



U.S. Fish & Wildlife Service

Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

Comprehensive Conservation Plan

September 2013



Front Cover:

Oak Point at Sunkhaze Meadows National Wildlife Refuge
Danielle D'Auria

Back Cover:

Black Tern (Chlidonias niger) at Carlton Pond Waterfowl Production Area
Kirk Rodgers



This blue goose, designed by J.N. "Ding" Darling, has become the symbol of the National Wildlife Refuge System.

The U.S. Fish and Wildlife Service (Service) is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service manages the 150-million acre National Wildlife Refuge System comprised of more than 555 national wildlife refuges and thousands of waterfowl production areas. It also operates 70 national fish hatcheries and 81 ecological services field stations. The Service enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Wildlife and Sport Fish Restoration Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

Comprehensive Conservation Plans provide long-term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.



U.S. Fish & Wildlife Service

**Sunkhaze Meadows National
Wildlife Refuge and Carlton Pond
Waterfowl Production Area**

*Comprehensive Conservation Plan
September 2013*

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8/19/2013
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U.S. Fish & Wildlife Service

Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

Comprehensive Conservation Plan

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Vision Statement

Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area are a tapestry of natural lands within central Maine.

The Sunkhaze Meadows Unit supports an expansive, intact peat bog system. The free-flowing Sunkhaze Stream and its tributaries meander through diverse habitats including raised peat domes, grassy wet meadows, and floodplain forests before joining the restored Penobscot River. Mature upland forests surround the wetlands, protecting this unspoiled landscape for future generations of plants, animals, and people.

Bobolink and sedge wren sing and woodcock dance in the large contiguous grassland and deer overwinter in the forest mosaic comprising the Benton Unit. Wood turtles and rare mussels are protected by the wide, shaded riparian forests of the Sandy Stream Unit.

Carlton Pond Waterfowl Production Area is a beautiful wetland jewel amidst a pastoral landscape. Rare black terns nest in the emergent marsh, while bald eagles, bitterns, and marsh wrens forage amid the shallow open waters and emergent pickerelweed and wild rice.

Visitors experience wildness and find respite there throughout the year. In spring, birders observe migratory waterfowl and songbirds. Wildlife enthusiasts and anglers enjoy fishing, paddling, and hiking throughout summer. Hunters spend crisp autumn mornings stalking their prey. In winter, people snowshoe and ski through the silent woods. Through our close partnerships and programs, visitors gain further appreciation of conservation and are inspired stewards of nature.



Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

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Summary

Type of Action: Administrative—Development of a Comprehensive Conservation Plan

Lead Agency: U.S. Department of the Interior, Fish and Wildlife Service

Location: Sunkhaze Meadows National Wildlife Refuge and
Carlton Pond Waterfowl Production Area
Kennebec and Penobscot Counties, Maine

Administrative Headquarters: Maine Coastal Islands National Wildlife Refuge Complex
Rockland, ME

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This Comprehensive Conservation Plan (CCP) for the 11,876-acre Sunkhaze Meadows National Wildlife Refuge and the 1,068-acre Carlton Pond Waterfowl Production Area (WPA) is the culmination of a planning effort involving the U.S. Fish and Wildlife Service, Maine Department of Inland Fisheries and Wildlife, the Penobscot Indian Nation, the town of Milford, and the local community. This CCP establishes the 15-year management goals and objectives for the refuge and WPA's wildlife and habitats, public use programs, and administration and facilities.

This plan sets forward the management direction that we think best achieves the refuge and WPA's purposes, vision, and goals, and responds to public issues. Under this plan, we will focus on the preservation of the peatland-wetland complex and mature forest within the Sunkhaze Meadows Unit, continue shrubland habitat management at the Sandy Stream Unit, expand grassland management at the Benton Unit, and expand and improve public use opportunities, as resources allow.

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Chapter 1



USFWS

Welcome sign at Sunkhaze Meadows National Wildlife Refuge

Purpose of, and Need for, the Action

- **Introduction**
- **Purpose of, and Need for, the Action**
- **Service and Refuge System: Policies and Mandates Guiding Planning**
- **History and Establishing Purposes**
- **Conservation Plans and Initiatives Guiding Planning**
- **Refuge and WPA Vision**
- **Refuge and WPA Goals**

Introduction

This comprehensive conservation plan (CCP) for Sunkhaze Meadows National Wildlife Refuge (Sunkhaze Meadows NWR, refuge) and Carlton Pond Waterfowl Production Area (Carlton Pond WPA, WPA) was prepared pursuant to the National Wildlife Refuge Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act) (Public Law 105-57; 111 Stat. 1253). An environmental assessment (EA), as required by the National Environmental Policy Act of 1969 (NEPA), was prepared with the draft CCP.

This final CCP presents the combination of management goals, objectives, and strategies that we believe will best achieve our vision and goals for the refuge; contribute to the mission of the National Wildlife Refuge System (Refuge System); achieve refuge purposes; fulfill legal mandates; address key issues; incorporate sound principles of fish and wildlife management; and serve the American public. This CCP will guide management decisions and actions on the refuge over the next 15 years. The U.S. Fish and Wildlife Service (Service) will use the CCP to promote understanding of, and support for, refuge management among State agencies in Maine, our conservation partners, Tribal governments, local communities, and the public.

This CCP has 6 chapters and 10 appendixes. This first chapter sets the stage for the subsequent chapters. Specifically, Chapter 1, “Purpose of, and Need for, Action”:

- Explains the purpose of, and need for, a CCP for the refuge.
- Defines the project area.
- Presents the mission, policies, and mandates affecting the development of this plan.
- Identifies other conservation plans used as references in the development of this plan.
- Lists the purposes for which the refuge was established.
- Presents the vision and goals that drive refuge management.
- Describes refuge operational (or “step-down”) plans.

Chapter 2, “The Planning Process,” describes our planning process, including public and partner involvement, its compliance with NEPA regulations, and identifies public issues or concerns that surfaced during plan development.

Chapter 3, “Existing Environment,” describes the physical, biological, and human environments of the refuge and WPA, including the land acquisition history of refuge units and the WPA.

Chapter 4, “Management Direction and Implementation,” presents the actions, goals, objectives, and strategies that will guide our decision-making and land management for the refuge. It also outlines the staffing and funding needed to accomplish that management.

Chapter 5, “Consultation and Coordination,” summarizes how the Service involved the public and its partners in the planning process; their involvement is vital for the future management of the refuge and WPA and all other Refuge System lands.

Chapter 6, “List of Preparers,” credits Service and non-Service contributors to the CCP.

A series of appendixes, a glossary with acronyms, and a bibliography provide additional documentation and references to support the developed narratives and analysis in the plan.

Purpose of, and Need for, the Action

We developed a CCP for the refuge that we believe best achieves the establishing purpose(s), vision, and goals of the refuge; contributes to the mission of the National Wildlife Refuge System (Refuge System); adheres to Service policies and other mandates; addresses identified issues of significance; and incorporates sound principles of fish and wildlife science.

The *purpose* of the CCP is to provide a management direction that best achieves the refuge and WPA purposes, attains the vision and goals developed for the refuge and WPA (see “Refuge and WPA Goals” section below), contributes to the Refuge System mission, addresses key issues and relevant mandates, and is consistent with sound principles of fish and wildlife management.

There are several reasons a CCP is *needed* for these areas. First, the Refuge Improvement Act requires national wildlife refuges to develop CCPs to help fulfill the mission of the Refuge System. Second, Sunhaze Meadows NWR and Carlton Pond WPA need up-to-date plans that establish priorities and ensure consistent management. Third, the refuge was administratively consolidated in 2005 to increase management efficiencies. Currently, Sunhaze Meadows NWR and the Carlton Pond WPA are administered by the staff at the Maine Coastal Islands National Wildlife Refuge Complex in Rockland, Maine.

Lastly, several Service policies providing specific guidance on implementing the Refuge Improvement Act have been developed since the refuge and WPA were established. A CCP incorporates these policies and develops strategic management direction for 15 years by:

- Stating clearly the desired future conditions for refuge habitat, wildlife, visitor services, staffing, and facilities.
- Explaining concisely to state agencies, refuge neighbors, visitors, partners, and other stakeholders the reasons for management actions.
- Ensuring that refuge management conforms to the policies and goals of the Refuge System and legal mandates.
- Ensuring that present and future public uses are appropriate and compatible.
- Providing long-term continuity and consistency in management direction.
- Justifying budget requests for staffing, operating, and maintenance funds.

Project Area

Sunhaze Meadows NWR, Carlton Pond WPA, and the four associated Farmers Home Administration (FmHA) conservation easements lie within two large watersheds: the Lower Penobscot River and Kennebec River watersheds (map 1.1, map 1.2). The Sunhaze Meadows Unit in Milford, Maine, encompasses 11,484 acres. Sunhaze Stream, which flows through the Sunhaze Meadows Unit, drains directly into the Penobscot River. This portion of the refuge protects the second largest and one of the most remarkable peatlands in Maine. Although Sunhaze Meadows NWR is a small part of the total conserved lands throughout the State of

Maine, these lands protect important parts of the regional landscapes in which they are located. Adding significantly to the conserved lands network around the Sunkhaze Meadows Unit is the Lower Penobscot Forest Project, a collaboration of The Nature Conservancy (TNC) and the Forest Society of Maine (see lands adjacent to Sunkhaze Meadows Unit in map 1.3). Together they are working to conserve over 42,000 acres abutting the southeast boundary of the refuge.

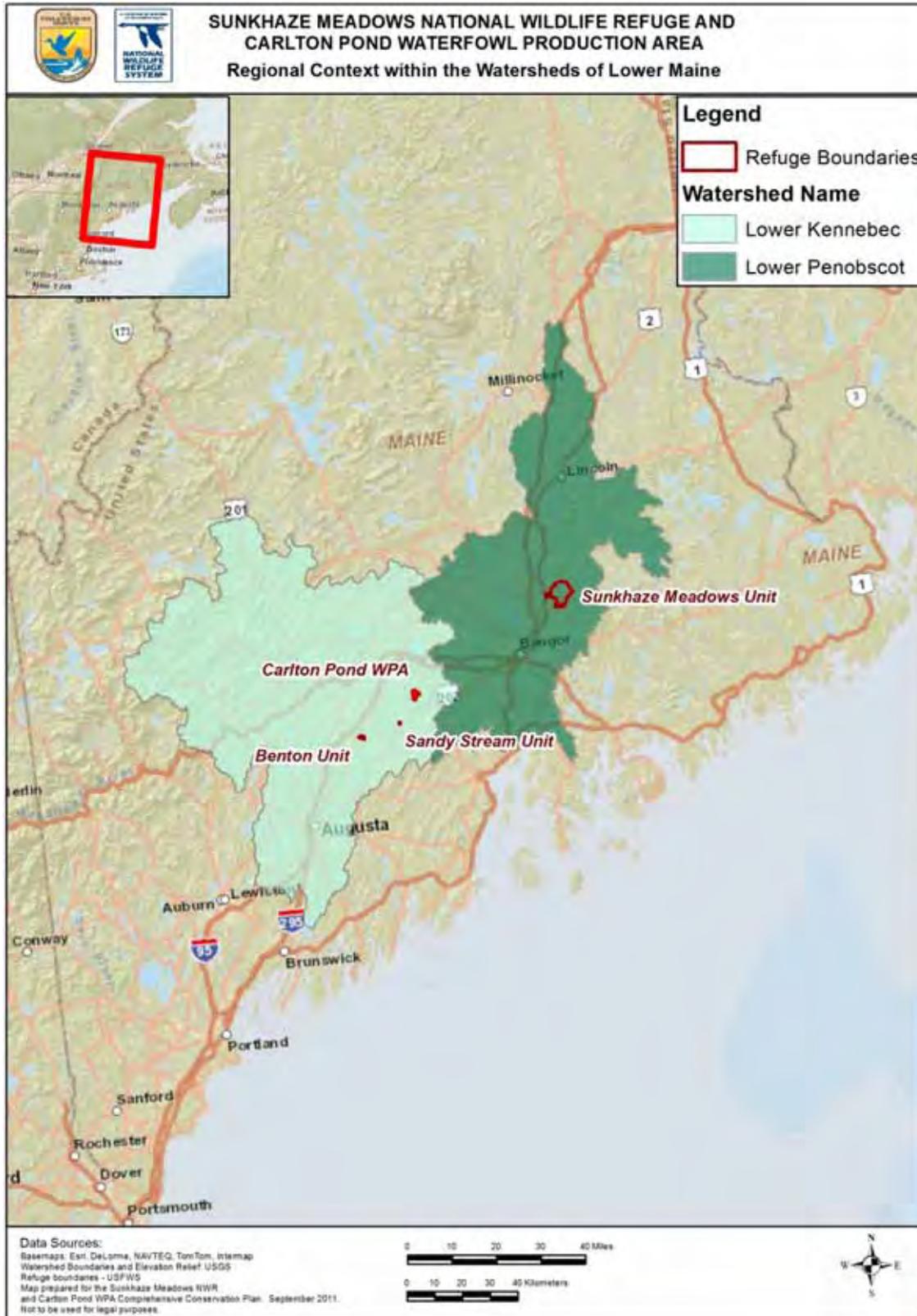
Carlton Pond WPA, as well as the refuge's Benton and Sandy Stream Units, lie within the Lower Kennebec River watershed (map 1.2). These sites drain toward the Sebasticook River that in turn flows into the Kennebec River. The Penobscot and Kennebec Rivers are subcomponents of the Gulf of Maine watershed, an immense area extending from eastern Quebec to Cape Cod, Massachusetts. Maine is the only state located entirely within the watershed boundary (see map 1.1). The Gulf of Maine watershed encompasses the great rivers of Maine: St. John, Penobscot, Kennebec, Androscoggin, Saco, and the coastal drainages of Downeast Maine. It also provides habitat for more than a dozen State-listed threatened or endangered species.

Sunkhaze Meadows NWR also has responsibility for four conservation easements on private lands in Maine, totaling about 320 acres. One easement (54 acres) is located in the Penobscot River watershed, about 35 miles north and a little east of Millinocket. Another easement (213 acres) is located in the Penobscot River watershed about 23 miles northwest of Bangor. The remaining two easements are located in the Kennebec River watershed. One easement (about 16 acres) is located about 4 miles northwest of Waterville, the other (37 acres) is located about 26 miles northwest of Waterville.

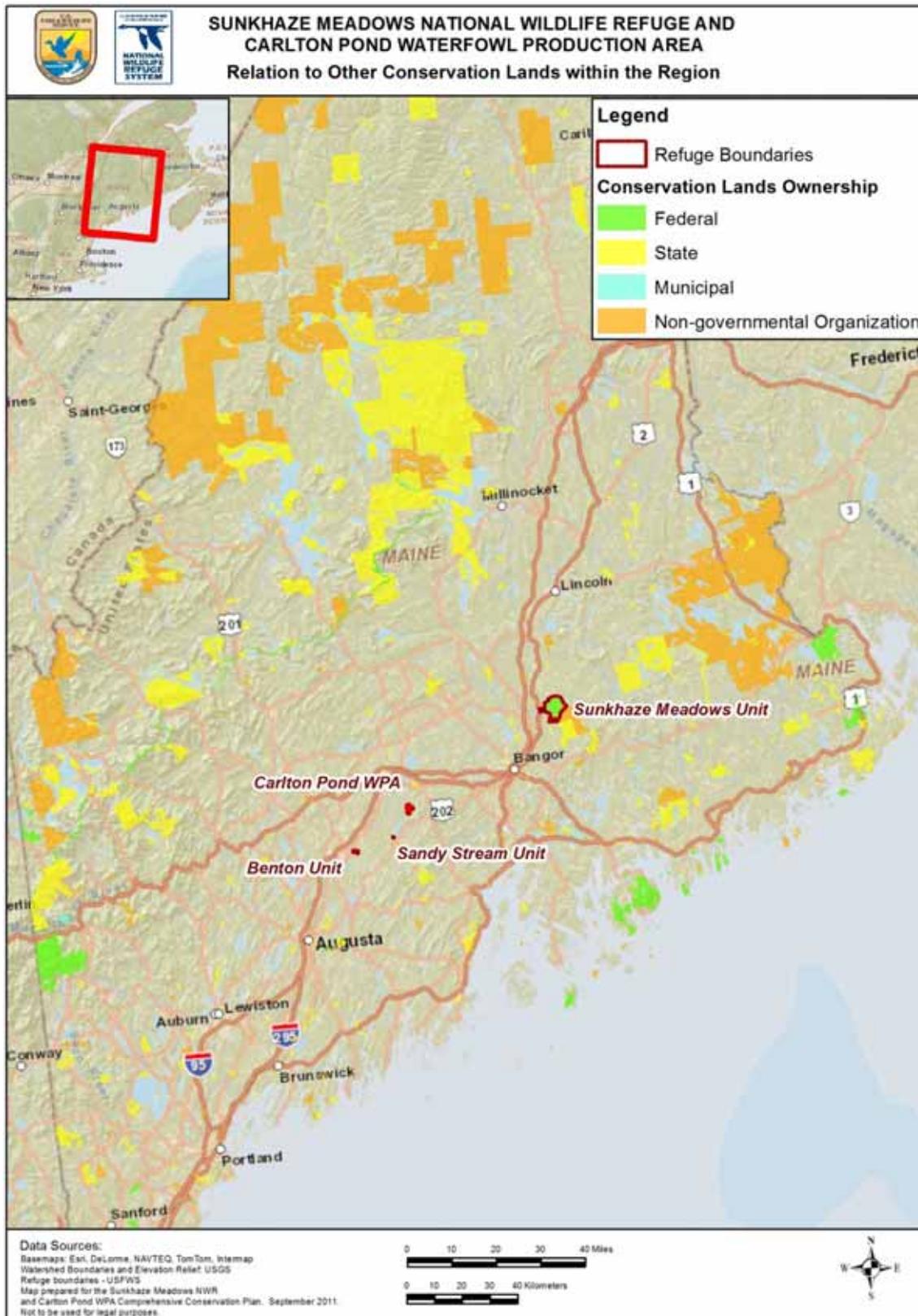
Map 1.1. Sunkhaze Meadows NWR and Carlton Pond WPA and their relationship to the Gulf of Maine watershed.



Map 1.2. Relationship of Sunkhaze Meadows NWR and Carlton Pond WPA to the lower Kennebec River watershed and the lower Penobscot River watershed.



Map 1.3. Sunkhaze Meadows NWR and Carlton Pond WPA and their relationship to other conservation lands in Maine.



Service and Refuge System: Policies and Mandates Guiding Planning

The U.S. Fish and Wildlife Service and its Mission

As part of the Department of the Interior, the Service administers the Refuge System. The Service mission is “Working with others, to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

Congress entrusts the Service with the conservation and protection of these Federal trust resources: migratory birds and fish, federally listed threatened or endangered species, interjurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. The Service also enforces Federal wildlife laws and international treaties on importing and exporting wildlife, assists states with their fish and wildlife programs, and helps other countries develop conservation programs.

The Service Manual (USFWS 2011) contains the standing and continuing directives on implementing our authorities, responsibilities, and activities. In addition, the Service publishes special directives that affect the rights of citizens or the authorities of other agencies separately in the Code of Federal Regulations (CFR); the Service Manual does not duplicate them (see 50 CFR 1–99).

The National Wildlife Refuge System and its Mission and Policies

The Refuge System is the world’s largest network of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 555 national wildlife refuges encompass more than 150 million acres of lands and waters in all 50 States and several island territories. Each year, more than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on refuges (Carver and Caudill 2007).

In 1997, President Clinton signed the Refuge Improvement Act into law. This act establishes a unifying mission for the Refuge System and a new process for determining the compatibility of public uses on refuges, and requires us to prepare a CCP for each refuge. The mission of the Refuge System, as established by the Refuge Improvement Act, focuses on wildlife conservation first. The Refuge Improvement Act also established that the mission of the Refuge System, coupled with the purpose(s) for which each refuge was established, will provide the principal management direction on each refuge. The mission of the Refuge System is:

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Improvement Act; P.L. 105–57)

The National Wildlife Refuge System Manual (Refuge Manual) contains policy governing the operation and management of the Refuge System that the Service Manual does not cover, including technical information on implementing refuge policies and guidelines on enforcing laws (USFWS 2010). We have summarized a few noteworthy policies instrumental in developing this CCP in the next section.

Policy on the National Wildlife Refuge System Mission, Goals, and Purposes

This policy (601 FW 1) sets forth the Refuge System mission noted above, how it relates to the Service mission, and explains the relationship of the Refuge System mission and goals and the purpose(s) of each unit in the Refuge System. In addition, it identifies the following Refuge System goals:

- Conserve a diversity of fish, wildlife, and plants.
- Develop and maintain a network of habitats.
- Conserve those ecosystems, plant communities, and wetlands that are unique within the United States (U.S.).
- Provide and enhance opportunities to participate in compatible, wildlife-dependent recreation.
- Help to foster public understanding and appreciation of the diversity of fish, wildlife, and plants and their habitats.

This policy also establishes management priorities for the Refuge System:

- Conserve fish, wildlife, and plants and their habitats.
- Facilitate compatible, wildlife-dependent recreational uses.
- Consider other appropriate and compatible uses.

Policy on Refuge System Planning

This policy (602 FW 1, 2, 3) establishes the requirements and guidance for Refuge System planning, including CCP and step-down management plans. It states that the Service will manage all refuges in accordance with an approved CCP that, when implemented, will help:

- Achieve refuge purposes.
- Fulfill the Refuge System mission.
- Maintain and, where appropriate, restore the ecological integrity of each refuge and the Refuge System.
- Achieve the goals of the National Wilderness Preservation System and the National Wild and Scenic Rivers System.
- Conform to other applicable laws, mandates, and policies.

That planning policy provides step-by-step directions and identifies the minimum requirements for developing all CCPs. Among them, the Service is to review any existing special designation areas, such as Wilderness and Wild and Scenic Rivers, specifically address the potential for any new special designations, and incorporate a summary of those reviews into each CCP (602 FW 3).

