations that can show a direct need for beach access. Under all of the alternatives, we would continue phasing out Refuge Motor Vehicle Access (MVA), according to the Federal law, to minimize erosion impacts of oceanfront beaches and lost shorebird use during spring and fall migrations. We would continue to authorize existing permits for vehicular beach access to only property owners and businesses south of the Refuge up to a point 1,600 feet south of the Currituck Lighthouse in North Carolina.

### **Law Enforcement**

All of the alternatives would maintain the Refuge's proactive law enforcement program. This program would enforce Federal, State, and local laws. Primary enforcement efforts concentrate on the protection of natural resources and enforcing the Refuge specific regulations, through proprietary jurisdiction. The Refuge law enforcement program also provides for the safety of those individuals who visit the Refuge.

- Close seasonal dike trails from November through March annually in order to prevent disturbance of wintering migratory waterfowl within the impoundments.
- Prohibit waterfowl hunting in the Presidential Proclamation area composed of 4,600 acres of bay waters and the impoundments (Note: Additional hunting strategies are covered in Goal 6).
- Conduct regular law enforcement patrols for visitor and resource protection.
- Patrol Refuge property along with Virginia Beach Police and State Officers, primarily from False Cape State Park (FCSP). Virginia State Conservation Officers also enforce State regulations on the Refuge.
- Open the Refuge to visiting public from one-half hour before sunrise to one-half hour after sunset every day of the year, except during the annual hunt in October. Provide law enforcement coverage during the October night surf fishing season.
- Prohibit non-wildlife dependent activities such as sunbathing, surfing, picnicking, and swimming. Dog-walking is prohibited in certain areas for all alternatives, and is eliminated in Alternatives B and C.

### **Refuge Partnerships**

Maintaining partnerships with various state, local and private agencies and organizations plays a very important part in the continued success of Refuge management. Refuge partnerships provide assistance in conducting Refuge inventories and surveys, advocacy for Refuge funds, and maintenance of communication and contact with the community. All of the alternatives would continue to maintain and enhance the Refuge's current partnerships.

### **Refuge Revenue Sharing**

As described in Chapter 3, the Service pays Virginia Beach refuge revenue sharing payments based on the acreage and value of refuge land in their jurisdiction. The payments are calculated by formula, and funds are appropriated by Congress. All of the alternatives will continue those payments in accordance with the law, commensurate with changes in the appraised market values of refuge lands or new appropriations by Congress.

## **Alternative A. Current Management**

### **Introduction**

Alternative A is the “No Action,” or current management alternative. This alternative serves as a baseline against which we compare the other alternatives. It may also describe projects currently planned, funded, or underway.

Under current management, we manage a series of wetland and moist-soil impoundments, forested and shrub-scrub habitats, and coastal beach and dune habitats. Under Alternative A, we would continue to conduct land bird, marsh bird and migratory waterfowl surveys, continue to conduct nesting and stranded sea turtle patrols, and continue current methods of nuisance and non-native species control. We would maintain existing opportunities for visitors to engage in wildlife observation, photography, and environmental education and interpretation, as well as maintain existing hunting and fishing opportunities on the Refuge. We would maintain existing infrastructure and buildings, and maintain current staffing levels.

In this alternative, we begin addressing objectives and rationale. Because most of the actions and strategies discussed under this current management alternative are already taking place, the objectives cannot be easily written to meet the SMART criteria discussed on page 2-1. Actions and strategies discussed in “Actions Common to All Alternatives” would also be included within this alternative:

### **GOAL 1.**

#### **Maintain and enhance a diversity of wetland habitats for migratory birds.**

#### **Objective 1a. Impoundment Management**

Continue existing management of 13 fresh-water impoundments (1,130 acres) for the primary purpose of providing at least 900 acres of high-quality, migration-stopover and wintering wetlands habitats for water-birds (waterfowl, shorebirds and wading birds) during winter, spring and late fall; while also providing “watchable wildlife” and public fishing opportunities for visitors. High-quality habitats shall consist of shallow-water, wetland areas within the impoundment complex that provide relatively high densities and mixes of waterfowl food plants and invertebrates, and are available to waterbirds.

#### **Rationale for objective**

Back Bay Refuge’s impoundments provide an easy-to-manage complex for year-round waterbird use (with emphasis on wintering waterfowl). Management typically consists of gradual flooding for waterfowl during winter; gradual draw-downs for shorebirds and waterfowl during spring and fall migrations; and extreme draw-down for wading birds during mid-summer. In addition, occasional disking and/or burning sets plant succession back from primarily perennial grasses and shrubs to primarily open ground with annual plant production. Such early successional stages are best for good invertebrate production.

The impoundments currently serve as an important replacement food source for Back Bay’s depleted resources. Submerged Aquatic Vegetation (SAV) and its associated vertebrate and invertebrate communities have greatly diminished during the past 25 years. The impoundments provide ideal shallow-water habitats for many species of wintering waterfowl such as the black duck, mallard, gadwall, pintail, widgeon, green-winged teal, snow and Canada goose and tundra swan that are not here in significant numbers during the rest of the year. Most wintering waterfowl use now occurs in the Refuge impoundment complex instead of Back Bay’s much greater acreages, because of the increased food availability and undisturbed resting areas that the impoundments provide. This has changed since the early to mid-1990s when most waterfowl use occurred in southwestern Long Island and throughout Ragged Island in Back Bay.

**Strategies:***Continue to:*

- Annually provide at least 325 acres of quality waterfowl stopover and wintering habitat, consisting of shallow, flooded wetlands (6"-18" water), dominated principally by large-seeded, perennial marsh vegetation, with some mixed, fine-seeded annuals.
- Annually provide at least 350 acres of quality waterfowl stopover and wintering habitat consisting of shallow, flooded wetlands (<7" water), dominated principally by mixed large and fine seeded, annual, moist-soil vegetation, with some perennials.
- Annually provide at least 60 acres of open, deeper-water (>1.5') wintering habitat for such diving ducks as the lesser scaup, ruddy duck, bufflehead, hooded merganser, coot and pied-billed grebe.
- Annually provide a minimum of 6 patches of feeding and roosting habitat at least 20 acres in size, for migrating shorebirds. These habitats should consist of wetlands where shallow (0"- 4") water and wet sand/mud flats make up the majority of the area.
- Each summer (July and August) provide a minimum of 350 acres of quality feeding habitat for wading and marsh birds. This habitat shall consist of an average mix of open, shallow water, with patches of emergent marsh plants, with an average water depth of 4"- 5". This habitat should be provided in a minimum of four patches of at least 50 acres each that support good populations of fish, insects and amphibians.
- Year-round, provide a minimum of 25 acres of "watchable wildlife" habitat for the visiting public during the winter impoundments' closure period. "Watchable wildlife" species include the snow goose, ducks, herons, egrets and ibis.
- Provide a minimum of 10 acres of quality fresh-water, year-round, fishing habitat, consisting of an average 60% mix of vegetation and open water with an average water depth of 2'- 3'. This fresh-water habitat should support viable populations of bluegill, pickerel, large-mouth bass and sunfish.
- Annually provide at least 250 acres of mixed stands of black needlerush and phragmites reed to continue supporting existing breeding populations of least bitterns; and as spring migration stop-over habitat for the Sora rail and bitterns.
- Minimize use of the impoundments by competing non-migratory wildlife such as the resident Canada goose, feral pig, nutria and feral horse. Since these species also consume large amounts of young wetland plants meant to provide wintering waterbirds with food during their fall migration and winter, resident species' use of Refuge impoundments presents a direct conflict with impoundment management objectives and must be curtailed where possible. Resident Canada goose numbers may be reduced by shooting and egg addling during their nesting season. The feral pig and nutria may be controlled by shooting/hunting and trapping. The feral horse may be controlled by capturing and transporting horses to North Carolina, with the support of local citizens and the Corolla Horse Association.
- Conduct waterbird surveys in the impoundments up to three times per month to determine if impoundment objectives aimed at sustaining moderate numbers of migrating and wintering waterbirds are being met.

- Close dikes to public access from November through March to reduce public disturbance to wintering waterfowl.
- Conduct ground surveys of vegetation in three larger impoundments once a year to assess waterfowl food production and monitor invasive species distributions.
- Annually treat (disk and/or burn) up to 250 acres of the total 1,130 acres of the main impoundments, including False Cape State Park's two impoundments, 26 acres at the Carter impoundment and 83 acres at the R&L Restoration tract.
- Gradually flood for waterfowl during winter; draw-down for shorebirds and waterfowl during spring and fall migrations; and extreme draw-down for wading birds during mid-summer.
- Provide maximum beneficial waterbird food-plant and invertebrate production, draw-down moist soil units during spring by exposing substrate of the eastern sections of impoundments. Maintain wet soils in those eastern areas throughout growing season.
- Remove brush (principally recurring waxmyrtle) that is too large to bush-hog. Live oaks would be allowed to remain.
- Mow herbaceous and grassy, dense perennial vegetation. Follow with flooding to provide wintering waterfowl access to rootstocks. May be an occasional substitute for prescribed burning; but does not remove undesirable seed-stock.
- In impoundments, addle resident Canada geese eggs by shaking, spraying with cooking oil or puncturing. Continue to selectively control individual resident Canada geese by lethal means (i.e., shooting with small caliber rifle or shotgun) during their April-June breeding season.
- Conduct periodic monitoring/surveys for waterbird use in the Refuge impoundment complex and False Cape State Park impoundments.
- Provide water to the East and West False Cape State Park (FCSP) impoundments via two water control structures in the Refuge south dike of A-Pool.

**Objective 1b. Pest Control  
(Phragmites)**

Continue to control the non-native, invasive species of phragmites reed in Refuge wetlands, woodlands and old field habitats. Phragmites reed control priorities would consist of: 1) the 880-acre Refuge impoundment complex, 2) the adjacent, western natural "Marsh Fingers," 3) Refuge bay islands, 4) western marshes and creeks, 5) North Bay marshes and more northern wetlands.

**Rationale for Objective**

A primary intention of the impoundment complex and related wetlands restoration efforts is to provide additional wetlands and food plants for waterfowl, shorebird, wading bird and marsh-bird -- with the understanding that creation of such habitats would result in a response by the target bird species. Such impoundment and wetland restoration work essentially increases the beneficial biodiversity of the area. As responsible stewards of these trust resources, Refuge biologists strive to minimize the presence of those plant or animal species that reduce such beneficial biodiversity.

Phragmites reed grows in dense monocultures that out-competes (by depriving of sunlight or "shading out") and eventually eliminates the preferred native

wetland plants. Many of the native wetlands species that are lost rank high as waterfowl and other wildlife food-plants; conversely, the invasive has very little wildlife value. In addition to presenting an undesirable monoculture, drastically reducing waterbird food availability, and greatly reducing waterbird diversity in a habitat, phragmites reed also presents a serious fire hazard. When old stems from previous years' growths build up, they present a highly flammable, straw-like, fuel over large acreages. Acres of dead phragmites stems present a serious fire danger to nearby Refuge and private property resources and structures – particularly in the fall (after senescence has occurred), winter and early spring.

When spraying, we would avoid spraying phragmites where least bitterns or other species of concern nest in western North Bay marsh area. This area is unique because it provides natural elevated nesting platforms for least bittern. These nesting platforms are formed by old phragmites stems lying on top of black-neederush.

**Strategies:**

- Once a year, at least 200 acres of phragmites reed would be aerially sprayed with an EPA-approved systemic herbicide within Back Bay NWR. Follow with prescribed burning to eliminate dead ground cover and encourage germination of desirable native wetland plants.
- Back-pack/ground spraying would be used to control remaining small stands of phragmites reed on the Refuge, where possible.

**Objective 1c. Pest Control  
(other than phragmites)**

Continue to control other non-native, invasive species and other pest plants and animals in Refuge wetlands, woodlands and old field habitats. Pest plants and animals requiring attention include Johnson grass, feral hog, feral cat, non-native nutria, feral horse and resident Canada goose. Other pest plants addressed include the non-native, invasive Japanese stiltgrass and the native, potentially invasive American lotus and narrow-leaved cattail.

**Rationale for objective**

The non-native Japanese stiltgrass is extensive in northern Refuge forested areas, which if left uncontrolled could out-compete more valuable native plant species, while Johnson grass rapidly dominates former agricultural fields. Techniques such as spraying, prescribed burning, and hand-pulling are used to suppress the growth of this invasive. Although narrow-leaved cattail and the American lotus are native species, they can rapidly become a nuisance in impoundments when they form large monocultures that exclude sunlight and eliminate plant diversity, particularly the more beneficial species. Extensive presence of a pest plant species like American lotus diminishes the migratory bird native food-plant diversity and abundance (particularly submerged plants and organisms) within an impoundment, through the increased leaf coverage of the water's surface, and the allelopathic qualities of the lotus' root systems. Previous efforts to control the plant have failed. These methods included: (1) hand-pulling – rootstocks were much too extensive for complete removal, and leaves were quickly replaced after removal; and (2) applying an EPA-approved Glyphosate herbicide (“Aqua-Neat”) several times during June and July 2006 where treatments failed when dead leaves were replaced in about 2 weeks, as apparently enough herbicide was not being transported to the rootstocks. We would continue to conduct invasive species surveys on the Refuge. If additional invasive plant species are located on the Refuge, they would be controlled when necessary. Necessity would be determined by how much the invasive species appears to conflict with the presence of other high priority native species.

Non-native feral hogs root in soft wetland soils, eating the roots and tubers of waterbird food-plants, and decreasing the quantity and quality of plant material available to native animals and migratory waterfowl. Hog rooting along dike slopes increases the potential for erosion. Additionally, feral hogs opportunistically eat birds, nestlings, reptiles, amphibians and small mammals.

The non-native nutria causes problems in wetlands by consuming wetland plants and digging into dikes, increasing erosion potential and reducing structural integrity. While nutria are present, they have not caused much visible damage unlike in Maryland and Delaware. It is theorized the water management regime in the impoundment complex (drawing down in the spring and summer, and flooding during the fall and winter) prevents their numbers from building up. We think their populations are forced to disperse into Back Bay during the draw-down periods, where they are more prone to predation. Impoundment habitats have not experienced noticeable nutria eat-outs, to date. It is possible if the impoundment complex was flooded year-round, nutria eat-outs would occur, and impoundment habitats would be negatively impacted. In addition, if the Back Bay SAV restoration effort is successful this new food source could cause a population explosion. The occurrence of habitat eat-outs would serve as our threshold for justifying nutria control. The Refuge would work with partners to reduce nutria populations.

Feral cats exist on the Refuge in the Sandbridge Fire Station, Refuge headquarters and maintenance compound vicinities. Cats are sometimes discarded by the visiting public or get lost. They are often unusually adaptable to living in the wild, earning them the title “feral.” These former domestic cats learn to live, eat and breed in the wild, where they take a toll on the resident migratory bird and small to medium-sized mammal populations. Such a negative impact directly conflicts with the migratory bird and other wildlife management objectives of this field station. Feral cat predation depletes the Refuge songbird populations that we strive to increase, while also depleting the mammal populations that other native larger mammals, hawks and owls depend upon for food.

Feral horses destroy vegetation and spread non-native, undesirable plant seeds through their droppings. A fence was built by the Corolla Wild Horse Fund of North Carolina at the southern border of FCSP where it abuts North Carolina. Occasionally horses get through, around, or over this fence.

The resident Canada goose is a year-round resident whose populations have increased since the early 1990s to approximately 80+ birds that use the Refuge impoundments. Their increasing population poses a significant conflict with a primary Refuge objective – providing food for wintering and migrating waterfowl. Since the resident Canada goose feeds on young waterfowl food-plants throughout the growing season, a good sized flock can diminish the amount of waterfowl food-plant production available for wintering and migrating waterfowl.

**Strategies:**

*Japanese stiltgrass*

- Use Sethoxydim herbicide, or other suitable herbicide, to control Japanese stiltgrass, starting in the Refuge headquarters vicinity. However, the feasibility of successfully controlling this pest plant that has become so entrenched throughout the Refuge is still under review. Limited control in higher priority areas may be the only feasible solution.

*Cattail*

- When cattail presence exceeds 50% of the cover within the impoundment, control is warranted. Control would consist of mowing/burning and subsequent flooding.

*American lotus*

- Draw-down impoundment water level to dry out affected areas and eliminate year-round, stable water depths that are conducive to American lotus. (Currently testing in C-Pool and the North and East Frank Carter/Colchester impoundments).

*Johnson grass*

- Apply Round-up (Glyphosate) herbicide to plants by agricultural tractor equipped with spray tank and booms. Have work done by Cooperative farmer if possible, since they have the expertise, equipment and herbicide.

*Resident Canada goose*

- Addle impoundment resident Canada geese eggs by shaking, spraying with cooking oil or puncturing to reduce reproduction.
- Selectively control individual resident Canada geese by lethal means (i.e., shooting with small caliber rifle or shotgun) during their April-June breeding season.

*Feral Hogs*

- State and federal biologists would continue their research of feral hog populations.
- Conduct a minimum seven-day feral hog hunt to control population levels.

*Nutria*

- Draw down water levels in the impoundments in the spring and summer and flood the impoundments during the fall and winter to minimize nutria habitat.

*Feral Cat*

- Control feral cats when they are spotted on the Refuge by lethal means ((i.e., shooting with small caliber rifle or shotgun).

*Feral Horses*

- Have the Virginia Wild Horse Rescue round-up and remove horses when contacted by Refuge personnel or Sandbridge residents.
- Work with Currituck NWR and FCSP to effectively and cooperatively manage the issue.

**Objective 1d. Water Quality Protection**

Maintain Refuge water quality at the current “good” Virginia State DEQ standards level.

**Rationale for objective**

Back Bay is the northern tip of the Albemarle-Pamlico National Estuarine System (APES). APES has been designated by the US Environmental Protection Agency (EPA) as a national estuarine system. As such, states within which APES exists receive federal EPA funding support to maintain the system in good health. Although most of APES exists in North Carolina, the portion in Virginia still qualifies for EPA protection and funding support (through the VA Coastal Zone Management Program).

It is important to note that many of the strategies found under other goals and objectives focus on habitats or species management that will also contribute to improvement of the water quality within the watershed. Chapter 4 includes greater discussion of impacts to water quality. Baseline data should be gathered from Nanney, Beggar’s Bridge, Asheville Bridge, and Hells Point Creeks,

and the North Bay Marshes on a consistent basis, using State Department of Environmental Quality protocols. Development pressures from the northwestern portion of the watershed are occurring, and may soon extend southward along Princess Anne Road (i.e., Pungo Ridge) on the western side of the watershed. The Refuge must be prepared to provide scientific evidence of current baseline water quality conditions. Land acquisition within the approved boundary will provide vegetated safeguards that can further protect the quality of the water within the Back Bay watershed. The Refuge has an approved acquisition boundary of 12,000 acres surrounding Back Bay, and currently owns approximately 9,035 acres. The more land purchased inside the Refuge Acquisition Boundary, the greater the potential for providing adequate protection to the water quality of the Back Bay Watershed from future development impacts and other land use changes. This land acquisition should insure that related Refuge wetlands habitats are not degraded/polluted and the dependent migratory bird and other wildlife communities are not lost or displaced.

Back Bay experienced a sudden decline in submerged aquatic vegetation (SAV) during the late 1970s and early 1980's that seems to have been connected to a decline in water quality. Although this process is not well understood, because of a lack of water quality monitoring data then, the issue has been studied as part of a cooperative program involving the US Army Corps of Engineers, Back Bay NWR, and other State and federal agencies. Turbidity and nutrient-loading of Back Bay waters are suspected to be the leading causes of the SAV decline. Attempts to restore the missing, critical SAV link in the Back Bay Ecosystem are currently focusing on how best to reduce the existing turbidity problem in Back Bay. This turbidity problem appears to be exacerbated by the SAV decline. SAV beds are useful in diminishing turbidity (if they don't get silted over), by reducing wave action and causing suspended particles in the water column to settle to the bottom. However, the SAV decline seems to be a "Catch-22" situation, whereby turbidity is inhibiting the germination of SAV by preventing sunlight from reaching the seedbank in Bay bottom substrates.

**Strategies:**

*Continue to:*

- Conduct biweekly water quality tests in A, B, C and D impoundments and in Back Bay.
- Acquire land from willing sellers within the approved boundary.
- Evaluate the Refuge acquisition boundary for possible inclusion of areas within the Back Bay watershed that are not currently included within the acquisition boundary. Areas for consideration should include wetlands, fields and forested habitats that would also serve as a safeguard to separate Beggar's Bridge, Asheville Bridge, Nanney, and Hells Point Creeks from future/current development to the west.

**Objective 1e. Wetlands Restoration**

Continue to focus our wetland restoration efforts toward: restoration to a natural, precipitation-based hydrology and native tree and shrub communities; control of non-native invasive species; reduction of flooding by wind driven tides through ditch plugging; and the reestablishment of submerged aquatic vegetation (SAV) in Back Bay and subsequent recreational fishery. (Additional strategies for SAV can be found under Goal 4).

**Rationale for objective**

The intensive habitat management (i.e. discing, root-raking, mowing, water management, pest control, prescribed burning, etc.) required in wetland restoration sites and impoundments is often necessary for supporting and

increasing use by target waterbird groups. In addition to the above mechanical and fire-related management tools, restoration of some natural habitats can also be carried out in a simpler, hydrological manner. Such hydrological restoration efforts consist of plugging waterways that feed into and drain a wetlands areas (wooded or emergent marsh), and exclude the negative impacts of the wind-tide driven surface water hydrology of Back Bay. This “wind-tide hydrology” essentially stifles germination of native wetlands trees and plants, along with the reproduction of affected insect, amphibian, fish, mammal and reptile populations. This stifling occurs from the flooding of these habitats during the spring and summer (when germination and reproduction of plants and animals is occurring), and the exposure of the ground during winter (when roots can more easily freeze without the insulation of water over them.) The “wind-tide hydrology” is the reverse of the normal precipitation-based hydrology (that the Refuge impoundment management program is based on), which is low-water during the late spring and summer, and higher water during winter.

