

**Visitor Center
for the Eastern Massachusetts NWR Complex
Environmental Assessment**

January 2006

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Chapter 1: Introduction

The U.S. Fish and Wildlife Service (Service) proposes to site and build a Visitor Center that would serve the Eastern Massachusetts National Wildlife Refuge Complex (Complex). The Visitor Center would provide information about Complex activities and management, as well as Service and National Wildlife Refuge System (Refuge System) information. In addition, it would also serve as an environmental education center. The new facility, as conceptualized, will house exhibits, office space, class room space, and space for a Friends group bookstore.

Purpose and Need for Action

The 2005 Omnibus Appropriation Bill (Public Law No: 108-447) included an appropriation of \$3,177,000 to be used for a “Visitor Center and Administration Building” at the Complex. The Visitor Center as envisioned will help the Complex and Refuge System to reach out to the public and provide information about the Mission of the Service. In addition, we will use the Visitor Center to provide outreach and as an opportunity to increase partnerships in the area.

The service identified the need for a Visitor Center at the Complex in 2001. In March of 2001, Complex staff learned that the Service had assembled a list of twenty refuge units from across the country that would receive new visitor centers in conjunction with the Refuge Centennial. The Complex ranked third on this prioritized list. A core planning team comprised of Complex staff and Friends Group members was assembled to further develop the concept for the new environmental education and visitor center/administrative headquarters, as envisioned.

Decision to be Made

Based on the information provided in this Environmental Assessment (EA), our Regional Director will select a preferred alternative for the Complex Visitor Center location. The preferred alternative may be the Proposed Action, one of the alternatives, or a modification of one of the alternatives. Selection of the preferred alternative will be made based on an evaluation of the Service’s mission, the purposes for which the refuge was established, legal mandates, and comments on this EA. In accordance with the National Environmental Policy Act (NEPA), our Regional Director must also determine whether the selected site location alternative will have a significant impact on the quality of the human environment. If there is a significant impact, additional analysis will be required in an Environmental Impact Statement (EIS). If there is no impact, we will issue a Finding of No Significant Impact (FONSI). Once the FONSI or Decision Memorandum have been signed, we will begin implementing the preferred alternative.

Background

The Complex is comprised of eight of the more than 545 refuges in the National Wildlife Refuge System (Refuge System) administered by the Service. The Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys and include small islands in the Caribbean and South Pacific. The character of the refuges is as diverse as the nation itself.

The Complex consists of eight refuges: Assabet River, Great Meadows, Mashpee, Massasoit, Monomoy, Nantucket, Nomans Land Island, and Oxbow.

Each of the eight National Wildlife Refuges was established either through legislation, Executive Order, transfer from federal agencies, or donation, with a statement of “purpose.” These follow:

Assabet River

Established in 2000, Assabet River NWR provides wildlife with a diversity of upland and wetland habitats. The 2,229-acre refuge is located near the Assabet River within the towns of Hudson, Maynard, Stow, and Sudbury. The refuge was transferred from the Fort Devens Army base in accordance with the Defense Base Closure and Realignment Act of 1990. The purpose of Assabet River NWR is its “particular value in carrying out the national migratory bird management program.”

Great Meadows

Great Meadows National Wildlife Refuge was established in 1944 “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (Migratory Bird Conservation Act) and is “suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, and (3) the conservation of endangered species or threatened species...” (Refuge Recreation Act).

The 3,863-acre refuge is located 20 miles west of Boston in the towns of Bedford, Billerica, Carlisle, Concord, Lincoln, Sudbury, and Wayland.

Mashpee

Mashpee was established in 1995 “to preserve and protect natural resources associated with the Waquoit Bay area for the protection of waterfowl and protection of wildlife.” (National Wildlife Refuge Administration Act, Emergency Wetlands Resource Act).

The refuge is a mosaic of public and private lands. Of the 5,871 acres within the acquisition boundary, 342 acres are federal. Refuge lands lie in the towns of Mashpee and Falmouth.

Massasoit

Massasoit was established in 1983 “to conserve (A) fish or wildlife which are listed as endangered species or threatened species or (B) plants...” (Endangered Species Act of 1973).

The 208-acre refuge is located in the town of Plymouth and abuts the Miles Standish State Forest.

Monomoy

Monomoy was established in 1944 “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (Migratory Bird Conservation Act)

The 6,735-acre refuge is comprised of barrier beach islands, tidal flats and offshore waters off the “elbow” of Cape Cod at Chatham.

Nantucket

Nantucket was established in 1973 for its “particular value in carrying out the national migratory bird management program.” (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or other purposes)

The 24-acre refuge is located at the tip of Great Point on Nantucket Island.

Nomans Land Island

Nomans Land Island was established in 1975 “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (Migratory Bird Conservation Act).

The 628-acre island refuge is located three miles southwest of Martha’s Vineyard Island.

Oxbow

Oxbow was established in 1974 for its “particular value in carrying out the national migratory bird management program.” (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or other purposes)

Portions of the 1,677-acre refuge are located in the towns of Harvard, Lancaster, Ayer, and Shirley.

Visitor Facility Background

Currently, total combined annual visitation to Complex refuges within the greater Boston area (Great Meadows, Assabet River and Oxbow NWRs), stands at about 408,776. More than 950 students (K through 12, college/university level), from the same area annually utilize the Complex's natural resources as an "outdoor classroom." While Complex staff directly facilitate a limited number of environmental education activities on the refuges throughout the school year, the majority of facilitated learning experiences are directed by the students' own teachers (or other group leaders). Complex public use staff have become more involved in planning and delivering environmental education programming as a result of the Urban Education Program. Staff involvement in environmental education has increased as this program has grown. Staff and volunteer involvement in environmental education programming will increase as a result of new school programs that would be based at the new Facility.

Many of the Complex refuges that are open to the public have trails, kiosks, and/or interpretive wayside exhibits. The Complex headquarters building, located within the Great Meadows NWR Sudbury Unit, contains a small visitor contact area with exhibits. The Monomoy NWR headquarters and visitor center contains exhibits and a small bookstore.

The Complex's strategic location within a day's drive of the Northeast's major cities (Boston, New York, and Philadelphia), as well the states of Maine, New Hampshire, Rhode Island, and Connecticut, gives the Complex great potential for educating and engaging millions of people about the Service and the Refuge System's important work. The target audiences for the new Visitor Center are eastern Massachusetts citizens (in particular, those from greater Boston communities), local schools, and the numbers of tourists that already visit the greater Boston area (particularly in the spring, summer, and fall months).

The original concept for the Visitor Center, outlined in a Project Identification Document (PID), called for a combined visitor center and administration building. However, the headquarters building for the Complex was just recently renovated. Complex staff will continue to work at the renovated headquarters and the new building will be used primarily as a visitor center with office space for 1-2 full time employees.

Conformance with Legal Mandates and Policies

National Wildlife Refuge System Improvement Act of 1997

Public Law 105-57, amends the National Wildlife System Act of 1966 (16 U.S.C. 668dd-ee), providing guidance for management and public use of the Refuge System. The Act mandates that the Refuge System be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management.

The Act establishes priorities for recreational uses of the Refuge System. Six wildlife-dependent uses are specifically named in the Act: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. These activities are to be promoted on the Refuge System.

All public uses on a refuge must be found compatible with the refuge and the Refuge System. Compatibility determinations are prepared prior to authorization of any public use of the refuge. A compatible use is one which, in the sound professional judgment of the Refuge Manager, will not materially interfere with or detract from fulfillment of the Refuge System Mission or refuge purpose(s). As stated in the Act, “the mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The Service will use the Visitor Center as an avenue to provide opportunities for the public to engage in wildlife-dependent use on the refuge. Additionally, trails, interpretive programs, and environmental educational opportunities associated with the Visitor Center will be used to increase public awareness of the mission of the Service and how the Complex fits within the National Wildlife Refuge System. Uses associated with the Visitor Center were found compatible during the CCP process for the refuges.

Clean Water Act of 1974, as amended

This Act and its amendments have as its objective the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters. Section 401 of the Act requires that Federally permitted activities comply with the Clean Water Act standards, state water quality laws, and any other appropriate state laws. Section 404 charges the U.S. Army Corps of Engineers with regulating discharge of dredge or fill materials into waters of the United States, including wetlands.

The Service will ensure that any and all permits required under federal and state water quality laws will be adhered to in the process of developing the Visitor Center.

National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852) as amended by P.L. 94-52, July 3, 1975, 89 Stat. 258, and P.L. 94-83, August 9, 1975, 89 Stat. 424).

Title I of the 1969 NEPA requires that all Federal agencies prepare detailed environmental impact statements for “every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment.”

The 1969 statute stipulated the factors to be considered in environmental impact statements, and required that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations.

This EA satisfies the impact analysis required under NEPA.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended

Public Law 93-205, approved December 28, 1973, repealed the Endangered Species Conservation Act of December 5, 1969 (P.L. 91-135, 83 Stat. 275). The 1969 Act had amended the Endangered Species Preservation Act of October 15, 1966 (P.L. 89-669, 80 Stat. 926). The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs. The Act: authorizes the determination and listing of species as endangered and threatened; prohibits unauthorized taking, possession, sale, and transport of endangered species; provides authority to acquire land for the conservation of listed species, using land and water conservation funds; authorizes establishment of cooperative agreements and grants-in-aid to states that establish and maintain active and adequate programs for endangered and threatened wildlife and plants; authorizes the assessment of civil and criminal penalties for violating the act or regulations; and authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the act of any regulation issued thereunder.

Through an analysis of the effect of the proposed Visitor Center on endangered species, the Service is ensuring that there will be no unauthorized take of threatened or endangered species as a result of this project.

National Historic Preservation Act of 1966, as amended

This Act establishes a National Register of Historic Places and a program of matching grants for preservation of significant historic features. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.

The Service will coordinate with the State Historic Preservation Officer to ensure compliance with the Act.