Policy on the Appropriateness of Refuge Uses

Federal law and Service policy provide the direction and planning framework for protecting the Refuge System from inappropriate, incompatible, or harmful human activities and ensuring that visitors can enjoy its lands and waters. This policy (603 FW 1) provides a national framework for determining appropriate refuge uses to prevent or eliminate uses that should not occur on Refuge System lands or waters. It describes the initial decision process the refuge manager must follow when first considering whether to allow a proposed use on a refuge. An appropriate use must meet at least one of the following four conditions:

- The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act.
- The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Refuge Improvement Act became law.
- The use follows state regulations for the take of fish and wildlife.
- The use has been found to be appropriate after concluding a specified findings process using 10 criteria.

Commercial uses are subject to additional conditions before they can be found appropriate (see 50 CFR 29.1). Findings of appropriateness for Sunhaze Meadows NWR and Carlton Pond WPA are provided in appendix B.

Policy on Compatibility

This policy (603 FW 2) complements the appropriateness policy. After finding a use appropriate, the refuge manager must conduct an assessment to determine compatibility. The compatibility determination ensures refuge uses are consistent with refuge purposes and the mission of the Refuge System. Compatibility determinations completed for those public uses found to be appropriate are included in appendix B as part of this CCP.

Service policy on compatibility determinations (603 FW 2) provides guidelines for determining compatibility of uses and procedures for documentation and periodic review of existing uses.

Highlights of the guidance in that chapter are as follows:

- The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager on the compatibility of a public use before the Service allows it on a refuge.
- A compatible use is one “that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge.”
- The act defines six wildlife-dependent uses that are to receive enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- The refuge manager may authorize those priority uses on a refuge when they are compatible and consistent with public safety.
- When the refuge manager publishes a compatibility determination, it will stipulate the required maximum reevaluation dates: 15 years for wildlife-dependent recreational uses; or 10 years for other uses.
- However, the refuge manager may reevaluate the compatibility of a use at any time. For example, the refuge manager may reevaluate compatibility sooner than its mandatory date, or even before the Service completes the CCP process, if new information reveals unacceptable impacts or incompatibility with refuge purposes (603 FW 2.11, 2.12).
- The refuge manager may allow or deny any use, even one that is compatible, based on other considerations such as public safety, policy, or available funding.

Policy on Wildlife-dependent Public Uses

Part 605, chapter 1 of the Service manual presents specific guidance on implementing management of the priority public uses, including the following criteria for providing a quality, wildlife-dependent recreation program that:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan.
- Minimizes or eliminates conflicts with other compatible, wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.
- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.
- Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources.
- Provides reliable and reasonable opportunities to experience wildlife.
- Uses facilities that are accessible to people and blend into the natural setting.
- Uses visitor satisfaction to help define and evaluate programs.

Policy on Maintaining Biological Integrity, Diversity, and Environmental Health

This policy (601 FW 3) provides guidance on maintaining or restoring the biological integrity, diversity, and environmental health of the Refuge System, including the protection of a broad spectrum of fish, wildlife, and habitat resources in refuge ecosystems. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded components of the environment. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem.

Native American Policy

The Service adopted a Native American Policy in 1994. This policy is a framework for our relationships with Native American Tribes in order to address whole ecosystems in conservation, and do it with the greatest assistance possible. You may view this policy on the Web at: www.fws.gov/policy/npi94_10.html (accessed September 2013).

Some highlights of the Service's Native American Policy include:

- The Service recognizes the sovereign status of Native American governments.
- There is a unique and distinctive political relationship between the U.S. and Native American governments that differentiates Native American governments from other interests and constituencies.
- The Service will maintain government-to-government relationships with Native American governments.
- Affected Native American governments will be afforded opportunities to participate in the Service's decision-making process for Service lands.
- The Service will consult with Native American governments on fish and wildlife resource matters of mutual interest and concern to the extent allowed by the law. The goal is to

keep Native American governments involved in such matters from initiation to completion of related Service activities.

- The Service will involve Native American governments in all Service actions that may affect their cultural or religious interests, including archaeological sites.
- The Service will provide Native Americans reasonable access to Service managed or controlled lands and waters for exercising ceremonial, medicinal, and traditional activities recognized by the Service and by Native American governments.
- The Service will provide Native American governments with the same access to fish and wildlife resource training programs as provided to other government agencies.
- The Service will facilitate the development of Native American fish and wildlife professionals through innovative educational programs and on-the-job training, partnerships and cooperative relationships with Native American educational institutions, and including Native American schools in its environmental education outreach programs.

Other Mandates

Although Service and Refuge System policy and the purpose(s) of each refuge provide the foundation for its management, other Federal laws (e.g., Migratory Bird Treaty Act, Archaeological Resources Protection Act, The Historic Sites, Buildings and Antiquities Act, National Historic Preservation Act), executive orders, treaties, interstate compacts, and regulations on conserving and protecting natural and cultural resources also affect how the Service manages refuges. The “Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service” describes many of them at: <http://www.fws.gov/laws/Lawsdigest.cfm> (accessed September 2013).

Of particular note for Sunhaze Meadows NWR, are The Wilderness Act of 1964 (16 U.S.C. 1131–1136; P.L. 88–577) and The Wild and Scenic Rivers Act of 1968, as amended.

The Wilderness Act

The Wilderness Act establishes a National Wilderness Preservation System (NWPS) that is composed of federally owned areas designated by Congress as wilderness areas. The act directs each agency administering designated wilderness to preserve the wilderness character of areas within the NWPS, and to administer the NWPS for the use and enjoyment of the American people in a way that will leave those areas unimpaired for future use and enjoyment as wilderness. The act also directs the Secretary of the Interior to review every roadless area of 5,000 acres or more and every roadless island (regardless of size) within the Refuge System and the National Park System for inclusion in the NWPS. Service planning policy requires that the Service evaluate the potential for wilderness on refuge lands, as appropriate, during the CCP planning process. The Wilderness Review is available in this document as appendix C.

The Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act of 1968, as amended, selects certain rivers of the Nation possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, preserves them in a free-flowing condition, and protects their local environments. Service planning policy requires that the Service evaluate the potential for wild and scenic rivers designation on refuge lands, as appropriate, during the CCP planning process.

History and Establishing Purposes

Refuges and WPAs can be established by U.S. Congress through special legislation, by the President through Executive Order, or administratively by the Director of the Service (with authority delegated by the Secretary of the Interior). Refuge lands may be acquired under a variety of administrative and legislative authorities as well.

Sunkhaze Meadows NWR

In the early 1980s, the peat mining industry was exploring the potential to mine peat from Sunkhaze Meadows Unit for use as heating fuel, threatening the bog and the integrity of the wetland complex. The mining plans were not implemented and because of the heightened awareness of the ecological significance of the area, funding was secured for its permanent protection as a national wildlife refuge.

Sunkhaze Meadows NWR was established administratively in 1988 to ensure the ecological integrity of the Sunkhaze Meadows Unit peat bog and to conserve wetland, stream, and forest habitats, and associated wildlife. The Sunkhaze Meadows NWR also includes two smaller units, Benton (334 acres) and Sandy Stream (58 acres), and four conservation easements scattered throughout central Maine.

Sunkhaze Meadows NWR was established under the authority of the Fish and Wildlife Act of 1956 and the Refuge Recreation Act. The purposes for which Sunkhaze Meadows NWR was established are:

- “...for the development, advancement, management, conservation, and protection of fish and wildlife resources...” 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956).
- “...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services.” 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).
- “...suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species” 16 U.S.C. 460k-1 (Refuge Recreation Act of 1966, as amended).

Carlton Pond WPA

Carlton Pond WPA was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965, under the authority of the Migratory Bird Conservation Act and Migratory Bird Hunting and Conservation Stamp Act. The intent was to provide primarily breeding habitat for waterfowl, as well as benefitting shorebirds, waterbirds, and other wildlife. About 95 percent of the Nation’s waterfowl production areas occur in the prairie potholes region of the Midwest (USFWS 2007). Carlton Pond WPA is the only waterfowl production area in the Service’s Northeast Region. The 1,068-acre Carlton Pond WPA was managed by Moosehorn NWR until Sunkhaze Meadows NWR was established in 1988.

The purposes for which Carlton Pond WPA was established are:

- “...as Waterfowl Production Areas subject to... all of the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions ...” 16 U.S.C. 718(c) (Migratory Bird Hunting and Conservation Stamp Act).

- “...for any other management purpose, for migratory birds.” 16 U.S.C. 715(d) (Migratory Bird Conservation Act).

Farmers Home Administration Conservation Easements

From the late 1980s to the mid-1990s, the FmHA acquired many properties throughout the country through foreclosure sales. Under the terms of a memorandum of understanding between FmHA and the Service, a review team consisting of their staff, our staff, staff from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service, and staff from USDA Agricultural Stabilization and Conservation Service evaluated those properties for their conservation value. Based on those evaluations, and before reselling the properties, the FmHA placed permanent conservation easements on many of these properties to protect important habitats, as authorized by the Food, Agriculture, Conservation, and Trade Act of 1990. FmHA retained full ownership in a smaller number of the properties. The responsibility for monitoring and enforcing those easements and managing the retained properties rests was transferred to the Service under authority of the Consolidated Farm and Rural Development Act (7 U.S.C. 2002). We have usually delegated this authority to the manager of the closest refuge. As discussed previously under “Project Area,” Sunkhaze Meadows NWR has responsibility for four conservation easements on private lands in Maine, totaling about 320 acres. The Service’s rights and responsibilities are specific to conditions stipulated in each easement.

The Farmers Home Administration properties (Benton and Sandy Stream Units) and conservation easements were transferred “...for conservation purposes...” 7 U.S.C. 2002 (Consolidated Farm and Rural Development Act).

Conservation Plans and Initiatives Guiding Planning

Important guidance for habitat management and visitor service management at Sunkhaze Meadows NWR and Carlton Pond WPA has already been provided by a series of refuge-specific, State, regional, and national plans and initiatives, and their priorities.

Regional and National Plans and Initiatives

Refuge System Visioning: Fulfilling the Promise, Conserving the Future

In 1999, the report, “Fulfilling the Promise, The National Wildlife Refuge System; Visions for Wildlife, Habitat, People, and Leadership” (USFWS 1999a), culminated a year-long process by teams of Service employees that created a nationwide vision for the Refuge System.

To update the vision for the Service’s future, the *Conserving the Future* conference was convened in July 2011 for the purpose of working toward a renewed and updated vision for the Refuge System. It was the largest gathering regarding the future of the Refuge System since the *Fulfilling the Promise* conference in 1998. It began with a draft vision document and over the course of the conference, both online and in-person feedback was gathered for its revision and finalization. The final vision document and its recommendations were published in the fall of 2011 (USFWS 2011a). This 21st century strategic vision for the Refuge System acknowledges the broad social, political, and economic changes that have made habitat conservation more challenging since the agency last set comprehensive goals in 1999. The vision document

represents the Service's vision for how to protect and conserve lands and waters in the coming decades and outlines a series of 24 recommendations for Service staff and other conservation partners to consider in future management.

We have often looked to the recommendations in these documents for guidance when writing this CCP. For example, one recommendation is that we “ensure these plans view refuges in a landscape context and describe actions to project conservation benefits beyond refuge boundaries.” To address this, we have viewed the refuge and WPA within a wider landscape context throughout this document and have targeted conservation actions that directly relate to needs within the larger landscape. Another recommendation of the vision document involves partnerships, “develop and nurture active and vibrant Friends groups or community partnerships for every staffed refuge or refuge complex.” Throughout this CCP, we have recognized the value that the Friends and other partnerships bring to the refuge and WPA and our reliance on them for its future. The vision document also outlines other recommendations for the Service, including other programs outside of the Refuge System. Many of these other recommendations are supported in part by refuge management guided by this CCP.

Strategic Habitat Conservation

The Service has a goal of establishing and building capacity for science-driven landscape conservation on a continental scale. Our approach, known as strategic habitat conservation, applies adaptive resource management principles to the entire range of species, groups of species, and natural communities of vegetation and wildlife. This approach is founded on an adaptive, iterative process of biological planning, conservation design, conservation delivery, and monitoring and research. The Service is refining this approach to conservation in a national geographic framework. This geographic frame of reference will allow us to more precisely explain to partners, Congress, and the American public why, where, and how we target resources for landscape-scale conservation and how our efforts connect to a greater whole. More information regarding SHC can be found at: <http://www.fws.gov/landscape-conservation/> (accessed September 2013).

North Atlantic Landscape Conservation Cooperative Operations Plan (USFWS 2010)

The Service and our partners are implementing a network of Landscape Conservation Cooperatives (LCCs) to help protect our Nation's natural and cultural resources and landscapes from negative effect of land use changes, drought, wildfire, habitat fragmentation, contaminants, pollution, invasive species, disease, and a rapidly changing climate. LCCs are public-private partnerships that recognize these challenges transcend political and jurisdictional boundaries and require a more networked approach to conservation that is collaborative, adaptive, and grounded in science to ensure the sustainability of America's land, water, wildlife, and cultural resources. The North Atlantic LCC is a conservation science-management partnership, consisting of Federal agencies, states, Tribes, universities and private organizations, focused on collaboratively developing science-based recommendations and decision-support tools to implement on-the-ground conservation. The goal is having all partners working together to sustain landscapes capable of maintaining abundant, diverse, and healthy populations of fish, wildlife, and plants. The work of the North Atlantic LCC will be integrated with a U.S. Geological Survey (USGS) regional climate impact response center to conduct studies and develop landscape-scale conservation plans. The North Atlantic LCC will also address impacts

to ecosystems beyond those of climate change, such as potential extirpation of wildlife populations from disease or habitat loss.

LCCs use principles of strategic habitat conservation to develop and communicate landscape-scale scientific information to shape conservation across the Northeastern U.S. This initial plan outlines the regional threats to conservation, some priority species and habitats, as well as active regional partnerships.

North American Bird Conservation Initiative (NABCI)

The North American Bird Conservation Initiative (NABCI) brings together the individual landbird, shorebird, waterbird, and waterfowl plans into a coordinated effort to protect and restore all native bird populations and their habitats in North America. By integrating bird conservation partnerships, NABCI strives to reduce redundancy in the structure, planning, and implementation of conservation projects. It uses Bird Conservation Regions (BCRs) to guide landscape-scale, science-based approaches to conserving birds and their habitats.

Sunkhaze Meadows NWR lies within BCR 14, the Atlantic Northern Forest. A blueprint for the design and delivery of bird conservation in this region was created by the Service based on input from dozens of bird experts from around the region (Dettmers 2006). The BCR 14 blueprint identifies 52 bird species designated “highest” or “high” conservation priority in the region, and 15 habitat types important for supporting one or more of those priority bird species during at least one of their life stages. Those habitats either need critical conservation attention, or are crucial in long-term planning to conserve continentally and regionally important bird populations. Of the 52 highest and high-priority birds, 17 breed on the Sunkhaze Meadows NWR or Carlton Pond WPA and several others migrate through.

Each of the individual bird plans noted below were referenced as we developed habitat goals and objectives for the Sunkhaze Meadows NWR and Carlton Pond WPA:

- Partners In Flight Landbird Conservation Plan: Physiographic Area 27: Northern New England (Hodgman and Rosenberg 2000).
- Partners In Flight Landbird Conservation Plan: Physiographic Area 28: Eastern Spruce-Hardwood Forest (Rosenberg and Hodgman 2000).
- Northern Atlantic Regional Shorebird Plan Version 1.0. (Clark and Niles 2000).
- Regional Waterbird Conservation: Mid Atlantic/New England/Maritimes (MANEM Waterbird Working Group 2006).
- Atlantic Coast Joint Venture Waterfowl Implementation Plan (ACJV 2005).

Partners in Flight Area 27 Landbird Conservation Plan

In 1990, Partners in Flight (PIF) was conceived as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industry, and other citizens dedicated to reversing the population declines of bird species and “keeping common birds common.” The foundation of PIF’s long-term strategy for bird conservation is a series of scientifically based bird conservation plans, using physiographic areas as planning units. Sunkhaze Meadows NWR and Carlton Pond WPA straddle the PIF physiographic areas 27, Northern New England, and 28, Eastern Spruce-Hardwood Forest.

The PIF Area 27 (Northern New England) plan (Rosenberg and Hodgman 2000) includes objectives for the following habitat types and associated species of conservation concern on the refuge.

- | | |
|----------------------------|--|
| Northern hardwood forest: | Canada warbler, wood thrush, black-throated blue warbler, and blackburnian warbler |
| Early successional forest: | American woodcock and chestnut-sided warbler |

Partners in Flight Area 28 Landbird Conservation Plan

The PIF 28 (Eastern Spruce-Hardwood Forest) plan (Rosenberg and Hodgman 2000) includes objectives for the following habitat types and associated species of conservation concern on the refuge.

- | | |
|------------------------------|--|
| Northern hardwood forest: | Canada warbler, wood thrush, and veery |
| Conifer (spruce-fir) forest: | Bay-breasted warbler, Cape May warbler, blackburnian warbler, spruce grouse, and red crossbill |
| Boreal peatland/edge/shrub: | American woodcock, chestnut-sided warbler, and olive-sided flycatcher |

North American Waterbird Conservation Plan

The North American Waterbird Conservation Plan (Kushlan et al. 2002) represents an independent partnership among individuals and institutions with interest and responsibility for conserving waterbirds and their habitats. The primary goal of the plan is to ensure that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding waterbirds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean. The plan facilitates continentwide planning and monitoring, national-state-provincial conservation action, regional coordination, and local habitat protection and management.

A partnership of organizations and individuals working to facilitate waterbird conservation in the Mid-Atlantic/New England/Maritimes (MANEM) region of the U.S. and Canada has developed a regional waterbird conservation plan (MANEM Waterbird Working Group 2006). Over 200 partners comprising the MANEM Waterbird Working Group have compiled and interpreted technical information on the region's waterbird populations and habitats, assessed conservation status of these natural resources, developed strategies to ensure the persistence of sustainable waterbird populations in the region, and identified near-term priorities.

Seventy-four waterbird species use habitats in MANEM for breeding, migrating, and wintering. Avian families include loons, grebes, shearwaters, storm-petrels, boobies, pelicans, cormorants, herons, ibises, rails, gulls, terns, skuas, jaegers, and alcids. Partners in four subregions of MANEM selected 43 focal species for immediate conservation action. In addition, 55 of MANEM's waterbirds are identified in state wildlife action plans as Species of Greatest Conservation Need (MANEM Waterbird Working Group 2006).

U. S Fish and Wildlife Service's Migratory Bird Program Strategic Plan

The Migratory Bird Program Strategic Plan (USFWS 2004) provides direction for the Services' migratory bird management over the next decade (2004 to 2014). The plan contains a vision and recommendations for the Refuge System's place in bird conservation. It defines strategies for the

Service, including the refuge system, to actively support bird conservation through monitoring, conservation, consultation, and recreation. To the extent practicable, considerations for standard monitoring protocols, habitat assessment and management, and promoting nature-based recreation and education to forward the vision of the Migratory Bird Program Strategic Plan have been incorporated into this plan.

U. S Fish and Wildlife Service's Birds of Conservation Concern (USFWS 2008)

The 1988 amendment to the Fish and Wildlife Conservation Act mandated that the Service “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.”

This report identifies the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the Service's highest conservation priorities and draws attention to species in need of conservation action. The geographic scope includes the U.S. in its entirety, including island territories in the Pacific and Caribbean. Birds considered within this report include nongame birds; gamebirds without hunting seasons; subsistence-hunted nongame birds in Alaska; and ESA candidate, proposed endangered or threatened, and recently delisted species. Assessment scores are based on several factors, including population trends, threats, and distribution, abundance, and area importance.

Maine Comprehensive Wildlife Conservation Strategy

Maine's Comprehensive Wildlife Conservation Strategy (MDIFW 2005) targets species in greatest need of conservation for the State while keeping “common species common.” The plan covers the entire State, from the coastline to the heights of Mt. Katahdin. It builds on existing fish and wildlife programs and on a species planning effort that has been ongoing for nearly 40 years and a landscape approach to habitat conservation that was initiated in 2000. These efforts incorporate a long history of public involvement and collaboration among conservation partners. The Maine landscape is not static but the result of profound natural and human-caused changes. Changes brought about by fire, land conversion, abandonment of agricultural land, timber harvesting, and the defoliation of forest by insects have had, and will continue to have, a dramatic impact on habitats and levels of biodiversity. Similarly, aquatic ecosystems in Maine have been profoundly and adversely affected by exotic introductions, dam building, pollution, pesticide use, and excessive nutrient input. These effects have occurred, and are occurring, statewide, but they differ in intensity from north to south.

In their Statewide wildlife conservation plan, the Maine Department of Inland Fisheries and Wildlife (MDIFW) noted the following: “Historically, wildlife conservation efforts tended to focus on single species. Other conservation efforts identify and protect areas of land (focus areas) that contain diverse assemblages of at-risk species. However, as we continue to change our landscape, species-by-species and focus-area conservation approaches, while both laudable may not be the most effective means to conserve biodiversity, and they do little to ensure the continued well-being of more common species under Department stewardship. Landscape-level conservation that addresses the needs of many species by conserving underlying resources upon which they depend, may be a more productive way to use limited resources to benefit the greatest number of species and address the full array of wildlife in Maine.”

U. S Fish and Wildlife Service's Fisheries Program, Northeast Region Strategic Plan 2009 to 2013

The primary mission of the Service's Fisheries Program is to work with others to maintain self-sustaining, healthy populations of coastal and diadromous fish (fish that spend part of their lives in freshwater and part in the ocean), fish species that cross state or national boundaries, and endangered aquatic animals and their habitats. In the Northeast Region, 25 fishery management offices and national fish hatcheries work with states and other partners to restore and protect a variety of fish and other aquatic species.