The wetlands restoration projects described above restore native wetlands plant and animal communities that existed prior to clearing and draining by previous residents; increase regeneration/reproduction rates of these native species; and increase the populations of wintering and migrating waterbirds that use Back Bay NWR habitats.

Submerged aquatic vegetation (SAV) is a critical component of the Back Bay ecosystem, as well as the rest of the Albemarle-Pamlico Estuarine System (APES). SAV provides habitats for fish and a wide variety of invertebrates, in addition to serving as a food for wintering and migrating waterfowl. However, this critical natural resource has been rapidly disappearing in the Back Bay Ecosystem. With the loss of SAV has come a number of additional problems for Back Bay’s ecology. Development of the landscape within the fringes of the northwestern watershed of Back Bay may have resulted in negative impacts to water quality that has negatively affected SAV. Turbidity, nutrient-loading and coliform bacterial levels are concerns in Back Bay and its tributaries. Erosion of the islands in Back Bay has accelerated since the decline of SAVs. A multi-agency effort is underway between the FWS and several agencies within the North Carolina Department of Environmental and Natural Resources, particularly the Albemarle-Pamlico National Estuarine Program (of the Division of Water Resources), the Division of Marine Fisheries, North Carolina Fish & Wildlife Department, as well as involved departments with Elizabeth City State University and East Carolina University. For five years, this Group has been making progress in inventorying, understanding SAV, and how to better manage the SAV resources of the Albemarle-Pamlico Estuarine System (APES), of which Back Bay is the northern tip. The next step is restoration of SAV in areas where it has become depleted, particularly Back Bay.

#### **Strategies:**

*Continue to:*

- Work with the Service’s Ecological Service Office in Gloucester, Virginia and Ducks Unlimited to conduct wetland restoration projects on the R& L, Lago Mar and Mel Smith properties.
- Conduct existing Refuge surveys to evaluate the effectiveness of intensive habitat management practices in the 880-acre Refuge impoundment complex, the 165 acres of False Cape State Park’s two impoundments, the 26-acre Frank Carter impoundments, and other Refuge wetland restoration sites. Management shall maintain or improve shorebird (semipalmated, least, and greater and lesser yellowlegs sandpipers) and waterfowl (blue-winged teal, wood duck, mallard, black duck) use during the spring and fall migrations;

wading bird (herons, egrets and ibises) use during the late summer and fall; and wintering waterfowl (widgeon, gadwall, mallard, pintail, black duck, green-winged teal and tundra swan) use.

- Conduct periodic surveys of: waterbirds in the impoundments; piping plover and American oystercatcher on the beach in late spring/early summer; anurans (frogs and toads); landbird breeding bird surveys in late spring and early summer; secretive marsh bird surveys in spring and summer; aerial surveys of migratory waterfowl populations during the winter; and monitor phragmites distribution in spray areas through use of photo points. Periodic surveys are a useful tool in developing adaptive planning for wetland restoration.
- Be an active participant in the multi-agency effort to better manage and restore SAV in Back Bay. Increase public environmental education efforts related to this initiative. Annually apply for grant funding in support of this effort.

## **GOAL 2.**

### **Enhance and preserve native woodland diversity and health.**

Native woodland diversity is defined at a scale of 80% replacement of existing, non-native woodland vegetation (loblolly pine/red maple/sweet gum) with original and native tupelo/oak/bald cypress woodland.

#### **Objective 2a. Shrub-Scrub Habitat**

Continue to provide additional shrub-scrub acreage aimed at providing at least 200 acres of nesting habitat within northern, recently acquired properties along Sandbridge and Muddy Creek Roads for a unique diversity of songbird species (i.e., yellow-breasted chat, indigo bunting, blue grosbeak), including the nationally declining prairie warbler, field sparrow, gray catbird, yellowthroat and eastern wood peewee.

#### **Rationale for Objective**

Recent understandings and research within the Service have revealed that shrub-scrub areas support an unusually high number and diversity of unique and, in some cases, declining songbird/landbird species. Most, if not all of these bird species breed in this habitat type. Many landowners consider shrub-scrub habitats to be unsightly and unkempt, and feel obligated to “clean them up” by clearing them back to the grassland successional state. However, their value on the landscape is one of increased biodiversity and community richness – particularly where migratory bird foods (seeds, fruits and insects) are concerned. This value is especially enhanced when the surrounding landscape consists of mixed forest and old fields in an early stage of plant succession.

On Back Bay NWR, shrub-scrub habitats consist of dense waxmyrtle and groundsel/saltbush shrubs, loblolly pine/red maple/sweetgum saplings, and an assortment of forbs, perennial grasses and blackberry canes. The local decline in grasslands and old fields, and the increased housing development rate of Virginia Beach have created an increased need for shrub-scrub. Otherwise there would be no infrastructure to support these declining national, State and local populations that depend on them, and local populations would disappear.

Since this habitat type is a transitional stage of “old field succession” between the old field and the forest stages, it must be cultivated (saplings must be topped off/pruned, burned, or periodically strip-mowed) to remain in that stage. Otherwise it would eventually revert to the forest stage.

Back Bay Refuge has approximately 145 acres of actual and future shrub-scrub habitat. An estimated 65 acres of shrub-scrub habitat exists along the barrier

island portion of the Refuge, west of the dunes and east of the high marshes of the impoundments. This area maintains itself naturally in shrub-scrub through the pruning action of salt spray and varying soil and moisture differences. The Refuge permits shrub-scrub growth in areas where it's not detrimental to moist soil management or other Refuge objectives. About 35 acres of recently acquired agricultural fields were allowed to revert to shrub-scrub, and where possible, would be maintained in that condition by burning, bush-hogging, boom-axing, or hydro-axing. Shrub-scrub habitat is beneficial as nesting and stopover habitat for many species of songbirds, including the declining field sparrow, prairie warbler, and neotropical migrants, and resident mammals.

### Strategies

*Continue to:*

- Allow shrub-scrub growth in areas not detrimental to moist soil management or other Refuge objectives.
- Maintain, where possible, shrub-scrub habitats in that state of plant succession by culling larger trees or removing tree tops.
- Revert up to 20 acres of former agricultural field over the next 5 years to shrub-scrub habitat.

### Objective 2b. Forest Management

Enhance, restore and preserve native tree species diversity and health in approximately 100 acres of existing mixed hardwood-Loblolly pine forest habitats to the north and south of Sandbridge Road, particularly in favor of the original bottomland hardwood communities (i.e., black and water tupelos, several water-loving oak species, bald cypress, green ash, mixed with such related shrubs as blueberries, inkberry, hollies, etc.) that previously existed. Reduce the presence of less desirable tree species, such as the red maple, sweetgum, and loblolly pine, by 25% to 50%.

#### Rationale for objective

Most of the existing bottomland mixed hardwood-loblolly pine forest community, to the north and south of Sandbridge Road has replaced the original forest community (after it was clearcut, ditched and drained) during the early 20<sup>th</sup> Century. Following the clearing, ditching and draining of this area, the water table is believed to have dropped, and provided a better medium for the germination of less water-tolerant species as the red maple, sweetgum and loblolly pine. The lower water table would also account for the lack of a germination response by the prior water-loving forest community. Recent management efforts have resulted in the plugging of all ditches that feed in and out of these forested areas. This plugging has restored the original, precipitation-based hydrology that provides low water during the growing season and higher water during the winter; it is also holding water levels at stable higher or lower levels for longer periods of time than the prior wind-tidal hydrology. Lower water levels, but with sustained wet soils, are resulting in the recent germination of black tupelos throughout the lower elevation areas. It is possible these recent modifications to the area's hydrology may bring about the desired species changes.

Prescribed burning is intended to reduce fuel build-ups that also stifle plant diversity. Only herbicide-treated, dead phragmites stands would be burned. Fire sets back succession, killing encroaching woody vegetation, and undesirable perennial plants. Prescribed burning is also used to control black needlerush, saltmeadow hay, and southern waymyrtle within the Refuge impoundments. With annual plants allowed to germinate and grow, waterbirds are provided with higher quality food. Burning also recycles nutrients more quickly than

decomposition alone. The nutrients are used by invertebrates that, in turn, feed waterfowl and shorebirds. As the City of Virginia Beach and the community of Sandbridge grow, it also becomes more important to provide a fuel-break at the wildland/urban interface.

**Strategies:**

*Continue to:*

- Initiate strategies to enhance forested habitats for the benefit of native wildlife (such as wood thrush, veery, brown thrasher, gray catbird, common yellowthroat, and eastern wood pewee) during the breeding season and fall and spring migrations. Forest structure should include moderate mid-story canopy.
- Initiate strategies to convert 75 acres of former farmland and old field habitats on the Refuge to wet woodlands. This is in the vicinity north and south of Sandbridge Road and east of Colchester Road.
- Close up the forest-shrub canopy in the northern and western portions of the Refuge by restoring forested wetlands habitats in areas that currently fragment the existing forest habitats. This shall apply to those open areas in the Sandbridge Road, New Bridge Road and Colchester Road vicinities.
- Annually, thin 1-3 acres of loblolly pine, sweetgum and red maple that prevent the sun from reaching the forest floor in the “Green Hills” area and along the western side of the A-Pool impoundment. This will encourage germination of mast-producers currently in the forest floor’s seed-bank.
- Conduct a fire management program capable of carrying out several prescribed burns each year with the primary purposes of increasing plant diversity in upland and wetland habitat, reducing the dominance of phragmites, and reducing fuel loads.
- Periodic monitoring should be conducted to determine if cutting and herbicide applications are necessary, prior to implementation.
- Burn up to 350 acres total of Refuge habitats in the fall and winter. Burning would be justified when any of the following conditions exist in patches greater than 1 acre:
  - a) Large stands of dead phragmites
  - b) Dense dead vegetation mats over existing live vegetation
  - c) Thick leaf and grass cover on woodland floors
  - d) Dense undesirable woody vegetation in impoundments
- Maintain a 1.4 mile fuel-break between forested/brushy Refuge habitats and the western edge of the Sandbridge residential community.
- Clear fuel-break of mid-story vegetation to a width of 50 to 75 feet.

**Objective 2c. White Cedar Restoration**

Enhance and preserve an on-going Atlantic white cedar restoration site to recreate a unique mixed bottomland hardwood-softwood forest that could have existed during pre-settlement times.

**Rationale for objective**

A small 2-acre tract of planted Atlantic white cedars exists immediately south of Sandbridge Road. The entire 15-acre field (behind the cedar stand) was also planted with a variety of oaks, green ash and bald cypress in 1994 and 1995. The intent was to recreate a unique mixed bottomland hardwood-softwood forest that could have existed during pre-settlement times. The 2-acre white cedar

concentration was fenced to prevent deer browsing. Subsequent monitoring of this “Wetlands Reforestation Site” revealed that nearly all oaks, cypress, white cedar and green ash planted outside the fenced area were destroyed by deer-browsing during winters of the late 1990s. Some cypress has survived to date. The previously planted areas outside of the fenced cedar stand have succeeded naturally to loblolly pine, groundsel/saltbush, sweetgum and blackberry. The white cedars within the fenced area have survived, and natural regeneration has been observed from 2000 to present. The cedar stand has been thinned of competing loblolly, maple, sweetgum and saltbush annually to reduce competition for sunlight. However slow, limited progress has been made utilizing existing staff. This cedar stand must be cleared of the remaining 15' to 20' tall pines to allow the underlying cedars to receive adequate sunlight for continued healthy growth. If these cedars are not released, they may be lost to sunlight deprivation. This objective is placed under the No Action Alternative as it is part of the “status quo” management, and has been under consideration as part of refuge habitat management planning.

**Strategies:**

*Within 1 year of CCP approval:*

- Begin removal of competing loblolly pine, sweetgum, and red maple trees, together with associated waxmyrtle and groundsel shrubs, within the 2-acre white cedar planted area of the Refuge reforestation site on Sandbridge Road. This area is a high priority area, because it is the only place where white cedar exists on the refuge.

**GOAL 3.**

**Manage beach and dunes to preserve and protect migratory bird and other wildlife habitats.**

**Objective 3a. Beach and Dune Management**

Under Alternative A, the Refuge would continue to manage beach and dunes for wildlife that depend upon these areas with a focus on limiting public use access to protect these fragile habitats.

**Rationale for objective**

The North Mile’s high beach contains the best potential nesting habitat on Back Bay NWR for the piping plover. Public use of the adjacent beach would reduce or eliminate such nesting from occurring.

Foot or vehicle traffic on the loose substrates of sand dunes results in the loss of stabilizing plants (i.e. American beachgrass, sea oats), and subsequent accelerated erosion/loss of sand dunes. Virginia Beach is the northern geographic limit for sea oats. Refuge sand dunes protect the 880-acre freshwater impoundment complex to the immediate west from ocean overwash during storms and hurricanes.

Refuge beaches host sea turtles during the summer breeding season and migrating shorebirds during the spring and fall. Disturbances to the sandy beach surfaces, such as increased tire ruts, pose obstacles to sea turtle hatchlings during their run to the ocean from local nests. Increased vehicle traffic along Refuge beaches would reduce feeding activity and physically harass the large numbers of migrating shorebirds that use Refuge and False Cape State Park beaches during April-early June and August-September. Physical harassment resulting in increased flight activity has been shown to negatively impact the condition and well-being of migrating birds by increasing caloric expenditures beyond normal levels, thereby reducing the amount of stored body fat required by these birds to survive their seasonal migrations. Reduced body fat levels may result in increased mortality rates during the arduous migrations that migratory birds undertake twice a year.

Storm damage to primary and secondary dunes immediately east of the 880-acre, ten impoundment complex, can pose a saltwater wash-over threat to that complex. Monitoring of those areas is a must after storm events.

**Strategies:**

*Continue to:*

- Prohibit public entry into dunes unless by Special Use Permit. Allow only compatible uses on the beach (i.e. shell collecting, wildlife observation, hiking, biking and fishing). Prohibit swimming, surfing, sunbathing or picnicking on the beach.
- Conduct regular law enforcement patrols for visitor and resource protection. Encourage formation of ocean-front, primary dunes by limiting vehicle access to only Refuge permittees and Back Bay NWR and False Cape SP employees on official business.
- Replace old “closed area” signs with new and improved signage.
- Assess post-storm damage immediately east of the 880-acre, ten impoundment complex, within 24 hours of a significant storm event, to evaluate any dune breaching that may have occurred and poses a saltwater wash-over threat to that complex. Repair the dune breach when breaching occurs by placing sand-fencing and/or discarded Christmas trees in the breach. If necessary, replace lost sand and start the dune rebuilding process.
- Ensure local sea turtle population has access to available nesting habitat along the 4.2 miles of Refuge high beach. From late May through August, conduct daily sea turtle patrols at sunrise to locate sea turtle crawls and strandings. When necessary, relocate sea turtle nests from an area on the open beach in which hatching success is threatened into a Refuge nursery site behind the primary sand dune. In addition, continue prohibition on permittee use of the Refuge beach from 11pm – 5am during sea turtle nesting season.
- Monitor shorebird use throughout the year to detect species trends and beach use. Collect and share survey data with partners and interested agencies.
- Encourage use by piping plover during its migration and breeding season by maintaining existing closure of the North Mile to the public. Conduct survey to detect nesting when two or more piping plover sightings occur in the same vicinity during routine shorebird beach surveys.
- Keep the paved Refuge entrance road protected from ocean wash-over and free of sand accumulations. Where necessary, protect and rebuild damaged primary and secondary dunes by insuring dune accretions east of the entrance road, using Christmas tree placements if necessary.
- Continue phasing out Refuge Motor Vehicle Access (MVA) use to minimize associated negative impacts to ocean-front beaches and related shorebird use during the spring and fall migrations.

**GOAL 4.**

**Provide natural environment for native fish, wildlife, and plant populations (with special consideration to those species whose survival is in jeopardy).**

**Objective 4a. Threatened and Endangered Species**

Continue current management practices (protection, monitoring, nest protection, ensuring high hatch and release rates, and habitat closures) of Federal and State threatened or endangered species, including the loggerhead sea turtle, piping plover and eastern glass lizard.

### Rationale for Objective

In keeping with the Endangered Species Act, Federal recovery plans for the above species, and Back Bay Refuge purposes and goals, the Refuge is responsible for ensuring that existing populations of endangered, threatened and rare species (whether Federal or State) are protected, and their populations encouraged to increase. The above practices have caused very high production rates (usually >90%) in sea turtle nests, and increased use of Back Bay by nesting bald eagles during the past 15 years. Refuge biological staff work with State non-game biologists to determine the extent of the Refuge glass lizard population.

Refuge habitats are used by several Federal and/or State-listed threatened or endangered species. These include: the State threatened Eastern slender glass lizard, State endangered Eastern big-eared bat, Federally threatened loggerhead sea turtle, and the Federally threatened piping plover. The bald eagle was de-listed in June 2007; however, protective actions are still required under other laws and regulations in order to maintain current population levels and prevent another decline. In addition, several State rare species are found throughout the Refuge, including the king rail, least bittern and the plant *Liliaeopsis carolinensis*. We would continue current management of the Refuge in order to protect and conserve these species. In addition, we specifically plan to maintain a nest success rate of 90% or higher for all Refuge sea turtle nests on Sandbridge, Refuge and False Cape State Park ocean-front beaches. Refuge biological staff have carefully studied differences between relocated sea turtle nests, and those left in place ('in situ') during 2003-2005. In addition, Refuge biologists have developed an extensive and detailed protocol for nest relocations during the past 15 years. Using Refuge protocols, nearly all viable, relocated turtle nests have experienced much higher hatching and emergence rates than those left "in situ."

### Strategies:

*Continue to:*

- Patrol areas, in the summer, by all-terrain vehicles (ATV) from the southern boundary of Dam Neck Naval Base, south through Sandbridge, the Refuge, and False Cape State Park to the North Carolina border for signs of nesting sea turtles and for stranded turtles and marine mammals. Photo-document, collect tissue samples and record various measurements of stranded sea turtles.
- Relocate all sea turtle nests from ocean-front beaches of the community of Sandbridge, the Refuge and False Cape SP. Sea turtle nests would be relocated, using the most current Refuge protocol, to one sea turtle nursery behind the primary sand dune and immediately west of the high beach, on the Refuge.
- Monitor sea turtle nests day and night, when eggs are close to hatching. Immediately transport the hatchlings to the beach from relocated nest sites.
- Conduct periodic surveys (approximately once every 3 years) for the glass lizard in cooperation with the State Nongame/Endangered Species Biologist.
- Monitor the active bald eagle nest in the North Bay marshes and any new ones located on the Refuge and protect area around nests from disturbance.

### Objective 4b. Wilderness

Continue managing all proposed Refuge Wilderness Study Areas (WSAs) as wilderness.

**Rationale for Objective**

The Refuge’s WSAs were proposed for Wilderness designation in 1974. In accordance with Service policy, the WSAs must be managed as if they were wilderness in order to preserve the wilderness character of each area until such time as the United States Congress acts on the proposal. (Please refer to Appendix B for the Wilderness Review).

**Strategies:**

*Continue to:*

- Maintain and manage all 2,165 acres of proposed wilderness that was designated under the 1974 EIS using “minimum tool.” The minimum tool concept is defined in the glossary.
- Management would include continued invasive plant control, periodic bird surveys, and the annual October deer hunt program.

**Objective 4c. Cooperative Farming**

Continue to provide a secondary food source for migratory geese populations through implementing a cooperative farming program.

**Rationale for Objective**

Cooperative farming can provide secondary benefits to the wildlife resource in the form of waste corn and soybeans that are fed upon by migratory geese and waterfowl. In addition, cooperative farmers have provided significant habitat management contributions in the form of mowing, discing, pest control and root-raking in Refuge impoundments and old fields that have provided natural foods for migratory waterbirds.

**Strategies:**

*Continue to:*

- Allow farmers to provide direct payment for participating in the cooperative farming program.
- Allow farmers to use pesticides only after pesticide use proposals are approved by the Regional Office.

**Objective 4d. Submerged Aquatic Vegetation Management**

**Restoration work pertaining to SAV can be found under Objective 1e.**

Continue to maintain our association in two multi-agency partnerships (“Currituck Sound Study” and “SAV Study”) aimed at scientifically determining water quality, vegetation community, migratory waterbird, and socio-political conditions in Back Bay and Currituck Sound, along with possible restoration possibilities.

**Rationale for Objective**

Since Back Bay is the northern tip of the Federally-recognized (and EPA funded) “Albemarle-Pamlico National Estuarine System” (APES), there is already a national and federal emphasis on this important estuarine system. However, Refuge staff often do not possess the necessary skills and time to conduct such work. State, City, private and other federal agencies exist that do, together with local citizens. Because of a mutual interest in the same natural resources on a Refuge, partnerships can be forged that provide mutual benefits to all partners, pool funding, and present possible solutions to degradation issues. Such important field data and information may help explain declining migratory bird populations, lost SAV distributions, desirable vegetation and habitat degradation and/or declining wildlife use; and result in possible restoration approaches. The Refuge alone cannot hope to accomplish the necessary major improvements on the landscape or ecosystem level that will truly make a difference to Refuge natural resources.

Submerged aquatic vegetation (SAV) is a critical component of the Back Bay ecosystem, as well as the rest of the Albemarle-Pamlico Estuarine System (APES). SAV provides habitats for fish and a wide variety of invertebrates, in addition to serving as a food for wintering and migrating waterfowl. However, this critical natural resource has been rapidly disappearing in the Back Bay Ecosystem. Loss of this important habitat has caused associated decreases in the fish and waterfowl populations utilizing the Bay as well as a number of additional problems for Back Bay's ecology. Development of the landscape within the fringes of the northwestern watershed of Back Bay may have resulted in negative impacts to water quality that has negatively affected SAV. Turbidity, nutrient-loading and coliform bacterial levels are concerns in Back Bay and its tributaries. Erosion of the islands in Back Bay has accelerated since the decline of SAVs. The need for partnerships to deal with this deteriorating situation is apparent.