Chapter 2: Alternatives

Alternative Selection

Soon after the PID was completed, refuge staff began looking for potential sites for the proposed Visitor Center. The Comprehensive Conservation Plans for Assabet River, Great Meadows, and Oxbow NWRs included general background information about the proposed Visitor Center, along with a list of criteria for site selection. The criteria were:

- Access from a major travel route (Route 2, 128, etc.)
- Access from public transportation
- Accessibility of utilities
- Presence of trust species, habitats or other important resources
- Opportunity for outdoor features associated with center, including interpretive trails
- Topography
- Minimal potential disturbance to habitats
- No presence of hazardous wastes
- Minimal potential impacts to neighbors
- Buffer from current or predicted commercial activity

Staff reviewed existing Service lands and engaged local partners to determine a list of suitable sites. When the project was included in the 2005 Omnibus Appropriations Bill, staff reviewed the previously identified sites, along with new sites suggested by Service staff and partners, to develop viable alternatives.

Alternatives Considered but Eliminated from Detailed Analysis

Town of Concord Sites

The opportunity to reach large numbers of people that vacation in the greater Boston area led us to look very closely at opportunities to locate the Visitor Center in the town of Concord. A number of tourist destinations are located in Concord, including Minuteman National Historical Park, Walden Pond, and the historic downtown area. A site in Concord would also provide easy access to Route 2.

Staff members engaged members of the community, local officials, and partners to investigate possible Visitor Center sites at the Concord Impoundments at Great Meadows NWR, or possible land acquisition or exchange opportunities. In the course of the discussions, individuals expressed a concern with an additional large-scale federal agency presence in Concord. Strong feelings were received that the Service should look to other locations.

Great Meadows NWR: Weir Hill Road

A site adjacent to the existing headquarters building on Weir Hill Road was considered and reviewed with regard to soil characteristics, 100-year flood plain, and access constraints. The costs and regulatory requirements for the site are greater than the Service is able to incur.

We considered a number of other sites in light of the criteria that were designed and outlined in the Comprehensive Conservation Plan (CCP). They are briefly described below.

Additional locations at Great Meadows NWR

Staff considered a number of additional locations at Great Meadows, including refuge lands in Billerica (Rt. 4), Sudbury (various sites along Water Row and River Road), and Wayland (Rt. 126 and Stonebridge Road). Each of the sites considered had considerable topographic, wetland, or visibility constraints.

Additional locations at Assabet River NWR

Staff explored a number of other sites at the Assabet River NWR. Two sites adjacent to Puffer Pond were explored. We decided that a Visitor Center in these locations would change the pristine character of the pond and had concerns about the impacts to water quality and wildlife resources the Visitor Center might have. We also considered the location of the former Army headquarters site on White Pond Road. This site is located on the interior of the refuge and would have required additional miles of road maintenance and plowing. We also would have needed to relocate approximately 3 miles of trails that use the former road bed.

Oxbow NWR

The Service considered a number of sites at Oxbow NWR including locations on or just off of Jackson Road. Staff eliminated all Oxbow sites from consideration for a number of reasons including distance from the Complex headquarters and other Complex refuges, lack of visibility from Rt. 2, and the distance from Boston and heaviest population densities.

One of the other five refuges in the Complex

Staff considered the appropriateness of constructing the Visitor Center at one of the other 5 refuges in the Complex. Monomoy NWR has an existing visitor facility building and, although it could reach large numbers of people during the summer months, it would not reach our objective of a year-round population and diverse environmental education component. Nantucket NWR is difficult to access and does not have an adequate land base. Nomans Land Island NWR is closed to the public because of the potential for unexploded ordnance. Mashpee NWR has a small land base with limited staff presence. It is a long distance from major population centers, as well. Massasoit NWR is located in the fast-growing area of the south-east shore of Boston. However, it is the home to the federal-listed threatened northern red-bellied cooter. It also has limited staff presence and is far from the Complex headquarters.

Alternatives

We selected 3 locations in addition to the No Action alternative for detailed analysis. Two of the sites are located at Assabet River NWR and one of the sites is at Great Meadows. The locations are depicted in Figure 1. Descriptions of the alternatives follow.

Alternative A: No Action

The existing headquarters building would continue to function as the main administrative and visitor contact facility for the Complex. No new facilities would be built and the Service would notify Congress that the appropriated money was not going to be used.

Alternative B: Great Meadows NWR: Water Row & Route 27 (Wolbach)

This site is located just off Route 27 at the Sudbury/Wayland town line on Great Meadows NWR (Figure 2). The site offers a compelling natural setting overlooking wet meadows and the broad flood plain along the Sudbury River. The site includes portions of the 100-year flood plain, which poses problems for access to the Visitor Center site and placement of a septic system.

The Visitor Center could be sited in the grassy field, at the base of the wooded knoll or among the pines on the knoll. Each site would offer views of the Great Meadows of the Sudbury River beyond Water Row Road. Access to the site would be from Water Row Road. However, the intersection of Water Row and Route 27 would need to be re-aligned to ensure safe access from Route 27. The interior access road would form a simple loop pattern providing ample parking for cars and buses. We would need to install a mounded septic system, which could be located in the middle of the loop, on the highest point of the field. By utilizing the back of the site, we would screen the Visitor Center from the adjacent Sudbury Valley Trustees headquarters. This would also minimize impacts to views from the historic Wolbach Road (Pinney 2005).

From this site, wildlife observation trails could be developed along the knoll, overlooking the adjacent wetland, and along the base of the knoll with wildlife observation blinds. Trails, eventually, could connect with the Strand property and with Sudbury Valley Trustees trails and provide additional opportunities for wildlife-dependent recreation.