The Regional Fisheries Program Strategic Plan (USFWS 2009) is an extension of the vision, describing more specifically the tactics to be implemented by the Northeast Region to fulfill the goals and objectives identified in the vision. The first plan covered years 2004 to 2008. One step-down effort resulting from the plan is the identification and ranking of fish and other aquatic species according to their level of conservation concern by USGS hydrologic unit (i.e., HUC watersheds). We used this ranking and have consulted with the Regional Fisheries Program staff in developing aquatic objectives and strategies.

Eastern Brook Trout Joint Venture Conservation Strategies

The Joint Venture's Conservation Strategy (EBJV 2011) is directed by rangewide objectives to guide conservation efforts across the eastern range of brook trout. The regional objectives represent expectations to be achieved by 2012. The Joint Venture, working with the National Fish Habitat Partnership, will use the Conservation Strategy as its blueprint for raising and using resources at the State level. The Eastern Brook Trout Joint Venture Conservation Strategies (EBJV 2011) for Maine were developed to maintain and restore then native brook trout populations in the streams, rivers, lakes, and ponds of Maine. Short- and long-term goals of the Joint Venture include determining the status of wild brook trout in watersheds lacking adequate and current data, identifying degraded stream habitats and prioritizing restoration efforts, restore degraded brook trout habitat, and prevent further degradation of existing brook trout habitat.

Sebasticook Regional Land Trust's Unity Wetlands Conservation Plan

The Sebasticook Regional Land Trust (formerly the Friends of Unity Wetlands) developed the Unity Wetlands Conservation Plan (FUW 2006) with support from TNC and The Natural Resource Conservation Service. The plan encompasses the 42,000-acre Unity Wetlands Focus Area, a unique and significant resource, with a combination of wild and working lands that is rich in biodiversity, scenic beauty, and economic value. This large tract of relatively undeveloped land stretches from the west side of Unity through all of Unity Plantation and into portions of Albion, Benton, Burnham, Clinton, and Freedom. It is home to many threatened and rare plants, animals, and natural communities, as well as to more wide-ranging creatures like black bear, moose, and bobcat. It is home, too, to a rich agricultural heritage that is critical to the regional economy. The farms and infrastructure within and adjacent to the Unity Wetlands are a vital component in Maine's Dairy Belt. They also provide habitat in their own right for fish and wildlife, contribute to several blocks of contiguous undeveloped habitat, and are a buffer between the interior undeveloped blocks and encroaching development.

The Benton and Sandy Stream Units are located within the Unity Wetlands Focus Area. Recommendations in the conservation plan support refuge management objectives of increasing

the riparian buffer at Sandy Stream and managing habitat for grassland birds at Benton. The Sebasticook Regional Land Trust is interested in partnering with the refuge to increase public understanding of refuge lands, their conservation values and public use opportunities. Carlton Pond WPA is located north and east of Unity Pond, just outside of the Unity Wetlands Focus Area.

Refuge-specific Plans

A number of other refuge-specific plans have been consulted either in their draft or final format to help guide decision-making. These plans will also be maintained and updated as necessary to maintain accordance with the recommendations of the CCP.

Sunkhaze Meadows NWR Station Management Plan

The original master plan (USFWS 1992) for the refuge was developed in 1992 through collaboration amongst individuals within the Northeast Region of Service's Division of Refuges. The master plan set the original guidance for management of Sunkhaze Meadows NWR and outlined the resources it protected.

Visitor Service Review

A Service-based review team assessed the public use issues, opportunities, and facilities available at Sunkhaze Meadows NWR in preparation for the refuge's comprehensive conservation planning process and to develop recommendations to improve the quality of the refuge's visitor services program. A visitor services review was conducted for Sunkhaze Meadows NWR on October 18 to 22, 2010, by a review team consisting of visitor services personnel from the Regional Office and other refuges. This review focused on the Sunkhaze Meadows Unit of the refuge, and recommendations included increased staffing, visitor use access, and public outreach. The Visitor Services Review recommendations were used as a stepping-off point for visitor services planning; its recommendations were also used to help develop goals, objectives, and strategies for refuge visitor services planning.

Step-down Plans

The Service Manual, (602 FW 4) identifies more than 25 step-down management plans that may be completed for each refuge. These plans provide the details necessary to "step-down" general goals and objectives to specific strategies and implementation schedules. Some require annual revisions; others are revised on a 5- to 10-year schedule. Some require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented.

Following is a list of step-down plans for the refuge and WPA:

- Annual Habitat Work Plan, most recently completed in 2010.
- Fire Management Plan, completed in 2001.
- Furbearer Management Plan, completed in 2001.
- Fisheries Management Plan, completed in 1999, to be updated after approval of the final CCP.
- Wildlife Inventory Management Plan, completed in 1995.
- Hunting Management Plan, completed in 1990, to be updated after approval of the final CCP.
- Law Enforcement Plan, to be completed after approval of the final CCP.
- Visitor Services Plan, to be completed after approval of the final CCP.

- Safety Plan, to be completed after approval of the final CCP.

Refuge and WPA Vision

The planning team developed the following vision statement to provide a guiding philosophy and sense of purpose in the CCP.

Sunkhaze Meadows NWR and Carlton Pond WPA are a tapestry of natural lands within central Maine.

The Sunkhaze Meadows Unit supports an expansive, intact peat bog system. The free-flowing Sunkhaze Stream and its tributaries meander through diverse habitats including raised peat domes, grassy wet meadows, and floodplain forests before joining the restored Penobscot River. Mature upland forests surround the wetlands, protecting this unspoiled landscape for future generations of plants, animals, and people.

Bobolink and sedge wren sing and woodcock dance in the large contiguous grassland and deer overwinter in the forest mosaic comprising the Benton Unit. Wood turtles and rare mussels are protected by the wide, shaded riparian forests of the Sandy Stream Unit.

Carlton Pond WPA is a beautiful wetland jewel amidst a pastoral landscape. Rare black terns nest in the emergent marsh, while bald eagles, bitterns, and marsh wrens forage amid the shallow open waters and emergent pickerelweed and wild rice.

Visitors experience wildness and find respite within nature throughout the year. In spring, birders observe migratory waterfowl and songbirds. Wildlife enthusiasts and anglers enjoy fishing, paddling, and hiking throughout summer. Hunters spend crisp autumn mornings stalking their prey. In winter, people snowshoe and ski through the silent woods. Through our close partnerships and programs, visitors gain further appreciation of conservation and are inspired stewards of nature.

Refuge and WPA Goals

The planning team developed seven goals after considering the vision statement, the purposes for establishing the refuge and WPA, the missions of the Service and the Refuge System, and the mandates, plans, and conservation initiatives noted above. These goals are intentionally broad, descriptive statements of purpose. They highlight elements that we will emphasize during future management.

Goal 1. Sunkhaze Meadows Biological Management. Promote the environmental health of Sunkhaze Meadows Unit wetland, forest, and aquatic habitats to protect water quality and sustain native rare plants, natural communities, and wildlife, including species of conservation concern.

- Goal 2. Carlton Pond WPA Biological Management. Promote the environmental health of forest, open water, and emergent wetland habitat at Carlton Pond WPA to benefit waterfowl and sustain a diversity of wildlife including species of conservation concern.
- Goal 3. Benton and Sandy Stream Biological Management. Promote the environmental health of forest, grassland, and shrubland habitat at Benton and Sandy Stream Units to sustain a diversity of wildlife, including species of conservation concern.
- Goal 4. Sunkhaze Meadows Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the wetlands, woods, wildlife, and cultural resources of the Sunkhaze Meadows Unit.
- Goal 5. Carlton Pond WPA Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the wetlands, woods, and wildlife at Carlton Pond WPA.
- Goal 6. Benton and Sandy Stream Units Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the shrublands, woods, grasslands, and wildlife at the Benton and Sandy Stream Units.
- Goal 7. Partnership Coordination. Communicate and collaborate with local communities, Federal and State agencies, local and Tribal representatives, and other organizations throughout Maine and the region to further the purposes of the refuge and the mission of the Refuge System.

Chapter 2

Lia McLaughlin/USFWS



Public scoping meeting for the draft CCP and EA in April 2013.

The Planning Process

- **Comprehensive Conservation Planning Process**
- **Issues, Concerns, and Opportunities**
- **Plan Amendment and Revision**

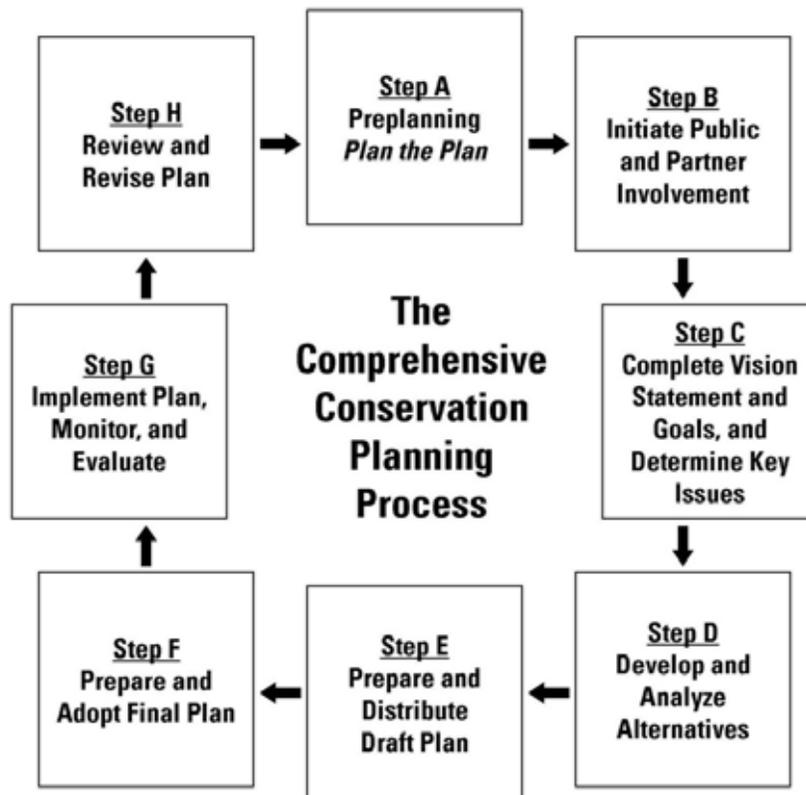
The Comprehensive Conservation Planning Process

Service policy (602 FW 3) establishes an eight-step comprehensive conservation planning process that provides guidelines for developing CCPs and facilitates compliance with NEPA by integrating NEPA compliance requirements in the CCP process (figure 2.1). The full text of the policy and a detailed description of the planning steps can be viewed at: <http://policy.fws.gov/602fw3.html> (last accessed September 2012).

The following describes the specific process implemented by the Sunkhaze Meadows NWR and Carlton Pond WPA planning team, including how others were engaged in developing issues for the CCP.

This summary does not detail the numerous meetings, events, and informal discussions the refuge manager and staff have had since January 2011 where the CCP was a topic of conversation. Those involved a wide range of audiences, including conservation groups, elected officials or their staffs, educators, refuge visitors, and other interested individuals. During those discussions, the refuge manager and staff provided an update on CCP progress and encouraged comments and participation.

Figure 2.1. The Service’s Comprehensive Conservation Planning Process



Chronological Summary of CCP Process

Step A: Preplanning

Several steps were initiated as part of “Step A: Preplanning” including the formation of the core planning team which is responsible for developing the CCP. Our core planning team consists of refuge staff, Regional Office staff, a representative of the MDIFW, a representative of the Penobscot Indian Nation, an elected representative from the Town of Milford, and contractors responsible for compiling information and preparing documents. The CCP planning process began formally on January 4, 2011, with a conference call between refuge staff, Regional Office staff, and contractors to discuss information needs, timelines, and involvement of others in the core planning team. As part of the preplanning process, the core planning team discussed management issues, drafted a vision statement and tentative goals and compiled a project mailing list of known stakeholders, interested individuals, organizations, and agencies. The team also began work on Wilderness and Wild and Scenic River reviews and summarizing the refuge’s biological inventory and monitoring information.

On March 1, 2011, a conference call was held between refuge staff, regional Service staff, and contractors to work on the preparations for the agency and Tribal partnership scoping meeting, as well as the public scoping meetings.

On March 7, 2011, the refuge manager emailed 29 local, county, State, and Federal agency contacts an invitation to an agency partner scoping meeting. This invitation encouraged agency participation in the agency scoping meeting in order to provide other government entities the opportunity to share their issues and concerns related to Sunkhaze Meadows NWR and Carlton Pond WPA. A follow-up reminder email was sent to this same group of contacts on March 17, 2011.

Step B: Public Scoping

On March 18, 2011, we started “Step B: Initiate Public Involvement and Scoping” by publishing the Notice of Intent in the *Federal Register*, officially announcing the beginning of public scoping for the Sunkhaze Meadows NWR and Carlton Pond WPA CCP. The project planning Web site and the refuge Web site were also updated at this time.

On March 23, 2011, the core team contacted approximately 394 individuals and organizations included in the planning contacts database compiled for the CCP. The refuge manager emailed 44 of those contacts inviting them to participate in our scoping process and to attend our public open houses in April and included an electronic copy of the first newsletter. The remaining 350 contacts were mailed paper copies of the first newsletter containing a similar invitation to participate.

On March 24, 2011, the core team held the agency scoping workshop at the MDIFW, Bangor Research Office. The workshop was attended by six representatives from municipal, State, and Federal agencies. Refuge and planning team staff were also in attendance at the meeting.

The core team completed their public scoping meetings in mid-April. Two public scoping meetings were held on April 12, 2011, in Milford, Maine, at the Milford Town Hall: one session

was held from 2 to 4 p.m., and another session was held from 6 to 8 p.m. Combined, these meetings were attended by 22 individuals from the surrounding communities. A third public scoping meeting was held from 4 to 8 p.m. in Unity, Maine, at Unity College on April 13, 2011. This meeting was attended by 12 individuals. Refuge and planning team staff were also in attendance at all three meetings.

The official comment period for initial public scoping to identify issues and opportunities for the CCP ended on April 30, 2011.

Steps C and D: Vision, Goals, and Alternatives Development

Following the public scoping period, the core team compiled and summarized all comments received. In doing so, the Service initiated “Step C: Review Vision Statement and Goals and Determine Significant Issues.” Through a series of conference calls and emails, the core team reviewed comments received and identified key issues to be addressed throughout the development of the CCP. At the same time, the core team evaluated the draft vision and goals presented during scoping. During this evaluation, the core team decided to reorganize the draft goals to better reflect the individuality of each refuge unit. This was motivated by two primary factors: (1) many individual comments received during scoping pertained to particular refuge units and people’s interest in a particular unit, and (2) each refuge unit and the WPA contain unique habitats and features and are managed individually.

From August 2012 through January 2013 the core team worked on “Step D: Develop and Analyze Alternatives.” On August 9 and 10, the core team met in person at the Service’s Ecological Services Office in Orono, Maine to discuss key issues and develop appropriate management considerations.

As part of this initial development of alternatives, the core team considered management alternatives at the Sunkhaze Meadows Unit that included special use designations such as wilderness area or research natural area. To further evaluate special designations as alternatives, in January 2012, we distributed a public notice and newsletter describing the consideration of special designations, specifically wilderness area designation and invited interested individuals to attend a public meeting to learn more about the consideration and obtain public input. This newsletter was distributed to 452 contacts, 112 of whom received the newsletter via email, and the remaining 340 were mailed hard copies. The public notice was also published on February 3, 2012, in a local newspaper, the SV Weekly.

The Sunkhaze Meadows Unit wilderness consideration public meeting was held on Thursday, February 9, 2012, at the Milford Town Hall. In total, 38 people from the general public attended the meeting. The refuge manager described the purpose of the meeting, the current status of our CCP and EA planning efforts, and the Wilderness Act criteria and how the Service delineated the potential wilderness area designation for the Sunkhaze Meadows Unit. The Service then facilitated public input while recording the comments on flip charts.

Following this meeting, the Service reviewed and considered comments received and determined not to pursue special designations at the Sunkhaze Meadows Unit. In early August 2012, the Service distributed a newsletter updating the public on the Service's decision not to pursue a wilderness area designation. This newsletter was distributed to the same 452 contacts noted in the January 2012 newsletter distribution.

Step E: Draft CCP and NEPA Document

The Service published a Notice of Availability (NOA) in the *Federal Register* announcing the release of the draft CCP and EA for a 39-day period of public review and comment on April 23, 2013. During the comment period, the Service held two public meetings to obtain comments on the document. We received comments by regular mail, electronic mail, and at the public meetings. We distributed a newsletter summarizing the three management alternatives for the draft CCP and EA to coincide with the publication of the NOA. After the comment period, we reviewed and summarized all of the substantive comments we received, developed our responses, and published them as appendix G.

Step F: Adopt Final Plan

We submitted the final CCP to our Regional Director for approval in September 2013. The Regional Director determined that a Finding of No Significant Impact (FONSI) was warranted. Shortly thereafter, we announced the Regional Director's final decision and the final CCP by publishing an NOA in the *Federal Register*. These actions complete "Step F: Prepare and Adopt a Final Plan."

Steps G and H: Implement, Evaluate, and Revise the Plan

With the planning phase of the CCP process complete, "Step G: Implement Plan, Monitor and Evaluate" will begin. As part of "Step H: Review and Revise Plan," the Service will modify or revise the final CCP, as warranted, following the procedures in Service policies 602 FW 1, 3, and 4 and the NEPA requirements. Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an environmental action memorandum. As the Refuge Improvement Act and Service policy stipulate, the Service will review and revise the CCP at least every 15 years.

Issues, Concerns, and Opportunities

The Service defines an issue as "any unsettled matter requiring a management decision" (USFWS 2010). Issues can include an "initiative, opportunity, resource management problem, threat to a resource, conflict in use, or a public concern." Issues arise from many sources, including refuge staff, other Service programs, state agencies, other Federal agencies, Tribes, other partners, neighbors, user groups, or Congress. One of the distinctions among the proposed management alternatives is how each addresses those issues.

From agency and public meetings and planning team discussions, we developed a list of issues, concerns, opportunities, and other items requiring a management decision. We placed them in two categories: key issues and issues outside the scope of this CCP.

Key issues—Key issues are those the Service has the jurisdiction and authority to resolve. The key issues, together with refuge goals, form the basis for developing the management direction we describe in chapter 4.

Issues and concerns outside the scope of this analysis—These issues do not fall within the scope of the “purpose of, and need for, action” in this CCP. These issues are discussed after the key issues below, but are not addressed further in this document.

Following is a summary of the issues that arose during the scoping process.

Key Issues

We derived the following key issues, not arranged in any particular order, from public and partner meetings and further team discussions.

Facilities, Infrastructure, and Staffing

1. *At what levels does the Service plan to continue staffing and management of the refuge?*

The lack of Service personnel at the refuge was raised several times by the public during scoping. Perceptions expressed during scoping were that the refuge has been abandoned or that the Service did not care about the future of the property. The long-term vision for the refuge includes staff stationed out of the Sunkhaze Meadows NWR. However, like all management decisions, the actual implementation of staffing is dependent upon budget availability.

How the refuge will respond to staffing concerns is noted in the refuge administration discussion in chapter 4.

Habitat and Wildlife Management

1. *How will the refuge address potential impacts of climate change on existing refuge habitats?*

Climate change and its corresponding effects on species migrations or range distributions, extreme shifts in temperature and precipitation, and invasive species introductions may potentially pose dramatic threats and alterations to the habitats encompassed within the refuge. The ability to adapt or address these ever-changing concerns requires a comprehensive understanding of the refuge’s landscape context, individual habitats, species utilization, and their resilience.

Sunxhaze Meadows NWR and Carlton Pond WPA are located within the range of inland spruce–fir dominated plant communities. Many of the refuge habitats have developed under the climate conditions present over the past 8,000 years. Given the projections for shifts in mean temperature and precipitation for the region, new introductions of both native and nonnative species are possible results of climate change. Potential impacts of climate change are discussed in chapter 3, and how the refuge will respond to its implications is addressed in chapter 4.

2. *How will the refuge protect or improve its biological integrity in light of landscape-level ecological concerns such as biological connectivity with other nearby habitats?*

Fragmentation of both terrestrial and aquatic habitats can have adverse effects on many plant, fish, and wildlife species: reducing biodiversity, limiting genetic diversity, and increasing susceptibility to species invasion and other stressors. Activities such as logging, agriculture, or residential development can create a patchwork of forest, wetland, and grassland habitats. Dams, culverts, and other water control structures can fragment the available aquatic habitat in a similar manner.

The units encompassed by Sunkhaze Meadows NWR and Carlton Pond WPA are each fragmented to varying degrees. Sunkhaze Meadows Unit near Milford and Carlton Pond WPA near Unity are abutted by large acreages of private forest lands, some of which have been recently logged. As a result, while these areas still provide habitat for some species, it does represent a fragmentation of late successional forest lands. Other units, such as Sandy Stream and Benton, are surrounded by roads, residential property, and agriculture, which also result in fragmentation of the habitats available onsite.

We envision partnering with a variety of Federal, State, and non-governmental organizations to address these landscape-level concerns to the refuge. How the refuge will respond to connectivity needs is discussed in chapter 4.

3. *How will the refuge balance early successional habitat management for species like American woodcock with late successional habitat management?*

Sunkhaze Meadows NWR and Carlton Pond WPA provide important habitat for many State-listed birds and other species of conservation concern across the region. Among these are species such as the American woodcock, identified in many state, regional, and national plans as a priority species. It is listed as a species of highest conservation priority in BCR 14 (Dettmers 2006). Woodcock require an assemblage of early successional habitat including clearings for courtship (singing grounds), large openings for night roosting, shrub and sapling stands (0 to 15 years) for foraging, as well as young, second-growth hardwoods or mixed woods (15 to 30 years) for nesting, feeding, and brood-rearing (Sepik et al. 1981, Keppie and Whiting 1994).