Two separate, but overlapping, efforts have resulted. The "SAV Study" and the "Currituck Sound Study." The "SAV Study" consists of the Service's Carolina Virginia Strategic Habitat Conservation Team, North Carolina State, universities, and other agencies' joint efforts to assess the current state of SAV in the Albemarle-Pamlico Estuarine System and manage it better. The "Currituck Sound Study" is a U.S. Army Corps of Engineers effort to determine the current state of Currituck Sound's and Back Bay's water quality, fish populations, waterfowl populations and SAV; and to then determine what restoration may be practical and possible. Extensive water monitoring and historical research efforts are underway. "Currituck Sound Study" partners include Back Bay NWR, U.S. Geological Survey, Elizabeth City State University and North Carolina Department of Environmental Quality, Division of Water Resources.

**Strategies:**

*Continue to:*

- Cooperative efforts with partners in North Carolina through participation in the Service's Carolina Virginia Strategic Habitat Conservation Team and the rest of the Albemarle-Pamlico Estuarine System (APES). This effort would include mapping existing SAV beds throughout APES, compiling historical SAV distribution reference materials, and establishing restoration and improved SAV management guidelines.
- Actively work with the U.S. Army Corps of Engineers in the Currituck Sound Feasibility Study, particularly in respect to their Hydrodynamics/Water Quality Modeling Work Group and the Fisheries, Shellfish, Submerged Aquatic Vegetation and Waterfowl Work Group.
- Explore new partnerships (Virginia Institute of Marine Science) to help understand and improve SAV in Back Bay.

**GOAL 5.**

**Provide additional viewing opportunities of migratory birds and other wildlife to increase the general public's appreciation and support of natural resources.**

The National Wildlife Refuge System Improvement Act of 1997 recognizes wildlife photography and observation, environmental education and interpretation, and hunting and fishing as the six priority public uses of the Refuge System. This means that when considering goals and objectives, priority public uses receive enhanced consideration over non-priority uses. Refuges provide outstanding opportunities to observe and appreciate wildlife in its natural environment. To this end, Back Bay NWR has attempted to provide facilities that promote on-the-ground experiences when visiting the Refuge. These include kiosks, observation areas, interpretive trails, and environmental

education workshops. To many visitors, and to the wildlife which depend on the Refuge, conveying the importance of proper wildlife management is one of the most important things that a refuge can do.

Through careful planning, diligent monitoring of impacts of uses on the natural resources, and by preventing uses not appropriate or compatible with Refuge purpose or the Refuge System mission, we can achieve the purposes, goals and objectives of Back Bay NWR while providing people with lasting opportunities for quality wildlife-dependent recreation.

**Objective 5a. Wildlife Observation and Photography**

Maintain the existing opportunities for visitors to engage in wildlife observation and photography by utilizing public access facilities at the Refuge.

**Rationale for objective**

The Refuge currently has two miles of hiking/biking trails, seven overlooks, five information kiosks, a wildlife observation building, a Visitor Contact Station (VCS), an entrance booth, the Asheville Bridge Creek Environmental Education Center (ABCEEC), and a 50-car parking lot adjacent to the Refuge headquarters. The number of visitors to the Refuge have continued to increase over the past couple years. In 2006, the Refuge estimated 115,000 visitors. In order to continue providing opportunities for wildlife observation and photography, we must maintain public access facilities on the Refuge. Many of the strategies for wildlife observation and photography are also applicable to the other priority public uses such as environmental education and interpretation.

**Strategies:**

*Continue to:*

- Complete the construction of the canoe/kayak launching facility at Horn Point.
- Utilize existing trams and programs. Currently, tram tours are conducted in cooperation with Back Bay Restoration Foundation (BBRF).
- Maintain the VCS, the ABCEEC, entrance booth, 50-car parking lot, other structures and buildings, interpretive and directional signs, informational kiosks, benches, trams, vehicles, and trails.
- Develop additional public access facilities. The Refuge is part of the new Virginia Coastal Birding Trail and is a viewing location along the multi-refuge Charles Kuralt Trail.
- Provide opportunities for photography and wildlife observation at the wildlife observation building (northeastern portion of C pool).

**Objective 5b. Environmental Education and Interpretation**

Maintain the existing opportunities for visitors to engage in environmental education and interpretation by providing educational workshops and events.

**Rationale for Objective**

The Refuge provides on- and off-site, as well as website environmental education programs for area schoolchildren, hosting more than 60 schools and 4,000 children annually. Exhibits in the VCS communicate the history of the Refuge, cultural influences in the area (fishing & watermen, hunt clubs, decoy carving, etc.) and natural resource themes. The ABCEEC, a 17-acre site, is available for use by schools and groups. It includes a 40-person classroom, short nature trail, an activity pier, outdoor classroom, and self-guided interpretive signing. Teacher workshops are provided by the Refuge as well as with partners. In order to

continue providing opportunities for environmental education and interpretation, we must continue educational workshops and events.

**Strategies:**

*Continue to:*

- Provide on- and off-site, as well as web site environmental education programs for area schoolchildren.
- Provide exhibits in the Visitor Contact Station (VCS) to communicate the history of the Refuge, cultural influences in the area (fishing & watermen, hunt clubs, decoy carving, etc.) and natural resource themes.
- Keep Asheville Bridge Creek Environmental Education Center (ABCEEC) available for use by schools and groups. The facility also houses the Refuge's museum collection, and provides office space for the Refuge's support group, the Back Bay Restoration Foundation (BBRF).
- Provide natural history interpretation in the VCS, through self-guided interpretive displays along trails, audiovisual programs, Service and Refuge-specific publications, guided walks, talks and field demonstrations, and through guided tram tours and special events.
- Maintain the Refuge's Bay Trail, adjacent to the headquarters, which includes a pond activity pier, outdoor classroom site, and interpretive kiosks.
- Provide opportunities for environmental education and interpretation at the wildlife observation building (northeastern portion of C pool).
- Work independently and with partners to provide teacher workshops.

**Objective 5c. Non-wildlife dependent uses**

Maintain the existing opportunities for visitors to engage in non-wildlife dependent public uses (hiking/biking, canoeing/kayaking, etc.) that are compatible with the purposes for which the Refuge was established.

**Rationale of Objective**

Under the Refuge Improvement Act, six priority public uses were established that would receive enhanced consideration on all Refuges. Not included in those priority public uses are activities such as hiking/bicycling, canoeing/kayaking, horseback riding, swimming, sunbathing, picnicking, and vehicular beach access. Compatibility with the purposes of the Refuge must be determined for each of these activities before they would be allowed. Currently, dog walking, hiking/bicycling, canoeing/kayaking and vehicular beach access are allowed on the Refuge, but some on a more limited basis than others. Dog-walking is currently permitted during the winter through early spring period, in the headquarters, adjacent nature trails and beach areas, where migratory bird use was low. The public and their leashed dogs are currently permitted in those areas from one-half hour before sunrise to one-half hour after sunset between October 1 and March 31. Activities are limited in order to protect and conserve wildlife and their habitats on the Refuge. The Refuge does not permit horseback riding, as Refuge staff determined that this activity was not appropriate due to lack of necessary resources to administer the use (refer to Appendix A for findings of appropriateness and compatibility determinations). While the activities mentioned above are not priority public uses, they are important to providing additional recreational opportunities for visitors to the Refuge.

**Strategies:**

**Canoeing and Kayaking**

*Continue to:*

- Provide an area car top canoe/kayak launch site at the Refuge headquarter area and at the Horn Point Public Access Site.
- Work with the City of Virginia Beach to develop additional launch sites on Refuge property.

**Hiking and Bicycling**

*Continue to:*

- Allow hiking and bicycling along the Refuge dike roads during April through October and year-round along the Refuge beachfront (except the “North Mile”), the entrance road, and the headquarters trails.

**Horseback Riding**

*Continue to:*

- Prohibit horseback riding on the Refuge. Horseback riding is not considered to be an appropriate public use (refer to Appendix A for the finding of appropriateness for horseback riding).

**Dog Walking**

*Continue to:*

- Annually permit leashed dogs on the Refuge, from October through March (excluding the annual hunt in October).
- Annually prohibit pets on the Refuge from April through to September.

**GOAL 6.**

**Provide and expand hunting and fishing opportunities to the public where compatible with Refuge purposes.**

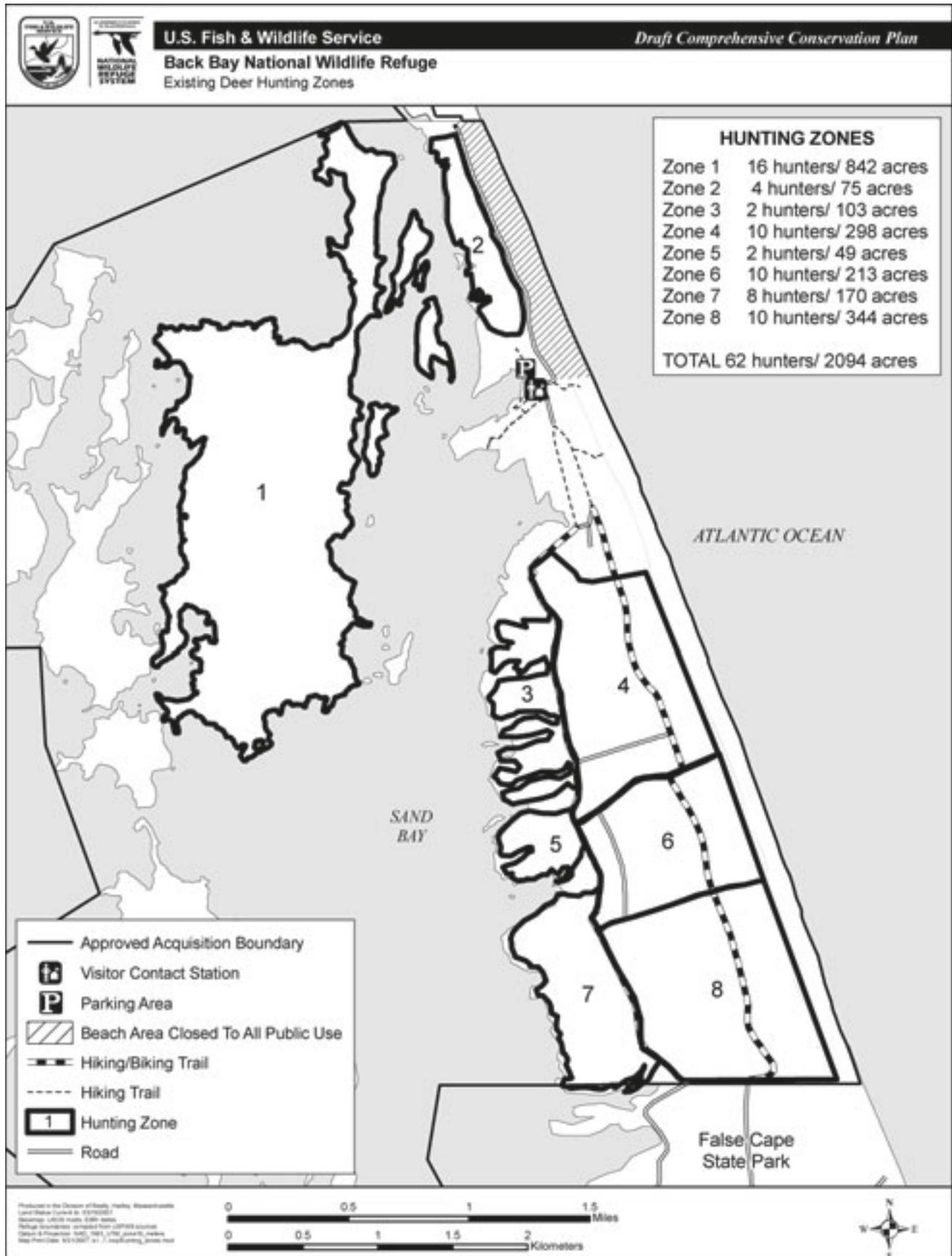
The National Wildlife Refuge System Improvement Act of 1997 recognizes wildlife photography and observation, environmental education and interpretation, and hunting and fishing as the six priority public uses of the Refuge System. This means that when considering goals and objectives, priority public uses receive enhanced consideration over non-priority uses. Refuges provide outstanding opportunities to engage in wildlife-dependent recreation and foster an appreciation for wildlife and habitat as a participant in the natural environment. To this end, Back Bay NWR has attempted to provide facilities that promote on-the ground experiences. These include fishing docks, hunt zones, and education events on these activities.

**Objective 6a. Deer Hunting**

Maintain existing hunting opportunities by annually providing a minimum seven-day white-tailed deer and feral hog hunt on the Refuge.

**Rationale for Objective**

The Refuge, in conjunction with False Cape State Park, currently runs a minimum seven-day annual hunt for white-tailed deer and feral hogs. Hunters are selected using a lottery system, coordinated and hosted by VDGIF. There are eight designated hunt zones on the Refuge, including Long Island where there are only deer, and which is accessible only by boat (Map 2-1). One hunting zone is handicapped-accessible. The hunt serves a dual purpose of providing public opportunity for hunting, while deer and hog populations are reduced, a necessity for proper habitat management. The Refuge does not currently permit waterfowl hunting in the Presidential Proclamation area or in the impoundments.



**Strategies:**

*Continue to:*

- Conduct a minimum seven-day white-tailed deer and feral hog hunt each year.
- Evaluate hunter satisfaction, as well as harvest rates of deer and hogs, to make management changes as needed to meet the Refuge goals, vision and purpose.
- Partner with Virginia Department of Game and Inland Fisheries to administer the hunt via a computerized permitting system.

**Objective 6b. Waterfowl Hunting**

Continue to implement the 1939 Presidential Proclamation prohibiting migratory bird hunting within the original Refuge boundary.

**Rationale for Objective**

Back Bay NWR was originally established to provide wintering and migrating waterfowl with continuous use of their traditional wetlands habitats in Back Bay, and insure that those habitats would be protected and continue to provide for the needs of the waterfowl resource. In view of the traditional use of Back Bay by large numbers of wintering and migrating waterfowl, the Presidential Proclamation was intended to insure that this important waterfowl use area was also not to be hunted to the detriment of the traditional waterfowl population use. Closing the higher waterfowl concentration areas that made up the new Refuge in 1939, insured that consumptive uses of those areas would not create a compatibility issue that could conflict with the purpose for establishing the Refuge, as well as its mission and objectives.

**Strategies:**

*Continue to:*

- Conduct law enforcement patrols to ensure no migratory bird hunting is occurring.
- Replace proclamation boundary markers to delineate the boundary.
- Provide environmental education in support of the objective.

**Objective 6c. Fishing**

Maintain existing opportunities for visitors to fish on the Refuge by providing several fishing sites and holding 1 fishing education event per year.

**Rationale for Objective**

Visitors are currently permitted to fish along the beach, the shore of the bay, and from the D Pool impoundment, which includes a handicapped-accessible pier. A multiple use site, Horn Point, is currently being developed, which would provide fishing opportunities. In addition to the Horn Point site, the Refuge recently completed a multiple use dock/pier next to the current headquarters and Visitor Contact Station. In 2005, nighttime surf fishing was initiated on a limited basis, by Special Use Permit. Each June, the Refuge and several partners hold a National Fishing Week special event, providing fishing rods and bait, instruction for children and novices, children's prizes, fishing clinics, displays and handouts.

**Strategies:***Continue to:*

- Allow visitors to fish along the beach, the shore of the bay, and from the D Pool impoundment.
- Work with partners to provide fishing education programs, and instill a conservative recreational fishing ethic through the National Fishing Week special event and other events.
- Complete development of the Horn Point site to provide additional fishing opportunities.
- Provide limited, night surf fishing opportunities through special use permits.

**GOAL 7.****Promote understanding and appreciation for the conservation of fish, wildlife and their habitats and the role of the Refuge in this effort through effective community outreach programs and partnerships.****Objective 7a. Partnerships**

Continue to actively outreach in regional and community economic development and conservation partnerships and initiatives, consistent with the Refuge System mission and Refuge purposes.

**Rationale for Objective**

These objectives would encourage broader cooperation between the Service and local communities, interest groups, and other agency partners. As an urban Refuge with limited internal resources, partnerships are readily available and key to accomplishing Refuge goals and objectives. Further, the Service can be a resource to the community in providing valuable technical assistance to area conservation groups. Sharing resources where mutually compatible conservation objectives are apparent is cost-effective, and in the best interest of the Service, the partner organization, and the public.

**Strategies:***Continue to:*

- Maintain partnership with Ducks Unlimited, an important partner in wetland and waterfowl conservation.
- Work with FCSP personnel to patrol the Refuge and the Park's beaches for sea turtle nests during the summer. Also, we would cooperate with FCSP on law enforcement efforts, interpretative programming, and special events management and staffing.
- Manage FCSP's two impoundments, including water level management, invasive species control, mechanical habitat management, and prescribed burning.
- Hold annual deer and feral hog hunts simultaneously with FCSP on the Barrier Island.
- Provide assistance to Mackay Island National Wildlife Refuge.

- Have BBRF collect bimonthly water quality data at six selected sites along the western side of Back Bay. We would also partner with BBRF for environmental education, programming, biological issues, and special events.
- Have the Friends of Back Bay NWR group work with Congress to advocate for Refuge land acquisition.
- Recruit, train, and utilize volunteers in public use, biology and maintenance programs.
- Participate in meetings of the Carolina Virginia Strategic Habitat Conservation Team.
- Serve as a host site for the City of Virginia’s court-ordered community service program.
- Cooperate with City schools as a “Partner in Education.”
- Cooperate with the City planning department, parks and recreation department, and convention and tourism bureau on short and long range open space preservation, recreation facility development, on-the-ground recreation program delivery and ecotourism planning.
- Provide annual funds for a summer Youth Conservation Corps (YCC) administered through the Chesapeake Volunteers in Youth Services Organization.
- Allow private partners, such as Bass Pro, Walmart, Home Depot, and Lowes to assist the Refuge with donations of materials, supplies and equipment for project work and special events.
- Maintain interest group partnerships with Ducks Unlimited, Izaak Walton League, the Audubon Society, the Conservation Fund, etc.
- Develop an environmental education effort with the new “Sanctuary at False Cape” condominium development to include use of their facilities for Refuge information and environmental education displays.
- Proactively pursue positive media relations and coverage of Refuge events and management issues.
- Keep Federal Congressional representatives apprised of Refuge issues affecting the district.
- Resolve encroachment issues through legal means (e.g., land exchange, evictions).
- Attend and support the “Green Infrastructure” program that the Hampton Roads Planning District Commission is spearheading. This program is aimed at providing a natural habitat connectivity between conservation lands in Hampton Roads, including parks and national wildlife refuges.

- Evaluate the Refuge acquisition boundary for possible inclusion of areas within the Back Bay watershed that are not currently included within the acquisition boundary. Areas for consideration should include wetlands, fields and forested habitats.

**Objective 7b. Public Use Facilities**

Continue to provide public use facilities (Visitor Contact Station and Asheville Bridge Creek Environmental Education Center) and services in order to promote resource appreciation and protection.

**Rationale for Objective**

This objective would provide for safe and convenient access to Refuge resources in order to promote public education and understanding of resource values. We must maintain our public use infrastructure to provide a “go to” location to get questions answered and host public use events on the Refuge.

**Strategies:**

*Continue to:*

- Maintain the current Office/Visitor Contact Station and maintenance compound at the barrier island in Sandbridge.
- Maintain the ABCEEC as the primary environmental education site and office space for BBRF
- Keep Visitor Contact Station open from 8am-4 pm on Monday-Friday (year round), 9am-4pm Saturday & Sunday (April 1 through October 30); closed Saturdays (November 1 through March 31) and closed all federal holidays except Memorial Day, Independence Day, and Labor Day.

## Alternative B. Service-preferred Alternative

### Introduction

Alternative B, which is the Service's preferred action, provides objectives and strategies that the planning team recommends for achieving Refuge purposes, vision and goals and responding to public issues. This alternative focuses on enhancing the conservation of wildlife through habitat management, as well as providing additional visitor opportunities on the Refuge such as an expansion of the deer hunt and new hiking trails. Alternative B incorporates existing management activities and/or provides new initiatives or actions, aimed at improving efficiency and progress towards Refuge goals and objectives.

Some of the major strategies proposed, discussed in greater detail in this section, include: opening up forest canopy by selectively removing loblolly pine, sweetgum and red maple; withdrawing the 1974 wilderness designation proposal for Long Island, Green Hills, and Landing Cove (2,165 acres); developing a canoe/kayak trail on the west side of Back Bay; and developing and designing a new headquarters/visitor contact station.