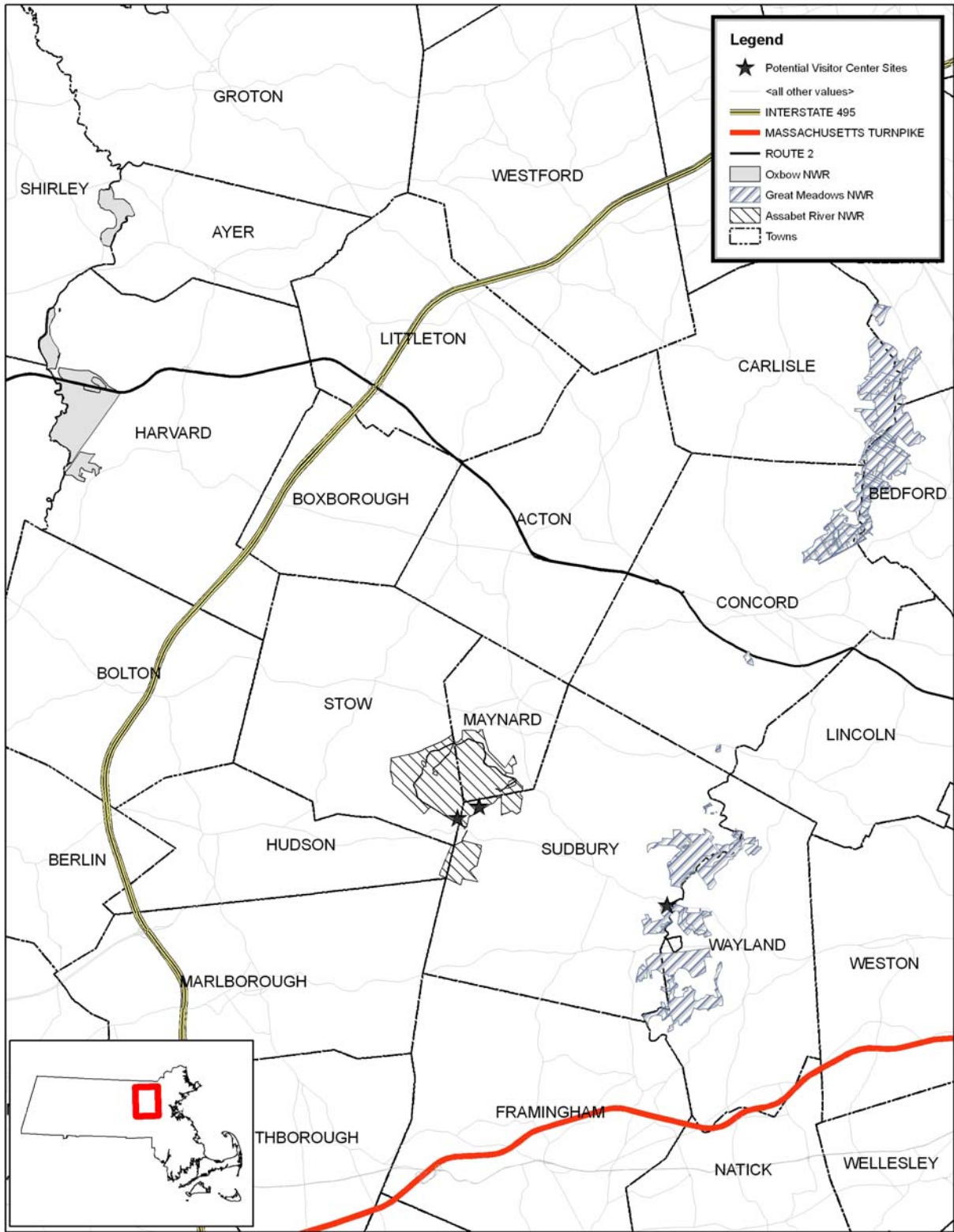


Figure 1. Vicinity map for Visitor Center site alternatives

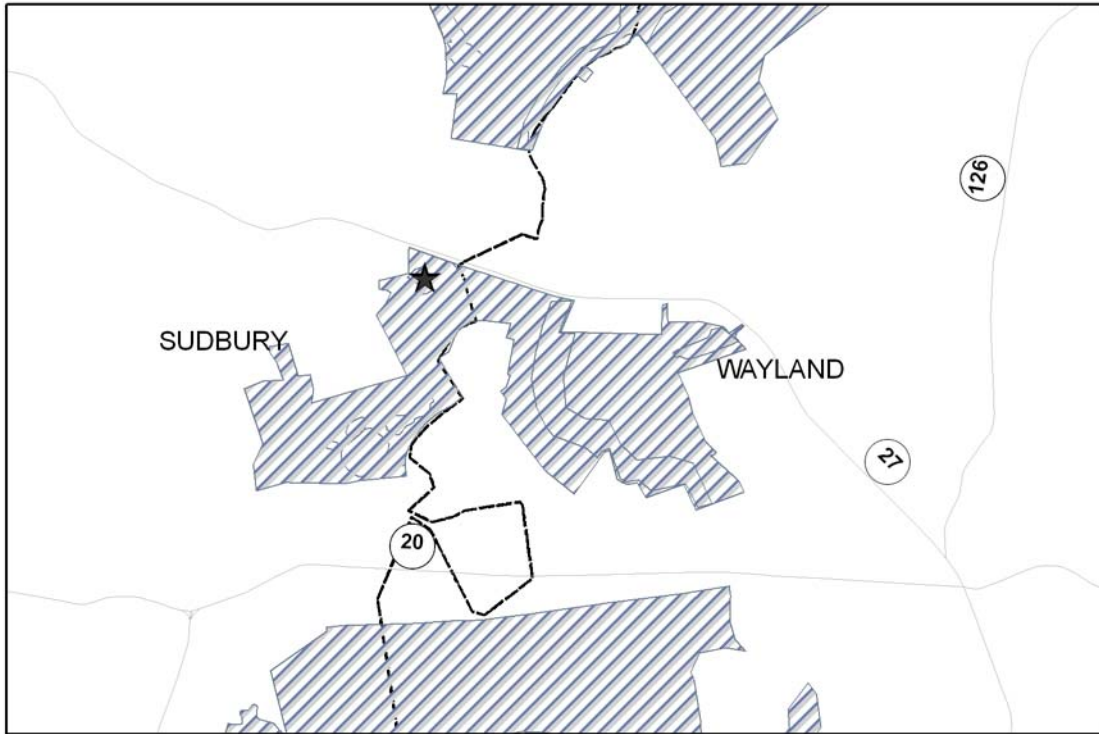


Figure 2. Vicinity map for Wolbach site

Alternative C: Assabet River NWR: Craven Lane (Proposed Site)

This site is located on Assabet River NWR along Craven Lane (Figure 3). The site is adjacent to Sudbury State Forest land and is located approximately 3/10 of a mile from Puffer Pond. There is an existing trail network that provides access to wildlife observation and photography opportunities on the refuge. The site is located approximately 1/3 mile north of Hudson Road in Sudbury. The Service would develop signs directing visitors from Hudson Road to the site, since the Visitor Center would not be visible from outside the refuge.

In 2003, the Service removed a number of Army buildings from this location. Utilizing this previously disturbed site would enable the Service to reduce the amount of tree removal and new soil disturbance that would be required. Parking would be provided adjacent to the building. The main access to the site would be from Hudson Road in Sudbury. The Service would develop a secondary vehicular access from Old Marlborough Road in Maynard. This entrance would provide access to the refuge off of Route 27 in Maynard at what is known as the East Gate. However, since the existing road cuts through a wetland north of Puffer Pond and the road floods seasonally, permanent access will not occur until the road is improved to restore the hydrologic link between the two sides of the road. When the road is improved, we will utilize animal

crossing devices to allow turtles, otters, and other animals to safely cross from one portion of the wetland to the other.

Under this alternative, access to the Visitor Center via bicycle would be allowed. We have included a compatibility determination for bicycling as Appendix A. We would allow bicycling as a means of transportation to the Visitor Center and to certain points on the refuge. For example, bicycles may be allowed from the North Gate east along the Patrol Road and south along Craven Lane or from the North Gate south along White Pond Road and east along a Service Road or Patrol Road to the Visitor Center.

Bicycles would be allowed to enter from the Hudson Road Gate and East Gate and travel on Craven Lane to the Visitor Center. By allowing bicycles as a means of transportation to specific points on the refuge, we will be able to link to the Assabet

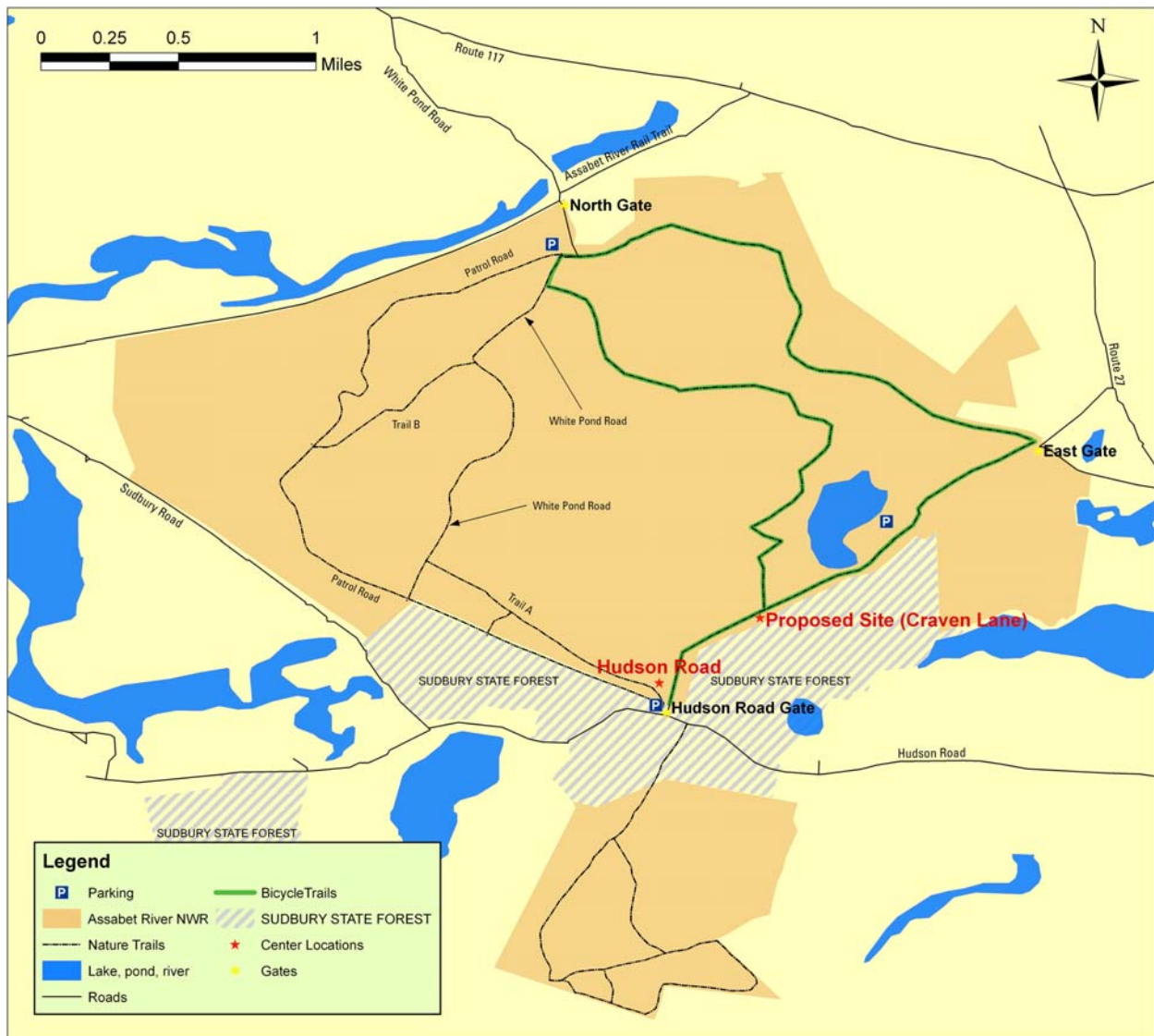


Figure 3. Assabet River NWR sites

River Rail Trail that is to the north of the refuge and provide individuals with the opportunity to access the refuge by a method that will be environmentally friendly.

Nature trails from the Visitor Center would provide opportunities for wildlife-dependent recreation as described in the Assabet River NWR Final CCP. Additionally opportunities for fishing and wildlife observation will be available at Puffer Pond, which is located approximately 1/4 mile from the site. We would develop an overlook on the southern portion of Puffer Pond and a parking area on the east side adjacent to the fishing pier and non-motorized boat launch that are described in the CCP. Additional information about the opportunities for wildlife-dependent recreation and the associated impacts is available in the Draft CCP/EA for Assabet River, Great Meadows, and Oxbow NWRs, as well as the Assabet River NWR Final CCP.

Portions of this alternative are modifications to the CCP that was completed in January 2005. For example, we included a prohibition on bicycling on the refuge in the CCP. In this EA and the attached compatibility determination, we examine the impacts of bicycling. Additionally, we have added a short trail (200 yards) to provide direct access to the Visitor Center site. The addition of this small trail will not change the impacts that were described in the Draft CCP/EA.

Alternative D: Assabet River NWR: Hudson Road

This site is located on Assabet River NWR adjacent to Hudson Road in the town of Sudbury. There is an existing trail network at the site that currently provides access to wildlife observation and photography opportunities on the refuge.

Access to the site would be from Hudson Road, on a relatively flat parcel of land. The building would be visible from Hudson Road and would be approximately 200 yards from the entrance. This site is at the southern end of the northern portion of the refuge. It would be approximately 8/10 of a mile from Puffer Pond and the associated wetlands.

Utilizing this previously disturbed site would enable the Service to reduce the amount of tree removal and new soil disturbance that would be required. Parking would be provided adjacent to the building. This site is the closest site to utility poles and the water main that runs along Hudson Road. Vehicular and bicycle access from the East and North Gates would be similar to that described in Alternative C.

Elements Common to Alternatives B, C, and D

Each of the alternatives, as described, would utilize the design for the "Stand Alone Visitor Center" of the Service's standard design Suite of Facilities. The Service will reduce architectural and engineering costs by utilizing this standard design. The footprint of the building is approximately 6,670 square feet. Parking facilities would be constructed to accommodate approximately 60 cars and 5 buses, as well as an area for bicycle parking. The facility is designed to handle a maximum capacity of 100,000 visitors per year.

We will conduct archaeological investigations, if needed, prior to ground disturbing activities. We will catalog any identified pre-historic or historic artifacts that are discovered as a part of the investigation. Following the appropriate investigation, we will remediate as appropriate.

In the CCP and hunt plan for Assabet River and Great Meadows NWRs, we outline a hunting program on the refuge. The details of the hunt program are available in either of these documents. We may need to alter the hunting program to ensure the safety of all visitors and to maintain a high quality hunting experience on the refuge.