Many of the bird species of conservation concern in the Northeastern U.S. are not entirely dependent on late-successional or old-growth forest (Hagan and Grove 1999); however, there are some at-risk species that are primarily dependent on the habitat features found in older forests. Birds of conservation concern that feed and nest within these late-successional forests at Sunkhaze Meadows Unit and elsewhere include bay-breasted warbler, Canada warbler, wood thrush, eastern wood-pewee, chestnut-sided warbler, blackburnian warbler, black-throated-blue warbler, and bald eagles. In addition, older forests have ecological processes that are mostly absent from young forests (Hagan and Whitman 2007). These species and processes require areas of long-term preservation in order to be sustained in perpetuity. This level of protection is not typically available with private lands, where changes in ownership can result in differing land use. Equally, other conservation lands managed by State, Federal, or local partners may change over time or have management goals that do not promote mature forest preservation.

Therefore, a management emphasis on late successional forest is important to sustaining the biological integrity, diversity, and environmental health of the Atlantic Northern Forest region.

Throughout this planning process, we have considered both the availability of habitat on a regional scale, while also considering our ability to successfully manage these types of habitats across refuge units and the WPA. How the refuge will balance early successional habitat management with late successional habitat management is discussed in chapter 4.

4. *What are the biological inventory and monitoring needs for the refuge and WPA and how will the Service meet them?*

Scientifically sound inventory and monitoring is important for the Service to understand what resources and species are present on refuge and WPA lands. Inventory and monitoring helps us increase our knowledge of those resources that we are striving to conserve and protect. In some cases, it can also help us evaluate how species or habitats respond to our management actions. A renewed emphasis on inventory and monitoring that helps inform on the ground management actions is an important recommendation of the recent *Conserving the Future* conference and final vision document, and the Service has recently expanded national funding for inventory and monitoring efforts.

Without dedicated staff to Sunkhaze Meadows NWR and Carlton Pond WPA, it is difficult for the Service to conduct the level of inventory and monitoring necessary to adequately inform management. We plan to work with the Service's regional inventory and monitoring staff, as well as area partners (e.g., local universities) to accomplish our inventory and monitoring needs. How the refuge will respond to the need for inventory and monitoring is discussed in chapter 4.

5. *How will the refuge manage for deer populations?*

As described in chapter 1, Congress entrusts the Service with the conservation and protection of specific national natural resources: migratory birds and fish, federally listed threatened or endangered species, interjurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. Because of this mandate, local game species (those that typically do not migrate across state lines, such as white-tailed deer) are managed by state fish and wildlife agencies. In Maine, MDIFW defines and enforces the series of regulations and management actions to maintain the State's deer population.

However, biological management for Federal trust species proposed within this plan will continue to provide habitat for local white-tailed deer populations. In addition, the Sunkhaze Meadows Unit contains a known deer overwintering yard that may provide important shelter during hard winter conditions. Similar deer yards located on adjacent private lands have recently been lost due to logging. As a result of the biological management proposed, we will protect this deer yard.

This concern and the relation of white-tailed deer to habitat management are discussed in chapter 4.

6. *How will the refuge manage invasive, nonnative, and overabundant species?*

Nonnative, invasive plant species such as phragmites (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*) threaten refuge and WPA habitats by displacing native plant and animal species, degrading natural communities, and reducing natural diversity and wildlife habitat values. They can out-compete native species by dominating light, water, and nutrient resources, and are particularly damaging when they dominate and overtake native habitats, as when phragmites dominates an entire wetland plant community.

The Sunkhaze Meadows Unit and Carlton Pond WPA are relatively free of invasive species. In these areas, prevention will be the key focus of invasive species management. In other areas, such as Benton Unit and Sandy Stream Unit, invasive species such as reed canarygrass (*Phalaris arundinacea*) have invaded wetland habitats and require active control to minimize their impacts on refuge habitats.

There are additional concerns that other invasive species such as nonnative insects, fish, and other animals should be considered and managed as well. Some climate change estimates also predict a shift of species distributions or conditions across the region that may allow introductions of additional species in the future.

How we respond to these concerns is discussed in chapter 4.

7. *How will the refuge manage the smaller Benton and Sandy Stream units in light of limited staff resources?*

Several comments were received pertaining to the ongoing management of two of the smaller units managed as part of Sunkhaze Meadows NWR. Benton and Sandy Stream Units are each located roughly an hour's drive away from the Sunkhaze Meadows Unit and the Maine Coastal Islands NWR staff headquarters in Rockland, Maine. Because of limited staff time and the distance from the refuge's current headquarters, both the Benton Unit and Sandy Stream Unit have had minimal management or monitoring by the Service.

How the refuge will respond to concerns regarding Benton and Sandy Stream units are noted in goals 3, 6, and 7 in chapter 4.

Visitor Services Management

For national wildlife refuges, providing wildlife-dependent recreation opportunities is also a priority. It creates the opportunity for many visitors to experience the lands that refuges protect and see the value behind the conservation work that the Service does. Providing public access and recreational use is an important issue addressed in this plan. The planning team received many opinions on specific actions or techniques to improve opportunities for wildlife-dependent recreation on the refuge and WPA.

Specific questions asked regarding the topic of visitor services, include:

1. *What is designated Wilderness and how will this affect public use and management of refuge lands?*

The Wilderness Act of 1964 established the National Wilderness Preservation System and a process for federal agencies to recommend wilderness areas to Congress. There are 75 wilderness areas on 63 units of the Refuge System in 26 states. About 90 percent of the Refuge System wilderness is in Alaska.

Wilderness, as defined by the Wilderness Act, is untrammeled (free from human control), undeveloped, and natural, offering outstanding opportunities for solitude or primitive recreation. Wilderness visitors may hunt, fish, and observe and photograph wildlife, if these activities are compatible with the refuge's primary mission of wildlife conservation. Many other types of compatible recreational uses, such as cross-country skiing, canoeing, kayaking, and hiking may also be enjoyed in wilderness areas (USFWS 2011b).

After completing the Wilderness Review, we do not intend to recommend wilderness designation on any of the refuge units or WPA at this time. The completed Wilderness Review is included as appendix C.

2. *What is the purpose of Wild and Scenic River designation, how is a Wild and Scenic River designation made, and how will this affect public use and management of refuge lands?*

The Wild and Scenic Rivers Act provides a national policy and program to preserve and protect selected rivers, or segments of rivers, in their free-flowing condition in the National System. Wild and Scenic River designation seeks to protect and enhance a river's current natural condition and provide for public use consistent with retaining those values. Designation affords certain legal protection from adverse development, e.g., no new dams may be constructed, nor federally assisted water resource development projects allowed, that are judged to have an adverse effect on designated river values.

When completing land and water planning (e.g., CCPs) on Federal lands, agencies are required to initiate a Wild and Scenic River Review. The review included in this document only applies to Service-owned lands, and only addresses our determinations of river eligibility and classifications. These determinations are tentative and are subject to further consideration during the study phase which we will complete sometime after the CCP is completed. At this time, we do not know when we might be able to complete the suitability study. We expect it will be several years.

Agencies by themselves cannot designate rivers under this act. If we determine that there are eligible and suitable segments (as defined by the act), we will prepare a separate legislative environmental impact statement and submit it with the results of the suitability study to the Director of the Service and ultimately to Congress for potential designation. This is a long process and there will be several opportunities for public involvement.

The results of our Wild and Scenic Review do not affect recreational use of Sunkhaze Stream or its tributaries, including access for boating, fishing, or hunting at current or expected levels of use. Wild and Scenic River designation, if it occurs, is not expected to affect these uses either. For more information, please see the Wild and Scenic River Review (appendix D).

3. How will the Service address snowmobiling on refuge lands? Will the refuge remain open to snowmobiling? Will snowmobiling be expanded?

Sunkhaze Meadows NWR currently allows snowmobiling in designated locations on several refuge units. Sunkhaze Meadows Unit contains a 3-mile segment of the Interconnected Trail System (ITS) trail along the western portion of the unit. Benton and Sandy Stream Units also contain smaller segments (1 mile or less) of local or regional snowmobile trails. These segments are maintained by local snowmobile clubs, which is authorized under a special use permit issued by refuge staff.

We intend to maintain snowmobile access similar to current levels. Specifics on how we will address snowmobiling on Service lands are noted in goals 4, 5, and 6 discussed in chapter 4.

4. How will the refuge continue to support hunting opportunities?

As previously mentioned, hunting is one of the priority public uses identified in the Refuge Improvement Act. We received several comments from interested members of the public both supporting and opposing hunting on refuge lands. Currently, the refuge is open to all State seasons, according to State regulations with one exception, coyote hunting. Some commenters requested we more closely align refuge regulations with State regulations, specifically by expanding the coyote hunting season and revising refuge hunter orange requirements to mirror State regulations.

As Federal lands, season dates and refuge-specific regulations apply on all refuge properties. To the extent practicable, refuges align their regulations with state regulations. Because of the Refuge System's wildlife first mission and the need to balance hunting with other priority public uses, refuge hunting regulations are sometimes more restrictive than state regulations. Because changing the refuge and WPA hunter orange requirements was minor, we were able to modify them to be consistent with State regulations in 2012. We have discussed coyote hunting on refuge and WPA lands previously (see issue 5, Habitat and Wildlife Management). Specifics of how the refuge will address hunting are described in goals 4 through 6 in chapter 4.

5. How will the refuge continue to support trapping opportunities?

Trapping is not included as a priority public use under the Refuge Improvement Act. Trapping is currently allowed on refuge units and at Carlton Pond WPA as a management activity. We control this activity by issuing special use permits. We are not proposing any changes to the refuge's current trapping program. How the refuge will address trapping is noted in chapter 4, under general refuge management.

6. *What will the refuge do to improve access to the various refuge units?*

Having access to the refuge by way of parking lots, trails, boardwalks, and other infrastructure is an important issue for many people who provided comments during scoping. These access points and trails are used by visitors to engage in various recreational uses, as well as by Service staff for management purposes.

Infrastructure requires regular maintenance to provide safe and open access. In recent years, some of the existing infrastructure at the Sunkhaze Meadows Unit has fallen into disrepair. Trails have become blocked or overgrown. Boardwalks have buckled as a result of frost heave. Maintenance of these access areas is important to provide continued, safe public use. Current interpretive kiosks are out of date as well.

Another concern at the Sunkhaze Meadows Unit is limited access to Sunkhaze Stream. Many visitors access the refuge via small boats. Currently, the refuge's only access point for the stream is at the far northern end of the refuge. Boaters need to portage their boats over 1,000 feet to reach the stream and launch. Commenters requested additional access to Sunkhaze Stream, particularly at the southern end near its confluence with the Penobscot River and State Route 2.

Other refuge lands have varying degrees or types of access. Carlton Pond WPA has no trail system because of limited upland areas and the dominance of open water and emergent wetlands. However, many people enjoy paddling Carlton Pond to observe wildlife. At the Benton and Sandy Stream units, no formal trail systems exist, although each unit does contain snowmobile trails that are used for winter transportation and for occasional wildlife observation during the warmer months. Several comments were received asking the refuge to consider improving access on these units for wildlife observation and other uses.

How the refuge will respond to access concerns are noted in goals 4 through 6 in chapter 4.

7. *How does the refuge plan to improve its public use programming, including environmental education and interpretation?*

Environmental education and interpretation are two priority public uses outlined under the Refuge Improvement Act and are important ways of reaching out to the public. Currently, we provide a limited number of presentations upon request. In the absence of staff, the Friends of Sunkhaze Meadows provide an important role in connecting people to the Sunkhaze Meadows Unit by providing regular environmental interpretive programming on refuge lands. The Service would like to improve its support for the Friends organization and programming, as well as create additional Service-led programs, if resources are available

Others are interested in the possibility of additional environmental education or interpretive programs at Carlton Pond WPA, Benton Unit, or Sandy Stream Unit. Providing programming at these units will require refuge staff or a partnership with local organizations to develop and lead events. How the refuge will respond to public use programming concerns are noted in goals 4 through 6 in chapter 4.

8. *How does the refuge plan to address cultural and historic resources related to the refuge?*

The lands and waters comprising Sunkhaze Meadows Unit have been important to the Penobscot Indian Nation for thousands of years. The refuge continues to have cultural and historic significance to the Penobscot Nation. Other Tribes such as the Passamaquoddy Tribe, Houlton Band of Maliseet Indians, and Aroostook Band of Micmacs also have historic or cultural connections to refuge units. Sunkhaze Meadows Unit is known to contain at least one archaeological site and others may exist. Preservation and interpretation of these resources is an interest to many of those who provided initial comment during scoping.

To date, no cultural or historic resources have been identified at Carlton Pond WPA or at Benton or Sandy Stream Units. Still, their locations may provide opportunities for future interpretation of Native American or early European settlement cultural history.

How the refuge will respond to cultural and historic resource concerns are noted in goals 4 through 6 in chapter 4.

9. *How will the refuge utilize partnerships with area agencies, businesses, and organizations to benefit resource conservation and visitation?*

The Service will not be able to accomplish all of its desired management for the refuge and WPA alone. To achieve its management goals, the Service will need to rely heavily on partnerships with Tribal, State, and local agencies, and other organizations.

Members of Tribal and State agencies have offered suggestions for ways the Service can partner on its biological management and public use goals. Local municipalities and non-governmental organizations have offered recommendations for ways partnerships can improve refuge visitation and public use offerings.

How the refuge will respond to potential partnerships is noted in goal 7 in chapter 4.

Issues and Concerns Outside the Scope of this Analysis

The following issue was raised during public meetings. It is outside the jurisdiction and authority of the Service and will not be addressed further within the CCP.

1. *Can the refuge harvest natural resources from refuge lands in order to fund refuge staff positions?*

Several comments were received during scoping inquiring into what opportunities might be available for resource harvesting on the refuge with the specific intention of using funds generated to support a refuge staff position. Resource harvesting is occasionally allowed in circumstances where it is deemed to be compatible with refuge goals and to fulfill wildlife habitat objectives. To date, no commercial resource harvesting has been allowed on the refuge.

According to Service policy, national wildlife refuges cannot use funds generated on the refuge for staff positions or other onsite improvements. Funds obtained from the sale or harvest of timber, peat, or other resources on a refuge are deposited into the national budget. They are then distributed as part of the Refuge Revenue Sharing Program, which distributes these funds to municipalities to offset losses in tax revenue from any tax-exempt Federal lands in their jurisdiction. Staffing levels at Sunkhaze Meadows NWR and Carlton Pond WPA are subject to approval of the Service's Northeast Region Assistant Regional Director of the Refuge System and are based on Federal budget allocations.

2. *What is the status of the East-West Highway and how will it affect the refuge?*

We are aware of the discussions around a proposed East-West Highway. We are working to stay informed of the process, but it is not a Federal or Service activity and therefore is outside of the Refuge System's jurisdiction.

Plan Amendment and Revision

Periodic review of the CCP will be required to ensure that objectives are being met and management actions are being implemented. Ongoing monitoring and evaluation will be an important part of this process.

Monitoring results or new information may indicate the need to change our strategies. At a minimum, CCPs will be fully revised every 15 years. We will modify the CCP documents and associated management activities as needed and we will follow the procedures outlined in Service policy, the Refuge Improvement Act, and NEPA requirements, and other Federal mandates.

Chapter 3

Dan Salas, Cardno JFNW



View of Carlton Pond

Existing Environment

- **Introduction**
- **Physical Landscape**
- **Refuge and WPA Biological Resources**
- **Cultural Landscape Setting and Land Use History**
- **Socioeconomic Environment**
- **Refuge and WPA Administration**
- **Refuge and WPA Public Use**
- **Archaeological and Historical Resources**

Introduction

This chapter describes the current and historic physical, biological, and socioeconomic landscape of Carlton Pond WPA and the three units comprising Sunkhaze Meadows NWR (Sunkhaze Meadows, Benton, and Sandy Stream Units). Included are descriptions of the physical landscape, the regional context and its history, and the refuge environment, including its history, current administration, programs, and specific refuge resources.

The 11,484-acre Sunkhaze Meadows Unit is located in the town of Milford, Penobscot County, approximately 14 miles northeast of Bangor, Maine. The refuge is about 3 miles east of the Penobscot River and roughly bounded on the west by Dudley Brook, on the south and east by County Road, and on the north and east by Stud Mill Road. Sunkhaze Stream bisects the refuge along a northeast to southwest orientation and, along with its six tributaries, creates a diversity of wetland communities. The bogs and stream wetlands, adjacent uplands and associated transition zones, provide important habitat for many wildlife species. The wetland complex consists primarily of wet meadows, shrub thickets, cedar swamps, extensive red and silver maple floodplain forests and open freshwater stream habitats, along with plant communities associated with peatlands, such as shrub heaths and cedar and spruce bogs.

The 334-acre Benton Unit is in the town of Benton, Kennebec County, about 5 miles northeast of Waterville, Maine. This unit is just east of the Sebasticook River and is bounded by Route 139 on the west, Fowler Brook to the east, and Albion Road to the south. The Service acquired this property from the FmHA. This unit includes wetlands and breeding habitat for sedge wrens (*Cistothorus platensis*), a State-listed endangered species, although sedge wrens have not been observed on the unit since then. About one-third of the Benton Division is maintained as grassland and two-thirds is second growth mixed softwood-hardwood forest. Historically, the land was drained to provide pasture for dairy cows. In 1993, the Service installed three dikes to restore some small wetland habitats ranging from one-quarter to 2 acres at the site.

The 58-acre Sandy Stream Unit was acquired along with the Benton property and is located in the town of Unity, Waldo County. This parcel is primarily old pasture with a variety of shrub species. The unit is bounded on the east by Sandy Stream that flows north into Unity Pond, west by Prairie Road, and to the south by town-owned land that abuts Route 139.

The 1,068-acre Carlton Pond WPA is located in the town of Troy, Waldo County, about 7 miles north of Unity, Maine. Waterfowl production areas are wetlands (and surrounding uplands) that provide breeding, resting, and nesting habitat for waterfowl, shorebirds, waterbirds, and other wildlife. The original rock dam at Carlton Pond was built in 1850 to power a local sawmill. The Service reconstructed the dam in 1972 and manipulates water levels using a water control structure. The pond is approximately 295 acres of open water and 489 acres of emergent marsh; the remainder of the WPA is upland forest and peat bog. Carlton Pond WPA provides nesting areas for a population of black terns (*Chlidonias niger*), a State-listed, endangered species.

Physical Landscape

Landscape Perspective

Sunkhaze Meadows NWR and Carlton Pond WPA lie within the Gulf of Maine watershed, an immense area extending from eastern Quebec Province in Canada to Cape Cod, Massachusetts. Maine is the only state located entirely within the watershed boundary. The Gulf of Maine watershed encompasses, among others, the great rivers of Maine (St. John, Penobscot, Kennebec, Androscoggin, and Saco) and the coastal drainages of Downeast Maine. The Sunkhaze Meadows Unit is within the Penobscot River watershed. Carlton Pond WPA and the Benton and Sandy Stream Units are in the Kennebec River watershed. These refuge lands lie in the south central region of Maine (see map 1.1 and 1.2).

Regional conservation initiatives in Maine span the State from the “Mount Agamenticus to the Sea” collaboration in southern Maine to the “Mahoosuc Initiative” straddling the western border with New Hampshire, and efforts to protect Cobscook Bay and the Downeast Lakes in Washington County. A partnership between TNC and the Forest Society of Maine is working to conserve 42,000 acres southeast of the Sunkhaze Meadows Unit. In addition to refuge lands, this would augment lands owned by the Maine Department of Conservation (Bradley and Greenfield Units and Nicaous easement) and the U.S. Forest Service (Penobscot Experimental Forest). This partnership known as the Lower Penobscot Forest Project would further buffer the refuge from future development and protect headwaters of several tributaries that flow into Sunkhaze Stream (TNC 2011).

The Sebasticook Regional Land Trust (formerly the Friends of Unity Wetlands) is active in the area around the Benton and Sandy Stream Units (FUW 2006). Their 42,000-acre Unity Wetlands Focus Area is a large expanse of wetlands and uplands centered on Unity Township, extending east to Unity Pond and west to the Sebasticook River, covering about 65 square miles. The Sebasticook River from its mouth upstream several miles is the best habitat in the State for at least two rare mussels, tidewater mucket (*Leptodea ochracea*), and yellow lampmussel (*Lampsillis cariosa*). These mussel populations extend into some of the tributaries including Sandy Stream. The focus area’s floodplain forests also provide habitat for wood turtles and yellow-throated vireos, which are both State-rare, streamside forest specialists. The Unity Wetlands landscape is characterized by working farms and forests and is known as part of Maine’s Dairy Belt (Friends of Unity Wetlands 2006).

Climate

Sunkhaze Meadows NWR and Carlton Pond WPA lie within the Central Interior biophysical region of Maine (McMahon 1990). The climate of this region is transitional between the more moderate climate of the coast and more extreme continental conditions (i.e., colder winters, warmer summers) further inland. Summers are warm and the frost-free season of 140 to 160 days is comparable to that of the coastal zone. Mean maximum July temperature is 80 °F. Winter temperatures are relatively mild with a mean minimum January temperature of 10 °F. Snowfall averages 80 inches per year, intermediate between coastal and northern regions. Vegetation associations, which are in part a reflection of climate, in the Central Interior region are transitional from Appalachian forests of oaks, pine, and mixed hardwood in the south to more

boreal spruce-fir and northern hardwood forests in northern and eastern Maine. Similarly, wetland types are transitional in this region, with red maple swamps and vernal pools more common in the southwest part of the region and peatlands more common farther north and east (McMahon 1990).

There is consensus among the scientific community that climate change will lead to significant impacts across the U.S. and the world (Joint Science Academies' Statement 2005). The effect of climate change on wildlife and habitats is expected to be variable and species specific, with a predicted general trend of species' distributions shifting northward. Current global climate change models developed by the U.S. Forest Service Northern Research Station predict that the range of spruce-fir forest cover type will recede substantially north of the Sunhaze Meadows Unit by the end of the present century (Prasad et al. 2007).

Climate change is expected to affect Maine's ecosystems and biodiversity in several ways, such as shifting species distributions, increasing drought stress for plant communities and aquatic systems, raising air and water temperatures, amplifying pest and disease outbreaks, and increasing plant growth fertilized by higher ambient carbon dioxide levels. In Maine, all groups of native species are predicted to be greatly affected by climate change and the corresponding shift in habitat, food resources, weather, and competition (Whitman et al. 2010). In addition, global climate changes are predicted to affect natural disturbance patterns over time by altering the timing and frequency of events such as flooding, fires, and other severe weather events (Lorimer 2001).