### GOAL 1.

#### **Maintain and enhance a diversity of wetland habitats for migratory birds.**

#### **Objective 1a. Impoundment Management**

Manage 906 acres of 13 freshwater impoundments at Back Bay NWR, plus 165 acres of two freshwater impoundments at False Cape State Park, to meet the needs of several migratory water-bird groups with varying habitat needs. Acreage and location of each habitat type may vary from one impoundment to another from year to year, depending upon the wetland dynamics, vegetation management, and plant successional changes that occur within each impoundment. Management efforts would be directed to provide approximately the following habitats each year:

- a. *Spring (March–April) Migrating Waterfowl:* Approximately 400 acres (on both Back Bay National Wildlife Refuge BBNWR & False Cape State Park FCSP) of shallow, flooded (6"-18" water depth), mixed annual and perennial marsh vegetation remnants of the previous growing season. These relatively open-water habitats shall serve as both waterfowl resting/roosting and feeding areas.
- b. *Spring (Late April–May) Migrating Shorebirds:* Approximately 350 acres (on both BBNWR & FCSP) of feeding habitat. Consisting of shallow water (<15cm deep) to mudflat habitat with sparse to no vegetation (<15% coverage), during the normal peak shorebird migration of early to mid-May. This habitat would consist of a minimum of 10 patches; each approximately 5-80 acres each. 180 acres should consist of shallow water wetlands (0"- 3" deep) interspersed with exposed, wet mud/sand flats. Encourage the production of invertebrates for shorebird food at a density of 4 grams of invertebrates per square meter.
- c. *Summer (July–Aug.) Wading and Marsh Birds:* Provide a minimum of 200 acres of high quality feeding habitat for wading and marsh birds. This habitat would consist of open, shallow water (2"-10" deep) with patches of emergent wetland plants that support fish, invertebrates and amphibians. Said habitat should be provided in a minimum of 4-6 patches of at least 50 acres each. Highest quality areas are those patches where prey is concentrated following water drawdown.
- d. *Fall (Late Aug.–Sept.) Migrating Shorebirds:* Approximately 200 acres of feeding habitat. Consisting of shallow (<15cm) water depth to mudflat habitat, with sparse to no vegetation (<15% coverage), during the normal peak shorebird migration of early September. Patch size shall be a minimum of 10 acres.

- e. *Fall (Late Aug. – Oct.) Migrating Waterfowl*: Approximately 350 acres of feeding and resting habitats. Habitats shall consist of shallow flooded (<12" water depth) marshes with vegetation dominated principally by large-seeded perennial, and smaller seeded annual, marsh plants (e.g. sedges, rushes, smartweeds, and threesquare, mixed with smaller areas of moist-soil annual plants, beggar's ticks, wild millets, water hyssop, bulrushes and submerged aquatic vegetation. Patch sizes shall be at least 15-20 acres.
- f. *Wintering (Nov. – Feb.) Waterfowl*: Approximately 830 acres (on both BBNWR & FCSP) of feeding and resting habitats. These areas shall consist of approximately 750 acres of emergent marshes, moist soil units and shallow open-water areas; plus an additional 80 acres of deeper, open-water habitat with submerged aquatic vegetation for diving waterfowl. A significant increase in open water areas (more than during the fall) shall be present, as a result of gradually raising water levels within the affected impoundments.
- g. *Secretive Marsh Birds (Year-round)*: Approximately 450 acres (on both BBNWR & FCSP) of feeding, nesting and resting habitat for rails, bitterns and the common moorhen. Habitats shall consist of dense (>80% coverage), robust vegetation (cattail, needlerush and bulrushes) that occurs in patch sizes of at least 25 acres. Water depths during the breeding season shall range between 0"–12".

#### **Rationale for objective**

As explained in Alternative A, Back Bay Refuge's impoundments provide an easy-to-manage complex for year-round waterbird use (with emphasis on wintering waterfowl). Management typically consists of gradual flooding for waterfowl during winter; gradual draw-downs for shorebirds and waterfowl during spring and fall migrations; and extreme draw-down for wading birds during mid-summer. In addition, occasional discing and/or burning sets plant succession back from primarily perennial grasses and shrubs to primarily open ground with annual plant production. Such early successional stages are best for good invertebrate production. The impoundments currently serve as an important replacement food source for Back Bay's depleted resources. SAV and its associated vertebrate and invertebrate communities have greatly diminished during the past 25 years. The impoundments provide ideal shallow-water habitats for many species of wintering waterfowl such as the Black duck, Mallard, Gadwall, Pintail, Widgeon, Green-winged teal, Snow and Canada goose and Tundra swan, which are not here in significant numbers during the rest of the year. Most wintering waterfowl use now occurs in the Refuge impoundment complex instead of Back Bay's much greater acreages, because of the increased food availability and undisturbed resting areas that the impoundments provide. This has changed since the early to mid-1990s when most waterfowl use occurred in southwestern Long Island and throughout Ragged Island in Back Bay.

Structured, FWS-approved waterbird surveys and other monitoring tools, must be conducted in order to evaluate the effectiveness of habitat management practices. Where target bird species use is low, habitat management efforts should be modified to attract additional waterbird use.

In managing Refuge wetland resources, it is important to stress that habitat management efforts aimed at increasing the diversity and abundance of waterbird food-plants, are actually aimed at meeting the needs of waterbirds that have historically used those wetlands. Conflicts with maintenance of such high food-plant diversity and abundance need to be addressed quickly, before the problem spreads and becomes more difficult and expensive to control. For example, small patches of American lotus have become established in B

and C Pools of the Refuge impoundment complex during the past 2-3 years. It is also present in the East and North Impoundments of the Frank Carter Impoundments on Colchester Road. These stands are expanding and have the potential to reduce the biodiversity and food plant production of these areas, if such expansions continue. Some non-native species may possibly be a benefit in the right location, if it occupies a vacant “ecological niche” and/or provides an important service (food, nesting areas, cover and concealment, water, etc.) to the habitat and/or wildlife community.

**Strategies in Addition to Alternative A:**

- **Hunting.** Remove as many feral hogs and deer as possible from the 880 acre impoundment complex. Both compete for foods raised by Refuge management actions for wintering and migrating waterbirds. Consider increasing hunting season(s) if practical.
- **Monitoring.** Over the fifteen years following approval of the CCP, periodically (weekly or biweekly) monitor and evaluate migratory waterfowl, shorebird, wading bird and marshbird species use of intensively managed Refuge habitats. These surveys shall determine whether the Refuge is maintaining or improving shorebird and waterfowl use during the spring and fall migrations; wading bird use during the late summer and fall; and wintering waterfowl use. Evaluate surveys and inventories as part of annual HMP, and determine whether they are accurately achieving desired goals and objectives. If not, they should be modified or abandoned. Determine whether new Service-approved monitoring techniques can be utilized, in keeping with Regional and National protocols and other standards.
- **Increased Levels of Alternative A.** As need dictates, increase the levels of active management detailed in Alternative A, that are necessary to meet new challenges and conflicts with impoundment management purposes and objectives.

**Objective 1b. Pest Control (Phragmites)**

Restore and maintain the natural, diverse, native wetland plant communities throughout the impoundment complex and up to 4,000 acres of wetlands within Refuge islands and the Back Bay watershed. A minimum of 200 Refuge acres of dense phragmites stands would be restored annually. The presence of this invasive plant should be reduced to 10% or less, of the plant species composition of Refuge wetlands habitats, through use of strategies outlined below.

**Rationale for objective**

Dominance of wetland habitats by the pest invasive phragmites reed has resulted in reduced biodiversity, and the resulting inability of those habitats to provide wintering and migrating waterbirds with the feeding and resting areas they need each year. This directly conflicts with the Refuge purpose. Control shall be warranted with as few as 5 phragmites stems per acre; however, the largest, denser stands shall receive higher priority.

Removal of dead phragmites stems and dense dead vegetation mats that have accumulated in the western marshes is often best accomplished with prescribed fire. Removal of this dense ground cover would permit the sun to contact the soils, and better germinate the extensive beneficial seed-bank already present. Typically in the years following a prescribed burn, annual food-plant production greatly increases, and includes stands of Walter’s millet, beggar’s ticks, smartweeds, and water hyssop. With the assistance of Great Dismal Swamp NWR’s fire staff, Back Bay NWR fire staff can conduct such prescribed burning projects.

**Strategies in Addition to Alternative A:***Within 2 years of CCP approval:*

- Consistent, annual control through use of an EPA-approved systemic herbicide (for use in wetlands). Herbicide applications shall occur via aerial and/or back-pack spraying. Expanded aerial control efforts would focus on larger stands, while back-pack spraying would be used to treat remaining small patches.
- Remove treated, dead phragmites stands in the same year of treatment, by prescribed burning.
- Long-range phragmites control would occur in the following sequence:
  - 1) Removal of phragmites stands within easternmost barrier island's impoundment complex;
  - 2) Progress westward outside of impoundment complex, to the barrier island shoreline;
  - 3) Progress further west onto the islands of central Back Bay (particularly Long and Ragged Islands) and private property partnerships along the western shorelines;
  - 4) Continue westward to the estuarine wetlands along the western side of Back Bay and the associated waterways within the watershed (Nanney's Creek and Beggar's Bridge Creek) including private property partnerships in those areas; and
  - 5) Continue northward to the estuarine wetlands along the northwestern and northern portions of Back Bay and the associated waterways within the watershed (Muddy Creek, Asheville Bridge Creek, Hell Point Creek and the North Bay Marshes – except for the sections of marsh that border both sides of the north-south "Black Gut ditch" that runs south of Sandbridge Road).
- Work with cooperating private property partners to treat areas on land adjacent to Refuge lands that have dead phragmites stands from prior control efforts. This would require the formation of new Refuge partnerships and written agreements.

**Objective 1c. Pest Control (other than phragmites)**

Other potential pest plants, such as the native American lotus, shall be controlled and/or eliminated when their coverage exceeds 20% of the existing open water surface within an impoundment. Control efforts should be continued until the species is either extirpated, or is contained to less than 10% of the impoundment's water surface. Feral hogs will be extirpated from Refuge and State Park lands.

**Rationale for Objective**

Extensive presence of a pest plant species like American lotus diminishes the migratory bird native food-plant diversity and abundance (particularly submerged plants and organisms) within an impoundment, through the increased leaf coverage of the water's surface, and the allelopathic qualities of the lotus' root systems. Previous efforts to control the plant have failed. These methods included: (1) hand-pulling—rootstocks were much too extensive for complete removal, and leaves were quickly replaced after removal; and (2) applying an EPA-approved Glyphosate herbicide ("Aqua-Neat") several times during June and July 2006—treatments failed when dead leaves were replaced in about 2 weeks, as apparently enough herbicide was not being transported to the rootstocks.

Japanese stiltgrass is present throughout most of the Refuge woodlands and upland old fields acquired since 1989. It exists in the shaded woodland understory, adjacent open fields, and shrub-scrub habitats. The size of the stiltgrass presence is extensive (possibly in the hundreds of acres). Because of the size of this presence, efforts should assess the negative impact (or lack thereof) of

this species' presence in the habitats it currently occupies. This would be followed up by a decision to control or not control this species in a geographic area, along with priority determinations that would aid in deciding where possible long-range control may be warranted, and where its negative impact is not significant and does not warrant (immediate) control.

Despite efforts by Refuge staff to control the size of the Refuge feral hog population through a public hunting program and opportunistic shooting, State biologists have come to the conclusion that it is expanding and increasing in size. The Refuge is concerned that this expansion may result in the hog population moving into the southern residential areas of the community of Sandbridge, where they would create additional nuisance problems and landscaping damage to local residents. The feral hog has a long history of competing with migrating waterfowl and native mammals for the same natural foods, particularly marsh annual plants and acorns. In addition, they turn over the soil and create large holes (rooting/wallows) in and adjacent to dike slopes, and along Refuge nature trails and landscaping. These disturbed/hole areas can accelerate erosion along dike slopes, causing increased maintenance costs. They also pose safety hazards to hiking and biking members of the public that use Refuge nature trails.

#### **Strategies in Addition to Alternative A:**

*Within the first year of CCP approval:*

- Drawdown water levels in impoundments and dry out substrate to discourage and eliminate lotus and monitor existing lotus stands to determine extent of threat to other native species and wetland plant diversity.
- Commence herbicide control efforts in fields and woodlands of the headquarters vicinity. (For control of Japanese stiltgrass, we would use a Sethoxydim herbicide, or other suitable herbicide. Gradually expand control efforts outwards, as cost and manpower needs permit. Assess new areas prior to expanding control efforts to additional geographic locations. As part of this assessment, a determination would be made to control, or not control, the stiltgrass. Mere presence does not constitute grounds for control. If the stiltgrass presence does conflict with the food-plant production and biodiversity of the area, proceed with a systematic control program, using good integrated pest management techniques. If it does not, move on to another area, and record that decision in that year's Annual Habitat Management Program (AHMP)).
- Increase pest control efforts involving the feral hog, through additional advances in the cooperative research effort with VDGIF. Additional efforts could include: permitting selected trappers to run traps for year-round feral hog population control as needed under Special Use Permits; working with State biologists to assess Refuge feral pig population through a mark-recapture, ear-tagging program; increased shooting by Refuge staff or permitting sharpshooters; and/or increasing public hunting to remove excess feral hogs.

#### **Objective 1d. Water Quality Protection**

Actively participate in multi-agency efforts to protect and improve the water quality of Back Bay and its watershed, particularly within the Refuge boundary, at good to excellent levels, as defined by Virginia Department of Environmental Quality standards presented below.

#### **Rationale for objective**

Maintenance of good to excellent water quality standards is critical to the continued plant (annual and perennial, oligohaline, emergent marsh and SAV species) and invertebrate productivity of Back Bay and its watershed. Healthy

wetland habitats are necessary for the Refuge to meet its target of supporting moderately high numbers of wintering and migrating waterbird and passerine populations each year. Water quality standards should not drop below the following parameter levels, without corrective action being taken:

- 1) *Dissolved oxygen*—Minimum 4.0 mg/L or Daily Avg. 5.0 mg/L
- 2) *pH*—range between 6.0 and 9.0
- 3) *Turbidity*—No written standards
- 4) *Bacteria*—Enterococci—Geometric Mean 35 cfu/100 mL or Single Sample Maximum 104 cfu/100 mL

Baseline data should be gathered from Nanney’s Creek, Beggar’s Bridge, Asheville Bridge, and Hells Point Creeks, and the North Bay Marshes on a consistent basis, using State Department of Environmental Quality protocols. Development pressures from the northwestern portion of the watershed are occurring, and may soon extend southward along Princess Anne Road (i.e., Pungo Ridge) on the western side of the watershed. The Refuge must be prepared to provide scientific evidence of current baseline water quality conditions, in order for determinations to be made as to whether pollution is actually occurring or not.

#### **Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Develop partnerships with State (Department of Environmental Quality) and local agencies (i.e., Back Bay Restoration Foundation) to collect water quality data that would result in a scientifically sound water quality database for Back Bay and its tributaries. Data from this database would be used to provide the Refuge with sound baseline data for existing Back Bay water quality standards.

*Within 5 years of CCP approval:*

- Establish an effective and scientifically-sound, interagency water quality monitoring program within the Back Bay watershed to establish sound baseline water quality data, and insure that negative impacts to the water quality of Back Bay are detected as soon as possible.

#### **Objective 1e. Wetlands Restoration**

Encourage and support planning and implementation efforts that can result in the restoration and/or regeneration of submerged aquatic vegetation (SAV) in Back Bay. Restoration targets should include a significant presence (>50 stems per acre) of the SAV species listed below, in 40% of open-water Bay habitats. Partnerships with other interested agencies in North Carolina and Virginia would be employed as much as possible.

#### **Rationale for objective**

Back Bay SAV distributions were aerially photographed in the fall of 2003. The resulting photo-interpretation, ground-truth checks and mapping data provided a current estimated SAV coverage of 1% of Back Bay’s open-water habitats. The “Sincock Study” (1965) and other earlier research (Martin 1956) estimated an SAV coverage of approximately two thirds of Back Bay. Species composition consisted principally of Sago pondweed, wild celery, southern naiad/bushy pondweed, widgeon grass, redhead grass, and two algal species — muskgrass and nitella. All of these species are good to excellent waterfowl food-plants. The subsequent SAV decline of the late 1970s and 1980s has resulted in the current low SAV level. This decline has also resulted in a corresponding decline in Back Bay fish and wintering/migrating waterfowl populations.

The blue-winged teal, wood duck, mallard and black duck would be targeted for increase use during spring and fall migrations, along with maintaining or

improving wintering widgeon, gadwall, mallard, pintail, black duck, green-winged teal and tundra swan use. Targeted annual food plant increases shall be aimed at the following: smartweeds, beggar's ticks, wild millets, water hyssop, a variety of bulrushes and sedges, and several submerged aquatic plant species.

Additional productive, freshwater wetland habitats are needed within the Back Bay watershed. Wetland food production in the watershed is declining drastically as SAV resources continue to diminish. In addition, development is encroaching into the northeastern portion of the watershed (the "Transition Zone"), and may eventually continue southwards via the Princess Anne Road corridor. Such development may pose additional future negative consequences to watershed wetlands, and to the waterbird populations dependent on them.

An impoundment system can provide an extensive array of moist soil plants with high seed production and/or succulent stems and leaves, that are excellent waterfowl foods (i.e. spikerushes, water hyssop, smartweeds, beggar's ticks, bulrushes, sedges, and wild millets). Such impounded moist soil marshes are much more diverse than most natural wetlands of the Back Bay watershed, and contribute more to waterbird food availability on an acre per acre basis. In addition, these impoundments can be drawn down during the spring shorebird migration, to provide shorebird migrants with additional feeding habitat, particularly when bay water levels are too high to do so. (Please refer to Chapter 1 to understand how Back Bay NWR connects to larger landscape level wetland restoration plans, such as the Atlantic Coast Joint Venture (ACJV) plan).

#### **Strategies in Addition to Alternative A:**

*Within 3 years of CCP approval:*

- Evaluate and determine existing and historical SAV species and distributions of Back Bay. Determine SAV restoration potential and implementation in Back Bay, and establish a long-term SAV monitoring and management program in Back Bay.
- Improve the plant diversity of 250 acres of freshwater wetlands habitat within the western and northern marshes (and adjacent habitats) around Back Bay (on or off Refuge), by increasing annual plant (smartweeds, Beggars ticks, wild millets, bacopa, and a variety of bulrushes and sedges) production. Such increased annual plant production would occur through a combination of decreasing phragmites reed density/presence in those areas through aerial applications and subsequently prescribe-burning Refuge marshes in previously described geographic locations.

*Within 5 years of CCP approval:*

Convert 30 to 40 acres of old field in Tract 194 (adjacent to Muddy Creek Road) to a shallow, fresh-water impoundment for migratory waterfowl and shorebird use.

## **GOAL 2.**

### **Enhance and preserve native woodland diversity and health.**

#### **Objective 2a. Shrub-Scrub Habitat**

Within 6 years of CCP approval, initiate strategies to provide 45 acres of shrubby, mid-story canopy in woodlands to the north and south of Sandbridge Road, and east of Muddy Creek Road, to benefit declining migratory landbird species, including the prairie warbler, field sparrow, gray catbird, yellowthroat and eastern wood peewee.

#### **Rationale for objective**

Shrub-scrub habitats in this area consist of mixes of short (young) loblolly pine, sweetgum, red maple, waxmyrtle and saltbush/groundsel shrubs and a variety of forbs (blackberry, raspberry, goldenrod, boneset, etc.). They provide

nesting, resting and feeding habitat for the nationally declining prairie warbler, field sparrow, gray catbird, yellowthroat and eastern wood peewee, along with the more common but unique, yellow-breasted chat, indigo bunting and blue grosbeak. Since 1995, several formerly farmed, small old fields were permitted to revert to shrub-scrub status. Point counts in those areas confirmed use by the above passerine species, as literature searches had also revealed. This increased awareness of the importance of what used to be considered a transitional habitat, to meet the needs of several nationally declining species, has gradually spread through refuges throughout the East Coast. Many refuges are now involved with managing for shrub-scrub habitats as part of their woodlands and/or forest management programs. Additional rationale can be found in Alternative A, Objective 2a.

#### **Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Reclaim old fields that have succeeded to an early forest habitat stage, using tree pruners and chain-saws to remove the tops of the taller trees adjacent to Sandbridge and Muddy Creek Roads.
- Prescribe burn these areas if possible, to reduce ground cover and encourage forb and shrub growths.
- Thin tree densities and remove tree tops to keep habitat from vegetationally succeeding to a forest habitat. Tree tops should not exceed 7 feet in height.

#### **Objective 2b. Forest Management**

Enhance, restore and preserve native tree species diversity and health, particularly bottomland hardwoods, while reducing the presence of undesirable tree species.

#### **Rationale for objective**

Of the total 9,035 acres of Refuge, approximately 1,415 acres are forest. Refuge forest habitats are composed of approximately 650 acres of forested swamp, 700 acres of mid-successional lowland forest, and 65 acres of maritime shrubland/woodlands. Following a FWS Biologists' and Foresters' review of all Refuge habitats in the late 1990's, it was recommended that the Refuge thin loblolly pine, sweetgum, and red maple in Refuge forest habitats – particularly around Sandbridge Road, as well as the Green Hills vicinities. Thinning would open up the forest canopy and allow sunlight to reach the forest floor, thereby increasing ground cover, oak germination and other mast production. Consequently, a mid-story canopy and additional food resources would be provided that would benefit declining migratory songbird species and resident mammals.

One of the major roles that this Refuge can play in the surrounding Virginia Beach landscape is to provide as much contiguous, non-fragmented native forest habitats as possible. Forest habitats are rapidly disappearing from the surrounding landscape, as urban sprawl continues spreading towards the rural Back Bay watershed of southeastern Virginia Beach. Wildlife habitats and resident wildlife are lost each year, as local woodlands are razed and replaced with large houses on small lots. Providing additional extensive forest habitats in the Back Bay vicinity has become a new priority; since this will also provide a last significant reservoir habitat for declining migratory bird populations (such as prothonotary warbler, ruby and golden crowned kinglet) and other resident wildlife that prefer large, non-fragmented forest tracts (such as bobcat).

Most Refuge forested habitats are not yet mature, and are principally lowland/bottomland types. As a result, their timber values are not very high. However, logging of some areas should occur, in accordance with good forest management practices and recommendations presented below.

Regional biologists theorize that remnant maritime forest along the western side of A-Pool may have formerly been a longleaf pine-pond pine forest that was clear-cut and drained, and replaced by the existing tree species. Tree thinning of young maples, sweetgums, and loblolly pines, along with prescribed burning, was recommended for this maritime forest remnant.