Alternative Selection

Staff developed additional criteria to assist in the selection of the proposed action. The 12 criteria concern a variety of aspects of outreach and the visitor experience. Table 1 indicates the various criteria and final rankings of the Visitor Center sites. Based upon the criteria outlined, the Assabet River NWR sites offer similar advantages and disadvantages. One of the attributes that made the Hudson Road site less appealing was the noise from vehicles traveling along Hudson Road. The Craven Lane site is far enough away from Hudson Road to offer a more natural, wildlife-oriented experience.

Table 1: Siting criteria for the Complex Visitor Center

Criteria	Values (points)	Alternative		
		B	C	D
Accommodates building footprint and a variety of interpretive and environmental education program activities adjacent to the building	More than 50 acres (10 points)	5	10	10
	8 to 50 acres (5 points)			
	Less than 8 acres (1 point)			
Viewshed from the facility	View is predominantly natural and has water view (10 points)	10	5	5
	View is predominantly natural (5 points)			
	View has a combination of natural and man-made features (1 point)			
Access to a numbered route	Within 1 mile (10 points)	10	5	5
	1 to 5 miles (5 points)			
	More than 5 miles (1 point)			
Boat access to water feature for administrative and outreach purposes	Shore access (10 points)	1	5	1
	Within ¼ mile (5 points)			
	More than ¼ mile (1 point)			
Minimize impacts to neighbors	No residences within 1 mile of the site (10 points)	5	5	10
	Residences between ¼ to 1 mile of the site (5 points)			

Criteria	Values (points)	Alternative		
		B	C	D
	Residences within ¼ mile of site (1 point)			
Biologically sensitive areas	Sensitive areas are greater than ½ mile away (10 points)	0	0	0
	Sensitive areas are between ¼ and ½ mile from the site (5 points)			
	Sensitive areas are within ¼ mile of the site (0 points)			
Disturbance for construction	On existing disturbed site, requiring minimum grading and fill (10 points)	0	10	10
	On existing or partially disturbed site, but requires some removal/addition of material (5 points)			
	On undisturbed site, significant removal/addition and grading of material (0 points)			
Opportunity to interpret and educate on diverse habitats	Greater than 4 habitat types exist within 1/2 mile walking distance (10 points)	10	10	5
	2-4 habitat types exist within 1/2 mile walking distance (5 points)			
	1 habitat type within 1/2 mile walking distance (1 point)			
Topography	Some elevation differences, but facilitates educational and interpretive programming (10 points)	0	10	10
	Little or no elevation issues to impair accessibility/programming (5 points)			
	Location has significant accessibility/programming issues (0 points)			
Flood plain	Construction site and infrastructure improvements completely outside 100-year flood plain (10 points)	5	10	10

Criteria	Values (points)	Alternative		
		B	C	D
	Construction site outside 100-year flood plain; infrastructure improvements within 100-year flood plain (5 points)			
	Site completely within 100-year flood plain (0 points)			
Connection to adjacent conservation lands/trail network	Site is within ¼ mile of adjacent conservation land/existing trail network (10 points)	10	10	10
	Site is ¼ to 1 mile from adjacent conservation land/existing trail network (5 points)			
	Site is more than 1 mile from adjacent conservation land/existing trail network (1 point)			
Noise	Site has little or no road noise (10 points)	5	10	0
	Site has discernible road noise that is seasonal or low-level (5 points)			
	Site has consistent, high levels of road noise (0 points)			
Total		61	90	76

Chapter 3: Affected Environment

Introduction

Sites that have been chosen for detailed analysis are located on lands of Assabet River NWR and Great Meadows NWR. The proximity of the alternative sites is such that many of the physical and biological resources are similar.

The sites are on refuge lands in Sudbury and Wayland, approximately 15 to 25 miles west of Boston. They are surrounded by refuge, residential, and additional conservation lands. The area surrounding the refuges has a long history of conservation as witnessed by the thousands of acres of adjacent conservation land administered by a variety of state, local, non-profit and private landowners. The refuges provide opportunities to serve as an outdoor classroom for local schoolchildren, as well as those from Boston and Worcester, and at times offers programs for visitors.

There are numerous wetland areas scattered throughout the refuges and each is prominently associated with natural water features. The refuges provide significant habitat for migrating and resident wildlife. Along with providing habitat to numerous species considered threatened or endangered by the state of Massachusetts, the refuges include several rare wetland types and a number of vernal pools, which are considered to be habitats of special concern.

Great Meadows NWR: Wolbach Farm Site

Geology and Soils

The Wolbach Site consists of a variety of soil types moving from the Sudbury River floodplain to an upland knoll. Along Route 27 and Water Row, Freetown Muck soils are the lowest lying soils on the site. The adjacent field consists of Merrimac fine sandy loam. The topography of the area rises to a pine knoll at the back of the site, where the soils are Charlton Hollis Rock Outcrop Complex.

Vegetation and Habitat Types

The majority of the site consists of a grassland field. Additionally, at the back of the site a stand of white pine dominates the knoll that rises away from the field. The east side of the site between the knoll and Water Row Road contains an emergent marsh.

Wildlife Resources

Migratory Birds

The site provides a mix of wetland, upland field, and forested habitats. This combination provides excellent habitat for a variety of bird species year-round.

Some of the songbird species that likely nest, feed, and rest at the site include marsh wren (*Cistothorus palustris*), gray catbird (*Dumetella carolinensis*), yellow warbler (*Dendroica petechia*), red-winged blackbird (*Agelaius phoeniceus*), swamp sparrow (*Melospiza georgiana*), common yellowthroat (*Geothlypis trichas*), yellow rumped warbler (*Dendroica coronata*), and northern mockingbird (*Mimus polyglottos*).

Marsh and water birds use the wetland adjacent to the site. The most common are great blue heron (*Ardea herodias*), great egret (*Ardea alba*), Virginia rail (*Rallus limicola*), and green heron (*Butorides virescens*). Less common species found at wetlands on the refuge include sora rail (*Porzana carolina*), and American bittern (*Botaurus lentiginosus*). The least bittern (*Ixobrychus exilis*), also a state listed endangered species, nests at the site.

Refuge staff conduct annual surveys of marshbirds on the refuges of the Complex. The survey points are scattered among the refuges. Each of the sites is visited 3 – 5 times per year. One of the survey points is located in the wetland adjacent to the Wolbach site. Staff visited this site 4 times during 2005 and compiled a list of bird species that were found during the year. Results of this compilation are found in Table 2. The Wolbach Site hosts 34 species. Refuge staff are very familiar with this site, which is important for hooded mergansers and wood ducks during the spring and for green herons, Virginia rails, black crowned night herons, teal and other ducks in the fall. Great blue heron nesting activity has decreased over the past few years with 9 nests in 2003 and 3 nests in 2005.

Table 2. Breeding and marshbird species in the vicinity of the Wolbach site (data from marshbird surveys)

Species	Common Name
<i>Agelaius phoeniceus</i>	Red-winged Blackbird
<i>Aix sponsa</i>	Wood Duck
<i>Anas platyrhynchos</i>	Mallard
<i>Bombycilla cedrorum</i>	Cedar Waxwing
<i>Branta canadensis</i>	Canada Goose
<i>Cardinalis cardinalis</i>	Northern Cardinal
<i>Carduelis tristis</i>	American Goldfinch
<i>Ceryle alcyon</i>	Belted Kingfisher
<i>Charadrius vociferus</i>	Killdeer
<i>Corvus brachyrhynchos</i>	American Crow
<i>Dendroica petechia</i>	Yellow Warbler
<i>Dumetella carolinensis</i>	Gray Catbird
<i>Empidonax minimus</i>	Least Flycatcher
<i>Geothlypis trichas</i>	Common Yellowthroat
<i>herodias</i>	Great Blue Heron
<i>Icterus galbula</i>	Baltimore Oriole
<i>Melospiza georgiana</i>	Swamp Sparrow
<i>Melospiza melodia</i>	Song Sparrow
<i>Parus atricapillus</i>	Black-capped Chickadee
<i>Parus bicolor</i>	Tufted Titmouse

Species	Common Name
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak
<i>Picoides pubescens</i>	Downy Woodpecker
<i>Picoides villosus</i>	Hairy Woodpecker
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher
<i>Quiscalus quiscula</i>	Common Grackle
<i>Rallus limicola</i>	Virginia Rail
<i>Seiurus noveboracensis</i>	Northern Waterthrush
<i>Sitta carolinensis</i>	White-breasted Nuthatch
<i>Sturnus vulgaris</i>	European Starling
<i>Tachycineta bicolor</i>	Tree Swallow
<i>Turdus migratorius</i>	American Robin
<i>Tyrannus tyrannus</i>	Eastern Kingbird
<i>Vireo gilvus</i>	Warbling Vireo
<i>Zenaida macroura</i>	Mourning Dove

Mammals

No formal surveys or inventories have been conducted on the site for mammals. However, many mammal species are likely to use the site: Virginia opossum (*Didelphis virginiana*), several shrew species (*Sorex spp.* and *Blarina spp.*), chipmunks (*Tamias striatus*), eastern gray squirrel (*Sciurus carolinensis*), flying squirrel species (*Glaucomys spp.*), white tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethica*), mink (*Mustela vison*), eastern coyote (*Canis latrans*), red fox (*Vulpes vulpes*), fisher (*Martes pennanti*) and American beaver (*Castor canadensis*).

Reptiles and Amphibians

Comprehensive inventories of many of the amphibian and reptile species have not been conducted at this site. We conduct an anuran call-count survey at this site a number of times during the field season. There are 3 survey points in the vicinity of this site. The survey is part of a standardized study being conducted on several refuges in the Service's northeast region. The survey is designed to identify frog and toad species of the refuge and monitor their populations. Frog and toad species at this site include green frog (*Rana clamitans cl.*), bullfrog (*Rana catesbiana*), northern spring peeper (*Pseudacris crucifer*), pickerel frog (*Rana palustris*), gray tree frog (*Hyla versicolor*), northern leopard frog (*Rana pipiens*), wood frog (*Rana sylvatica*), pickerel frog (*Rana palustris*) and American toad (*Bufo americanus*).