The effect of climate change on wildlife and habitats is expected to be variable and species specific, with a predicted general trend of species' distributions shifting northward. Global climate change models developed by the U.S. Forest Service Northern Research Station predict that the range of spruce-fir forest cover type will recede substantially beyond the refuge boundaries to the north by the end of the present century (Prasad et al. 2007). Climate change is expected to affect Maine's ecosystems and biodiversity in several ways, such as shifting species distributions, increasing drought stress for plant communities and aquatic systems, raising temperatures, amplifying pest and disease outbreaks, and increasing plant growth fertilized by higher ambient carbon dioxide levels (Whitman et al. 2010).

Hydrology and Water Quality

The lands comprising Sunhaze Meadows NWR and Carlton Pond WPA are within two distinct watersheds. Sunhaze Stream, which flows through Sunhaze Meadows Unit, drains into the Penobscot River. Carlton Pond WPA and Benton and Sandy Stream Units are in the Sebasticook River Watershed, which in turn flows into the Kennebec River. The landscapes of both watersheds impact the water quality of both systems.

Penobscot River – Sunhaze Stream

The Penobscot River, New England's second largest river system, drains into an 8,570-square mile watershed. The West Branch starts near Penobscot Lake in western Maine, on the border between Maine and Quebec Province, Canada. The East Branch begins at East Branch Pond near the headwaters of the Allagash River in north-central Maine. The two branches join in the town of Medway near East Millinocket, more than 60 miles to the north of the Sunhaze Meadows

Unit. The main stem of the Penobscot River empties into Penobscot Bay, along the Maine coast, near the town of Bucksport.

Sunkhaze Stream is approximately 20 miles long and begins as a series of seeps and springs. The stream and its tributaries flow through three townships (Greenfield, Greenbush, and Milford) before reaching the Penobscot River in Milford. The Sunkhaze Meadows Unit encompasses 5 miles of Sunkhaze Stream and another 16 miles of tributary streams that include Buzzy, Little Buzzy, Baker, Dudley and Johnson Brooks, and Birch and Little Birch Streams. The portion of Sunkhaze Stream within the refuge is generally comprised of three river segments. The lower section contains a deep, wide, channelized stream surrounded by a hardwood canopy, dominated by silver maples, that shades the water. Middle portions of Sunkhaze Stream are bordered by emergent marsh and grassy wet meadow and contain a string of beaver dams and ponds connected by slow-moving runs. Upstream of Johnson Brook, alders and other shrubs and trees form a canopy, then the grade increases creating a series of riffles, runs, and pools below Stud Mill Road (Smithwood and McKeon 1999). Sunkhaze Stream, north of Stud Mill Road and outside refuge lands, has a series of riffles and falls separated by long stretches of slow meandering water. This section supports some of the most important brook trout fisheries in the Bangor area (Rupp 1955, Stockwell and Hunter 1983, Smithwood and McKeon 1999).

Sunkhaze Stream, with a watershed of approximately 100 square miles, flows in a westerly direction to its confluence with the Penobscot River. During spring snowmelt periods, waters from the Penobscot River flow up Sunkhaze Stream and down the Otter Chain Ponds, causing the entire bog area to become a large lake (USFWS 2001).

Sunkhaze Stream and its tributaries are classified as Class AA waters by Maine Department of Environmental Protection (MDEP) (MDEP MRS Title 38 467 7(C)(8)). According to MDEP, “Class AA shall be the highest [water] classification and shall be applied to waters which are outstanding natural resources and which should be preserved because of their ecological, social, scenic or recreational importance” (MDEP MRS Title 38 464 1(A)). Class AA waters must be of such quality that they are suitable for the designated uses of drinking water after disinfection, fishing, agriculture, and recreation in and on the water, navigation, and as habitat for fish and other aquatic life. The habitat must be characterized as free-flowing and natural.” The main stem of the Penobscot River in this region is classified as Class B water, defined as waters of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation; navigation; and as habitat for fish and other aquatic life (MDEP 2011c).

Kennebec River – Sebasticook River and Tributaries

The Kennebec River begins at Moosehead Lake in west-central Maine, and flows 150 miles to its outflow into Merrymeeting Bay in the town of Richmond. The Sebasticook River is the largest tributary to the Kennebec River. The Sebasticook River begins in Dexter and flows 50 miles, draining 985 square miles before reaching the Kennebec River, about 16 miles upstream of Merrymeeting Bay (Maine Rivers 2011).

The Benton Unit of Sunkhaze Meadows NWR lies along a portion of Fowler Brook, which flows north directly into the Sebasticook River in the town of Benton. Carlton Pond drains into Carlton Stream, one of three major tributaries that flow into Unity Pond. Sandy Stream flows north into Unity Pond just at its outlet. The outlet of Unity Pond is Twenty-Five Mile Stream, which joins the Sebasticook River in the town of Burnham. Typically, Sandy Stream flows north and into the wetland area southwest of the Unity Pond outlet and then into Twenty-Five Mile Stream. However, during significant rain events and when lake water levels are low Sandy Stream may bypass Twenty-Five Mile Stream and flow directly into Unity Pond, greatly increasing the watershed of the Pond (MDEP 2004).

According to the MDEP Water Classification Program Report (Title 38, Article 4-A), the Sebasticook River main stem, including all impoundments—from the confluence of the East Branch and the West Branch to its confluence with the Kennebec River is classified as Class C water. This is the 4th highest classification in Maine and is defined as suitable for the designated uses of drinking water supply after treatment, fishing, agriculture, recreation in and on the water, industrial process and cooling water supply, hydroelectric power generation, navigation, and as habitat for fish and other aquatic life. Tributaries in the Sebasticook River are classified as Class B water (MDEP 2011c). Unity Pond has a history of supporting excessive amounts of algae in the late summer and early fall, due in large part to the contribution of phosphorus that is prevalent in area soils and that has accumulated in the pond bottom sediments (MDEP 2004).

Geology and Soils

Continental glaciers probably extended across Maine several times during the Pleistocene Epoch, which lasted from about 2.5 million to 10,000 years ago. The slow-moving glacial ice changed the landscape as it scraped across mountains and valleys, eroding and carrying rock debris. The sand, gravel, and other unconsolidated sediments that cover much of Maine are largely the products of that glaciation. Glaciation also changed drainage patterns and helped create the hundreds of modern ponds and lakes scattered across the State (MGS 2005).

The most recent glacial period in Maine began 35,000 years ago, when the Laurentide Ice Sheet spread across southern Quebec and New England. During its peak development, this ice sheet was centered over eastern Canada and flowed east to southeast across Maine. It became several thousand feet thick and covered the highest mountains in the State (MGS 2005). The Laurentide Ice Sheet started to recede as early as 21,000 years ago, soon after it reached its terminal position on Long Island, New York (Sirkin 1986). The ice margin receded to the present position of the Maine coast by 17,000 to 16,000 years ago (Borns et al. 2004).

The land previously underneath the glacier was still depressed by the weight of the ice sheet, causing ocean waters to flood southern Maine as the glacier continued retreating. Ocean waters extended up into the Kennebec and Penobscot valleys, reaching present elevations to at least 420 feet above current mean sea level in central Maine (MGS 2005). Consequently, the lowlands of the lower Kennebec and Penobscot River valleys were filled with glaciomarine clays and silts (McMahon 1990). The last remnants of glacial ice were gone from Maine by about 11,000 years ago (MGS 2005). The modern network of streams became established soon after glaciers receded and organic deposits began to form in peat bogs, marshes, and swamps. Tundra vegetation

bordering the ice sheet was replaced by changing forest communities as the climate warmed (Davis and Jacobson 1985).

Most of the soils (more than 70 percent) on the Sunkhaze Meadows Unit are poorly or very poorly drained; the dominant soil types include peat and muck, Monarda and Burnham, Biddeford, Buxton-Scantic-Biddeford, and Scantic. The primary well-drained soils at Sunkhaze Meadows Unit include Howland, Plaisted, and Thorndike (USDA 2011).

The dominant soil types on the Benton Unit are poorly drained Scantic silt loam and Ridgebury very stony fine sandy loam. These soils underlie much of the fields including the entire field area around the small diked wetlands. Well-drained soils at this unit include Scio, Woodbridge, and Paxton-Charlton soil types, which are primarily in the eastern half of the unit (USDA 2011).

The soils at the Sandy Stream Unit include the poorly drained Limerick and Rumney soils, and moderately well-drained Podunk fine sandy loam. The poorly drained soils underlie much of the shrub habitat (USDA 2011).

Approximately 90 percent of the soils on Carlton Pond WPA are poorly drained. Besides a large area of open water, the dominant soil type is the very poorly drained Borosapristis (ponded). The primary well-drained soil is the Thorndike-Winnecook complex (USDA 2011).

Air Quality

The Penobscot Indian Nation monitoring station, located in Penobscot County on the Penobscot Indian Nation Reservation and adjacent to the Sunkhaze Meadows Unit, is the only air quality monitoring station near any Sunkhaze Meadows NWR and Carlton Pond WPA properties. The Penobscot Indian Nation monitoring station monitors ozone levels hourly.

Ozone levels are low in the winter and peak in the summer months. The current National Ambient Air Quality Standard for ozone is 0.075 parts per million (ppm). A monitoring station experiences an ozone exceedance when the 8-hour ozone average exceeds the current standard. Table 3.1 presents the ozone exceedance incidents for the Penobscot Indian Nation station from 2006 to 2011.

Table 3.1. Ozone exceedance days, Penobscot Indian Nation Monitoring Station, Penobscot County, 2006 through 2011 (MDEP 2011).

Year	Number of Exceedance Days, State of Maine	Number of Exceedance Days at Penobscot Indian Nation	Ozone PPM Level	Date(s) of Exceedance Days at Penobscot Indian Nation Monitoring Station
2011	3	0	--	n/a (not applicable); no exceedance days recorded
2010	8	0	--	n/a
2009	3	0	--	n/a
2008	4	0	--	n/a
2007	14	2	0.080; 0.080	4/23/07; 5/25/07
2006	11	1	0.077	5/15/06

Given that ozone levels around the refuge continue to be well below the State's overall number of exceedance days, there appears to be no ozone-related air quality issues at the Sunhaze Meadows Unit.

Particulate Pollution

While particulate pollution can occur throughout the year, it peaks in the summer, due mainly to wildfires, and in the winter, primarily from wood smoke (EPA 2011). Wood burning is one of the largest sources of particulate and toxic air pollution in Maine. Wood smoke can contain nitrogen oxides, carbon monoxide, and organic gases in addition to particulate matter pollution (MDEP 2011b).

During the winter months wood smoke contributes to higher levels of particulate matter pollution in Maine, with pollution levels highest in the morning hours. Maine experiences a number of days with moderate levels of particulate matter pollution during the winter months, even when much of New England might have lower levels of particulate matter pollution. Wood smoke can cause harm to human health, particularly to the health of children, the elderly, and those with chronic conditions. It can also result in environmental and general neighborhood complaint issues (EPA 2011).

MDEP staff monitors particle pollution levels daily and provides data on recorded levels to the public in four ways:

- 24-hour toll free Air Quality hotline: 1-800-223-1196.
- Online at: <http://www.maine.gov/dep/air/ozone/index.html> (accessed September 2012).
- EnviroFlash— Email and text message alert system established by EPA in cooperation with MDEP.
- Sharing information with local media.

When levels are elevated and expected to remain elevated, staff report the levels on the air quality hotline and the air quality forecast Web site. Whenever unhealthy concentrations are expected, staff issues an advisory message.

To report on daily air quality, U.S. Environmental Protection Agency (EPA) developed the air quality index (AQI). The AQI's purpose is to help citizens understand what local air quality means to their health. MDEP uses the AQI to report on particle and ozone levels. They take the measurements of concentrations of the major pollutants at locations throughout the State and then convert them into AQI values, with an AQI value calculated for each of the individual pollutants in an area.

For ozone, the AQI is based on ozone levels averaged over an 8-hour period; for particulates, it is based on particle pollution levels averaged over a 24-hour period. Table 3.2 describes the AQI levels of health concern, including the index ranges and the color system used to represent each level.

Table 3.2. Overview of air quality index levels.

AQI Levels of Health Concern	Color	Air Quality Index
Good	Green	0 to 50
Moderate	Yellow	51 to 100
Unhealthy for Sensitive Groups	Orange	101 to 150
Unhealthy	Red	151 to 200
Very Unhealthy	Purple	201 to 300

Adapted from: <http://www.airnow.gov/index.cfm?action=aqibasics.aqi>

Environmental Contaminants

Two landfills near the Sunkhaze Meadows Unit pose potential concerns: the Fort James (formerly James River) Corporations sludge landfill along Stud Mill Road, and the town of Milford municipal landfill along County Road. The 27-acre Fort James landfill is located approximately 3,600 feet east of Buzzy Brook along the refuges northern boundary. The landfill was closed on December 1, 1996, and covered with a combination of soil, borrow, grit, and sand. Between 1979 and 1996, the landfill received sludge from paper mill operations, woody debris, lime, tire chips, and miscellaneous material. Twenty-one groundwater wells surround the landfill, two of which are located on the refuge. However, all required groundwater monitoring has been completed and these wells are no longer sampled. The potential for overland transport of contaminants from this landfill appears remote. No established surface water drainages appear to exist between Buzzy Brook and the landfill. However, there are borrow pit ponds on the refuge within approximately 850 feet of the landfill; groundwater flow direction is towards the borrow pit ponds.

The 5-acre Milford municipal landfill is located approximately 980 feet east of Baker Brook along the southern boundary of the refuge. The Milford landfill was closed in 1995. From 1976 to 1993 the landfill received municipal solid waste, demolition debris, white goods, tires, and household waste. The landfill is capped with an impermeable clay cover and a vegetative cover. Visual inspections by Service personnel in late February 1999 (an unusual period of minimal snow cover) did not indicate any sloughing, erosion, or breakouts on the cap. Groundwater monitoring wells are located around the landfill, but there are no monitoring wells on refuge property. The three existing wells are monitored biannually for State Closure Indicator parameters: hardness, chloride, chemical oxygen demand, iron, manganese, sodium, and sulfate (CES, Inc. 1998). The potential for overland transport of contaminants from the landfill appears remote. No established surface water drainages exist between Baker Brook and the northwest corner of the landfill. The floodplain of Baker Brook is less than 1,000 feet from the landfill, and it is possible that groundwater underlying the landfill discharges to the brook.

In 1993, a screening-level contaminant survey of the Sunkhaze Meadows Unit was conducted by the Service's Maine Ecological Services Office (Mierzykowski and Carr 2004). Elevated levels of polychlorinated biphenyls (PCBs) were found in a Baker Brook sediment sample (0.78 ppm) and high chromium levels were found in chain pickerel (10.59 ppm) and yellow perch (13.20 ppm) samples from Sunkhaze Stream. In 2001, a follow up contaminant survey was conducted using additional locations along these watercourses to validate the earlier results and to

determine the extent of contamination in fish and sediments. The contaminants of concern in the 1993 collections were not found at elevated levels in the 2001 collections. In 2001, fish tissue samples from Sunkhaze Stream and Baker Brook did not contain detectable levels of PCBs or chromium. No other organochlorine compounds or inorganic elements were found at elevated concentrations in fish tissue during the follow-up study. PCBs were not detected in the five sediment samples from Baker Brook. Chromium was detected in Baker Brook sediments at low levels, but the element was not detected in any fish samples from the brook (Mierzykowski and Carr 2004).

Data collected in contaminant studies suggested that the former Milford municipal landfill, closed since 1995, may be influencing Baker Brook. Of the 21 inorganic elements identified during analysis, 10 elements exhibited their highest concentrations in the Baker Brook sediment collection site approximately one-half mile downstream of the former landfill. Of the 10 elements, however, only cadmium occurred at an elevated concentration (1.18 ppm) and at a level only slightly above the threshold effect concentration of 0.99 ppm. Arsenic was also found slightly above its threshold effect concentration (9.79 ppm), measuring 10.2 ppm at the confluence of Baker Brook and Sunkhaze Stream (Mierzykowski and Carr 2004).

The Service's Northeast Region has also participated in and coordinated its regional work with the National Abnormal Amphibian Project at various national wildlife refuges throughout the Northeast since 2000. Many amphibians (such as frogs and salamanders) are sensitive to a variety of environmental stresses, such as pollution, and may be good early indicators of the health of their environment. For this reason, the Service has had an interest in determining if amphibian abnormalities are occurring on national wildlife refuges. In their 2005 report, researchers summarized the results to date of the sampling effort conducted in 2005 as well as previous years' efforts extending back to preliminary efforts in 1997. As part of their investigation, the Service sampled frogs at Sunkhaze Meadows Unit and Carlton Pond WPA. Ongoing sampling was discontinued at Sunkhaze Meadows Unit due to small number of frogs collected and the lack of abnormalities found. A small percent (approximately 1 percent) of Carlton Pond frogs did exhibit some abnormalities (Pinkney et al. 2005). Some of these were the result of fungal infections to individuals. Other causes of abnormalities are unknown since the Carlton Pond watershed is known to be free of contaminant sites (Pinkney et al. 2005).

An underground natural gas pipeline (Maritimes and Northeast Pipeline) was constructed near the Sunkhaze Meadows Unit in the fall of 1999 and early spring 2000. The pipeline route runs along County Road, adjacent to the Sunkhaze Meadows Unit. This right-of-way crosses seven streams and tributaries that flow into the refuge. Limited surface water sampling along the pipeline corridor before and after construction detected no impacts to the refuge.

Two roads form more than half of the Sunkhaze Meadows Unit boundary: the northern and northeastern boundaries are bordered by Stud Mill Road, and County Road forms the southeastern boundary. Both roads are unpaved, typical of northern and eastern Maine. Stud Mill Road is a privately owned logging road, while County Road is maintained by the Town of Milford. Vehicle traffic along these roadways is fairly constant throughout the year. Refuge staff has observed illegally dumped debris and refuse frequently along the roadways. Numerous roadside ditches, bridges, and culverts along the Stud Mill Road and County Road are potential

pathways for vehicle-related or illegally disposed contaminants into the watercourses of Sunkhaze Meadows Unit. In the early 1990s, the refuge worked with its neighbor, James River Corporation, to install five gates on refuge access points to help curtail illegal dumping; the gates had a positive effect in controlling dumping.

No contaminants are known to impact the other refuge units or Carlton Pond WPA.

Refuge and WPA Biological Resources

Vegetation and Habitat Resources

In 2004, the Service contracted with the James W. Sewall Company to conduct aerial surveys and develop vegetation maps for several refuges in the Northeast, including Sunkhaze Meadows NWR and Carlton Pond WPA. Sewall delineated habitats based on the National Vegetation Classification Standard (NVCS, <http://biology.usgs.gov/npsveg/nvcs.html>; accessed September 2012). The Nature Conservancy and the Natural Heritage Network developed the NVCS as their standard system for classifying vegetation communities; the Service subsequently adopted this system to map habitats on refuges. This classification system is based on hierarchical levels so that it can be used on the finest or coarsest level as needed (Comer et al. 2003). This is useful since wildlife typically respond to coarser scale conditions rather than more fine-scale individual natural communities. Therefore, we combined several natural community types into broader habitat types to guide management objectives and strategies.

Sunkhaze Meadows Unit

Sunkhaze Meadows Unit is an ecologically diverse community dominated by an expansive freshwater wetland-peatland complex surrounded by a conifer-northern hardwood upland forest. The habitat types are listed in Table 3.3 and displayed on map 3.1.

Table 3.3. Sunkhaze Meadows Unit habitat types.

Habitat Type	Acres
<i>Freshwater Wetlands-Peatland Complex</i>	
Freshwater Wetland	1,654
Open Water	158
Peatland	1,649
<i>Forested Habitats</i>	
Northern Hardwood-Mixed Forest	5,002
Conifer Forest	2,904
Young Forest	117
Total	11,484

Freshwater Wetland-Peatland Complex

The complex contains several large raised bogs or domes, separated by extensive areas of streamside freshwater meadows. Davis et al. (1983) ranked the peat bogs of the Sunkhaze Meadows Unit high quality among 31 other peatlands in Maine based on its developmental-morphological diversity, pristine character, and exemplary quality of peatland type or feature. It

is the second largest peatland in the State, with peat thickness ranging from 5 to 20 feet. The peat is typically underlain by 10 to 20 feet of silt and clay which in turn is underlain by 20 to 30 feet of glacial till over bedrock (MGS 2011).

Peatlands are a wetland type whose soils are “peat”—partially decayed remains of dead plants. Peatlands are described by topography (flat or level, on slopes, or raised) and are classified by their water and nutrient characteristics (Johnson 1985):

- *Minerotrophic* peatlands receive water primarily from underground or surface sources; has higher nutrient concentrations because the water picks up nutrients as it passes through soil and bedrock.
- *Ombrotrophic* peatlands receive their water from precipitation; lower nutrient concentrations.
- *Oligotrophic* peatlands are between the other two in nutrient richness.
- A *fen* is a strongly enriched (primarily minerotrophic) peatland, while a *bog* is a rain-fed (largely ombrotrophic) peatland.

The Northeast U.S. supports a range of peatland types, with many different types often occurring together in large peatland complexes (Johnson 1985).

The wetland-peatland complex is just part of the diverse mix of natural communities and habitats on this unit. An exemplary floodplain forest abuts the peatland, Sunkhaze Stream meanders through a portion of the bog, and the wetland complex is surrounded by mixed upland forest (see map 3.9). The Sunkhaze Meadow focus area description in the Maine Comprehensive Wildlife Conservancy Strategy, notes that the large unpatterned fen appears to provide outstanding habitat for peatland dragonflies and damselflies (MDIFW 2005). Bog bedstraw, a species of special concern in Maine, is found in the peatlands (MNAP 2010). Sunkhaze Meadows Unit is also identified as a Statewide conservation priority focus area by MDIFW. These areas are “landscape scale areas that contain exceptionally rich concentrations of at-risk species and natural communities and high quality common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat” (MDIFW 2008a).