Tree thinning is also needed to open up the canopy in forests to the north and south of Sandbridge Road. This thinning would encourage natural regeneration of hard mast species such as oak, ash and tupelo, where the sun can reach the forest floor. A Biological Review Team suggested the future desired condition of these forest habitats (north and south of Sandbridge Road) and similar stands, should be towards a more complex canopy structure that favors retention of larger hardwoods and removal of loblolly pine; together with increased forest understory (shrubs) structure and development of large enough canopy openings to encourage successful oak regeneration where oak seedlings now exist.

The barrier island portion of the Refuge, along the western side of A-Pool, includes a young remnant maritime forest. It includes such southern species as live oak and pond pine, together with the usual red maple, sweetgum and loblolly pine. Other lowland forests exist along the western side of Back Bay, in the Nanney Creek, Beggar's Bridge Creek, Muddy Creek and Hell Point Creek vicinities, and along the northern and southern sides of Sandbridge Road. They consist primarily of red maple, bald cypress, sweetgum, black gum/tupelo, white oak, laurel oak, southern magnolia and scattered loblolly pine. Waxmyrtle, high-bush blueberry, and groundsel shrubs are also scattered about the forest floor, together with several ferns, vines, canes and greenbriers. In several older growth locations, very large trees exist that should be protected and preserved. A separate oak, tupelo, green ash and cypress seedling planting effort should occur in thinned areas that lack such parent trees, to restore more desirable bottomland tree species. Volunteers could be encouraged to plant oak and other hardwood seedling, after the thinning is completed. A higher water table should be maintained in these replanted sites, to support the native tupelos, ash and cypress trees; since they prefer wet soils.

#### **Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Use EPA-approved herbicide, if necessary, to thin undesirables. This would also support the growth of new tree plantings and related restoration efforts.
- Plant seedlings of mast-producing oaks, tupelos/gums and/or green ash in those areas that have had the canopy opened up, and now allow sunlight to reach the forest floor. Volunteers could be utilized to plant oak and other hardwood seedling, after the thinning is completed.
- Investigate the feasibility of establishing a "Partners Restoration Project" with Virginia Ecological Services Office, involving tree-cutting and planting contractors.
- Manage for higher water levels by eliminating or plugging man-made drainage ditches to support new trees that prefer a high water table, where adjacent property owners would not be negatively impacted.
- Conduct a fire management program capable of carrying out several prescribed burns each year with the primary purposes of increasing plant diversity in upland and wetland habitat, reducing the dominance of phragmites, and reducing fuel loads. Focus efforts on the Green Hills area for fuel reduction and habitat improvement.

- Periodic monitoring should be conducted to determine if cutting and herbicide applications are necessary prior to implementing such actions.

*Within 3 years of CCP approval:*

- Increase the presence of a shrubby, mid-story canopy to benefit the migratory songbird population by opening up the upper tree canopy in areas where sunlight can not reach the forest floor. This will also support the growth of tree plantings, and related restoration efforts.
- Initiate strategies to provide an additional 30 acres of mixed tupelos/gums, bald cypress, wetland tolerant oaks and green ash in woodlands to the north and south of Sandbridge Road, east of Colchester Road, and within the “Green Hills” area.

*Within 10 years of CCP approval:*

- Reduce the number/density of loblolly pine, red maple, and sweetgum trees, to approximately 35% of all trees in the Sandbridge Road forest vicinities. Conversely, we would increase the number of tupelos/gums, bald cypress, wetland tolerant oaks and green ash so that they collectively comprise 60% of the tree species in the Sandbridge Road forest vicinities.

**Objective 2c. White Cedar Restoration**

Enhance and preserve an on-going Atlantic white cedar restoration site to recreate a unique mixed bottomland hardwood-softwood forest that could have existed during pre-settlement times.

**Rationale for objective**

A small 2-acre tract of planted Atlantic white cedars exists immediately south of Sandbridge Road. The entire 15-acre field (behind the cedar stand) was also planted with a variety of oaks, green ash and bald cypress in 1994 and 1995. The intent was to recreate a unique mixed bottomland hardwood-softwood forest that could have existed during pre-settlement times. The 2-acre white cedar concentration was fenced to prevent deer browsing. Subsequent monitoring of this “Wetlands Reforestation Site” revealed that nearly all oaks, cypress, white cedar and green ash planted outside the fenced area were destroyed by deer-browsing during winters of the late 1990s. Some cypress has survived to date. The previously planted areas outside of the fenced cedar stand have succeeded naturally to loblolly pine, groundsel/saltbush, sweetgum and blackberry. The white cedars within the fenced area have survived, and natural regeneration has been observed from 2000 to present. The cedar stand has been thinned of competing loblolly, maple, sweetgum and saltbush annually to reduce competition for sunlight. However slow, limited progress has been made utilizing existing staff. This cedar stand must be cleared of the remaining 15' to 20' tall pines to allow the underlying cedars to receive adequate sunlight for continued healthy growth. If these cedars are not released, they may be lost to sunlight deprivation.

**Strategies in Addition to Alternative A:**

*Within 3 years of CCP approval:*

- Complete removal of 90% of competing loblolly pine, sweetgum, and red maple trees, together with waxmyrtle and groundsel shrubs within this area. This would be accomplished by annually thinning up to 2 acres of this vegetation in summer using chain-saws and hand tools, with a focus on areas with denser canopies causing shading of the ground.

**GOAL 3. Manage beach and dunes to preserve and protect migratory bird and other wildlife habitats.**

**Objective 3a. Beach and Dune Management**

Manage beach and dunes for wildlife that depend upon these areas, with a focus on limiting public use access to protect these fragile habitats (same as Alternative A). We would protect the stability and integrity of ocean-front primary and secondary sand dunes by maintaining the existing dune and high beach profiles in as pristine a condition as possible, reducing disturbances to dunes and beach from vehicular and human traffic.

**Rationale for objective**

Rare plant species are known to exist in Refuge and False Cape State Park dune swales. Some people in the community suspect that Refuge impoundment construction of G, H and J Pools contributed to the loss of some swales. However, Refuge biological staff maintain that construction of G, H and J Pools actually resulted in the creation of additional dune swale habitats, and that many of the plant species that exist therein include some of these rare dune swale species. Research is needed to confirm that the existing three “dune pools” contain many of the same species, and possibly in greater numbers, than the original swales that may have been impacted by the three impoundments’ construction. Comparisons between the vegetation of the natural existing dune swales within False Cape State Park can be compared with the plant species within G, H and J Pools to arrive at a satisfactory conclusion. Additional rationale for this objective can be found on page page 2-17 (Alternative A, Objective 3a)

**Strategies in Addition to Alternative A:**

*Within 1 year of CCP approval:*

- Implement vegetation transect lines in G, H, and J Pools. North to south transect lines would allow Refuge biologists to better understand what plant species occupy those impoundments.

*Within 3 years of CCP approval:*

- Coordinate with False Cape State Park to monitor and assess the effects of natural dune succession and natural dune swale plant community changes at both Back Bay NWR and False Cape State Park. (We will conduct comparative surveys/transects of three, 3-5 acre False Cape State Park dune swales, and three similar sized patches of wet marsh in G, H, and J Pools. Compare survey results to determine plant species identification, relative densities, and frequency of occurrences in both systems, using Refuge EXCEL databases).

**GOAL 4. Provide natural environment for native fish, wildlife, and plant populations (with special consideration to those species whose survival is in jeopardy).**

**Objective 4a. Threatened and Endangered Species**

Objective, rationale and strategies are the same as discussed in Alternative A, Objective 4a.

**Objective 4b. Wilderness**

Rescind existing proposal to designate proposed Refuge Wilderness Survey Area (2,165 acres) as Wilderness (Map 2-2).

**Rationale for Objective**

The conditions within and surrounding the Refuge’s WSAs have changed considerably since their original designation proposal in 1974. The population of Virginia Beach has increased by more than 250% since 1970, from 172,000 then to approximately 440,000 today. The proliferation of boats and personal motorized watercraft (i.e. jet skis) on waters surrounding the marsh islands has resulted in negative impact related to “sights and sounds” as compared to 30-plus years ago.



Non-native invasive plants within the WSAs, such as common reed (*Phragmites* species), are also more dominant and require intensive management to maintain biological integrity and environmental health. In addition, due to island erosion and the intensive management efforts needed to control encroachment of invasive species, the island assemblage is affected by man's work rather than the forces of nature. This work is noticeable throughout the year. Furthermore, although the island assemblage can provide limited opportunities for primitive recreation, and even solitude in the winter months, there are no *outstanding* opportunities for such throughout the year. The Green Hills and Landing Cove WSA units provide limited opportunity for primitive recreation opportunities, and do not meet wilderness size criteria.

Although the area no longer meets the minimum criteria for wilderness designation, the Service recognizes the importance of preserving plant and animal communities in a natural state for research purposes. Thus, the Service will identify, classify and establish the previously proposed areas as a Research Natural Area (RNA). Activities would be limited to research, study, observation, monitoring and educational activities that are non-destructive, non-manipulative, and maintain unmodified conditions as outlined in Service policy for RNAs. Service RNA policy also states:

- RNAs must be reasonably protected from any influence that could alter or disrupt the characteristic phenomena for which the area was established.
- The refuge manager may initiate management practices only where necessary to preserve vegetation and only as stated in a plan approved by the regional director. These management practices may include grazing, control of excessive animal populations, prescribed burning, and the use of chemicals for plant, insect and disease control.

**Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Work with interest groups, partners (i.e., The Wilderness Society, Virginia Department of Game and Inland Fisheries) and appropriate government officials to rescind the proposal to designate the proposed WSAs as Wilderness.
- Initiate the formal process to remove all proposed WSAs from consideration as Wilderness. Complete procedures to designate appropriate areas as Research Natural Areas (RNA). Document in an approved Natural Area Information Form, and submit to Regional and Washington offices sequentially for approval.

**Objective 4c. Cooperative Farming**

Within 5 years of CCP approval, implement strategies for managing the existing farmland to benefit migratory birds during the fall migration and possibly winter.

**Rationale for Objective**

Cooperative farming has been permitted to occur on newly acquired lands that were farmed prior to acquisition since the early 1990s. Farming supports the local economy while maintaining the disturbed status of the land, in the event that a better use for it is determined. Agricultural farming is prevalent in the surrounding community. Only corn and soybeans are grown on these lands (since they also provide a wildlife food value), and only approved pesticides and herbicides are permitted. Genetically modified crops are not permitted.

However, possible conflicts with the Service's Biological Integrity policy may force terminating the Cooperative Farming Program. The policy specifies that farming on refuges must provide direct, primary wildlife benefits to specific wildlife populations for which the refuge was established. Secondary benefits alone do not constitute justification for continuation of farming on a national wildlife refuge.

#### **Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Explore the possibility of the farmers contributing a portion of their crop to migratory birds in the fall, in lieu of rental payments. If it is determined that this would provide a more beneficial habitat for migratory birds than native vegetation, this contribution could take the form of several acres of grain being knocked down or otherwise being used to benefit migratory birds.

*To provide time for adequate planning and evaluation, within 5 years of CCP approval:*

- Phase out cooperative farming as a Refuge program, in keeping with the Service's Biological Integrity policy.
- The Refuge will develop a phase-out plan including strategies to reforest/restore the parcels to wildlife habitats with native tree and shrub species.
- Notify farmers of the timeline, and request existing farmers to voluntarily withdraw within the timeline.
- Where restoration plans can be implemented, and farmers have not voluntarily withdrawn, no new cooperative farming agreements will be issued.

*Within 10 years of CCP approval:*

- Convert former agricultural areas to forest and/or shrub-scrub habitats.

#### **Objective 4d. Submerged Aquatic Vegetation Management**

Restoration work pertaining to SAV can be found under Objective 1e.

Within five years of approval of this CCP, we plan to increase (to four) the number of multi-agency partnerships aimed at providing additional reliable water quality, vegetation, wildlife use, and habitat management data, together with other environmental conditions of Back Bay.

#### **Rationale for objective**

Refuge staff do not often possess the necessary skills and time to conduct landscape level work outside the Refuge. State, City, private and other Federal agencies exist that do, together with local citizens. Because of mutual interests in the same natural resources, new partnerships need to be forged, that provide mutual benefits to all partners, pool funding, and shortstop potential problems before they become problems. These partnerships should also present possible solutions to current and future habitat degradation issues that affect us all. Such important field data and information may help prevent future isolations of wildlife populations, and their gene pools, in addition to providing evidence that habitat restoration efforts are in fact working (i.e., targeted migratory bird species are now using these newly restored areas). The Refuge alone cannot hope to accomplish the necessary major improvements, on the landscape and/or ecosystem level, that would truly make a difference to Refuge natural resources; however, specialized teams or partners can.

Wind tidal influences are present in the Back Bay Watershed and often pose a negative hydrological influence on existing plant and animal communities (such

as SAV), and local agriculture. A lunar tide does not exist. Typically these wind tides flood adjacent wetland areas during the growing season when winds are predominantly from the south; and maintain low water levels during winter when winds are predominantly from the north. Normal surface water hydrology operates oppositely; with low levels during summer (that encourages germination and reproduction of native plant communities and related organisms) and high levels during winter (that buffers the substrate and organisms within from freezing and other cold weather impacts).

The areas of open-water/pothole habitats, that include Ragged Island and southern Long Island, are areas that had previously supported higher aquatic biodiversity up until 2001. Thus, they should have the highest potential for recovery to previous levels, if provided with the necessary protection and time to recover from past frequent disturbances to the water column. Such disturbances in the past have included frequent boat traffic, net-fishing, and recreational personal watercraft activities. A lack of disturbance to the water column should provide time for turbidity to settle out of the water column in these protected, sheltered coves and potholes, where wave action is reduced to a minimum. Decreased turbidity would permit sunlight to reach the substrate and encourage germination of the existing SAV seed-bank. That seed-bank should still be viable. Once SAV germination occurs, the biodiversity associated with it (i.e., fish, shellfish, invertebrates, amphibians, waterfowl, etc) should also return. The return of biodiversity below the water's surfaces of Back Bay hinges on the return of SAVs, and the elimination of as many negative impacts as possible that detract from that goal.

The US Army Corps of Engineers is the Federal agency responsible for maintenance and protection of the nation's waterways; therefore, the Refuge and FWS must partner with them in order to initiate and implement such changes.

#### **Strategies in Addition to Alternative A:**

*In addition to the strategies discussed in Alternative A, Objective 4d, and in Alternative B, Objective 1e*

- Pending results of the North Carolina-FWS "SAV Study," determine the best SAV restoration technique(s); and implement those SAV restoration techniques on the best available Refuge sites in the Back Bay watershed.
- Create new habitat improvement partnerships where possible, and work with State, Federal, and university partners in new, as well as current, cooperative research programs aimed at improving Refuge and Back Bay habitats and wildlife resources.
- Work with partners (State, universities, interns, bird-watching groups, and/or volunteers) to study Refuge use by neotropical migrant birds, particularly in wetlands and forest restoration areas. (i.e., "*Are rare bird species appearing that prefer large forest tracts, and were not present previously?*")
- Ensure that Refuge wetlands and open-water/pothole habitats remain protected from public disturbances. These areas include Ragged Island and southern Long Island, which have historically supported the greatest waterbird use. Through working with the US Army Corps of Engineers (USACE), initiate personal watercraft use controls in the sensitive, high waterbird-use areas of Ragged and Long Islands. Establish the necessary cooperative regulations to ensure effective public use management during this transition, and develop enforcement capabilities involving possible partnerships

with the Virginia Marine Resources Commission, US Coast Guard, Virginia Department of Game & Inland Fisheries, etc., to insure that violations of USACE policies and regulations are not ignored.

- Eliminate the Back Bay wind tide influences in restoration sites within the upper reaches of the Back Bay watershed, by installing ditch-plugs or water control structures in connecting, man-made ditches.

## GOAL 5.

### **Provide additional viewing opportunities of migratory birds and other wildlife to increase the general public's appreciation and support of natural resources.**

The National Wildlife Refuge System Improvement Act of 1997 recognizes wildlife photography and observation, environmental education and interpretation, and hunting and fishing as the six priority public uses of the Refuge System. This means that when considering goals and objectives, priority public uses receive enhanced consideration over non-priority uses. Refuges provide outstanding opportunities to observe and appreciate wildlife in its natural environment. Refuges also provide quality opportunities to engage in wildlife-dependent recreation and foster an appreciation for wildlife and habitat as a participant in the natural environment.

### **Objective 5a. Wildlife Observation and Photography**

Within 5-7 years of CCP approval, ensure that wildlife observation and photography opportunities meet the needs of 90% of participants.

#### **Rationale for objective**

In order to enhance opportunities for wildlife observation and photography, we must improve and expand public access facilities on the Refuge to meet the needs of 90% of the participants. Many of the strategies for wildlife observation and photography are also applicable to the other priority public uses such as environmental education and interpretation. Enhancing these opportunities can increase visitation, thereby expanding public support and understanding of Back Bay NWR and the Refuge System.

This alternative would expand viewing and photography opportunities on the Refuge beyond what was proposed under Alternative A. We propose to develop a canoe/kayak trail between four launch sites on Asheville Bridge Creek, Hell's Point Creek, Beggars Creek (Lovitt's Landing), and Horn Point. As discussed in Alternative A, we currently have a launch site at Horn Point. Under Alternative B, we would develop the other three access points. At all sites, we would develop a low-impact canoe/kayak launch ramp, an 8 to 12 car parking lot, and a restroom. Under Alternative B, we would also implement a fee collection program at Horn Point for all commercial canoe/kayak launching. Commercial operators could purchase various passes, depending on the number of trips per season, as follows: \$20 per trip, up to 4 trips; \$100 per season for 5 to 10 trips; \$200 for 11 to 20 trips; and, \$300 for 21 or more trips. Outfitters must schedule trips in advance.

We propose to develop a 2-mile hiking trail beginning at the proposed HQ/VCS site (Tract 244 on Sandbridge Road) and ending at Horn Point. Two footbridges would be constructed along the trail: one going over Asheville Bridge Creek at the ABCCEC, and another going over Muddy Creek. Interpretative signs would be placed strategically throughout the trail. The development of the trail would be completed in different phases. We would first work to develop each site (i.e. Asheville Bridge Creek and Horn Point), and then work on constructing the footbridges and connecting the trail with boardwalk. We propose to fully complete the trail, with footbridges, boardwalk, and signs within 15 years of the plans approval (Map 2-3).

Bicycling and hiking on the Refuge has increased in recent years, likely due to local development and increased awareness of the public opportunities at FCSP (access through the Refuge by hiking or biking only). In order to provide a safe and quality experience for all Refuge users, we propose to relocate and construct a new fee booth, to be aligned with Sandpiper Road. Once the entrance is moved, we would develop a new maximum 20-car parking lot to accommodate parking for hikers and bikers. This re-alignment would encompass a new hiking/biking trail parallel to the entrance road, along an existing powerline right-of-way, and end up at the existing headquarters visitor parking lot. This trail would provide a safer route for hikers and bikers, and vehicles, as they would not be on the same road/path.

**Strategies in Addition to Alternative A:**

*Within 1 year of CCP approval:*

- Implement fee collection program at Horn Point for commercial canoe/kayak launching.

*Within 5-7 years of CCP approval:*

- Develop canoe/kayak trail between Asheville Bridge Creek, Hell's Point Creek, Beggars Creek (Lovitt's Landing), and Horn Point.
- Construct kiosks in conjunction with newly proposed trail heads and canoe/kayak launch sites.
- Construct handicap accessible trail on Tract #244, in conjunction with new HQ/VCS, after remaining land is reforested.
- Provide 8 to 12 car parking lot, a low impact canoe/kayak launch ramp and a restroom at Asheville Bridge Creek, Hell's Point Creek, and Beggars Creek sites throughout the canoe/kayaking and hiking trails
- Utilize trams for transportation to wildlife viewing facility.
- Move and construct new fee booth and re-align entrance road to be straight with Sandpiper Road.
- Develop a new biking/hiking trail starting at the entrance of the Refuge.
- Develop a new 20-car parking lot behind the new fee booth (south of the hammerhead) for hikers/bikers.

**Objective 5b.  
Environmental Education  
and Interpretation**

Within 5-7 years of CCP approval, improve environmental education and interpretation opportunities on the Refuge such that 90% of participants would be able to identify one purpose of the Refuge and one species we manage on the Refuge.

**Rationale for objective**

Similar to wildlife observation and photography, environmental education and interpretation programs can dramatically increase public awareness for the Refuge System because these activities can be scheduled with a syllabus to reach target audiences such as, school groups, conservation organizations, community groups, etc. In addition, interpretive panels and displays can help communicate the agency mission to all Refuge visitors.

Under Alternative B, we would like to expand the number of fishing events that we have each year. We would like to have a total of two fishing education events per year. The second event, to be hosted in the spring, would be coordinated and co-hosted with VDGIF. This event would be more like a workshop, with a

registration fee, and include education on aquatic ecology, fish biology, angling techniques and non-native species. Also, the event would allow attendees to fish and compete for prizes (i.e. fishing derby). In addition, we propose to initiate a youth hunt for white-tail deer and feral hogs (See Alternative B, Objective 6a) and additional waterfowl hunting on the Refuge (See Alternative B, Objective 6b).

The construction of the new wildlife viewing facility (refer to rationale under objective 5a) would also provide opportunities for environmental education and interpretation. We would maintain four interpretative signs along the proposed hiking trail (refer to rationale under objective 5a) that would provide education and interpretation along this self-guided trail.

We also propose development of a new facility to include refuge headquarters, VCS, and an Environmental Education Center (EEC), and a maintenance compound on New Bridge (Map 2-3). Construction would follow Regional design standards for a medium facility (see Goal 7 for additional details of the facility). Once this new facility is built it would become the primary environmental education facility. The ABCCEEC would become an office and maintenance facility. As stated earlier under Alternative A, many of the strategies for wildlife observation and photography are also applicable to the other priority public uses of environmental education and interpretation, and vice versa.

#### **Strategies in Addition to Alternative A:**

*Within 1 year of CCP approval:*

- Expand fishing education events at the Refuge to 2 events per year.