Reptile species found on the refuge include snapping turtle (*Chelydra serpentina*), state-listed Blanding's turtle (*Emys blandingii*), eastern box turtle (*Terrapene carolina carolina*), common garter snake (*Thamnophis sirtalis*), eastern ribbon snake (*Thamnophis sauritus*), and northern water snake (*Nerodia sipedon*). For a complete list of amphibians and reptiles, see Appendix D of the Great Meadows NWR Final CCP (USFWS 2005a).

Threatened and Endangered Species

No federal-listed endangered or threatened species reside on the refuge. As a part of the CCP development process, refuge staff developed comprehensive lists of species found at Great Meadows NWR. In correspondence dated September 3, 2003 the Massachusetts Division of Fish and Game provided a list of state-listed rare species that have been documented at Great Meadows NWR. This list is found in Table 3. In researching specific sites for possible Visitor Center siting, refuge staff also reviewed the Massachusetts Natural Heritage Atlas (NHESP 2003). The Wolbach site is located within an area of designated priority habitat.

Table 3. State-protected rare species in the vicinity of Great Meadows NWR

Scientific Name	Common Name	State Status
<i>Ambystoma laterale</i>	Blue Spotted Salamander	Special Concern
<i>Bolboschoenus fluviatilis</i>	River Bulrush	Special Concern
<i>Botaurus lentiginosus</i>	American Bittern	Endangered
<i>Clemmys guttata</i>	Spotted Turtle	Special Concern
<i>Cyperus engelmannii</i>	Engelmann's Umbrella-Sedge	Threatened
<i>Emydoidea blandingii</i>	Blanding's Turtle	Threatened
<i>Gallinula chloropus</i>	Common Moorhen	Special Concern
<i>Ixobrychus exilis</i>	Least Bittern	Endangered
<i>Rallus elegans</i>	King Rail	Endangered
<i>Viola brittoniana</i>	Britton's Violet	Threatened

Cultural Resources

The area is rich in historic and prehistoric activity. Known cultural resources indicate that undiscovered archaeological resources may exist on the property.

Special Designations

Wild and Scenic River Designation

In April 1999, Congress included 29 miles of the Sudbury, Assabet, and Concord rivers within the National Wild and Scenic Rivers System, in recognition of their outstanding ecology, scenery, recreation value, and their place in American history and literature. Those 29 miles are further sub classified as 14.9 miles scenic and 14.1 miles recreational. The refuge is located along some of the 14.9 miles classified as scenic on the Sudbury River and along some of the 8-mile segment of the Concord River designated as recreational. Adjacent to the Wolbach site, the Sudbury River is classified as scenic.

Important Bird Area

Portions of Great Meadows NWR are included in the designated Sudbury Valley Important Bird Area (IBA). IBAs provide essential habitat for at least one or more

species of breeding, wintering or migrating birds. The program highlights these important areas, but is not regulatory in nature. The primary goals of the program are listed below.

- “To identify, nominate and designate key sites that contribute to the preservation of significant bird populations or communities.
 - To provide information that will help land managers evaluate areas for habitat management or land acquisition.
 - To activate public and private participation in bird conservation efforts.
 - To provide education and community outreach opportunities.”
- (<http://www.massaudubon.org/birds & beyond/iba/iba intro.html>)

Assabet River NWR: Craven Lane and Hudson Road

Geology and Soils

Each of these sites has been previously disturbed to some extent. Buildings have been removed and access roads are adjacent to each site. In addition to the disturbed soils, at the Hudson Road site there is a wetland area adjacent to the site that consists of Scarboro muck, fine loamy sand. To the north there are Windsor loamy sands that would be appropriate for a septic system. (Pinney 2005)

The soil survey for Middlesex County indicates that the boundary of three map units is in the vicinity of the Craven Lane Site. The site contains udorthents, along with Carver and Paxton soils (USDA 2005).

The agreement between the U.S. Army and the Service that resulted in the transfer of the former “Sudbury Annex” imposed institutional controls if ground disturbance occurs 4 feet below ground. The U.S. Army completed an Ordnance and Explosives (OE) Survey/Removal Action in 1998 covering the entire refuge to determine if explosives or ordnance existed on the site. No OE was discovered and there is no evidence that OE or OE-related material is located on the refuge. Nevertheless, there is a small possibility that unexploded ordnance could be located at either site. The U.S. Army will not assume responsibility for OE clearance or removal located more than 4 feet below the ground surface.

Additionally, arsenic has been found in the soils at the Craven Lane site but has not been detected in groundwater (ABB Environmental Service, Inc., 1995). Arsenic-based herbicides were applied in the vicinity of the fence line along Patrol Road. The Army concluded, after completing a facility-wide investigation, that the resulting concentrations of arsenic in the soil did not pose an unacceptable risk to human health or the environment. An existing 50-foot buffer along the fence line along Patrol Road has a restriction on residential habitation. The Craven Lane site is just outside this buffer area. Use of either Assabet River NWR sites for a Visitor Center is not precluded by the Transfer Agreement.

Vegetation and Habitat Types

The area at each of these sites is mainly grassland. At the edges of each of the fields, there are stands of white pine and mixed hardwoods. The trails that are proposed for bicycle access are bordered mainly by white pine forest. The existing access road that is used by Service personnel passes through a wetland east of Puffer Pond. Dr. David Hunt conducted a floristic survey of the entire refuge area in 1992. We reviewed the report and found no historic evidence of rare plant species or unique habitat types at either site. The access road that connects Craven Lane and White Pond Road passes through a red pine (*Pinus resinosa*) stand. Dr. Hunt strongly suspected that these trees were planted and are not naturally occurring.

Wildlife Resources

Migratory Birds

Refuge staff conduct annual surveys of breeding birds on the refuges of the Complex. The survey points are scattered among the refuges. Two of the survey points are in the vicinity of the Hudson Road site, while there are 3 points at or close to the Craven Lane site. Staff compiled a list of bird species that were found at these points over the last 3 years. Results of this compilation are found in Table 4. The Craven Lane site hosts 25 species, while the Hudson Road site has 20 known species. Other species have been documented on the refuge and should occur at or near these sites, but have not been documented during the breeding bird surveys.

Table 4. Breeding bird species in the vicinity of the Assabet NWR sites

Species	Common Name	Craven Lane	Hudson Road
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	●	
<i>Bubo virginianus</i>	Great Horned Owl		●
<i>Cardinalis cardinalis</i>	Northern Cardinal	●	
<i>Carduelis tristis</i>	American Goldfinch	●	●
<i>Catharus fuscescens</i>	Veery	●	●
<i>Catharus guttatus</i>	Hermit Thrush	●	
<i>Colaptes auratus</i>	Northern Flicker	●	
<i>Corvus brachyrhynchos</i>	American Crow		●
<i>Cyanocitta cristata</i>	Blue Jay	●	●
<i>Dendroica pinus</i>	Pine Warbler	●	●
<i>Dendroica virens</i>	Black-throated Green Warbler	●	
<i>Dumetella carolinensis</i>	Gray Catbird		●
<i>Geothlypis trichas</i>	Common Yellowthroat	●	●
<i>Hylocichla mustelina</i>	Wood Thrush	●	●
<i>Icterus galbula</i>	Baltimore Oriole	●	●
<i>Molothrus ater</i>	Brown-headed Cowbird	●	●
<i>Parus atricapillus</i>	Black-capped Chickadee	●	●
<i>Parus bicolor</i>	Tufted Titmouse	●	●
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	●	●
<i>Piranga olivacea</i>	Scarlet Tanager	●	●

Species	Common Name	Craven Lane	Hudson Road
<i>Quiscalus quiscula</i>	Common Grackle	●	
<i>Sayornis phoebe</i>	Eastern Phoebe		●
<i>Seiurus aurocapillus</i>	Ovenbird	●	●
<i>Sitta canadensis</i>	Red-breasted Nuthatch	●	
<i>Spizella passerina</i>	Chipping Sparrow	●	●
<i>Turdus migratorius</i>	American Robin	●	●
<i>Tyrannus tyrannus</i>	Eastern Kingbird	●	
<i>Vireo olivaceus</i>	Red-eyed Vireo	●	●
<i>Zenaida macroura</i>	Mourning Dove	●	

More information about bird species on the refuge is available in the Assabet River NWR Final CCP (USFWS 2005b).

Mammals

Comprehensive surveys for mammal species have not yet been conducted at the sites. Several shrew species, chipmunks, eastern gray squirrel, flying squirrel species, white tailed deer, eastern coyote, and red fox are some of the species believed to use the sites.

In December, 2002, The Friends of the Assabet River NWR received a grant from Sudbury Foundation for training 17 team members with researcher Sue Morse of Keeping Track VT. The Assabet Keeping Track (AKT) received training in identifying track and sign of nine focal species and in establishing and running a baseline wildlife monitoring program on the Assabet River NWR. Some of the information that they have collected is directly relevant to these sites. On the western side of Puffer Pond, AKT has consistently found evidence of use by mink, fisher, and river otter (*Lutra canadensis*).

Additional information about mammal species on the refuge is available in the Assabet River NWR Final CCP (USFWS 2005b).

Reptiles and Amphibians

Comprehensive surveys of amphibians and reptiles have not yet been completed at the refuge. However, the refuge staff initiated an annual call-count survey for anuran species (frogs and toads) in 2000. The survey is part of a standardized study being conducted on several refuges in the Service's northeast region. There are 9 survey points on the refuge that could be impacted by the construction of the visitor center or changes to the amount of visitation. The survey is part of a standardized study being conducted on several refuges in the Service's northeast region. The survey is designed to identify frog and toad species of the refuge and monitor their populations. Frog and toad species at this site include green frog (*Rana clamitans cl.*), bullfrog (*Rana catesbiana*), northern spring peeper (*Pseudacris crucifer*), pickerel frog (*Rana palustris*), gray tree frog (*Hyla versicolor*), northern leopard frog (*Rana pipiens*), wood frog (*Rana sylvatica*), pickerel frog (*Rana palustris*) and American toad (*Bufo americanus*).

Elsewhere on the refuge, Aneptek (1991) inventoried amphibians and reptiles within the habitats surrounding the former Taylor Drop Zone during June and July of that year. Three reptilian and seven amphibian species were recorded during their surveys. In addition, Meyer and Montemerlo (1995) surveyed the portion of the refuge south of Hudson Road for amphibian and reptilian species in June and July of that year.