In August and September 1996, Famous and Famous (1997) sampled the following plant communities across environmental gradients from Sunkhaze Stream to the open bog. Their report also lists the dominant plant species found in each community type and provides recommendations for future vegetation sampling.

- | | |
|-------------------|---|
| Rooted aquatic: | A narrow zone along the streams, always inundated but shallow enough for abundant cover of aquatic vascular plants to be present; water depth may vary; minerotrophic |
| Graminoid meadow: | A zone of varying width along streams, dominated by grasses and sedges; often flooded, especially seasonally; minerotrophic |
| Open fen: | Low shrubs (less than 1 meter); dominance by minerotrophic species, wide variety of herbaceous species; some sedge and/or sphagnum peat accumulation |

- Shrub fen: Shrubs taller than open fen, averaging 1 to 2 meters; sphagnum more abundant than open fen with peat accumulation; some tree species, but usually less than 2 meters tall; minerotrophic
- Wooded fen: Shrubs 1 to 2 meters tall, tree species average 25 to 50 percent cover; sphagnum abundant, peat accumulation; minerotrophic
- Dwarf shrub heath: Dominance of ericaceous shrubs, less than 1 meter tall; close to 100 percent sphagnum cover and well developed hummocks; thick peat layer; ombrotrophic
- Wooded shrub heath: Dominance by ericaceous shrubs, but 25 to 50 percent cover by tree species; sphagnum close to 100 percent, well developed hummocks; ombrotrophic
- Forested bog: Dominated by black spruce (*Picea mariana*), possibly larch (*Larix laricina*), and ericaceous shrubs; sphagnum close to 100 percent cover, well developed hummocks; ombrotrophic
- Peatland lagg: Narrow zone between ombrotrophic peatland and upland where water collects at the edge of a bog; characterized by robust shrubs and scattered trees, mostly ericaceous but supports other shrubs as well; variety of sedges and herbs possible; sphagnum cover usually high, but many other mosses may be present; minerotrophic

High rainfall during the summer of 1996, and as recent as 2005, flooded much of the meadow areas in this unit for most of the summer. This may have changed the species composition, at least temporarily. Although perennial herbaceous species were present, annual species may not have had ample opportunity to become established. Likewise, flowering and fruiting times for both annuals and perennials may have been interrupted, causing changes for the next growing season. It is most likely that yearly fluctuations in summer rainfall are an ongoing part of the ecology of this wetland complex (Famous and Famous 1997).

Sunkhaze Stream—The Sunkhaze Meadows Unit includes nearly 5 miles of Sunkhaze Stream and another 16 miles of tributary streams (map 3.1). Sunkhaze Stream and its tributaries (Buzzy, Little Buzzy, Baker, Dudley, and Johnson Brooks, Birch, and Little Birch Streams) support diverse wetland communities including wet sedge meadow, shrub thicket, cedar swamp, forested wetland, and open freshwater stream habitat. Sunkhaze Stream was described earlier under the Hydrology and Water Quality subsection under Physical Landscape.

Habitat on the tributaries varies. Birch and Little Birch Streams have long, shallow riffle areas followed by shaded, deep, sand and gravel bottoms. Buzzy and Baker Brooks are similar to each other with lower reaches containing narrow, winding channels blocked by beaver dams (Smithwood and McKeon 1999).

Conifer- Northern Hardwood Mixed Forest—Sunhaze Meadows Unit has 7,906 acres of forested upland habitat. Much of the forest was selectively harvested prior to refuge acquisition, creating age class and structural diversity. In the late 1970s and early 1980s, the State of Maine experienced a severe spruce budworm infestation and much of the balsam fir-red spruce overstory was removed from lands along the Stud Mill and County roads. The forest today is diverse, dominated by softwood tree species (red, white, and black spruce, balsam fir, hemlock, northern white cedar, eastern tamarack, eastern white, and red pine) with a mix of northern hardwoods (aspen species, paper birch, gray birch, red maple, silver maple, sugar maple, red and white oak, ash, and beech).

Northern hardwood-mixed forests and conifer forests at Sunhaze Meadows Unit likely contain scattered vernal pool habitats. Vernal pools are small areas that seasonally fill with water in spring, but then dry out later in the year. These transient habitats provide ideal breeding and juvenile rearing habitat for a variety of amphibian species (Regosin et al. 2005, Rittenhouse and Semlitsch 2007).

At the southwestern part of the Sunhaze Meadows wetland-peatland complex, the floodplain forest forms a narrow band along Sunhaze Stream and is dominated by silver maple with some red maple. The Maine Natural Areas Program identified this approximately 100-acre floodplain forest as an exemplary natural community (MNAP 2010). Hardwood floodplain forests are classified as rare (S3) by the Maine Natural Areas Program (MNAP 2010), occurring in long and narrow floodplains or on islands of large rivers and streams throughout Maine and New England. Maine's remaining floodplain forests are generally more extensive than in other New England states. Most of the northern floodplain examples of this forest type were harvested or converted to agriculture.

Young Forest Early Successional Habitat—Early successional habitats (including young forests, shrublands, and grasslands) are created through some form of disturbance such as logging, clearing, fire, wind damage, or pest outbreaks. Young forest habitat contains a mix of trees and shrubs typically younger than 40 years old and often create dense, thick stands of vegetation. If left unmanaged, these habitats will eventually transition (or succeed) into more mature forested habitats.

An electric transmission corridor (power lines) transects the western portion of the refuge providing 107 acres of early successional habitat. This powerline right-of-way is a deeded property right established prior to refuge acquisition. This young forest habitat is comprised largely of speckled alder, white ash, sweet gale, and other native tree and shrub species. Another 10 acres of young forest habitat is mapped within former log yards and small clearings at the Sunhaze Meadows Unit, including 2 acres originally cleared for young forest early successional habitat management demonstration. This demonstration area is located near the Johnson Brook Trail.

Benton Unit

The 334-acre Benton Unit consists of 2 acres of freshwater marsh and open water, 96 acres of grassland, 155 acres of northern hardwoods-mixed forest, and 70 acres of conifer forest. The upland forests are a mix of sugar maple, ash, beech, white oak, and eastern white pine, and a few

stands of mature eastern white pine, spruce-fir, and on wetter ground, northern white cedar. The habitat types are listed in table 3.4 and displayed on map 3.2.

When this unit was a working farm, the fields were ditched to remove excess surface moisture. In 1993 the Service installed three dikes to plug some of these ditches to create small impoundments varying in size from 0.25 acres to over 2 acres as a wetland restoration project under the Service’s Private Lands Initiative. Most of the Benton Unit drains into Fowler Brook, which then flows into the Sebasticook River. One stream segment on refuge lands goes through the center of the unit, primarily the grassland habitat. The other stream segment follows the eastern edge of the unit and is bordered by forest. The open fields are maintained through prescribed fire and annual haying. A local farmer is currently permitted to mow approximately 72 acres of the fields each year. Mowing occurs after mid-July, to avoid disturbing grassland-nesting birds.

Table 3.4. Benton Unit habitat types.

Habitat Type	Acres
Northern Hardwoods- Mixed Forest	155
Conifer Forest	70
Grassland	96
Sedge Meadow and Open Marsh	13
Total	334

Sandy Stream Unit

The 58-acre Sandy Stream Unit is mainly comprised of upland shrubland and floodplain forest. The habitat types are listed in table 3.5 and displayed on map 3.3. The shrubland was hydro-axed in 1995, and burned periodically in subsequent years to maintain a balance of open grass with a 30 to 50 percent open shrub component. Some of the Sandy Stream Unit was mapped as aspen-birch woodland forest by Sewall (2004); however, from a management perspective, this is considered part of the early successional-upland shrub habitat. A narrow band of floodplain forest is located along Sandy Stream; the floodplain forest widens at the north end of the Unit. A snowmobile trail, maintained by a local snowmobile club, bisects the shrubland habitat.

Table 3.5. Sandy Stream Unit habitat types.

Habitat Type	Acres
Riparian Floodplain Forest	19
Upland Shrub	26
Grassland	13
Total	58

Carlton Pond WPA

The 1,068-acre Carlton Pond WPA includes most of Carlton Pond, the surrounding freshwater wetlands, and several small areas of forested lowlands and uplands (see table 3.6 and map 3.4). Carlton Pond WPA was acquired by the Service in the mid-1960s. The original rock dam was built in 1850 to power a sawmill. It was reconstructed by the Service in 1972 to maintain the

integrity of the structure and to allow for continued management of water levels using a water control structure (WCS). In partnership with Ducks Unlimited the Service repaired the WCS in 1996 to allow for more effective water level management. More than 84 percent of the site is open water or shallow freshwater marsh. The remaining 16 percent is forested, dominated by aspen, red and sugar maple, box elder, paper birch, and eastern white pine. At capacity, the pond itself consists of approximately 295 acres of open water containing 1,198 feet of water. Emergent plants such as pickerel weed, pond lily, and water lilies are abundant. Surrounding the open water is a freshwater wetland with plants typical of a graminoid marsh, including leather-leaf, buttonbush, cranberry, sweet gale, and rhodora.

Table 3.6. Carlton Pond WPA habitat types.

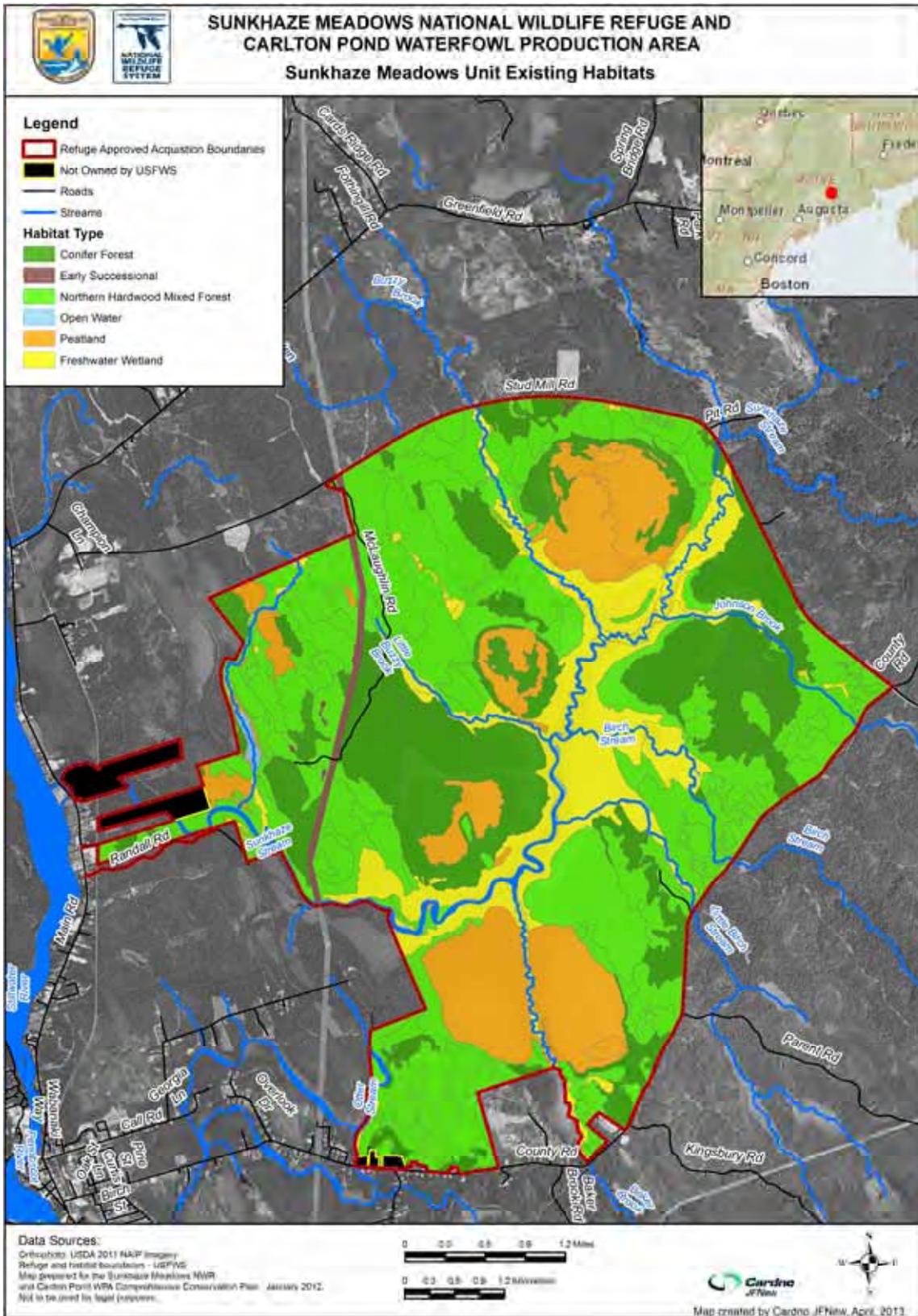
Habitat Type	Acres
Conifer Forest	45
Northern Hardwood- Mixed Forest	239
Freshwater Wetland	455
Peat Bog	34
Open Water	295
Total	1,068

Rare or Exemplary Natural Communities and Rare Plants

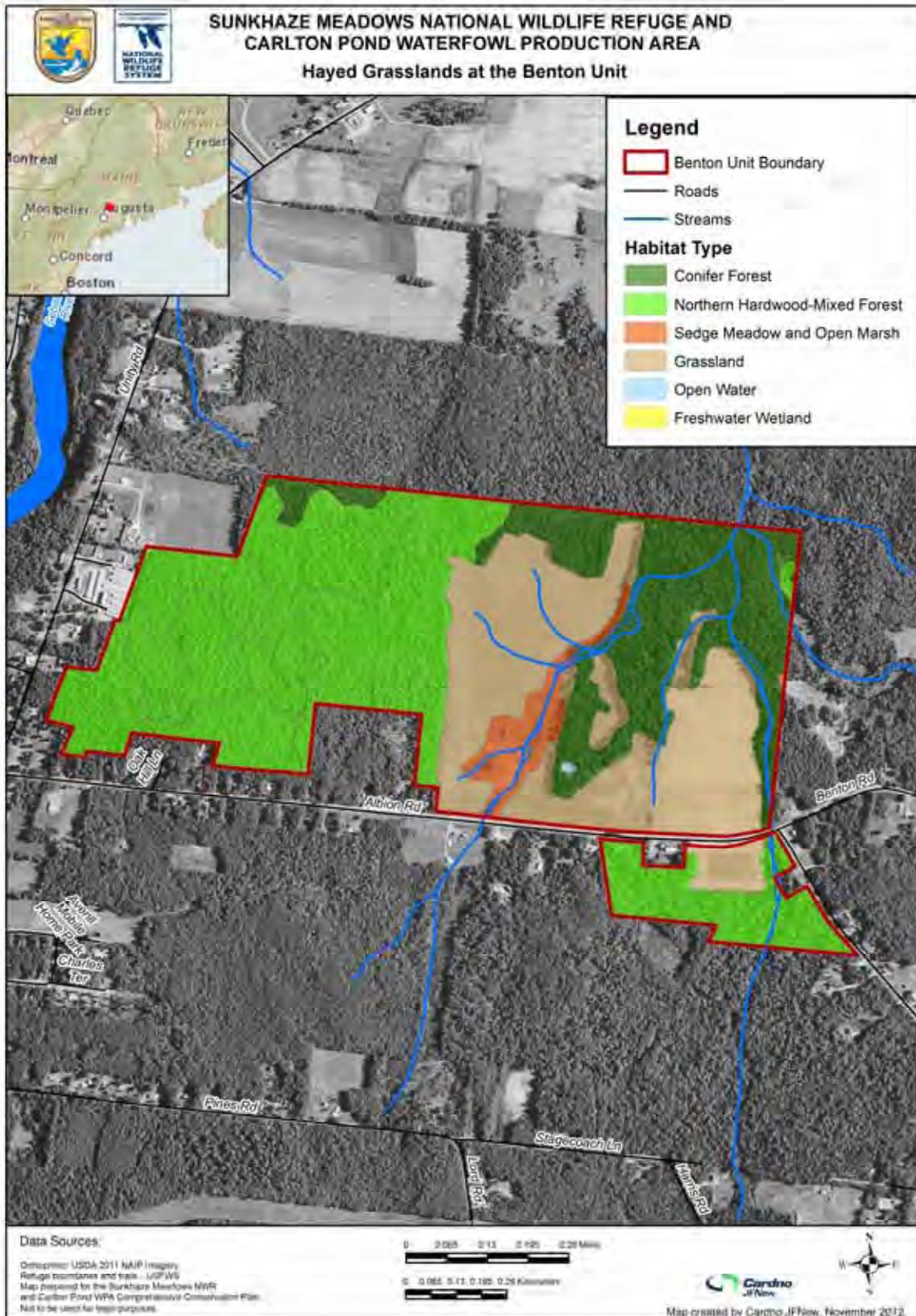
Exemplary Natural Communities

The Maine Natural Areas Program (MNAP) documented several exemplary natural communities and ecosystems on the Sunkhaze Meadows Unit (MNAP 1999). These include: unpatterned fen ecosystem, domed bog ecosystem, northern white cedar woodland fen, and silver maple floodplain forest. A field survey by MNAP staff in 2010 resulted in an updated map and description of the northern white cedar woodland fen, which was previously described as a northern white cedar seepage forest (MNAP 2010). Table 3.7 lists the rare or exemplary communities and ecosystems that are known to occur on the Sunkhaze Meadows Unit. See map 3.5 for their locations.

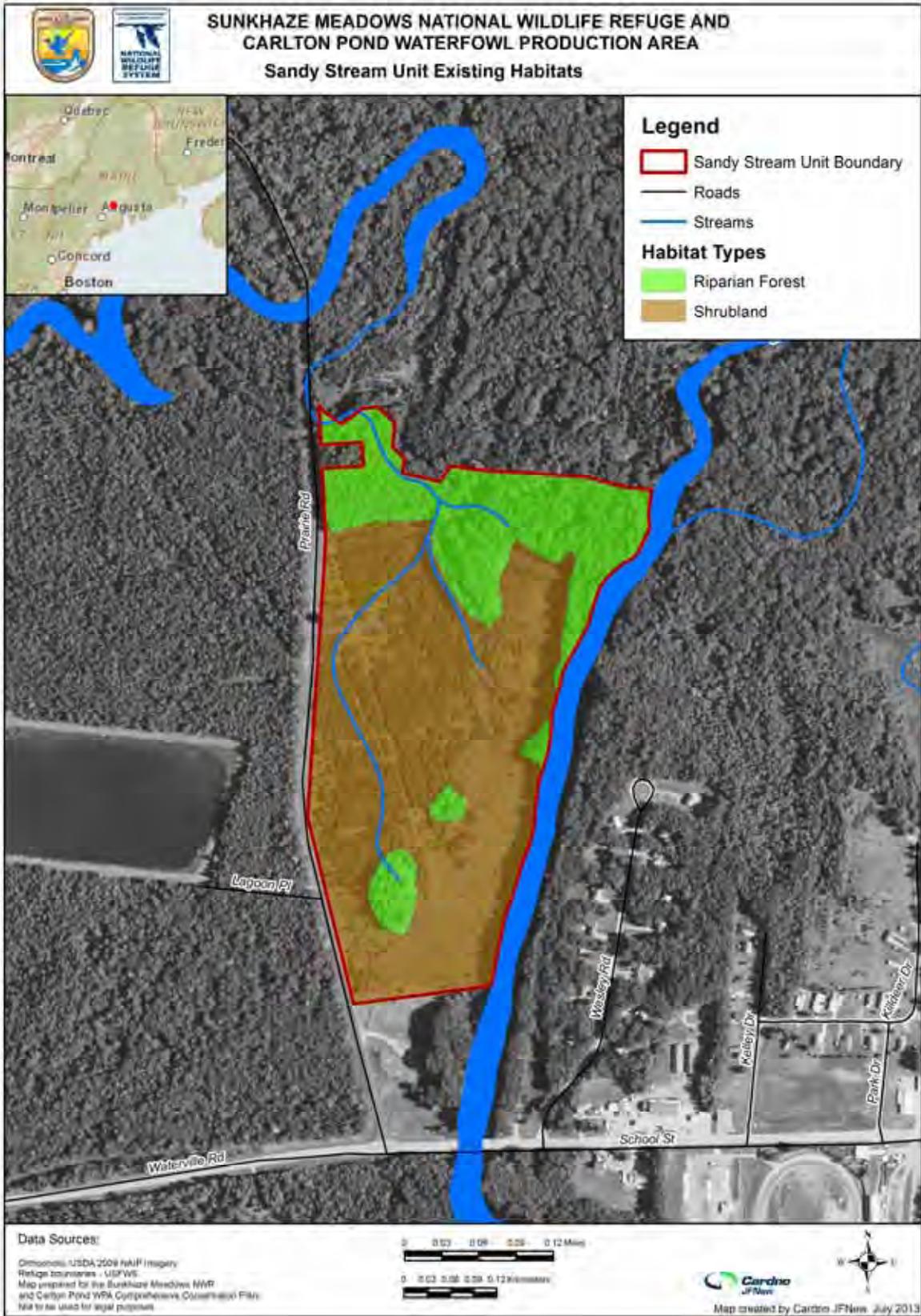
Map 3.1. Existing habitats of the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



Map 3.2. Existing habitats of the Benton Unit of Sunkhaze Meadows NWR.



Map 3.3. Existing habitats of the Sandy Stream Unit of Sunkhaze Meadows NWR.



Map 3.4. Existing habitats of Carlton Pond WPA.