*Within 5-7 years of CCP approval:*

- Develop four interpretive signs that would be placed strategically throughout the hiking trail from the proposed headquarter site to Horn Point.
- Increase on- and off-site environmental education programs and teachers workshops by 20%.

*Within 7-10 years of CCP approval:*

- Develop and design a new headquarters, VCS, EEC and maintenance compound on New Bridge
- Once the new headquarters facility is built, use the ABCCEEC building as an office and facility for maintenance.

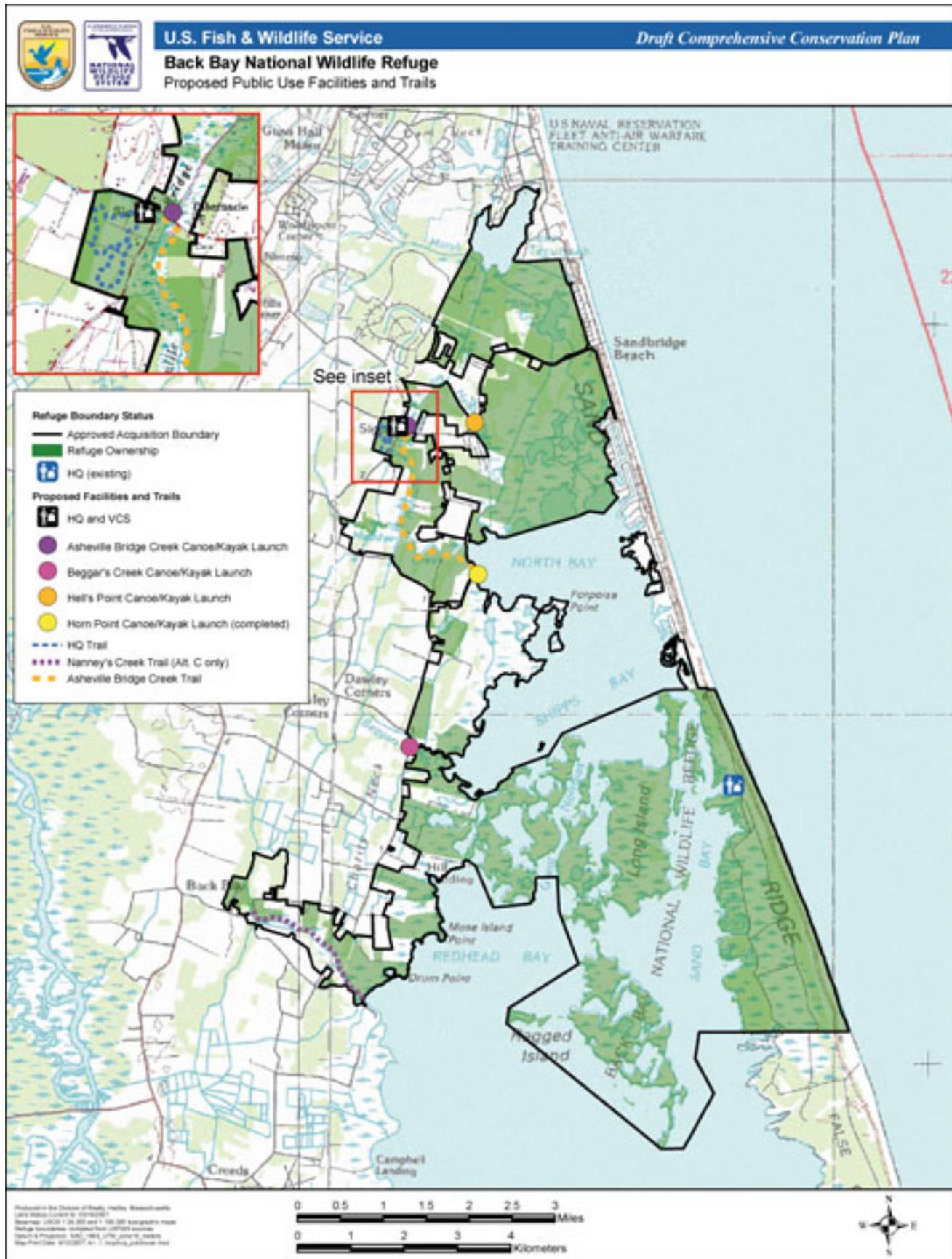
#### **Objective 5c. Non-wildlife dependent uses**

Within 5-7 years of CCP approval, improve the quality of non-wildlife dependent recreation facilities to meet the needs of 90% of participants.

##### **Rationale of objective**

We propose to prohibit dog-walking on the Refuge. Since the Refuge mission consists of providing habitats for wintering and migrating birds that include waterfowl, shorebirds, wading birds, marshbirds and landbirds, minimizing those uses that provide the greatest potential conflicts and disturbances to those migratory bird species is a priority. Dogs have been shown by recent research to displace native migratory bird species from the natural habitats that Back Bay NWR was established to provide.

Under this alternative, the Refuge would also work with City and State partners for scenic byway opportunities. This would include a biking trail head once our new headquarter and VCS facility is completed. This would allow the existing biking community a place to connect to the Refuge for enhanced understanding and appreciation of the adjacent, road-side habitats they observe on existing bike routes.



**Strategies in Addition to Alternative A:**

*Within 1 year of CCP approval:*

- Within 6 months of CCP approval, dog-walking will no longer be permitted in any Refuge locations. (refer to rationale of objective above)
- Implement fee collection program at Horn Point for commercial canoe/kayak launching.

*Within in 7-10 years of CCP approval:*

- Upon completion of the new headquarters/VCS, partner with City and State for scenic byway opportunities (including biking trail head).

**GOAL 6.**

**Provide and expand hunting and fishing opportunities to the public where compatible with Refuge purposes.**

**Objective 6a. Deer (and Feral Hog) Hunting**

Within 3 years of CCP approval, expand high-quality deer hunting opportunities to meet the needs of 90% of participants.

**Rationale for Objective**

Under Alternative B, we will fully analyze the potential of expanding additional deer hunting in new areas through a complete and separate NEPA analysis. The refuge intends to begin this analysis within 3 years of CCP approval. We will work closely with VDGIF to pull together data necessary to complete this analysis. We will propose to expand the areas in which deer hunting opportunities would be provided. In order to meet the needs of 90% of the participants, new opportunities would be provided in areas located in the North and West sides of the Refuge (see Strategies below). Deer management in those areas has become increasingly more important over the past couple years due to overbrowsing on Refuge habitats and local agriculture; however new hunting zones would be established in two phases in order to accomplish existing habitat management objectives. The hunt serves a dual purpose of providing public opportunity for hunting, while deer populations are reduced, a necessity for proper habitat management.

Implementing new hunt areas would be administered the same way as our existing hunt on the barrier spit, which includes a lottery system in cooperation with VDGIF. We have identified a hunter density of 1 pair of hunters per every 50 acres of suitable deer habitat within designated hunting zone. Some zones would be designated as bow hunting only. Each new zone would be open to selected hunters 3 to 5 consecutive days in each of October, November, and December, in accordance with VDGIF season dates. Hunters applying to hunt the new zones can select a preferred zone and month to hunt. Parking would be provided at selected sites throughout the new zones. Parking availability would be re-evaluated whenever new Refuge land is acquired. Maps and permits would be sent out to all selected hunters. Hunters would be responsible for carrying their permits at all times and would be required to report (call in) whether or not they hunted and any deer harvested. Signage would be posted along waterways adjacent to hunt zones. Refuge law enforcement as well as state law enforcement would ensure that all hunters follow state and refuge regulations. No “drive-hunting” would be allowed in these areas – only still-hunting would be permitted. Dogs would not be allowed when hunting in these areas. In addition, no rifles or crossbows would be allowed.

Safety of residents, hunters, and other visitors is important. We would clearly post hunting areas and adjacent waterways to notify boaters and land-based visitors of potential hunting activity.

In addition, to expanding hunting areas we would also like to initiate a youth hunt on the Refuge, as part of our increased environmental education initiative (Connecting Children with Nature) and expansion of priority public uses (see

Alternative B, Objective 5.b). This would include hunting of both white-tailed deer and feral hogs. We would dedicate one of the current eight zones for the youth hunt on the opening Saturday of the season. Adult hunts would then begin the following Saturday. The zone would be determined and advertised for each new season. During our youth hunts, we would enforce the one gun rule. Only the child can carry a gun, not the adult that accompanies them.

We propose under Alternative B periodic reevaluation of the hunting program. This evaluation would help us to determine if we are adequately meeting the management needs. Depending on the results of the evaluation, the hunt would be expanded, reduced or maintained to meet management needs. An evaluation of the hunt would take place once every 3 years.

We define a high-quality hunt program as one that:

- Maximizes safety for hunters and other visitors;
- Encourages the highest standards of ethical behavior in taking or attempting to take wildlife;
- Is available to a broad spectrum of hunting public;
- Contributes positively to or has no adverse affect on population management of resident or migratory species;
- Reflects positively on the individual Refuge, the System, and the Service;
- Provides hunters uncrowded conditions by minimizing conflicts and competition among hunters;
- Provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program. It also minimizes the reliance on motor vehicles and technology designed to increase the advantage of the hunter over wildlife;
- Minimizes habitat impacts;
- Creates minimal conflict with other priority wildlife-dependent recreational uses or Refuge operations; and
- Incorporates a message of stewardship and conservation in hunting opportunities.

**Strategies in Addition to Alternative A:**

*Within 3 years of CCP approval (phase 1):*

- Fully analyze the potential of expanding deer hunting (as described below) through a complete and separate NEPA analysis. Work with VDGIF to pull together data necessary to complete this analysis.
- Expand deer hunting opportunities in the Sandbridge area, north and south of Sandbridge Road on Tracts 101d, 102, 103, 104, 104a, 104b, 106, 108b, and 110 (Zones A, B, C, D). Parking would be provided at the old tower pad on Tract 107 (Zone A) and we would coordinate with the City of Virginia Beach for possible parking spots at the Sandbridge Fire Station (adjacent to Zone D) and along the utility right-of-way adjacent to Tract 106b (Zones B, C) (Map 2-4).
- Expand deer hunting opportunities (bow only) at the end of Bank Lane on Tract 127a (Zone G), and along Muddy Creek Road on Tracts 163, 166, and 169 (Zone I). Parking would be provided on federal property at the end of Banks Lane and on Tracts 163a and 166, respectively.

- Expand deer hunting along Muddy Creek Road at Pleasant Ridge Road on Tract 194 (Zone J), with parking on site.
- Implement a youth hunt on opening day in Zone 4 (refer back to Map 2-1).
- Evaluate the feral hog and deer hunt to determine if they are meeting management needs.

*Within 10 years of CCP approval (phase 2):*

- Expand deer hunting opportunities south of Sandbridge Road at the “old hunt club” on Tract 104b (Zone E). This portion of Tract 104b has an existing road and parking area on site.
- Expand deer hunting opportunities east of Sandbridge Road at the “reforestation site” on Tract 125a (Zone F). This area has an existing road and parking area on site.
- Expand deer hunting opportunities east of Colchester Road on Tract 150 (Zone H). This area has an existing road and parking area on site (Map 2-4).

## **Objective 6b. Waterfowl Hunting**

Within 3 years of CCP approval, provide a high-quality waterfowl hunt program in partnership with the VDGIF at Redhead Bay and Colchester impoundment.

### **Rationale for Objective**

As part of our increased environmental education initiative and expansion of priority public uses (see Alternative B, Objective 5.b), we propose a waterfowl hunting program in two areas within the Refuge. This hunting program would be administered according to both State and Refuge regulations. One waterfowl hunting area is Redhead Bay, located south of the Presidential Proclamation area. We would provide three sites within this area for waterfowl hunting, located on Back Bay on Tracts 229, 217, and 214-I. These areas would be designated by three stakes that would accommodate temporary (i.e. float/boat) waterfowl hunting blinds. The VDGIF would assist with implementing the waterfowl hunt three days per week during the season. In order to ensure that hunters are not building additional blinds in the three staked areas, we would have a law enforcement official check each stake periodically.

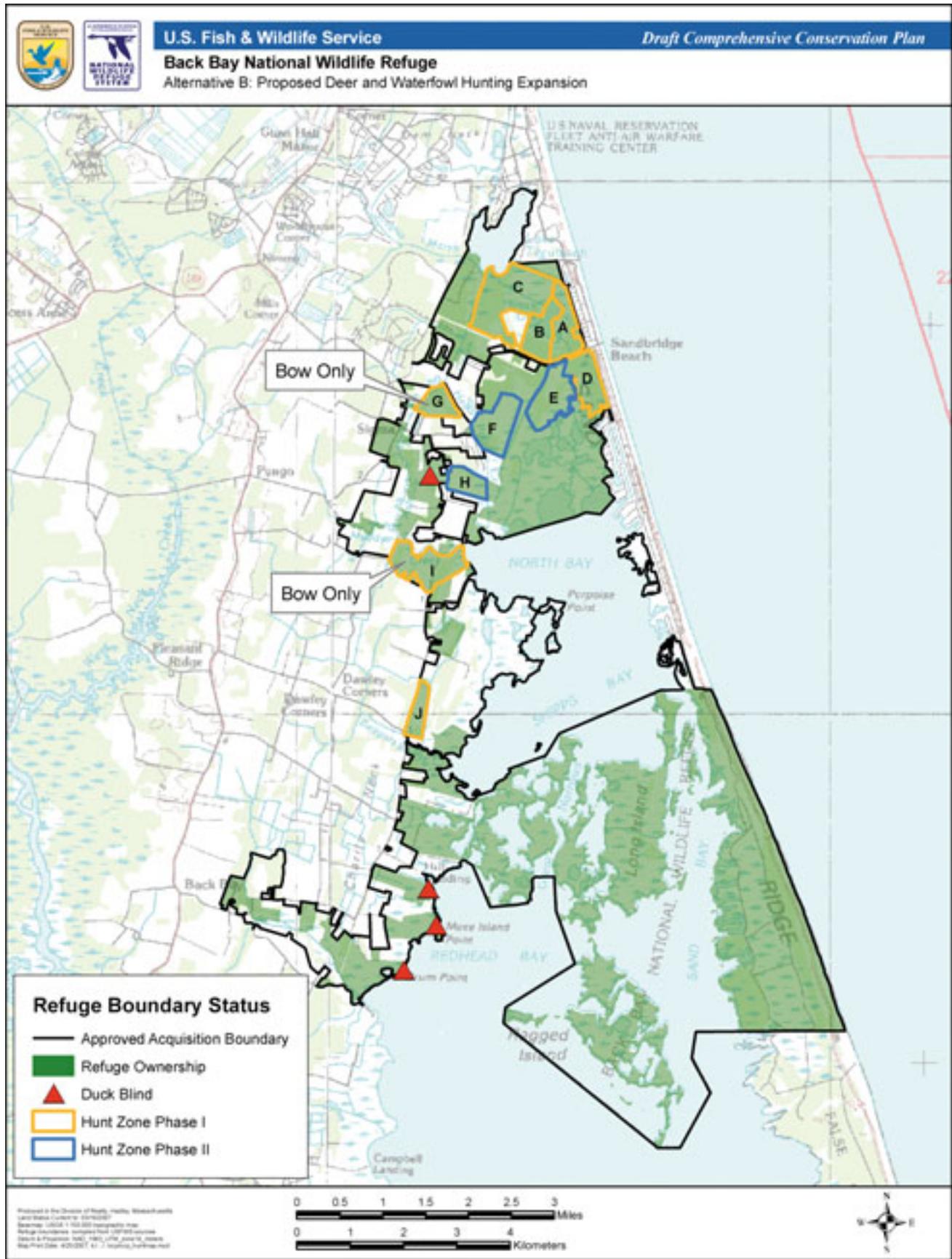
The second waterfowl hunting area is the Colchester impoundment. An annual one-day limited youth waterfowl hunt would be implemented here in partnership with the VDGIF. Construction at this site would be minimal considering a small parking lot is already in place.

A partnership with VDGIF would provide benefit to both parties. In return for aiding us with our waterfowl program, we would provide support to VDGIF with the waterfowl hunt at FCSP. This support would include providing parking on the Refuge to those hunting at FCSP. As explained with the deer hunt, we propose to fully analyze the potential of adding waterfowl hunting through a complete and separate NEPA analysis. The refuge intends to begin this analysis within 3 years of CCP approval.

### **Strategies in Addition to Alternative A:**

*Within 3 years of plan's approval:*

- Fully analyze the potential of adding waterfowl hunting through a complete and separate NEPA analysis. The refuge intends to begin this analysis within 3 years of CCP approval.
- Work with VDGIF to assist with implementing a waterfowl hunt at Redhead Bay. Blind stakes will be located at three sites (Map 2-4).



- Implement a limited waterfowl hunt at Colchester impoundment in partnership with VDGIF.
- Support VDGIF with waterfowl hunt at FCSP by providing parking at Refuge.

### Objective 6c. Fishing

Within 5-7 years of CCP approval, expanding high-quality fishing opportunities on the Refuge.

#### Rationale for Objective

During the Refuge expansion proposal in the 1990's, the Refuge promised to work with the City of Virginia Beach to provide additional public access to Back Bay for uses compatible with Refuge purposes. There are limited shoreline public access points on Back Bay. As part of our efforts to expand priority public uses, in cooperation with the City of Virginia Beach and VDGIF, we propose to provide enhanced fishing access at Hell's Point Creek and Beggars Creek. As was discussed under Goal 5, we propose to develop these two multiple use sites (please refer to objectives under Goal 5 for additional information). As stated earlier, we would develop a low-impact canoe/kayak launch ramp (where one could fish from), an 8 to 12 car parking lot (unless it's already present) and a restroom.

We propose to expand the number of fishing education events that we have on the Refuge. We would like to have one additional fishing education event per year, thus making a total of two fishing education events per year (See Rationale under Goal 5). The second event, to be hosted in the spring, would be coordinated and co-hosted with VDGIF. This event would be more like a workshop, with a registration fee, and include education on aquatic ecology, fish biology, angling techniques and non-native species. Also, the event would allow attendees to fish and compete for prizes (i.e. fishing derby).

We define a high-quality fishing opportunity as one that:

- Maximizes safety for anglers and visitors;
- Causes no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat;
- Encourages the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish;
- Is available to a broad spectrum of the public that visits, or potentially would visit, the Refuge;
- Provides reasonable accommodations for individuals with disabilities to participate in Refuge fishing activities.
- Reflects positively on the System;
- Provides uncrowded conditions;
- Creates minimal conflict with other priority wildlife-dependent recreational uses or Refuge operation;
- Provides reasonable challenges and harvest opportunities; and
- Increases the visitors' understanding and appreciation for the fisheries resource.

#### Strategies in Addition to Alternative A:

*Within 1 year of CCP approval:*

- Expand fishing education events at the Refuge to 2 events per year.

*Within 5-7 years of CCP approval:*

- Provide fishing access at the Hell's Point Creek and Beggars Creek sites as described earlier.

**GOAL 7.**

**Promote understanding and appreciation for the conservation of fish, wildlife and their habitats and the role of the Refuge in this effort through effective community outreach programs and partnerships.**

**Objective 7a. Partnerships**

With current partners, identify and implement new initiatives and opportunities in interpretation, environmental education, maintenance, habitat enhancement and protection, law enforcement, hunting, and fishing.

**Rationale for objective**

Refer to rationale for Objective 7a under Alternative A.

**Strategies in Addition to Alternative A:**

*Within 2 years of CCP approval:*

- Work with False Cape State Park to monitor and assess the effects of natural dune succession and dune swale plant community changes.
- Work with Ducks Unlimited to redevelop impoundment management at Colchester
- Pending results of the SAV study, examine and implement best sites for SAV restoration and best restoration technique. Partners could include the Virginia Department of Environmental Quality, Department of Conservation Resources, US Geological Survey, US Army Corp of Engineers, Department of Transportation, US Environmental Protection Agency (EPA), Virginia Institute of Marine Services, and a variety of agencies connected with the North Carolina Department of Environment and Natural Resources.
- Work with partners to treat phragmites areas on private lands immediately adjacent to Refuge property
- Continue to work with partners and the Corps of Engineers in the feasibility study to restore the Albermarle-Pamlico Estuarine System, including Currituck Sound and Back Bay.

*Within 5 years of CCP approval:*

- Complete a Cooperative Management Agreement with the City of Virginia Beach for enhanced law enforcement service, including increased patrol coverage of Refuge lands.
- Increase off-site environmental education programs by 20% over current levels.

*Over the duration of this plan:*

- The Refuge would support multi-use trails as proposed by the City of Virginia off of Refuge lands that are also compatible with Refuge purposes.

**Objective 7b. Individual and Volunteerism Opportunities**

Within 2-5 years of CCP approval, increase Refuge volunteerism hours by 5 to 10% to enhance visitor service, maintenance, habitat management, and resource protection efforts.

**Rationale for Objective**

The expansion of visitor facilities and services, as well as the projected increase in visitation, would require additional staffing support to meet public expectations, and provide for public safety, convenience, and a high quality experience for Refuge visitors. Current staffing projections for the foreseeable future appear constrained, and are not expected to change with the addition of new facilities. Partnering, interagency agreements, service contracting,

internships, and volunteer opportunities would increase in order to provide this staffing support.

**Strategies in Addition to Alternative A:**

*Within 2 years of plan's approval:*

- Increase volunteer hours by 5% over current levels through proactive recruitment, enhanced outreach, and increased opportunities on the Refuge.
- Recruit a volunteer to manage the volunteer program.
- Integrate volunteer program with other Refuge support groups, including but not limited to Back bay Restoration Foundation BBRF, "Reese's Pieces," Friends, and work campers.

*Within 5 years of plan's approval:*

- Increase Refuge volunteer hours by 10% over current levels through proactive recruitment, enhanced outreach, and increased opportunities on the Refuge.