One state-listed amphibian, the blue spotted salamander (*Ambystoma laterale*), and three state-listed reptilian species (see Table 5), one of which is state threatened, have been reported from the refuge to date. More information about reptile and amphibian species on the refuge is available in the Assabet River NWR Final CCP (USFWS 2005b).

Threatened and Endangered Species

With the exception of occasional, wintering bald eagles, no federal listed threatened or endangered species are currently known from the Assabet River NWR. The Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries and Wildlife provided information in 2004 about the state-protected rare species that are found in the vicinity of Assabet River NWR. These species are listed in Table 5. In researching specific sites for possible Visitor Center siting, refuge staff also reviewed the Massachusetts Natural Heritage Atlas (NHESP 2003). Neither the Hudson Road nor the Craven Lane site is located within an area of designated priority habitat.

Table 5. State-protected rare species in the vicinity of Assabet River NWR

Scientific Name	Common Name	State Status
<i>Ambystoma laterale</i>	Blue Spotted Salamander	Special Concern
<i>Clemmys guttata</i>	Spotted Turtle	Special Concern
<i>Emydoidea blandingii</i>	Blanding's Turtle	Threatened
<i>Terrapene Carolina</i>	Eastern Box Turtle	Special Concern
<i>Carex oligosperma</i>	Few-fruited Sedge	Endangered
<i>Liatris borealis</i>	New England Blazing Star	Special Concern
<i>Panicum philadelphicum</i>	Philadelphia Panic Grass	Special Concern
<i>Spiranthes vernalis</i>	Grass-leaved Ladies-tresses	Threatened

Cultural Resources

The area is rich in historic and prehistoric activity. Prehistoric sites have been identified on the refuge. Known cultural resources indicate that undiscovered archaeological resources may exist on the property. An assessment of the refuge conducted in 2003 determined that there are cultural resources with integrity and association representative of the World War II period of military occupation which might make the refuge a potential National Register eligible historic district (Reed 2003).

Special Designations

Important Bird Area

Assabet River NWR has been designated as a Massachusetts Important Bird Area (IBA) for its rare and unique habitat communities, including Atlantic white cedar swamp, a kettlehole pond, several dwarf shrub bogs, open canopy minerotrophic peatlands, and other sand communities. IBAs provide essential habitat for at least one or more species of breeding, wintering or migrating birds. The primary goals of the program are listed below.

- “To identify, nominate and designate key sites that contribute to the preservation of significant bird populations or communities.
 - To provide information that will help land managers evaluate areas for habitat management or land acquisition.
 - To activate public and private participation in bird conservation efforts.
 - To provide education and community outreach opportunities.”
- (<http://www.massaudubon.org/birds-&-beyond/iba/iba-intro.html>)

Chapter 4: Environmental Consequences

Introduction

In this section, we analyze and describe the environmental consequences likely to result from building the Visitor Center at each of the alternative sites that are described. This section of the environmental assessment forms the scientific and analytical basis for comparisons of the alternatives.

Both indirect and direct effects are predicted for the foreseeable future. In the following discussion, the terms “positive”, “negative”, and “neutral” are used frequently as qualitative measures of how an action would likely affect resources of concern. In some of our discussions below, we are not able to quantify the effect. A “positive effect” means that the actions are predicted to enhance or benefit the resources under consideration and work towards accomplishing goals and objectives over the short or long term. A “negative effect” means that the actions are predicted to be detrimental to a resource over the short or long term, and work against achieving goals and objectives. A “neutral effect” means either a) there would be no discernible effect, positive or negative, on the resources under consideration; or B) predicted positive and negative effects cancel each other out.

No Action Alternative

Under the No Action alternative, since the Visitor Center would not be constructed, there would be very few impacts, positive or negative. There would be no impacts to geologic resources, vegetation, or wildlife.

The existing public facilities at the Complex headquarters building would continue to be the only staffed Complex facility within 75 miles. The existing space is limited and the exhibits are in need of updating. Opportunities for environmental education would be limited to the headquarters site and existing outdoor classroom facilities. Meeting and office space would be limited to the existing space at the headquarters, as well.

Alternative B: Wolbach

Geologic Resources

Ground disturbing activities associated with septic system and building excavation would require the removal of soil and rock in the construction zone. These materials would be moved to a suitable location nearby. Erosion fencing would be put into place to ensure that disturbed soils are not carried onto areas adjacent to the construction zone. Impacts to the construction zone, where the building, parking areas and associated infrastructure such as stormwater detention basins are located, would be

permanent as the structure will remain in place for many years. Activities that will occur at the site would have no impact on soils outside the construction footprint.

Vegetation

Some vegetation removal would be required for access and site construction. Site clearing for access to the construction area and temporary construction offices would be required. Impacts to the area adjacent to the construction site would be temporary, as these areas would be able to regenerate after construction is completed. Impacts to the building site, including adjacent parking and stormwater facilities would require permanent removal of some vegetation. Site clearing would be restricted to the smallest footprint possible.

Activities associated with the Visitor Center would have minor effects on vegetation for trail maintenance and necessary building and grounds maintenance.

The land clearing would occur on an area that consists primarily of grassland. Some removal of white pine would be necessary to accommodate the building and parking lots.

Wetlands

The access road at the Wolbach site would require a small amount of fill in the existing wet meadow to reach the upland portion of the site. In addition, there would be impacts to the wet meadow at the base of the site. Hydric soils to the west of Water Row would need to be raised and filled to re-align the intersection of Water Row and Route 27. The Service would need to obtain permits from the Massachusetts Department of Environmental Protection and the Army Corps of Engineers under Section 404 of the Clean Water Act. Re-alignment of the intersection would increase motorist safety.

Wildlife

Construction of the Visitor Center would replace existing grassland, wetland, and a small piece of white pine wildlife habitat. The loss of habitat would have minor impacts to migratory songbirds, mammals, reptiles and amphibians, as they are displaced. Continued impacts to wildlife include human-animal interactions that cause flushing or other avoidance behaviors by wildlife. After construction of a wildlife observation trail along the west side of the wetland, individuals and groups walking on the trail could impact bird species that use the marsh, particularly during the breeding season. Continued use by visitors in the vicinity of the emergent marsh could impact nesting success of great blue herons here. Of the sites reviewed in this document, the Wolbach site has the greatest habitat diversity and therefore could impact the largest number of individual bird species.

Endangered Species

There are no known occurrences of federal listed threatened or endangered species at this site. Therefore, the construction and operation of the Visitor Center will have no effect on Federal-listed endangered species. The Wolbach site is contained within an area that the State of Massachusetts Natural Heritage and Endangered Species Program has designated as Priority Habitat for Rare Species in Massachusetts. Potential impacts to the rare species include habitat loss and degradation at the Visitor Center site and disturbance caused by increased use of the area.

Cultural Resources

The Service will conduct a phase I survey, if necessary, as a part of the design of the Visitor Center. The survey will help ensure that cultural resources are either not disturbed or impacts to resources are minimized and mitigated.

Recreation

The Visitor Center would be designed to provide opportunities for appropriate recreational opportunities. We would develop trails to enhance opportunities for wildlife observation and photography. Visitors to the Visitor Center would receive a positive benefit from the enhanced exhibits and nature trail opportunities.

Socio-economics

The local communities could receive a positive impact from the increased tourism and associated revenue to local businesses. Increased traffic to the area is not expected to cause a negative impact, because the increase should not be large in relation to the amount of traffic that currently uses the local roads. A re-alignment of Water Row would be pursued to facilitate safe access from Route 27.

Alternative C: Craven Lane

Geologic Resources

Ground disturbing activities associated with septic system and building excavation would require the removal of soil and rock in the construction zone. These materials would be moved to a suitable location nearby. Erosion fencing would be put into place to ensure that disturbed soils are not carried onto areas adjacent to the construction zone. This site is fairly level and would not require additional major earthwork. Impacts to the construction zone, where the building, parking areas and associated infrastructure such as stormwater detention basins are located, would be permanent as the structure will remain in place for many years. Activities that will occur at the site would have no impact on soils outside the construction footprint.

Both site assessment work – such as drilling soil borings – and construction such as pipe laying or foundation work, will require drilling more than 4 feet below the surface.

We will work with the U.S. Army Corps of Engineers to ensure that we take the necessary precautions for the potential clearance or removal of ordnance and explosives (if present) from the site.

Vegetation

Some vegetation removal would be required for access and site construction. Some white pines and oaks would be removed. This construction site was formerly occupied by support buildings for the Sudbury Annex of Fort Devens. Some site clearing for access to the construction area and temporary construction offices would be required. Impacts to the area adjacent to the construction site would be temporary, as these areas would be able to regenerate after construction is completed. Impacts to the building site, including adjacent parking facilities and stormwater detention facilities, would require permanent removal of some vegetation. Site clearing would be restricted to the smallest footprint possible.

Some vegetation that has encroached on Craven Lane from Hudson Road to the proposed site will be removed. The two-lane road is in disrepair and will be regraded and resurfaced to improve visitor safety. A walking and bicycle path will be constructed to the east of the road to facilitate pedestrian use and safe cycling.

Activities associated with the Visitor Center would have minor effects on vegetation for trail maintenance and necessary building and grounds maintenance.

The land clearing would occur on an area that consists primarily of grassland or fill material from the removal of previous buildings.

Wetlands

There would be no impact to wetlands at the building site. A small wetland is located to the east of the site but construction will occur beyond the wetland buffer. The Service would improve the access road from the East Gate to the Visitor Center site to allow year-round use. This improvement would require new culverts that would allow better water exchange from one side of the existing road to the other. The Service would also utilize animal crossings in the form of tunnels. The improved flow would provide a positive impact to the wetland vegetation and the animal crossings would reduce impacts of increased vehicle and bicycle use on amphibians, reptiles, and mammals.

Wildlife

Construction of the Visitor Center would replace a small amount of existing grassland wildlife habitat. Due to the small size, the loss of habitat would have only very minor impacts to migratory songbirds, mammals, reptiles and amphibians, as they are displaced to other locations on the refuge.