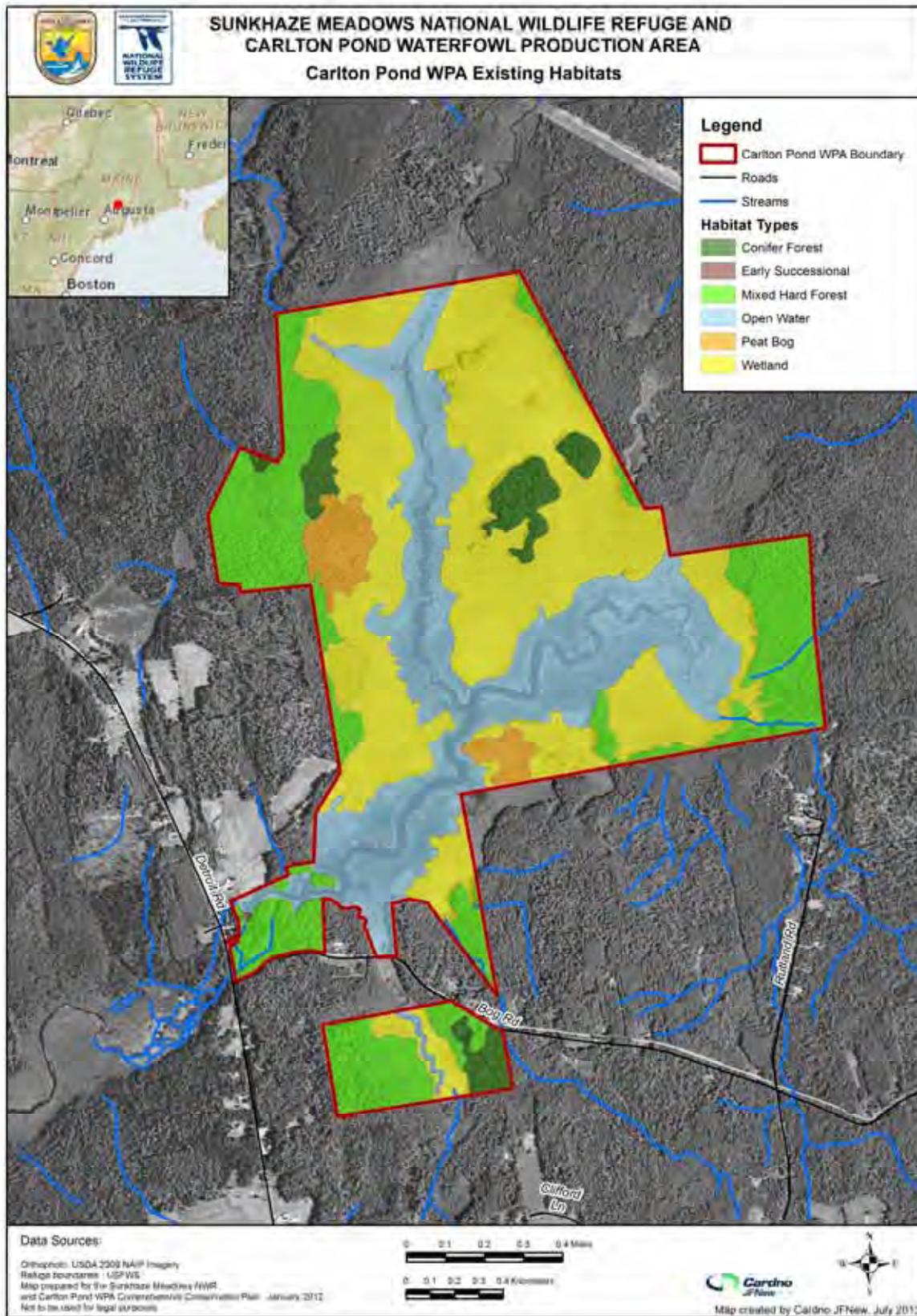


Table 3.7. Rare or exemplary natural communities and ecosystems on the Sunkhaze Meadows Unit.

Natural Community/Ecosystem/Plant	Approx Size (acres)	State Ranking
Unpatterned fen ecosystem ₁	6,855*	S5 – secure
Domed bog ecosystem	1,649	S3 -- uncommon
Northern white cedar woodland fen	390	S4 -- common, outstanding example
Silver maple floodplain forest	100	S3 -- uncommon

* *Of this total, 5,949 acres of unpatterned fen ecosystem are located within the refuge boundaries.*

The 6,855-acre unpatterned fen ecosystem extends beyond the refuge boundaries, although most of it (5,949 acres) lies within the Sunkhaze Meadows Unit. Unpatterned fen ecosystems are peatlands in which groundwater or water from adjacent uplands moves through the area (MNAP 2012). As a result, plants are exposed to more nutrients, and the vegetation is typically different and more diverse than that of bogs. The dominant vegetation includes sedges, grasses, reeds, and sphagnum (Gawler and Cutko 2010).

The domed bog ecosystem is comprised of a series of islands, at a slightly higher elevation than the surrounding unpatterned fen ecosystem. These island peatlands display a vegetation pattern that reflects a nutrient gradient from the higher center of the dome out to the lower edges of the island (Gawler and Cutko 2010).

The 390-acre northern white cedar woodland fen is embedded within the unpatterned fen ecosystem. According to MNAP, the woodland fen is a broad, flat peatland dominated by a canopy of northern white cedar, with a dense mix of rough-leaved alder, winterberry, and black ash. The cedar trees range from 4 inches to 23 inches (10cm to 60cm) diameter at breast height (dbh), with smaller diameter trees being much more common than larger ones. Cinnamon and royal ferns dominate the hummocky herb layer which includes a number of sedge species and a variety of forbs characteristic of this community type. Under the ferns, mixes of low-growing sedges are common. Sphagnum and other mosses dominate the abundant hummocks, but hollows are largely unvegetated and often saturated. The MNAP also noted a small band of cedar-spruce seepage forest along the upland edge of the fen, although it was too small to map as a separate community (MNAP 2010).

The MNAP also documented a 100-acre exemplary silver maple floodplain forest along Sunkhaze Stream, from 0.25 miles upstream of the power line and continuing upstream approximately 1.5 miles on both sides. Although not the highest quality, the forest is well buffered and protected within the refuge. Hardwood floodplain forest is usually dominated by widely spaced and multi-trunk silver maple. The understory is usually sparse with few shrubs, a result of annual ice scouring. By early summer the forest floor is often lush with herbaceous plants including spring ephemerals such as trout lily and ferns. High nutrient levels in the soil are

maintained through seasonal deposition of nutrient-rich sediments as a result of seasonal flooding (MNAP 1999).

No exemplary or rare natural communities or ecosystems are documented for the other refuge units or WPA.

Rare Plants

Two rare plant species are documented on the Sunkhaze Meadows Unit. A population of State-listed, threatened showy lady's slipper (*Cypripedium reginae*) is documented in the northern white cedar woodland fen in Sunkhaze Meadows Unit (MNAP 2011). Bog bedstraw (*Galium labradoricum*), a State species of concern, was documented in 1995 for this unit, although the population has not been re-surveyed since then (MNAP 1998). Two other rare species – slender blue flag iris (*Iris prismatica*, State-listed, threatened) and wild garlic (*Allium canadense*, Maine species of concern) are listed as occurring on the Sunkhaze Meadows Unit in earlier Service documents (e.g., USFWS 2001); however, these species are not in the MNAP database and are likely historical records (Don Cameron, MNAP, personal communication 2011). No other rare plant species have been documented on the other refuge units or at the WPA.

Invasive Plant Species

The Service identifies an invasive species as a species that is (1) nonnative to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112). Invasive plant species are recorded for Sunkhaze Meadows and Benton Units and Carlton Pond WPA; no invasive plants have been detected at the Sandy Stream Unit (table 3.8).

In the early 1990s, an infestation of purple loosestrife was discovered on a portion of the Carlton Pond WPA. Refuge staff pulled loosestrife plants in 1993 and 1994 but concluded that the level of effort and cost to physically remove the infestation was not feasible. In subsequent years, refuge staff has released biological control agents (*Galerucella pusilla*) to combat purple loosestrife at Carlton Pond WPA.

Refuge staff has slowly watched purple loosestrife spread along roadsides and in private wetland areas closer to the Sunkhaze Meadows Unit. Staff members and friends have been pulling 30 to 40 purple loosestrife plants here annually between July and August to prevent its spread onto the refuge. In 2011, the Friends of Sunkhaze hired a licensed pesticide applicator. With permission from appropriate land owners and assistance from refuge staff, loosestrife plants in the ditches along County Road were killed using a glyphosate-based herbicide approved for use in wetlands. The refuge paid for a treatment in 2012. Similar treatments may be necessary for a number of years to successfully control new plants arising from the seedbed. Two groups of loosestrife were also discovered in the Sunkhaze Meadows Unit along Sunkhaze Stream south of Ash Landing in 2011. These were dug up and removed.

Map 3.5. Exemplary natural communities and deer overwintering area at the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.

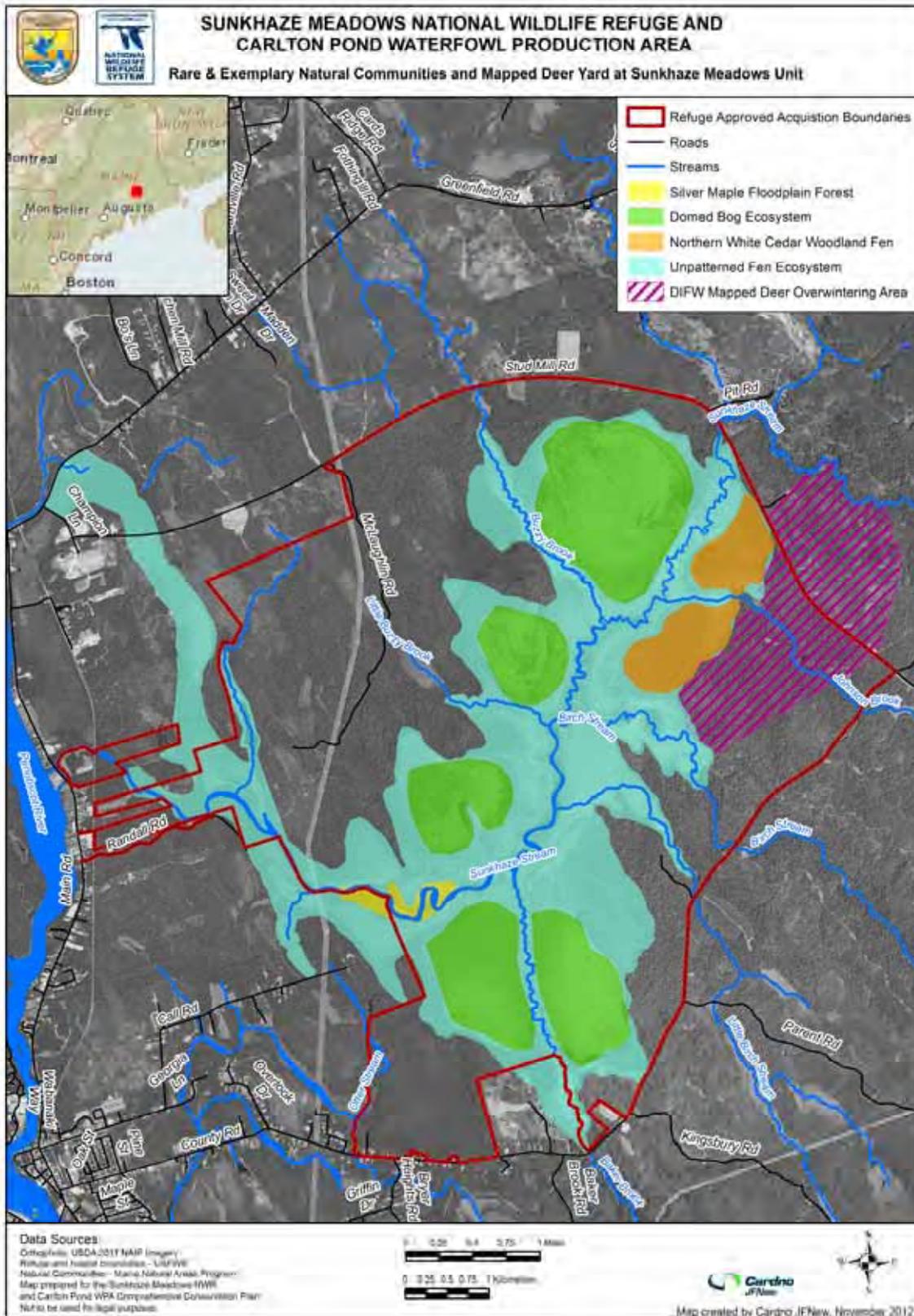


Table 3.8. Invasive plants detected on Sunkhaze Meadows NWR and Carlton Pond WPA.

Scientific Name	Common Name	Location
<i>Cirsium arvense</i>	Canada thistle	Benton Unit
<i>Cirsium vulgare</i>	Bull thistle	Sunkhaze Meadows Unit Benton Unit
<i>Elaeagnus umbellata</i>	Autumn-olive	Benton Unit
<i>Fallopia japonica</i>	Japanese knotweed	Sunkhaze Meadows Unit
<i>Lonicera tatarica</i>	Tartarian honeysuckle	Benton Unit
<i>Lythrum salicaria</i>	Purple loosestrife	Sunkhaze Meadows Unit; Benton Unit; Carlton Pond WPA
<i>Rhamnus cathartica</i>	Common buckthorn	Sunkhaze Meadows Unit Carlton Pond WPA
<i>Tussilago farfara</i>	Coltsfoot	Sunkhaze Meadows Unit

Fish and Wildlife Resources

Table 3.9 lists the number of species by taxa that have been recorded on Sunkhaze Meadows NWR and Carlton Pond WPA since 1990. Appendix A includes a complete list of the species observed across all refuge units and the WPA.

Table 3.9. Summary of species detected by taxa on Sunkhaze Meadows NWR and Carlton Pond WPA, 1990 to 2005. Numbers compiled from available refuge inventory summary data.

	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Fish and Wildlife				
Amphibians	17	12	16	12
Birds	202	66	98	96
Fish	21	19	1	29
Invertebrates	121	11	26	55
Mammals	45	17	23	14
Mollusks	5	4	1	4
Reptiles	10	2	4	4
Plants				
Plants	358	133	223	202
Fungi	22	1	2	7
TOTAL	801	265	394	423

Fish and Mussels

The Sunhaze Meadows Unit provides habitat for both warmwater and coldwater fish species. Smithwood and McKeon (1999) compiled a list of 15 fish species as part of a Fisheries Management Plan. Included in this list are three interjurisdictional fish species: Atlantic salmon, American eel, and brook trout. Sunhaze Stream and its tributaries are designated as critical habitat for the federally listed, endangered Atlantic salmon. This listing is described in more detail under the subsection, federally listed threatened or endangered species below. Atlantic salmon has been reported entering the lower reaches of Sunhaze Stream from the Penobscot River during warmer summer months. The Penobscot River is a major migratory pathway for Atlantic salmon and American eel, but numerous dams on the river impede upstream and downstream migration of these (and other) species. Brook trout and American eel are native to the Sunhaze Stream system, while smallmouth bass were introduced sometime prior to the 1940s. Several other species have been documented on Sunhaze Meadows since the 1999 study; a full list is in table 3.10.

The primary brook trout habitat on the refuge appears to be a reach of Sunhaze Stream from Stud Mill Road extending 200 meters downstream. During warm periods of the year, brook trout appear to move farther upstream. Brook trout have also been found in Little Birch Stream. Nearly 40,000 brook trout were stocked into Sunhaze Stream between 1940 and 1950, and another 500 were stocked in Sunhaze and Birch Streams from 1974 to 1975, the last year that any fish were stocked in waters now encompassed by the refuge. The stocking period coincided with heavy fishing pressure, especially on brook trout (Smithwood and McKeon 1999).

A recent study of fish assemblages in the Penobscot River and some tributaries (Kiraly 2012) included sampling of Sunhaze Stream. All of the species found in Sunhaze Stream were warm water species. The dominant fish were golden shiner, brown bullhead, and pumpkinseed. Other species that were captured during the study included redbreast sunfish, yellow perch, chain pickerel, and common shiner.

The Benton and Sandy Stream Units and Carlton Pond WPA are also dominated by common, warm water fish species. Fish species diversity at these units is as follows: Benton Unit (1 species), Sandy Stream Unit (19 species), and Carlton Pond WPA (29 species). There are no known federally listed or State-listed fish species at any of these sites. Known species in these locations include: chain pickerel, yellow perch, bullheads, carp, golden shiner, and smallmouth and largemouth bass. Smallmouth and largemouth bass are not native to Maine (MDIFW 2001). According to MDIFW, there has been an increase of 47 percent in the number of lakes with one or more species of bass between 1980 and 2000 (MDIFW 2001). Chain pickerel are thought to be native only to southern Maine and are, therefore, not considered native to these sites (MDIFW 2008). Based on the MDIFW (2008) assessment, abundance of chain pickerel is increasing; and, despite State efforts to limit the distribution of pickerel, the species distribution is also increasing (MDIFW 2008). Bullhead and yellow perch are also considered to be nonnative to these units (MDIFW 2002). A complete list of reported fish species at each site is included in table 3.10.

Table 3.10. Fish species observed at Sunkhaze Meadows NWR and Carlton Pond WPA.

Common Name	Scientific Name	Status*	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
American Eel	<i>Anguilla rostrata</i>		X	X		X
American Shad	<i>Alosa sapidissima</i>					X
Atlantic Salmon	<i>Salmo salar</i>	FE	X			
Banded Killifish	<i>Fundulus diaphanus</i>					X
Black Crappie	<i>Pomoxis nigromaculatus</i>					X
Blackchin Shiner	<i>Notropis heterodon</i>					X
Blacknose Dace	<i>Rhinichthys atratulus</i>		X	X		X
Blackspotted Stickleback	<i>Gasterosteus wheatlandi</i>					X
Blueback Charr	<i>Salvelinus alpinus oquassa</i>					X
Bridle Shiner	<i>Notropis bifrenatus</i>	ME SC				X
Brook Trout	<i>Salvelinus fontinalis</i>		X	X	X	
Brown Bullhead	<i>Ameriurus nebulosus</i>		X			X
Brown Trout	<i>Salmo trutta</i>		X	X		X
Burbot (Cusk)	<i>Lota lota</i>		X	X		X
Carp	<i>Cyprinus carpio</i>			X		X
Chain Pickerel	<i>Esox niger</i>		X	X		X
Common Shiner	<i>Luxilus Cornutus</i>		X	X		X
Creek Chub	<i>Semotilus atromaculatus</i>		X	X		X
Eastern Silvery Minnow	<i>Hybognathus regius</i>		X	X		X
Emerald Shiner	<i>Notropis atheinoides</i>			X		X
Fallfish	<i>Semontius corporalis</i>		X	X		X
Fathead Minnow	<i>Pimephales promelas</i>			X		X
Fourspine Stickleback	<i>Apeltes quadracus</i>			X		X
Golden Shiner	<i>Notemigonus crysoleucas</i>		X	X		X
Largemouth Bass	<i>Micropterus salmoides</i>					X
Ninespine Stickleback	<i>Puntitius puntitius</i>		X			
Northern Pike	<i>Esox lucius</i>					X
Pearl Dace	<i>Semotilus margarita</i>			X		

Common Name	Scientific Name	Status*	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Pumpkinseed Sunfish	<i>Lepomis gibbosus</i>		X	X		X
Redbelly Dace	<i>Phoxinus eos</i>		X			
Redbreast Sunfish	<i>Lepomis auritus</i>		X			X
Smallmouth Bass	<i>Micropterus dolomieu</i>		X	X		X
Spottail Shiner	<i>Notropis hudsonius</i>		X			
White (Common) Sucker	<i>Catostromus commersonni</i>		X	X		X
Yellow Perch	<i>Perca flavescens</i>		X			X

*FE stands for federally listed, endangered. The ME SC status indicates species that are listed as Special Concern by MDIFW. These species have no special legislative protection. However, they are believed to be vulnerable and could become threatened or endangered because of factors such as their distribution, low or declining populations, or specialized habitat needs.

A handful of mussels have been found on or near refuge property as well (table 3.11). These include two State-listed, threatened freshwater mussels documented in Sandy Stream, just off refuge property: the tidewater mucket and the yellow lampmussel.

Table 3.11. Mussel species observed at Sunkhaze Meadows NWR and Carlton Pond WPA.

Common Name	Scientific Name	Status*	Sunkhaze Meadows Units	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Eastern Elliptio	<i>Elliptio complanata</i>		X			X
Eastern Lampmussel	<i>Lampsilis radiata radiata</i>		X	X		X
Eastern Pearlshell	<i>Margaritifera margaritifera</i>		X			
Tidewater Mucket	<i>Leptodea ochracea</i>	ME T		X		
Yellow Lampmussel	<i>Lampsillis cariosa</i>	ME T/ FSC		X		

*ME T indicates Maine State-listed, threatened. FSC stands for Federal species of concern. This indicates species that are listed as Special Concern by USFWS. These species have no special legislative protection; however, they are believed to be vulnerable and could become threatened or endangered because of factors such as their distribution, low or declining populations, or specialized habitat needs.

Birds

According to the Atlas of Breeding Birds of Maine (Adamus 1987), approximately 130 species of birds—resident and migratory—are possible, probable, or confirmed breeders in the vicinity of Sunkhaze Meadows Unit. The wetland-peatland complex is particularly valuable to songbirds during their spring and fall migration (Adamus 1987). Sixteen waterfowl species have been observed at Sunkhaze Meadows Unit, of which seven are known to breed there: wood duck, black duck, mallard, blue-winged and green-winged teals, ring-necked duck, and hooded merganser (USFWS 2008b). The wood duck and hooded merganser nest in tree cavities. Black ducks are the most common waterfowl species on the refuge in the fall (USFWS 2008b).

Other bird highlights for Sunkhaze Meadows Unit include breeding American and least bitterns and Virginia and sora rails, 23 species of breeding warblers, and documented nesting of spruce grouse, ruffed grouse, and wild turkey. Several shorebird species use the refuge during migration, while killdeer, spotted sandpiper, common snipe, and American woodcock breed there (appendix A).