**Objective 7c. Public Use Facilities**

Within 10 years of CCP approval, expand and/or replace existing public use facilities (identified in table 3.9. Refuge Infrastructure, in Chapter 3), and adjust current VCS operating schedule to provide for enhanced visitor services and accommodate an anticipated minimum 10% visitation increase over the period.

**Rationale for Objective**

Refer to rationale for Objective 7c under Alternative A.

**Strategies in Addition to Alternative A:**

*Within 1 year of CCP approval:*

- Change VCS operating schedule – Close Sundays instead of Saturday from November 1 through March 31. We would continue to operate 7 days per week from April 1 through October 31, including being open on the 3 major summer holidays (Memorial Day, Independence Day, and Labor Day).

Utilize Rightmeyer House as temporary office space until new Headquarters/VCS is completed.

*Within 5-7 years of CCP approval:*

- Develop and design a new facility to serve as a refuge headquarters (Region 5 standard design for medium facility) VCS, and EEC and a maintenance compound at New Bridge Road.

*Upon completion of new Headquarters/VC, the following additional strategies are proposed:*

- Evaluate option of operating new Headquarters/VC 7 days per week.
- Work with City of Virginia Beach to realign New Bridge Road (Note: This strategy can, and should, be done as part of the development, design and construction of the new HQ/VCS.)
- Utilize ABCEEC site as office and facility for maintenance. After the Rightmeyer House has been updated to be more energy-efficient and updated to meet electrical codes, it may be utilized by Refuge partners or staff as office space.
- Provide new office space for BBRF.
- Maintain and improve current office as primary visitor contact facility and possible sales outlet for cooperating association (BBRF).

## **Alternative C. Improved Biological Integrity**

### **Introduction**

The “Biological Integrity, Diversity, and Environmental Health Policy” (published January 16, 2001, <http://www.fws.gov/policy/library/01fr3809.pdf>) guides Refuge System personnel in implementing the clause of the National Wildlife Refuge System Improvement Act of 1997 directing the Secretary of the Interior to ensure that we maintain the “biological integrity, diversity, and environmental health” of the System. Alternative C prominently features additional management that aims to restore (or mimic) natural ecosystem processes or function to achieve Refuge purposes.

Alternative C focuses on using management techniques that would encourage forest growth and includes an increased focus toward the previously proposed wilderness areas. Some of the major strategies proposed and discussed in greater detail in this section, include: developing an interagency agreement that would allow the 1974 proposed wilderness areas at Long Island, Green Hills, and Landing Cove (2,165 acres) to again meet minimum criteria, and then manage accordingly; and, creating conditions that allow us to shift more resources from intensive management of the Refuge impoundment system to the restoration of Back Bay-Currituck Sound. In addition, we propose to continue enhancing visitor services for wildlife observation and photography, environmental education and interpretation, hunting, and fishing; such as: developing a hiking trail along Nanney’s Creek; initiating actions to open the Colchester impoundment for fishing opportunities; considering additional waterfowl hunting areas; developing and designing a new headquarters/visitor contact station that provides more office space than proposed for Alternative B; and working with partners to provide a shuttle (for a fee) service from the new headquarter site to the barrier spit.

The directives of the biological integrity policy do not entail exclusion of visitors or elimination of public use structures (e.g., boardwalks, observation towers). However, maintenance and/or restoration of biological integrity, diversity, and environmental health may require spatial or temporal zoning of public use programs and associated infrastructures. General success in maintaining or restoring biological integrity, diversity, and environmental health will produce higher quality opportunities for wildlife-dependent public use.

### **GOAL 1:**

#### **Maintain and enhance a diversity of wetland habitats for migratory birds.**

#### **Objective 1a. Impoundment Management**

Modify existing management of the impoundments on the Refuge to restore natural shrub-scrub and emergent marsh habitats. Increase annual migratory landbird use up by 35% by reverting approximately 300 acres of D, E, G, H and J Pools, and approximately 350 acres of A, B, C, and C-Storage Pools to shrub-scrub habitat. Species to benefit would include the yellow-breasted chat, prairie warbler, field sparrow, brown thrasher, gray catbird, yellowthroat warbler and yellow warbler. In addition, increase marshbird use up by 35% by reverting approximately 150 acres of the western half of B (including B-Storage), C, and C-Storage Pools to emergent Bay marsh habitat. Species to benefit include bitterns, rails, moorhens, grebes and coots. Wintering and migrating waterfowl use may be reduced, as the diversity of their food plant and animal foods decreases.

#### **Rationale for objective**

Shrub-scrub habitats originate and are often maintained by natural disturbance phenomena including grazing by hoofed animals, tornadoes, hurricanes, ice storms, and most notably fire. The trends away from large clear-cuts on public and non-industrial, private lands in the South, and inefficient farming, when combined with too few efforts to restore natural ecosystem functions in biotic

communities requiring regular disturbance, all point to a loss of birds dependent on shrub-scrub habitats.

The eastern one third of A, B and C Pools was cleared of shrub-scrub during the creation of those pools, in the late 1960's. G, H and J Pools were similarly cleared for impoundment creation in the early 1990s. These same areas, in addition to D and E Pools, comprise the "moist soil units" of the existing impoundment complex, that now provide some of the best annual waterfowl food-plant production within the impoundment complex. However, the cost of continuing to provide wintering and migrating waterfowl with such high quality food is high; since natural vegetation succession consistently attempts to reclaim these sandier soils as shrub-scrub. Routine habitat maintenance requires that these moist soil units be disced or root-raked at least every 3-4 years, to prevent reclamation by waxmyrtle shrubs and other perennial grasses that typify the original shrub-scrub community that inhabited those areas prior to creation of the impoundment complex. It can be expensive to continue neutralizing a natural successional process.

The western half to two-thirds of B (including B-Storage) C, and C-Storage Pools, historically, made up additional Back Bay emergent marsh habitat. Such Bay habitats generally maintain lower levels of desirable waterfowl food-plant production, unless submerged aquatic vegetation production is high. Alternative C proposes to cease active management of the impoundments to establish more natural characteristics; however, the end result may be a reduction in the vegetative diversity and ability of those three Pools to support wintering waterfowl, and migrating waterfowl and shorebirds during the spring and fall.

Elimination of active management efforts within the impoundment complex will save Back Bay NWR a large amount of habitat maintenance funding. Past active management efforts include: mowing, agricultural discing, root-raking, pest-control (plant and mammal), prescribed burning, pumping of water from the Bay into C-Storage Pool, and raising/lowering water levels during the four seasons. Such management has been supported in the past, as a means to provide feeding opportunities for migrating waterfowl, shorebirds, wading birds and marsh-birds, along with wintering waterfowl.

#### **Strategies:**

*Within 1-3 years of CCP approval:*

- Cease active management strategies on the 300 acres of D, E, G, H and J Pools within the impoundment complex, and allow those habitats to revert to shrub-scrub vegetation.
- Cease active management strategies on the 550 acres that make up A, B (including B-Storage), C, and C-Storage Pools within the impoundment complex, and allow the eastern portions of those pools (including all of A Pool) to revert to shrub-scrub vegetation.
- Cease active management strategies to encourage the proliferation of native Back Bay emergent marsh habitats within the western half or two-thirds of B (including B-Storage), C, and C-Storage pools.

*Within 3-5 years of CCP approval:*

- Improve pest control efforts involving the feral hog, through advances in the cooperative research effort with Virginia Department of Game & Inland Fisheries (VDGIF); to include researching their effects on migratory bird habitat and minimizing those effects. Efforts would focus on the barrier island portion of the Refuge, particularly within the current impoundment complex vicinity.

**Objective 1b. Pest Control (Phragmites)**

Restore the natural, diverse, native wetland plant communities for up to 4,000 acres of wetlands within Refuge islands and the Back Bay watershed. A minimum of 200 Refuge acres of dense phragmites stands would be restored annually. The presence of this invasive plant should be reduced to 10% or less, of the plant species composition of Refuge wetlands habitats.

Rationale and strategies for this objective mirror those of Alternative B, but without the priority of controlling phragmites in the current impoundment complex. Phragmites reed control priorities would consist of: 1) the western natural “Marsh Fingers” 2) Refuge bay islands 3) western marshes and creeks 4) North Bay marshes and more northern wetlands. Additionally, the Refuge would consider biological control techniques for phragmites if deemed acceptable and evaluated as part of future step-down plans.

**Objective 1c. Pest Control (other than Phragmites)**

Other potential pest plants, such as the native American lotus, shall be controlled and/or eliminated when their coverage exceeds 20% of the existing open water surface of any 1 square mile area. Control efforts should be continued until the species is either extirpated, or is contained to less than 10% of the identified area’s water surface. Rationale and strategies for this objective mirror those of Alternative B, Objective 1c.

**Objective 1d. Water Quality Protection**

Actively participate in multi-agency efforts to protect and improve the water quality of Back Bay and its watershed, particularly within the Refuge boundary, at good to excellent levels, as defined by Virginia Department of Environmental Quality standards presented below. Rationale and strategies for this objective mirror those of Alternative B, objective 1d.

**Objective 1e. Wetlands Restoration**

Encourage and support planning and implementation efforts that can result in the restoration and/or regeneration of submerged aquatic vegetation (SAV) distributions in the reverted pools of western B (including B-Storage), C, and C-Storage (see Objective 1a) and Back Bay. Restoration targets should include a significant presence (>50 stems per acre) of the SAV species listed in Alternative B, objective 1e in 40% of habitats.

**Rationale for objective**

Focus our wetland restoration efforts towards restoration to a natural, precipitation-based hydrology and reestablishment of submerged aquatic vegetation (SAV) in Back Bay and subsequent recreational fishery. (Additional strategies for SAV can be found under Goal 4). Significant improvements aimed at stemming the declining status of SAVs and migratory water-bird populations of Back Bay can best be achieved through a coalition of organizations and agencies that have both the funding and decision-making authority that govern the natural resources of North Carolina and Virginia. The ongoing “Currituck Sound Study” is an example of a coalition concerned with the health and well-being of Currituck Sound, NC and the connected Back Bay, VA. However, since most support for this Study is in North Carolina, additional involvement by Virginia partners is required for future recommendations to be meaningful and effective in both North Carolina and Virginia.

Biological integrity may be evaluated by examining the extent to which biological composition, structure, and function have been altered from historic conditions. In deciding which management activities to conduct to accomplish refuge purpose(s) while maintaining biological integrity, we start by considering how the ecosystem functioned under historic conditions. Primary strategies to allow transition from the existing man-made impoundment system to the more historic conditions (extensive wash flat areas and maritime forests) would be passive, and would rely on natural events such as hurricanes, storms, and flooding. Thus, eventual restoration of this area may not occur within the 15-year lifecycle of this plan, but would be allowed to occur as nature dictates.

It is possible that restoration of Back Bay from a fresh-water, wind-tidal system to a brackish-water, lunar-tidal system could be a possible solution to restoration of SAVs in Back Bay; since it would provide low-water periods on a regular daily basis. Providing extended periods of low-water during the spring and summer SAV germination periods provides opportunities for the sun to penetrate the turbid water, reach the bay bottom, and provide the photoperiods necessary for SAV seeds to germinate. The lower water levels would also permit the flowers to reach the surface and be pollinated, for seed production. Such a scenario would be possible if the ocean-front dunes were eliminated and the barrier island allowed to revert to the old “Wash Flats” of the early 1930’s; when storm tides washed over the barrier island and flooded Back Bay. However, there should be study conducted prior to such an action, to weigh the consequential losses of fresh-water fish and plant species (including salt-intolerant SAVs) in Back Bay, versus the gains of brackish-water fish and denser SAV, along with local economic impacts if any. The Study should also determine how much dune needs breaching to obtain the desired overwash necessary to make the system tidal again.

#### **Strategies:**

*Within 15 years of CCP approval:*

- Allow creation of wash flat areas (generally flat and sandy) as previously created berms and dunes are altered by natural events, resulting in increased natural water flows from the bay and/or ocean.
- If necessary, hasten the process by leveling several large primary dunes to permit ocean overwash during storm tides, at low elevation areas of the more southern beach, in the vicinity of the False Cape State Park boundary.
- Draw together a team of professionals and scientists to determine the feasibility and cost of such a venture, and to determine how much primary dune needs removal to provide the desired ocean overwash necessary to make Back Bay a tidal system again.
- Determine SAV restoration potential and implementation in the reverted pools and Back Bay and establish a long-term SAV monitoring and management program.

#### **GOAL 2:**

##### **Enhance and preserve native woodland diversity and health.**

**Same as Alternative B, with the following modifications or exceptions:**

*Within 5 years of CCP approval:*

- Provide an additional 50 acres of shrubby, mid-story canopy to benefit such migratory songbirds as the prairie warbler, field sparrow, common yellowthroat, and gray catbird, in the woodlands to the north and south of Sandbridge Road and east of Muddy Creek Road.
- Initiate strategies for complete removal of competing loblolly pine, sweetgum, and red maple trees, together with associated waxmyrtle and groundsel shrubs, from within the 2-acre white cedar planted area of the Refuge restoration site on Sandbridge Road.

*Within 10 years of CCP approval:*

- Provide an additional 100 acres of mixed tupelos/gums, bald cypress, wetland tolerant oaks and green ash in woodlands to the north and south of Sandbridge Road, east of Colchester Road, and within the “Green Hills” area. Areas where cypress is not regenerating (i.e. Asheville Bridge Creek), Refuge would augment existing forest with seedlings.

- Implement prescribed burning and tree top removals as tools to maintain those areas as shrub–scrub habitat. Implement prescribed burning where excessive fuel build-ups inhibit tree seedling germination.
- See objective 1a for additional information on scrub-shrub management as related to the current impoundment complex.

**GOAL 3:**

**Manage beach and dunes to preserve and protect migratory bird and other wildlife habitats.**

**Same as Alternative B:**

*Within 3 years of CCP approval:*

- Coordinate studies with FCSP to assess natural dune succession and plant community changes at transects established at both Back Bay NWR and FCSP.
- See objective 1e for additional information on natural beach and dune management as related to the current impoundment complex.

**GOAL 4:**

**Provide natural environment for native fish, wildlife, and plant populations (with special consideration to those species whose survival is in jeopardy).**

**Objective 4a. Same as Alternative B, with the following modifications or exceptions:**

Specific strategies for shifting resources from intensive management of Refuge impoundment system to the restoration of Back Bay-Currituck Sound would be employed as efforts within Back Bay by the many Federal, State and private agencies begin to show success. Success may be defined as major increases in migrating and wintering habitat for waterfowl, shorebirds and wading birds within Back Bay NWR. This can occur through a combination of new SAV beds and low maintenance wetlands habitats. Maintaining and monitoring those natural resources would then become a high priority for the Refuge, in line with our primary mission and purpose. The potentially productive acreage involved in Back Bay and its watershed (tens of thousands of acres) far exceeds the acreage of the existing impoundment complex on BBNWR and FCSP (~1160 acres). Thus, a greater effort would be put into the maintenance and monitoring of the more productive system(s) that feeds and shelters the largest waterbird populations. Management emphasis would shift from the impoundment complex to the productive natural resources of the Back Bay watershed. Active habitat management actions (i.e., water level manipulations, discing, burning, root-raking, etc.) would cease.

*Within 2 years of CCP approval:*

- Terminate cooperative farming by not renewing existing agreements and not initiating any new agreements.

*Within 10 years of CCP approval:*

- Convert remaining Refuge former farmland and old field habitats to forested wetlands.

*Over the next 15 years:*

- Create partnerships and work with State, Federal, and university partners in cooperative research programs aimed at improving Back Bay habitats and wildlife resources.
- Shift resources from intensive management of Refuge impoundment system to the restoration of Back Bay-Currituck Sound.
- Hire additional staff to manage the sea turtle program.

- Expand sea turtle nest patrols and monitoring north of Dam Neck Naval Base, including the Fort Story beach. Within the lifecycle of the CCP (15 years), we will monitor and evaluate beach conditions as specific events occur. These could include natural events such as sea level rise or hurricane storms altering the current beach dune complex, or the eventual decreasing and elimination of the beach permittee program. Thus, sea turtle relocation may not be necessary under these conditions that could favor in-situ sea turtle nests.
- During the year following CCP approval, ensure that Refuge wetlands and open-water/pothole habitats in Ragged Island and southern Long Island remain protected from public disturbances.

#### **Objective 4b. Wilderness**

Work with partner agencies and/or other interest groups to gain jurisdictional control over the navigable waters which surround the WSAs in order to provide greater protection (Map 2-5).

##### **Rationale for objective**

When originally identified, the proposed Refuge WSAs were considered to meet core wilderness criteria and values. Since that time, the growth and development of Virginia Beach has eroded the WSAs wilderness character and values. This includes the naturalness and the opportunity for primitive recreation or solitude. Restoring the naturalness of the wilderness character of the proposed WSAs could be accomplished over time with less management application, sound habitat restoration prescriptions, and with the protection that would be afforded by total jurisdictional control over the lands and waters which surround the WSAs. For example, reducing public perturbations on the area could allow a more natural, wilderness area within the island complex in Back Bay. Motor boats that cause strong wakes expedite shoreline erosion of these sensitive areas, creating increased turbidity and reduced light penetration. Increased turbidity and light penetration have been shown to retard and eliminate SAV germination and growth. Motor boats create a noise levels that can disturb wildlife and reduce the wilderness solitude expected by other non-motorized users.

##### **Strategies:**

*Within 1 year of CCP approval:*

- Work with the State of Virginia and Army Core of Engineers ACOE to gain total jurisdictional control over the navigable waters that surround the WSAs.
- Complete Habitat Management Plans for all proposed WSAs.

*Within 2-5 years of CCP approval:*

- Work with the U.S. Army Corps of Engineers and other Federal and state officials to eliminate all motorized watercraft traffic within ½ mile of the Refuge's Proclamation boundary. Complete a phase-out plan.
- Work with state and local agencies, government officials, and private citizens to protect lands and waters within, adjacent to, and in proximity of, the Refuge's Proclamation boundary. Utilize a broad spectrum of land management actions to accomplish the necessary protection objectives, possibly including, but not limited to: scenic easements, zoning restrictions, providing economic incentives for land stewardship, use of the local agricultural reserve and open space programs, adding state game management preserves around the bay, and increasing the law enforcement presence.
- Establish cooperative law enforcement agreements with the Virginia Marine Resources Commission, the Virginia Department of Game and Inland Fisheries, U.S. Army Corps of Engineers, and any other appropriate local, state, or federal agencies, in respect to enforcement of regulations affecting the designated WSAs, and the Refuge Proclamation Boundary.



- Implement an ongoing wilderness education program for the public. Increase on and off Refuge wilderness interpretive programming, incorporating various related ethics, such as Leave No Trace, Pack It In-Pack It Out, etc.
- Work with area outdoor/water recreation interests, including watercraft dealers, associations, clubs, and outfitters, to implement wilderness education programs for their customers/members.
- Eliminate the use of motorized car-topped watercraft for hunting white-tailed deer on Long Island during the Refuge's annual October hunt. Revise the Refuge hunt plan to reflect this change.
- Work with appropriate state and Federal government officials to initiate the nomination process for wilderness area designation of all Refuge WSAs.

*Within 5-7 years of CCP approval:*

- Implement total jurisdictional control over the lands and waters which surround the WSAs from the State of Virginia and ACOE.
- Implement the phase-out plan to eliminate motorized watercraft use within ½ mile of the Refuge's Proclamation Boundary.
- Implement a formal wilderness resource monitoring program.
- Provide grant monies for individuals and businesses to mitigate negative economic impacts caused by wilderness designation.

*15 years of CCP approval:*

- Perform a Wilderness Review as part of the 2023 CCP process to determine if the wilderness character of the proposed WSAs and other Refuge areas (i.e. impoundments, northern inholdings) have been restored to such an extent that they meet the Wilderness criteria (See Goals 1 and 2 for details of restoring naturalness character).

**GOAL 5.**

**Provide additional viewing opportunities of migratory birds and other wildlife to increase the general public's appreciation and support of natural resources.**

**Same as Alternative B, with the following modifications or exceptions:**

Although horseback riding is prohibited, under this alternative, the Refuge would consider providing a trail head, and/or staging areas for parking, interconnecting to nearby trail systems for horseback riding once our new headquarter and VCS facility is completed. This would be in cooperation with City and local neighborhood partners, and would be subject to a compatibility determination once the infrastructure is completed.

*Within 5 years of CCP approval:*

- Operate the tram system by way of a concession service, or entirely through a partner organization. Such service would allow a commercial, non-profit, private, or other public organization to operate the tram system in its entirety. This would include maintenance of the trams, providing service to Refuge visitors, and collecting all funds received. This would free Refuge staff from having to maintain the trams or running the tram rides to the wildlife viewing facility and FCSP. Since the proposed site for the new headquarters and VCS facility is a far distance from the barrier island (where the current headquarters is located), we would work with partners to provide a shuttle service from the new office facility to the barrier island. We would charge a

small fee for the service. This fee would be determined upon completion of the new headquarters and VCS facility.

- In addition to the facilities proposed under Alternative B, we would also develop a hiking trail along Nanney's Creek. This 1.5 mile trail would include several interpretive signs strategically placed throughout. This trail would provide both individuals and groups with an additional site to view and photograph wildlife on the Refuge (refer back to Map 2-3).

*Upon completion of the new headquarters and VCS facility:*

- Enhance "Teach the Teacher" workshops and other environmental education opportunities at the new site.
- Within two years of completing the new facility, consider establishing a trail head, and/or staging areas for parking, interconnecting to nearby City and neighborhood trail systems at Asheville Park, Heritage Park, and Lago Mar for horseback riding, scenic bicycling, and hiking on the north side.