Map 4-1 in the Assabet River NWR CCP depicted a visitor contact station on or near Craven Lane. The Visitor Center will be a larger facility than a visitor contact station, and, because of the exhibits and programs offered, will draw more visitors, thereby increasing the likelihood of disturbance to wildlife. Pedestrian access was described in the CCP. No new trails, except a 200-yard extension of a service road off Puffer Road, will be opened on the refuge. However, it is anticipated that more people will walk these trails as a result of Visitor Center construction, and there will be an increased amount of disturbance along the trails to wildlife. Continued impacts to wildlife include human-animal interactions that cause flushing or other avoidance behaviors by wildlife. Greater visitation will also increase habituation to human use by certain wildlife species.

Bicycle access will be restricted to a few trails that are already opened for walking. Automobile access will increase, but will be restricted to the Craven Lane and Puffer Pond area. Automobiles could have minor negative impacts on birds and other wildlife that could exhibit avoidance behaviors as these vehicles approach on the access roads and access trails. Occasionally, it is possible that an animal will be killed or injured by cars or bicycles, as the animal crosses the roadway. Such events would most likely be infrequent. Speed limits would be low to reduce mortality.

Threatened and Endangered Species

There are no known occurrences of federal listed threatened or endangered species at any of the sites. The site is not located within priority habitat for state-listed rare species. The construction and subsequent visitation are not likely to impact state- or federal-listed species.

Cultural Resources

The Service will conduct a phase I survey, if necessary, as a part of the design of the Visitor Center. The survey will help ensure that cultural resources will not be disturbed or impacted. Since the site was previously developed, the likelihood of archaeological resource impacts is low. Craven Lane was identified by Reed (2003) as contributing to the potentially-eligible historic district on the refuge. There will be no impacts to Craven Lane that should affect its contribution to a potential historic district, if one is recommended by the Service.

Recreation

The Visitor Center would be designed to provide opportunities for appropriate recreational opportunities. We would complete the phased opening of trails to enhance opportunities for wildlife observation and photography, as outlined in the Assabet River NWR CCP. Visitors to the Visitor Center would receive a positive benefit from the enhanced exhibits and nature trail opportunities. Allowing bicycles on certain roads and trails for access to wildlife dependent recreation opportunities would allow individuals easier access to locations that are further from the planned parking lots on the refuge.

After the Visitor Center is built, we will likely modify the hunting zones on the refuge. A change to the hunt areas would reduce potential conflicts between hunting and wildlife observation or environmental interpretation. It would also ensure a quality hunting experience by creating a buffer between the user types. It is likely that hunting opportunities may be slightly reduced on the refuge.

Socio-economics

The local communities could receive a positive impact from the increased tourism and associated revenue to local businesses. Increased traffic to the area is not expected to cause a negative impact, because the increase should not be large in relation to the amount of traffic that currently uses the local roads. The majority of visitors will arrive at the Visitor Center from the main entrance to the refuge on Hudson Road in Sudbury. Once improvements are made to Old Marlborough Road (Craven Lane) from the East Gate, electric gates will be installed and opened only during the hours the Visitor Center is in operation. Additionally, traffic slowing devices and barriers will be installed to slow vehicles and to prevent cross-through traffic on the refuge.

Alternative D: Hudson Road

Geologic Resources

Ground disturbing activities associated with septic system and building excavation would require the removal of soil and rock adjacent to the construction zone. These materials would be moved to a suitable location nearby. Erosion fencing would be put into place to ensure that disturbed soils are not carried onto areas adjacent to the construction zone. This site is level and would not require additional major earthwork. Impacts to the construction zone where the building, parking areas and associated infrastructure such as stormwater detention basins are located, would be permanent as the structure will remain in place for many years. The soils in the vicinity of the site are not suitable for a septic system, which would require that the Service install a pump system to transport waste from the site to a suitable septic location. The Service would locate the septic at the closest appropriate site to minimize ground disturbance. Activities that will occur at the site would have no impact on soils and rocks outside the construction footprint.

Both site assessment work – such as drilling soil borings – and construction such as pipe laying or foundation work, will require drilling more than 4 feet below the surface. We will work with the U.S. Army Corps of Engineers to take the proper actions necessary to ensure the clearance or removal of ordnance and explosives (if present) from the site.

Vegetation

Some vegetation removal would be required for access and site construction. Site clearing for access to the construction area and temporary construction offices would be

required. Impacts to the area adjacent to the construction site would be temporary, as these areas would be able to regenerate after construction is completed. Impacts to the building site, including adjacent parking facilities and stormwater detention, would require permanent removal of some vegetation. Site clearing would be restricted to the smallest footprint possible.

Activities associated with the Visitor Center would have minor effects on vegetation for trail maintenance and necessary building and grounds maintenance.

The land clearing would occur on an area that consists primarily of an old field and a few mixed hardwoods and conifers. The overall impact to habitat would be minimally negative.

Wetlands

There could be minor negative impact to the wetland adjacent to the site depending upon the site configuration. Some fill may be required to ensure an adequate footprint for the building and parking areas. The Service would ensure proper design to keep stormwater impacts away from the adjacent wetland areas.

Wildlife

Construction of the Visitor Center would replace a small amount of existing grass and forested wildlife habitat. The loss of habitat would have minor negative impacts to migratory songbirds, mammals, reptiles and amphibians, as they are displaced. Continued impacts to wildlife include human-animal interactions that cause flushing or other avoidance behaviors by wildlife.

Endangered Species

There are no known occurrences of federal listed threatened or endangered species at the site. The site is not located within priority habitat for state-listed rare species. The construction and subsequent visitation are not likely to impact state- or federal-listed species.

Cultural Resources

The Service will conduct a phase I survey, if necessary, as a part of the design of the Visitor Center. The survey will help ensure that cultural resources will not be disturbed or impacted.

Recreation

The Visitor Center would be designed to provide opportunities for appropriate recreational opportunities. We would develop trails to enhance opportunities for wildlife

observation and photography. Visitors to the Visitor Center would receive a positive benefit from the enhanced exhibits and nature trail opportunities.

Socio-economics

The local communities could receive a positive impact from the increased tourism and associated revenue to local businesses. Increased traffic to the area is not expected to cause a negative impact, because the increase should not be large in relation to the amount of traffic that currently uses the local roads. There would be less positive socio-economic benefit to the towns of Maynard and Stow as the majority of visitors will arrive at the Visitor Center at the Hudson Road entrance. Once improvements are made to Old Marlborough Road (Craven Lane) from the East Gate, electric gates will be installed and opened only during the hours the Visitor Center is in operation. Additionally, traffic slowing devices and barriers will be installed to slow vehicles and to prevent cross-through traffic on the refuge.

Public Comment and Review

This environmental assessment and associated compatibility determination (CD) are available for a 30-day review and comment period from January 23, 2006 through February 22, 2006.

We have also included a compatibility determination that would allow bicycling on the refuge as a means of access to the visitor center and as a connection to the existing Assabet River Rail Trail.

The EA and CD can be found at the Eastern Massachusetts National Wildlife Refuge Complex Headquarters, on-line at <http://www.fws.gov/northeast/easternmanwrcomplex/index.html>, or by contacting Bill Perry at the address below.

Individuals or groups that wish to provide comment on the EA or CD can submit comments in writing to: Bill Perry, Refuge Planner; Eastern Massachusetts National Wildlife Refuge Complex, 73 Weir Hill Road; Sudbury, MA 01776 or by email at bill_perry@fws.gov

Any questions can be directed to Bill at the above referenced addresses or by phone at 978-443-4661 ext. 32.

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Appendix A: Compatibility determination for bicycle access

COMPATIBILITY DETERMINATION

USE: Non-motorized Cycling To Facilitate Priority Public Uses

Refuge Name: Assabet River National Wildlife Refuge

Establishing Authority: Assabet River National Wildlife Refuge (NWR) was established in 2000 under an Act Authorizing the Transfer of Certain Real Property for Wildlife, or Other Purposes. (16 U.S.C. 667b).

Purpose: Assabet River NWR's purpose is its "...particular value in carrying out the national migratory bird management program." (16 U.S.C. 667b-d, as amended)

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is cycling to facilitate travel for priority public uses on the Assabet River National Wildlife Refuge. Priority public uses allowed on Assabet River NWR are hunting, fishing, wildlife observation and photography, environmental education, and interpretation. Cycling would not likely support hunting, but could support the remaining priority uses. Cycling itself is not a priority public use.

(b) Where would the use be conducted?

Cycling would be allowed on designated roads and trails on the refuge. These would be designated as travel routes for bicycles to access the proposed visitor center and certain wildlife observation points on the refuge, including but not limited to the proposed overlook at Puffer Pond, potential wildlife observation blinds along Patrol Road and bank fishing locations on Puffer Pond. These trails are former military roads that have an appropriate width and surface for cycling. The vast majority of these existing roads are bordered by heavy vegetation. A map depicting allowed cycling routes will be posted at the refuge, on the Assabet River NWR website, and will be available at the Eastern Massachusetts NWR Complex headquarters. Trails and roads that would be opened for cycling are the Patrol Road from the East Gate westward to the Hudson Road gate, White Pond Road, Craven Lane and Old Marlborough Road.

(c) When would the use be conducted?

Designated roads and trails would be open to cycling all year until closed by snow. Snow removal is not conducted on Refuge trails. Cycling usually occurs between April and November with peak use in July through October, depending on weather. To promote safety, cycling hours will be limited to sunrise to sunset.

(d) How would the use be conducted?

Cycling to facilitate priority public uses commonly involves observing the natural landscape from a bicycle. Riders stop to observe associated animal and plant communities. The use mainly occurs in groups with an average group size of 2-4 riders. Cyclists may gather in larger groups for seasonal events like the viewing of fall colors (USFWS, 2002). To promote safety with other users and encourage a nature viewing experience, organized cycling groups will not be allowed to ride on the refuge and organized riding events of any type, including races, will not be permitted.

Travel would be limited to designated roads with paved or gravel surfaces where road width can accommodate the safe passage of other users. A paved bicycle path may be constructed on or adjacent to certain gravel roads to accommodate bicycles arriving from the adjacent Assabet River Rail Trail. Designated trails will have sufficient viewing distance for cyclists to detect the approach of other users and maneuver to accommodate them. Cyclists either enter the Refuge at public entry points or transport bicycles by vehicle and park at designated parking sites. Off road use is prohibited.