**GOAL 6.**

**Provide and expand hunting and fishing opportunities to the public where compatible with Refuge purposes.**

**Same as Alternative B, with the following modifications or exceptions:**

*Within 5-7 years of CCP approval:*

- Expand high quality fishing opportunities on the Refuge by providing a minimum of 2 additional fishing sites (i.e. Colchester) and a minimum of 1 additional fishing education event.
- Propose opening Colchester impoundment to provide additional fishing opportunities to Refuge visitors. We would have to assess the habitat as well as the current fish population in the impoundment before we could determine the kind of opportunity we would be able to offer the public.
- Consider stocking the Colchester impoundment with hatchery-raised native fish if it meant providing a higher quality fishing experience. Stocking of the impoundment would not take place until a complete assessment of the impoundment is completed. Our proposed stocking of the impoundment would not only ensure a satisfying experience for current participants, but would ensure continued fishing opportunities in that area.
- Consider expanding waterfowl hunting into North Bay.

**GOAL 7.**

**Promote understanding and appreciation for the conservation of fish, wildlife and their habitats and the role of the Refuge in this effort through effective community outreach programs and partnerships.**

**Same as Alternative B, with the following modifications or exceptions:**

*Within 2 years of CCP approval:*

- Expand the existing cooperative partnership with the City of Virginia Beach to strengthen the relationship for future outdoor recreation facility planning, development, operation, and maintenance

*Within 5 years of CCP approval:*

- Proactively cooperate with current partners to identify and implement new initiatives and opportunities in interpretation, environmental education, maintenance, habitat enhancement and protection, law enforcement, hunting, and fishing.
- Cooperate with partners to identify additional focus areas for protection within the Refuge approved acquisition boundary.

*Within 2 years of new Headquarters/Visitor Contact Station:*

- Expand the Refuge tram operation to accommodate visitor transportation (for a fee) between the new VCS and False Cape State Park. Revise agreement with BBRF partner, or develop agreement with other partner, to reflect this expanded level of service; or, contract the service.
- Increase volunteer hours donated to the Refuge by 20% over current levels.
- Hire additional staff to manage and expand the volunteer program
- Increase the number of Refuge internship opportunities by 50% over current levels.
- Work with the Back Bay Restoration Foundation (BBRF) or another appropriate partner to establish and operate an educational sales outlet in the facility.
- Consider relocating the current Office/VCS to Little Island City Park to serve as an interagency visitor contact point.
- Develop and design new headquarters (Region 5 standard design for *large* facility --14,470 square feet) VCS, EEC and maintenance compound at New Bridge Road
- Consider establishing a trail head, and/or staging areas for parking, interconnecting to nearby City and neighborhood trail systems at Asheville Park, Heritage Park, and Lago Mar for horseback riding, scenic bicycling, hiking on the north side.

**Table 2.1. Highlights of respective alternatives as they relate to significant issues**

Issue	Alternative A	Alternative B	Alternative C
Prescribed burning/ Wildfires	<p>Burn up to 350 acres total per year within the Refuge (primarily impoundments).</p> <p>Maintain the fuel breaks between forested/brushy habitats and residential areas.</p>	<p>In addition to A, work with cooperating private property partners to burn land adjacent to Refuge lands that have dead phragmites stands. Expand WUI program to include lands currently leased as part of the cooperative farming program.</p> <p>Prescribe burn Refuge marshes in the Beggars’s Bridge, Nanney, Asheville Bridge Creeks, and other areas adjacent to Back Bay, to remove mats of dead vegetation.</p> <p>Reclaim old fields that have succeeded to an early forest habitat stage, and prescribe burn these areas if possible to reduce ground cover and encourage forb and shrub growths.</p> <p>Conduct prescribed burning in the Green Hills area for fuel reduction and habitat improvement.</p>	<p><i>In addition to B:</i></p> <p>Provide an additional 50 acres of shrubby, mid-story canopy in the woodlands to the north and south of Sandbridge Road and east of Muddy Creek Road. Implement prescribed burning and tree top removals as tools to maintain those areas as shrub–scrub habitat.</p> <p>Implement prescribed burning where excessive fuel build-ups inhibit tree seedling germination. In WSA’s prescribed fire will be evaluated as minimum tool within wilderness designated areas.</p>
Invasive plant management	<p>Monitor, spray (200+ acres), and burn phragmites.</p> <p>Draw-down impoundment water levels to dry out areas affected by American lotus, and use herbicide to control Japanese stiltgrass.</p>	<p>In addition to A, work with cooperating adjacent land owners to treat phragmites with spraying and burning.</p> <p>Expand aerial control spray program for phragmites to encompass all Refuge islands, western marshes and north bay marshes (200+ acres in year 1).</p>	<p><i>In addition to B:</i></p> <p>Investigate biological control techniques for phragmites. (If an appropriate species is discovered, FWS will develop a programmatic document for compliance prior to implementation).</p>
Pest species management	<p>Addle resident Canada geese eggs, and selectively control individual Canada geese by lethal means.</p> <p>Research feral hog populations, and conduct 7-day feral hog hunt.</p>	<p>Canada goose management same as A.</p> <p>Research feasibility of using the most efficient methods (i.e., expanded public hunt, permitted sharpshooters and trappers) to eliminate the high feral hog population.</p>	<p><i>In addition to B:</i></p> <p>Improve pest control efforts involving the feral hog, through advances in the cooperative research effort with Virginia Department of Game &amp; Inland Fisheries (VDGIF); to include researching their effects on migratory bird habitat and minimizing those effects.</p>
Feral horses management	<p>Have the Virginia Wild Horse Task Force round-up and remove horses when contacted by Refuge personnel or Sandbridge residents. We will work with Currituck NWR and FCSP to effectively and cooperatively manage the issue.</p>	<p>Same as A.</p>	<p>Same as A.</p>

Issue	Alternative A	Alternative B	Alternative C
Mosquito control	Cooperate with the local City Mosquito Control Biologist in mosquito monitoring and data sharing, as needed, both on and adjacent to the Refuge.	Same as A.	Same as A.
Sea turtle management	<p>In summer, continue patrol by all-terrain vehicles (ATV) from the southern boundary of Dam Neck Naval Base, south through Sandbridge, the Refuge, and FCSP to the North Carolina border for signs of nesting sea turtles and for stranded turtles and marine mammals.</p> <p>Relocate sea turtle nests to behind the primary dunes with predator enclosures, and place wire cages around non-relocated (in-situ) sea turtle nests.</p> <p>Monitor sea turtle nests when eggs are close to hatching and then transport the hatchlings to the beach from relocated nests sites.</p> <p>Photo document, collect tissue samples and record various measurements of stranded sea turtles.</p> <p>Value the use of volunteers, interns and FCSP staff as critical to the success of sea turtle management on the Refuge.</p>	Same as A.	<p><i>In addition to A:</i></p> <p>Expand sea turtle nest patrols and monitoring north of Dam Neck Naval Base, including the Fort Story beach.</p> <p>Hire additional staff to manage the sea turtle program.</p> <p>Within the lifecycle of the CCP (15 years), we will monitor and evaluate beach conditions as specific events occur. These could include natural events such as sea level rise or hurricane storms altering the current beach dune complex, or the eventual decreasing and elimination of the beach permittee program. Thus, sea turtle relocation may not be necessary under these conditions that could favor in-situ sea turtle nests.</p>

Issue	Alternative A	Alternative B	Alternative C
Wilderness review	Maintain and manage 2,165 acres of proposed wilderness that was designated under the 1974 EIS.	<p>Work with interest groups, partners (i.e., The Wilderness Society, Virginia Department of Game and Inland Fisheries) and appropriate government officials to rescind the previously proposed wilderness areas, as they no longer meet minimum criteria.</p> <p>Initiate the formal process to remove all proposed WSA's from consideration as wilderness, and complete steps to designate as Research Natural Areas (RNA).</p>	<p>Work with the State of Virginia to gain total jurisdictional control over the navigable waters which surround the proposed wilderness areas.</p> <p>Complete Habitat Management Plans for all proposed areas, and implement a formal wilderness resource monitoring program.</p> <p>Work with U.S. Army Corps of Engineers and other Federal and state officials to eliminate all motorized watercraft traffic within ½ mile of the Refuge's Proclamation boundary.</p> <p>Provide grant monies for individuals and businesses to mitigate possible negative economic impacts caused by wilderness designation.</p> <p>Implement wilderness education program.</p> <p>Perform a Wilderness Review as part of the next CCP process to determine if the wilderness character of the proposed areas have been restored to such an extent that they fully meet the wilderness criteria.</p>
Cooperative farming	<p>Approximately 100 acres of upland and prior-converted wetlands in 4 tracts leased to 4 local farmers.</p> <p>Farmers provide direct payment/ payment-in-kind in form of Refuge habitat improvements.</p> <p>Allow farmers to use pesticides, only after Pesticide Use Proposals are approved by Regional Office.</p>	<p>Within 5 years after CCP approval, phase out cooperative farming as a Refuge program.</p> <p>Refuge would seek for cooperative farmers to voluntarily withdraw from the program.</p> <p>Former agricultural areas would be converted to forest (tree plantings) and/ or shrub scrub habitats.</p>	<p><i>In addition to B:</i></p> <p>Within 10 years of CCP approval, convert any remaining Refuge former farmland and old field habitats to forested wetlands.</p>

Issue	Alternative A	Alternative B	Alternative C
<p>Wildlife disturbance/ Law Enforcement</p> <p>Wildlife disturbance/ Law Enforcement continued</p>	<p>Close seasonal dike trails November 1 through March 31, and prohibit waterfowl hunting in the Presidential Proclamation area.</p> <p>Conduct regular law enforcement patrols for visitor and resource protection.</p> <p>Work with Virginia Beach Police, State Officers primarily from FCSP; and Virginia State Conservation Officers through co-operative agreements with the Refuge. Continue to prohibit certain non-wildlife dependent activities such as sunbathing, surfing, and swimming.</p>	<p>In addition to A, work with US Army Corps of Engineers to initiate personal watercraft use controls in the sensitive, high waterbird-use areas of Ragged and Long Islands.</p> <p>Establish the necessary legal mandates to ensure effective public use management during this transition, and develop enforcement capabilities involving possible partnerships with the Virginia Marine Resources Commission, US Coast Guard, Virginia Department of Game &amp; Inland Fisheries, etc., to ensure that violations of the new USACE policies and regulations are not ignored.</p>	<p>Same as B, but work with the State of Virginia to gain total jurisdictional control over the navigable waters which surround the proposed designated wilderness areas.</p> <p>Work with the U.S. Army Corps of Engineers and other Federal and state officials to eliminate all motorized watercraft traffic within ½ mile of the Refuge’s Proclamation boundary.</p> <p>Complete a phase-out plan, and establish cooperative law enforcement agreements with the Virginia Marine Resources Commission, the Virginia Department of Game and Inland Fisheries, U.S. Army Corps of Engineers, and any other appropriate local, state, or federal agency to assist with enforcement of regulations affecting the designated wilderness area.</p>
<p>Realty/ ownership</p>	<p>Acquire land from willing sellers within the approved boundary.</p> <p>Cooperate with City of Virginia Beach on open space preservation, recreational facility development, ecotourism, and farmland preservation.</p> <p>Support “Green Infrastructure” program with Hampton Roads Planning District Commission.</p> <p>Evaluate areas within the Back Bay watershed not in the existing approved boundary for possible inclusion into the Refuge Acquisition Boundary.</p> <p>Cooperate with the City of Virginia to resolve encroachment issues through legal means (i.e. docks and piers).</p>	<p>Same as A.</p>	<p>Same as A.</p>

Issue	Alternative A	Alternative B	Alternative C
Jurisdiction	<p>No concurrent jurisdiction among the various law enforcement agencies (City, State, Federal) to enforce regulations on the Refuge.</p> <p>Work with local agencies on enforcing Refuge regulations to the extent possible.</p>	<p>Same as A, but work to obtain concurrent jurisdiction.</p> <p>Complete a Cooperative Management Agreement with the City of Virginia Beach for enhanced law enforcement service, including increased patrol coverage of Refuge lands.</p> <p>Deputize FCSP officers.</p>	<p>Work with the State of Virginia to gain total jurisdictional control over the navigable waters which surround the proposed designated wilderness areas.</p>
Refuge access	<p>Close seasonal dike trails November 1 through March 31. The “North Mile” remains closed to visitors at all times.</p> <p>Provide public access to a portion of the closed area via the new wildlife observation building at the north end of C-Pool.</p> <p>No public entry is permitted in dunes other than by Special Use Permit.</p> <p>Throughout the Refuge, provide opportunities on two miles of hiking/biking trails and from seven overlooks (not including dikes/beaches).</p> <p>Develop additional public access facilities.</p>	<p>In addition to A, move and construct new fee booth and re-align entrance road to be straight with Sandpiper Road.</p> <p>Develop a new biking/hiking trail starting at the entrance of the Refuge.</p> <p>Develop a 20-car parking lot behind the new fee booth (south of hammerhead) for hikers/bikers.</p> <p>Change VCS operating schedule – Close Sundays instead of Saturdays from November 1 to March 31. The Code of Federal Regulations (CFR) will be updated as appropriate to reflect CCP strategies.</p>	<p>Same as B, but we will also consider relocating the current Office/VCS to Little Island City Park (neighboring property) to serve as an interagency visitor contact point.</p>
Boat/water access	<p>Refuge currently has no jurisdiction over water uses of the bay, except for migratory bird hunting.</p>	<p>Same as A. Develop canoe/kayak trail from Asheville Bridge Creek to Hell’s Point Creek to Lovitt’s Landing to Horn Point.</p>	<p>Same as B.</p>
Motor Vehicle Access Permit	<p>Phase out Refuge Motor Vehicle Access (MVA) use to minimize associated negative impacts to ocean-front beaches and related shorebird use during the spring and fall migrations.</p>	<p>Same as A.</p>	<p>Same as A.</p>
Entrance fees	<p>Collect an entrance fee from April 1 through October 31; suspend fee collection from November 1 through March 31.</p>	<p>In addition to A, implement fee collection at Horn Point for commercial canoe/kayak launching.</p>	<p>Same as B.</p>

Issue	Alternative A	Alternative B	Alternative C
Tram tours	Provide tram tours with help from BBRF throughout the year.	In addition to A, utilize trams for transportation to wildlife observation building	<p><i>In addition to B:</i></p> <p>Operate the tram system by way of a concession service, or entirely through a partner organization. A concession service would allow a commercial, non-profit, private organization to operate the tram system in its entirety.</p> <p>Expand the Refuge tram operation to accommodate visitor transportation (for a fee) between the new VCS and False Cape State Park. This fee would be determined upon completion of the new HQ/VC facility.</p> <p>Revise agreement with BBRF partner to reflect this expanded level of service, or contract the service</p>
Trail Maintenance / Development	Maintain and develop public access facilities as part of the Virginia Coastal Birding Trail and the Charles Kuralt Trail. Current trails include 2 miles of hiking biking trails and 7 overlooks.	<p>In addition to A, construct handicap accessible trail on Tract #244, in conjunction with new HQ/VCS, after remaining land is reforested.</p> <p>Develop canoe/kayak trail from Asheville Bridge Creek to Hell's Point Creek to Lovitt's Landing to Horn Point.</p> <p>Develop new biking/hiking trail starting at the entrance of the Refuge, and an additional hiking trail from proposed HQ site (at Sandbridge road) along Asheville Bridge Creek to the Horn Point site</p>	<p>Same as B, plus an additional hiking trail along Nanney's Creek.</p> <p>Consider establishing a trail head, and/or staging areas for parking, interconnecting to nearby City and neighborhood trail systems at Asheville Park, Heritage Park, and Lago Mar for horseback riding, scenic bicycling, and hiking on the north side.</p>

Issue	Alternative A	Alternative B	Alternative C
<p>Headquarters, Visitor Center and maintenance compound</p>	<p>Maintain current VCS, ABCEEC, entrance booth, 50-car parking lot, other structures and buildings, interpretive and directional signs, informational kiosks, benches, trams, vehicles and trails.</p>	<p>Develop and design a new headquarters, VCS, EEC and maintenance compound at the corner of New Bridge and Sandbridge Road (Tract #244).</p> <p>Re-align New Bridge Road to accommodate new HQ/VCS.</p> <p>Once the new headquarters facility (Region 5 standard medium design) is built, use the ABCEEC building as a facility for maintenance.</p> <p>Utilize Rightmeyer House as temporary office space until new Headquarters/VCS is completed.</p> <p>Upon completion of the new HQ/VCS, maintain and improve current office as primary visitor contact facility and possible sales outlet for cooperating association (BBRF)</p>	<p>Same as B, but with Region 5 standard large design instead of medium to accommodate neighboring Refuge, State Park, and City staff.</p> <p>We will consider relocating the current office to the Little Island City park (neighboring property) to serve as an interagency visitor contact point.</p>

Issue	Alternative A	Alternative B	Alternative C
Hunting	<p>Prohibit waterfowl hunting in the Presidential Proclamation area composed of 4,600 acres of bay waters and the impoundments.</p> <p>Partner with VDGIF to administer the hog and deer hunt via computerized permitting system.</p>	<p>In addition to A, evaluate the annual Refuge hunt and modify hunt to meet management goals.</p> <p>Fully analyze the potential of expanding deer and hog hunt and adding waterfowl hunting through a complete and separate NEPA analysis. The refuge intends to begin this analysis within 3 years of CCP approval. We will work closely with VDGIF to pull together data necessary to complete this analysis.</p> <p>Expand deer hunting opportunities (shotgun and bow) with parking areas provided.</p> <p>Implement a youth deer hunt on opening day in Zone 4.</p> <p>Work with VGDIF to assist with implementing waterfowl hunt at West Back Bay marshes and Redhead Bay (targeted publics). Blind stakes will be located at three sites. Support VGDIF with waterfowl hunt at FCSP by providing parking at the Refuge.</p> <p>Implement a limited youth waterfowl hunt at Colchester impoundment in partnership with VDGIF.</p>	<p>In addition to B, consider expanding waterfowl hunting into the North Bay. At the current time there are no access facilities to that area, but if those conditions were to change we would re-evaluate hunting opportunities at that site.</p>
Dog walking on Refuge	<p>Dog walking is currently permitted during the winter through early spring period, in the headquarters, adjacent nature trails and beach areas, where migratory bird use was low. The public and their leashed dogs are currently permitted in those areas from one-half hour before sunrise to one-half hour after sunset between October 1 and March 31.</p>	<p>Dog-walking will no longer be permitted in any Refuge locations.</p> <p>Since the Refuge mission consists of providing habitats for wintering and migrating birds that include waterfowl, shorebirds, wading birds, marshbirds and landbirds, minimizing those uses that provide the greatest potential conflicts and disturbances to those migratory bird species is a priority. Dogs have been shown by recent research to displace native migratory bird species from the natural habitats that Back Bay NWR was established to provide.</p>	<p>Same as B.</p>
Horseback riding on Refuge	<p>Prohibit horseback riding on the Refuge.</p>	<p>Same as A.</p>	<p>In addition to A, work to establish trailhead and/or staging areas for parking and interconnecting to nearby partner trail systems for horseback riding (and scenic bicycling) on west side.</p>

Issue	Alternative A	Alternative B	Alternative C
Partnerships	<p>Manage FCSP’s two impoundments, including water level management, invasive species control, mechanical habitat management, and prescribed burning.</p> <p>Provide support to the Friends Group and the Back Bay Restoration Fund</p> <p>Refuge biologists would continue to participate in quarterly meetings of the Roanoke-Tar-Neuse-Cape Fear (RTNCF) Ecosystem Team.</p> <p>The Senior Outdoor Recreation Planner would continue to participate in RTNCF Ecosystem Team Public Outreach Committee.</p> <p>The Refuge Manager would continue to attend RTNCF Ecosystem Team Executive Committee meetings.</p> <p>Participate at general RTNCF Ecosystem Team meetings.</p> <p>Recruit, train, and utilize volunteers in public use, biology and maintenance programs.</p> <p>Provide annual funds for a summer Youth Conservation Corps (YCC) administered through the Chesapeake Volunteers in Youth Services Organization.</p> <p>Serve as a host site for the City of Virginia’s court-ordered community service program.</p> <p>Cooperate with City schools as a “Partner in Education.”</p> <p>Develop an environmental education effort with the new “Sanctuary at False Cape” condominium development to include use of their facilities for Refuge information and environmental education displays.</p>	<p><i>In addition to A:</i></p> <p>Pending results of the North Carolina-FWS “SAV Study,” determine the best SAV restoration technique(s); and implement those SAV restoration techniques on the best available Refuge sites in the Back Bay watershed.</p> <p>Through working with the US Army Corps of Engineers (USACE), initiate personal watercraft use controls in the sensitive, high waterbird-use areas of Ragged and Long Islands.</p> <p>Develop enforcement capabilities involving possible partnerships with the Virginia Marine Resources Commission, US Coast Guard, Virginia Department of Game &amp; Inland Fisheries, etc., to insure that violations of the new USACE policies and regulations are not ignored.</p> <p>Work with partners and the Corps of Engineers in the feasibility study regarding restoration.</p> <p>Coordinate with Ducks Unlimited, VDGIF and the Virginia Ecological Services Field Office’s (Gloucester) Partner’s Program to establish the appropriate wetlands restoration project and location, and insure funding availability.</p> <p>Complete a Cooperative Management Agreement with the City of Virginia Beach for enhanced law enforcement service, including increased patrol coverage of Refuge lands.</p> <p>Increase volunteer hours by 5-10% over current levels</p> <p>Integrate volunteer program with other Refuge support groups, including but not limited to BBRF, “Reese’s Pieces,” Friends, and work campers.</p>	<p><i>In addition to B:</i></p> <p>Increase volunteer hours donated to the Refuge by 20% over current levels.</p> <p>Increase the number of Refuge internship opportunities by 50% over current levels.</p> <p>Work with the Back Bay Restoration Foundation (BBRF) or another appropriate partner to establish and operate an educational sales outlet in the facility.</p> <p>Expand the existing Cooperative Management Agreement with the City of Virginia Beach to strengthen the relationship for future cooperative outdoor recreation facility planning, development, operation, and maintenance.</p>