Cycling on the Refuge is currently prohibited. Cycling will be conducted in accordance with the stipulations necessary to ensure compatibility. Safety and information signs will be installed at Refuge entry points and at appropriate sites where designated roads intersect other roads and trails.

There will be several trails on the refuge that will be open for pedestrian use only. Additionally, most of the former railroad beds will remain closed to all public use and will provide access for Service vehicles only or will be allowed to revegetate.

Roads and trails will be maintained in such a manner as is practical to minimize environmental effects such as erosion and sedimentation and to provide safe conditions for travel. Roads will be monitored annually to determine if they remain appropriate and safe for cycling use.

(d) Why is this use being proposed?

Cycling on the Refuge would provide an increased opportunity for the public to participate in priority public uses. Cycling is less physically demanding than pedestrian access, is an environmentally preferable mode of transportation, provides a more expedient mode of travel to view the Refuge's diverse biological assets than foot traffic alone, and requires less maintenance to keep trails open for the public than would be necessary if vehicles were allowed. As restricted to designated roads and trails with hardened and modified surfaces, cycling would cause minimal surface disturbance. Refuge roads and trails provide exceptional opportunities to view wetland communities because they offer unrestricted views and are relatively level for easy cycling.

The refuge is adjacent to the Assabet River Rail Trail. A link between the rail trail and the refuge, including the proposed visitor center, would provide a valuable wildlife viewing opportunity to the adjacent communities.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer this use, at anticipated use levels, is available within current and anticipated refuge budgets. Staff time associated with administration of this use is related to assessing the need for road maintenance and repair, maintaining kiosks, gates, sign-posting of roads, monitoring potential impacts of the use on Refuge resources and visitors, ensuring visitor compliance, and providing information to the public about the use.

The Refuge Manager will administer the program. The Complex Outdoor Recreation Planner will be responsible for public outreach. Biological program staff will monitor the environmental effects of public access. The Park Ranger will conduct law enforcement activities to provide for visitor safety and resource protection.

A Maintenance Worker performs the maintenance and repair of Refuge roads, trails and associated structures. The refuge has a heavy equipment fleet that includes a motor grader, dump truck, bulldozer, front-end loader, 4x4 farm tractor, bobcat, and backhoe.

Annual costs associated with the administration of all trails, including those that will allow cycling, are estimated below:

Trail maintenance and repair (cleaning culverts, brush clearing), sign installation and kiosk construction and repair
WG-10 Equipment Operator for 14 work days = \$1,836.00

Planning and monitoring road conditions, supervising staff to monitor bicycle use and its effects on environment and other visitors, and

providing information to the public
GS-12 Outdoor Recreation Planner for 14 work days = \$2,553,60

Law enforcement, monitoring bicycle users and interactions with other users
GS-9 Park Ranger for 28 work days = \$3,635.2

Monitoring environmental effects of bicycle use
GS-9 Wildlife Biologist for 10 work days (monitoring) = \$1,704

Vehicle fuel / law enforcement patrols = \$210
Heavy equipment fuel = \$150

Signs, printing maps and information = \$550

Grand Total Estimated Costs = \$,10,488.8

Funding will be sought for the construction of a 4' wide bike path along portions of the Patrol Road and on other refuge roads. As outlined in this CD, the refuge would open approximately 5.25 miles of trail to bicycles. Paved bicycle trails cost approximately \$100,000 per mile.

Based on existing Refuge expenditures for managing visitor use, funding is adequate to ensure compatibility and to administer and manage the recreational use listed.

ANTICIPATED IMPACTS OF THE USE:

A literature review of potential impacts associated with cycling was completed for this use at Canaan Valley NWR in West Virginia. The information obtained from that literature was incorporated into this CD. Additional research was located for this CD. Potential and anticipated impacts of cycling as reported in the literature and through field investigations are described below:

Soil Impacts: Bicycle wheels can cause physical impacts on soil surfaces. Cessford (1995) notes the shearing action of wheels creates damage to trails, which increases when trail conditions are wet or when traveling up a steep slope. When traveling down slope, skidding with hard braking can result in loosening soil surfaces, which leads to rutting and erosion by channeling water down wheel ruts. If braking is not performed on downhill travel, the impact of tires on the slope will be much less damaging (Cessford 1995).

It is anticipated that bicycle use of designated routes will cause minor to no soil erosion and compaction. Routes designated for this use have very little elevation change with no steep grades. The designated routes are pre-existing roads that have been previously altered by vehicles and military equipment, therefore soils are generally compacted and less susceptible to physical impact and mechanical erosion. Based on the conditions of designated routes and current levels use, this activity is not likely to cause significant impacts to soils.

Plant Impacts: Bicycle use will occur on designated roads and trails that have little to no vegetation. In fact, we prefer that vegetation not grow up on these roads and trails, because vegetation that grows through the pavement can damage refuge roads. For non-paved surfaces, we would need to mow the trails as vegetation grows higher than would be appropriate for bicycling or walking. It is anticipated that bicycles will have some impacts on refuge plant communities growing on the designated travel routes. However, Thurston and Reader (2001) found no differences in impacts to vegetation between mountain biking and hiking on trails during an experiment on a provincial park in Ontario. They also found that impacts did not extend beyond 30 cm of the centerline of the trail. The designated routes were located predominately on upland soils to prevent impacts to fragile wetland soils and associated plant communities. Rare plant species have not been found on the designated routes. Based on anticipated levels of use, no significant impacts to plants are likely to occur through the use of bicycles on designated routes.

Wildlife Impacts: Human uses can result in habitat modification, pollution and create disturbances to wildlife. Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. Whittaker and Knight (1998) note that wildlife response can include attraction, habituation and avoidance. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat. The effects of trails on plants and animals are complex and not limited to trail width. A 'zone of influence' is described where trail use disturbs areas outside the immediate trail corridor (Miller et al. 2001, Trails and Wildlife Task Force 1998). Miller et al. (1998) describe a 75-meter zone of influence where bird abundance and nesting activities (including nest success) were found to increase as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where 'generalists' (American robins) were found near trails and 'specialist' species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998). Additionally, Taylor and Knight (2003) describe an area of influence of 100 meters for 4 types of ungulates. If we apply a 100-meter area of influence to the proposed bicycling trails, the area of potential impacts to wildlife species consists of 18% of the total area of the refuge. Further, there was no difference in impacts from bikers versus hikers.

Knight and Cole (1991) describe behavioral changes as a result of disturbance from recreational use. Effects range from short-term shifts in habitat use to complete

abandonment of disturbed areas in favor of undisturbed sites. Disturbance can have negative effects by increasing the energy demands on wildlife. Flight in response to disturbance can lower songbird nesting productivity and cause disease and death. Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in 'wildland' areas can dramatically change the normal behavior of wildlife mostly through 'unintentional harassment'.

Seasonal sensitivities are also important in wildlife responses to human disturbance. For example, when a species is already stressed, human disturbance can compound the effect on the animal. Examples of these disturbances would include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. This indicates increased sensitivity to human disturbance during the breeding season.

Anticipated impacts bicycle use on wildlife include temporal disturbances to species using habitat on the trail or directly adjacent to the trail. These disturbances are likely to be short term and infrequent based on anticipated levels of use and adjacent habitat types. Use of some trails may cause direct impacts such as mortality (crushing amphibians foraging on or crossing designated routes) to nest abandonment of bird species nesting on trails. There is a wetland that is bisected by Old Marlborough Road. This relatively short stretch of road is adjacent to more sensitive habitat than the rest of the proposed routes. Additional wetland species (such as turtles and waterfowl) may be impacted. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time. These impacts are expected to be minor.

User Conflicts: Conflicts between trail users are commonly reported in the literature (Knight and Gutzwiller 1995, Ramthun 1995, Watson et. al 1994, Chavez et al 1993). Conflicts range from concerns over personal safety, to conflicts among user groups.

Any effects of cycling on the roads and trails designated are not anticipated to constitute significant short-term or long-term impacts. The anticipated use is viewed as an effective and justifiable method of travel allows the public to discover, experience, and enjoy priority public uses on the 2,230-acre Refuge. Continued monitoring of the effects of cycling and associated human activities is necessary to better understand the influence of the use on refuge habitats, plant and wildlife communities, and visitors. Monitoring will identify any actions needed to respond to new information (adaptive management) and correct problems that may arise in the future.

DETERMINATION: THIS USE IS COMPATIBLE X
THIS USE IS NOT COMPATIBLE _____ (check one)

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Cycling to facilitate priority public uses is only compatible on the roads and trails designated by refuge staff. Off road cycling is prohibited.
- Only non-motorized bicycles may be used.
- Signs necessary for visitor information, safety, and traffic control will be installed.
- The Refuge will conduct an outreach program to promote public awareness and compliance with Refuge public use regulations.
- Cycling is allowed between sunrise and sunset.
- Camping and overnight parking are prohibited.
- Cycling on roads designated for vehicular travel will be permitted subject to vehicles having the right-of-way.
- To promote safety with other users and encourage a nature viewing experience, cycling by organized groups and cycling events will not be allowed.
- All routes designated for public access will be annually inspected for maintenance needs. Road and trail conditions that require immediate maintenance will be identified and appropriate action will be taken to correct such conditions. Prompt action will be taken to correct any conditions that risk public safety.
- Routes designated for public access will be monitored annually to determine if they should be continued.
- Routine law enforcement patrols will be conducted throughout the year. The patrols will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interaction. Patrols will include the routine assessment of safety conditions and visitor interactions on Refuge routes. Conditions that are or will risk public safety will be identified and appropriate action will be promptly taken to correct such conditions. Non-compliance rates will be monitored and high levels of non-compliance could result in suspension of the cycling program.

JUSTIFICATION:

This use has been determined to be compatible provided the stipulations necessary to ensure compatibility are implemented, and the use does not exceed thresholds necessary for visitor safety and resource protection. This use is not expected to materially interfere with or detract from the mission of the National Wildlife Refuge System nor diminish the purposes for which the Refuge was established, will not pose significant adverse effects on Refuge resources, will not interfere with public use of the

Refuge, nor cause an undue administrative burden.

Signature: Project Leader: _____
(Signature and Date)

Concurrence: Regional Chief: _____
(Signature and Date)

Mandatory 10-year re-evaluation date: _____

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