Twenty-one species of raptors have been documented on the Sunkhaze Unit (USFWS 2008b) including: hawks, falcons, and owls. Ten of these are known to breed on the refuge: osprey, bald eagle, northern harrier, sharp-shinned hawk, northern goshawk, red-shouldered hawk, broad-winged hawk, great-horned owl, barred owl, and northern saw-whet owl (appendix A).

Several bird species of concern are known to breed on the Sunkhaze Meadows Unit, including American woodcock, bay-breasted warbler, American black duck, Canada warbler, wood thrush, eastern wood-pewee, chestnut-sided warbler, blackburnian warbler, and black-throated-blue warbler, among others. Bald eagles are commonly seen foraging on this unit and were first observed nesting here in 2005.

Many of the birds observed at the Benton Unit were observed during migration. For example, several shorebird species were observed during spring or fall migration, including greater yellowlegs, killdeer, upland sandpiper, and American woodcock. Red-winged blackbird and tree swallow nest in or near the emergent wetland and sedge meadow. Sedge wrens documented at this site when the unit was first acquired by the Service have not been reported since that time. The grassland habitat is maintained to support nesting grassland birds, specifically bobolink.

The two main habitat types on the Sandy Stream Unit—shrubland and floodplain forest—support breeding bird species associated with these habitats. Shrub-nesting species include eastern kingbird, willow flycatcher, yellow warbler, common yellowthroat, field sparrow, and American goldfinch. Birds associated with the floodplain forest include pileated woodpecker, hairy woodpecker, yellow-bellied sapsucker, red-eyed vireo, and veery.

Carlton Pond WPA is one of the few wetlands in Maine used by nesting black terns, a State-listed, endangered species. The black tern population in Maine has been annually monitored since 1990, reporting between 80 and 90 pairs. The MDIFW manages black tern habitat by maintaining stable water levels in impoundments, taking efforts to deter predators, and using floating nest platforms (MDIFW 2013c). Other species that use the WPA for breeding, nesting, feeding, or migration include American black ducks, hooded mergansers, common goldeneyes,

Canada geese, wood ducks, blue-winged teal, ring-necked ducks, and other waterfowl, osprey, and several species of migratory song birds. Wood duck nest boxes were installed and are now maintained by volunteers.

Mammals

Forty-four species of mammals are documented for the Sunkhaze Meadows Unit (USFWS 2008b), including six species of shrews and moles, eight species of bats, eight species of the weasel family, many other species of small mammals, and an array of medium to large mammals including black bear, white-tailed deer, moose, bobcat, coyote, red and gray fox, and muskrat. Beaver are especially abundant along Sunkhaze Stream and its tributaries, as evidenced by their lodges, dams, caches, and scent mounds. MDIFW considers most furbearer populations to be stable in this part of the State; however, there are concerns over declines in fisher and bobcat harvests between 2008 and 2012 (DePue 2013 personal communication). MDIFW is also concerned about the over-harvest of river otters in this area (DePue 2013 personal communication).

A portion of the Sunkhaze Meadows Unit is part of a 1,129-acre deer wintering area. The deer wintering area extends throughout some of the eastern portion of the refuge and across the Stud Mill Road to the northeast. The mix of mature conifer, northern white cedar, and northern hardwood-mixed forest provides protection from severe weather and winter food sources for deer, which are at their northern limits of their range in Maine. The Benton Unit forest is part of a 435-acre deer wintering area that extends into the northeast corner of the unit.

The Benton Unit and Sandy Stream Unit report 23 and 17 mammal species, respectively. Moose, white-tailed deer, river otter, raccoon, woodchuck, and eastern chipmunk occur on both units. A mix of other small and medium sized mammals is reported from these two units (table 3.12).

Fifteen mammal species are reported for Carlton Pond WPA, including beaver, muskrat, river otter, and moose in the aquatic habitats. Other mammals include black bear, white-tailed deer, coyote, red fox, raccoon, woodchuck, ermine, chipmunk, and red and gray squirrels. For a full listing of all known mammal species at the different sites, see table 3.12.

We do not have estimates of mammal abundance for refuge or WPA lands. Statewide, status of mammal populations varies. According to the MDIFW, the State's deer population has increased since the early 1980s to about 255,000 wintering deer. Deer abundance in central and southern Maine ranges from 15 to 25 deer per square mile (MDIFW 2013). However, recently deer populations in Maine have been declining (MDIFW 2011). White-tailed deer are near their northern range limit in Maine and are not well adapted for harsh winter conditions (Jakubus 1999). Consequently, winter severity is considered to be the greatest contributor to deer mortality in Maine (MDIFW 2011). Statewide, furbearer populations (e.g., beaver, mink, otter, and muskrat) are thought to be stable or increasing, with the exception of fisher and marten (M. Caron personal communication 2013).

Table 3.12. Mammal species observed at Sunkhaze Meadows NWR and Carlton Pond WPA.

Common Name	Scientific Name	Status*	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Beaver	<i>Castor canadensis</i>		X	X	X	X
Big Brown Bat	<i>Eptesicus fuscus</i>	ME SC	X			
Black Bear	<i>Ursus americanus</i>		X		X	X
Bobcat	<i>Lynx rufus</i>		X			
Coyote	<i>Canis latrans</i>		X		X	X
Deer Mouse	<i>Peromyscus maniculatus</i>		X	X		
Eastern Chipmunk	<i>Tamias striatus</i>		X	X	X	X
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>		X		X	X
Eastern Mole	<i>Scalopus aquaticus</i>			X		
Fisher	<i>Martes pennanti</i>		X		X	
Gray Fox	<i>Urocyon cinereoargenteus</i>		X			
Hoary Bat	<i>Lasiurus cinerues</i>	ME SC	X			
Keen Myotis	<i>Myotis keeni</i>		X			
Least Weasel	<i>Mustela rixosa</i>		X			
Little Brown Myotis	<i>Myotis lucifugus</i>	ME SC	X			
Long-tailed Shrew	<i>Sorex dispar</i>		X			
Long-tailed Weasel	<i>Mustela frenata</i>		X			
Marten	<i>Martes americana</i>		X			
Masked Shrew	<i>Sorex cinereus</i>		X	X	X	
Meadow Jumping Mouse	<i>Zapus hudsonius</i>		X	X	X	
Meadow Vole	<i>Microtus pennsylvanicus</i>		X	X	X	
Mink	<i>Mustela vison</i>		X			
Moose	<i>Alces alces</i>		X	X	X	X
Muskrat	<i>Ondatra zibethicus</i>		X		X	X
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>		X	X	X	
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>		X	X	X	
Northern Water Shrew	<i>Sorex plaustris</i>		X	X		
Porcupine	<i>Erethizon dorsatum</i>		X		X	

Common Name	Scientific Name	Status*	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Pygmy Shrew	<i>Sorex hoyi</i>		X			
Raccoon	<i>Procyon lotor</i>		X	X	X	X
Red Bat	<i>Lasiurus borealis</i>	ME SC	X			
Red Fox	<i>Vulpes vulpes</i>		X			X
Red Squirrel	<i>Tamiasciurus hudsonicus</i>		X		X	X
River Otter	<i>Lutra canadensis</i>		X	X	X	X
Short-tailed Weasel (Ermine)	<i>Mustela erminea</i>		X			X
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	ME SC	X			
Smoky Shrew	<i>Sorex fumeus</i>		X		X	
Snowshoe Hare	<i>Lepus americanus</i>		X		X	X
Southern Bog Lemming	<i>Synaptomys cooperi</i>		X			
Southern Redback Vole	<i>Clethrionomys gapperi</i>		X	X	X	
Star-nosed Mole	<i>Condylura cristata</i>		X			
Striped Skunk	<i>Mephitis mephitis</i>		X	X	X	
White-footed Mouse	<i>Peromyscus leucopus</i>		X			
White-tailed Deer	<i>Odocoileus virginianus</i>		X	X	X	X
Woodchuck	<i>Marmota monax</i>		X	X	X	X

*The ME SC status indicates species that are listed as Special Concern by MDIFW. These species have no special legislative protection. However, they are believed to be vulnerable and could become threatened or endangered because of factors such as their distribution, low or declining populations, or specialized habitat needs

Reptiles and Amphibians

As shown in tables 3.13 and 3.14, Sunkhaze Meadows NWR and Carlton Pond WPA support many amphibians and reptiles. A majority of these are frogs and salamanders. A Unity College student conducted an amphibian study at the Benton Unit and reported 10 amphibian species and 2 reptile species (Bishop et al. 1996). Seventeen amphibian species are reported from all three Sunkhaze Meadows NWR units and Carlton Pond WPA as listed in table 3.14. Three amphibian species of special concern in Maine are reported: blue-spotted salamander (Sunkhaze Meadows Unit, Sandy Stream Unit, Benton Unit) and leopard frog (Sunkhaze Meadows Unit, Sandy Stream Unit, Carlton Pond WPA). Wood turtle, a species of special concern in Maine, is reported from Sunkhaze Meadows Unit, Sandy Stream Unit, and Carlton Pond WPA.

Table 3.13. Reptile species observed at Sunhaze Meadows NWR and Carlton Pond WPA.

Common Name	Scientific Name	Status*	Sunhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Common Musk Turtle	<i>Sternotherus odoratus</i>	ME SC				
Common Snapping Turtle	<i>Chelydra serpentina</i>		X	X		X
Eastern Garter Snake	<i>Thamnophis sirtalis</i>		X		X	X
Eastern Painted Turtle	<i>Chrysemys picta</i>		X			X
Milk Snake	<i>Lampropeltis triangulum</i>		X			
Northern Brown Snake	<i>Storeria dekayi</i>	ME SC	X			
Northern Redbelly Snake	<i>Storeria occipitomaculata</i>		X		X	
Northern Ribbon Snake	<i>Thamnophis sauritus</i>	ME SC	X		X	
Northern Ringneck Snake	<i>Diadophis punctatus edwardsii</i>		X		X	
Smooth Green Snake	<i>Liochlorophis vernalis</i>		X			
Wood Turtle	<i>Glyptemys insculpta</i>	ME SC	X	X		X

*The ME SC status indicates species that are listed as Special Concern by MDIFW. These species have no special legislative protection. However, they are believed to be vulnerable and could become threatened or endangered because of factors such as their distribution, low or declining populations, or specialized habitat needs.

Table 3.14. Amphibian species observed at Sunhaze Meadows NWR and Carlton Pond WPA.

Common Name	Scientific Name	Status*	Sunhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
American Toad	<i>Bufo americanus</i>		X	X	X	X
Blue-spotted Salamander	<i>Ambystoma laterale</i>		X	X	X	
North American bullfrog	<i>Rana catesbeiana</i>		X	X	X	X
Red-spotted Newt	<i>Notophthalmus viridescens</i>		X	X	X	X

Common Name	Scientific Name	Status*	Sunkhaze Meadows Unit	Sandy Stream Unit	Benton Unit	Carlton Pond WPA
Four-toed Salamander	<i>Hemidactylium scutatum</i>	ME SC	X		X	
Gray Tree Frog	<i>Hyla versicolor</i>		X	X	X	X
Green Frog	<i>Rana clamitans</i>		X	X	X	X
Mink Frog	<i>Rana septentrionalis</i>		X	X	X	X
Northern Dusky Salamander	<i>Desmognathus fuscus</i>		X	X	X	
Northern Leopard Frog	<i>Rana pipiens</i>	ME SC	X	X	X	X
Red-backed Salamander	<i>Plethodon cinereus</i>		X	X	X	
Spring Peeper	<i>Hyla crucifer</i>		X	X	X	X
Spring Salamander	<i>Gyrinophilus porphyriticus</i>	ME SC	X	X	X	
Northern Two-lined Salamander	<i>Eurycea bislineata</i>		X		X	X
Pickerel Frog	<i>Rana palustris</i>		X		X	X
Spotted Salamander	<i>Ambystoma maculatum</i>		X	X	X	X
Wood Frog	<i>Rana sylvatica</i>		X	X	X	X

*The ME SC status indicates species that are listed as Special Concern by MDIFW. These species have no special legislative protection. However, they are believed to be vulnerable and could become threatened or endangered because of factors such as their distribution, low or declining populations, or specialized habitat needs.

Invertebrates, Excluding Mussels

According to refuge records, a large number (121 species) of invertebrates have been inventoried at the Sunkhaze Meadows Unit, a majority of which are butterflies, moths, dragonflies, and damselflies. This includes two species of special concern in Maine: tomah mayfly and pygmy snaketail dragonfly. As expected, fewer invertebrate species are documented for the Benton and Sandy Stream Units (26 and 12 species, respectively), and Carlton Pond WPA (55 species). Carlton Pond WPA is dominated by dragonflies, damselflies, and butterflies. The Benton and Sandy Stream Units have a mixed diversity of invertebrates including butterflies, crickets, mosquitoes, and bees.

Nonnative, Invasive Wildlife Species

While there are several nonnative fish species that occur in refuge and WPA waters, these are not considered to be invasive by MDIFW in these locations. No other nonnative wildlife species are known to occur on Sunkhaze Meadows NWR or Carlton Pond WPA.

Federally Listed Threatened or Endangered Species

Sunkhaze Stream and its tributaries are also designated as critical habitat for the federally listed, endangered Atlantic salmon. In 2009, the Gulf of Maine Distinct Population Segment (GOM DPS) of Atlantic salmon was listed as an endangered species pursuant to the Endangered Species Act (ESA). The Gulf of Maine Atlantic salmon population was divided into three separate Salmon Habitat Recovery Units, located in the Penobscot, Merrymeeting, and Downeast watersheds of Maine. The Atlantic salmon is an anadromous species, i.e., it relies on both freshwater and marine environments to complete its life cycle. Each phase of the life cycle (i.e., egg, juvenile, adult) is marked by distinct physical changes and habitat needs (Kircheis and Liebich 2007). Sunkhaze Stream was evaluated for its contribution to potential habitat for Atlantic salmon as part of the 2009 designation of critical habitat for Atlantic salmon (NMFS 2009). This watershed-scale analysis was based on the quantity and quality of Atlantic salmon migrating, spawning, and juvenile rearing habitat needs. As part of this analysis, Sunkhaze Stream was determined to be within the Critical Habitat Area for Atlantic salmon. However, it did rank low for habitat availability when compared to other streams within the watershed. Sunkhaze Stream's primary contribution to Atlantic salmon is likely as a cool water refuge. Spawning adults typically return to spawning waters early and find short-term cold water refuge in streams (e.g., deep pools, springs, and mouths of smaller tributaries) during the summer months before spawning in October and early November (Baum 1997).

While not included as critical habitat for Atlantic salmon, the Benton Unit, Sandy Stream Unit, and Carlton Pond WPA are also located within the GOM DPS for this species.

The Service is currently reviewing the status of the American eel as a potential candidate for listing under the Endangered Species Act. The American eel is native to the Sunkhaze Stream system and was documented on the unit in Birch Stream, one of the tributaries.

Although recently delisted from the Federal list, bald eagles are still protected under the Bald and Golden Eagle Protection Act. They are also still listed as State threatened by MDIFW.

No other federally endangered or threatened species are known to occur on other units of Sunkhaze Meadows NWR or Carlton Pond WPA.

State-listed Species

State-listed, threatened or endangered wildlife species are described in more detail in the previous section. Below is a summary table of State-listed species documented on the refuge or WPA (see table 3.15).

Table 3.15. State-listed, threatened or endangered species documented on Sunkhaze Meadows NWR and Carlton Pond WPA.

Common name	Scientific Name	Status	Division
Black tern	<i>Chlidonias niger</i>	State endangered	Carlton Pond WPA
Least bittern	<i>Ixobrychus exilis</i>	State endangered	Sunkhaze Meadows Unit and Carlton Pond WPA
Sedge wren	<i>Cistothorus platensis</i>	State endangered	Benton Unit

Common name	Scientific Name	Status	Division
Tomah mayfly	<i>Siphonisca aerodromia</i>	State threatened	Sunkhaze Meadows Unit
Pygmy snaketail dragonfly	<i>Ophiogomphus howei</i>	State threatened	Sunkhaze Meadows Unit
Tidewater mucket	<i>Leptodea ochracea</i>	State threatened	Sandy Stream Unit
Yellow lampmussel	<i>Lampsilis cariosa</i>	State threatened	Sandy Stream Unit

Wildlife Trends and Changes

While some species such as alpine plants have been in Maine for 10,000 years or more, the region also supports recent arrivals, such as coyotes, which appeared in the last 75 years. The majority of change to the area occurred over the last 400 years, significantly altering the landscape that was previously there (Foss 1992).

The 1800s witnessed the demise of many forest wildlife species from loss of habitat due to forest clearing, bounty and market hunting, millinery trade, and natural history specimen collecting (Foster et al. 2002). Heath hen, passenger pigeon, great auk, Labrador duck, and sea mink became extinct because of humans during the same period (DeGraaf and Yamasaki 2001, Foster et al. 2002).

Mountain lion, gray wolf, elk, and caribou were extirpated by the mid-1800s or early 1900s in Maine, and only the gray wolf has recently returned to New England. Two wolves were documented in Maine in the 1990s, although there has been no evidence of a breeding population. Lynx have returned to northern Maine.

In contrast, grassland species such as meadowlark, bobolink, upland sandpiper, woodchuck, and meadow vole increased as hayfields and pastures expanded during the early 19th century (Foss 1992, Foster and Motzkin 2003). Open land plant and animal species reached their peak abundance in the mid-1800s. The historical record is unclear on the abundance and distribution of these species prior to the surge in farming. DeGraaf and Yamasaki (2001) and Foster and Motzkin (2003) suggest that open land species were opportunistic, expanding into large, newly cleared lands from small, scattered populations in the pre-settlement era. In a similar pattern, other species expanded their range into New England from the Midwest.

After farm abandonment escalated in the early 1900s, grassland habitats ebbed, while thickets, brush lands, and young forests surged (Litvaitis 2003). Populations of black bear, bobcat, and broad-winged hawk increased. Intense logging, wildfire activity and natural events such as heavy rains, ice storms and early snow storms, significantly altered the northern forest landscape, changing both plant and animal species in abundance and diversity. Many of the barren mountaintops below 3,800 feet and other hardwood-dominated hillsides seen today are artifacts of early 20th century land use (Foss 1992, DeGraaf and Yamasaki 2001).

The young hardwood forests that emerged in the 1920s and 1930s after the old-field pine harvests provided premier habitat for ruffed grouse (DeGraaf and Yamasaki 2001). As these forests reached maturity late in the 1900s, there was a noticeable decline in the grouse population

along with an increase in other species preferring more mature forest stands. Hence species dependent on early succession habitats declined to almost pre-settlement levels (Litvaitis 2003).

Eastern coyotes were first sighted in northern Maine in the 1930s, Vermont and New Hampshire in the 1940s, and Massachusetts in the 1950s. The turkey vulture, tufted titmouse, northern mockingbird, and Virginia opossum are newer arrivals. Wild turkey, reintroduced in the 1960s and 1970s, are flourishing well beyond their historic ranges.

Cultural Landscape Setting and Land Use History

Sunkhaze Meadows NWR and Carlton Pond WPA contain cultural resources that indicate use from prehistoric through historic time periods. These resources may contribute to further understanding of Maine's prehistory and history. This is especially true in the areas involving Native American settlement and subsistence, prehistoric and historic travel, and use of the peat bog. Archaeological investigations in areas surrounding Sunkhaze Meadows Unit indicate that activities relating to travel, hunting and fishing, fortifications, and group gatherings all likely occurred within today's boundaries of the Sunkhaze Meadows Unit (Robinson 2011).

Archaeological investigations near Carlton Pond WPA revealed areas of prehistoric settlement, resource procurement, and tool manufacture (Shaffer 2011). Furthermore, "at least 95 percent of the known prehistoric habitation and workshop sites in Maine are found next to waters that are (or were) navigable by canoe" (Shaffer 2011). The identification of archaeological sites adjacent to the waterways at both the refuge and WPA suggests that both Sunkhaze Meadows NWR and Carlton Pond WPA were heavily used waterways throughout prehistory.

Native Peoples

The first inhabitants along the Penobscot River and present-day Sunkhaze Meadows Unit were the Penobscot Indian Nation. Archaeological evidence shows native inhabitants on the Penobscot River fished for American shad as early as 8,000 years ago and for sturgeon as early as 3,000 years ago. Shad bones found in native settlements along the Sebec River in Milo (approximately 30 miles northwest of the refuge) are dated from 6,000 to 8,000 Before Current Era (BCE) (Penobscot River Restoration Trust, n.d.). Land adjacent to Sunkhaze Meadows Unit contains archaeological deposits of American eel, white perch, and bullhead dating to 8,500 BCE (Robinson 2011).

Archaeological excavations adjacent to the Sunkhaze Meadows Unit indicate prehistoric occupation in the area occurred from 8,500 years ago to at least 5,000 years ago (information pertaining to the last 5,000 years of occupation was lost when the land was stripped for loam in the 1960s) (Robinson 2011). Additionally, records dating from 1671 indicate that this area contained the location of a Penobscot Indian Nation fort or stronghold (Robinson 2011). Fortifications were often constructed along access routes, in an area accessible from multiple locations (Robinson 2011). Research indicates that Sunkhaze Stream was an access route to the Union River and Blue Hill Bay, both important cultural areas throughout history (Cook 2007). The identification of a Penobscot Indian Nation stronghold so close to the Sunkhaze Meadows Unit indicates the area was heavily used prehistorically.

In addition to known resources around Sunkhaze Meadows Unit, at least 17 prehistoric archaeological sites have been documented near Carlton Pond WPA (Shaffer 2011). These sites relate to settlement and resource procurement and use, and 94 percent has been documented along the Sebasticook River, many near rapids or a confluence with another stream (Shaffer 2011).

Early European Settlement

European contact (e.g., explorers and traders) with native people began in the 16th century in much of New England. Foster and Motzkin (2003) suggest that European arrival prompted such rapid and profound changes to the lifestyle and land use practices of indigenous people that by the time colonists began to settle here, the landscape was already changing quickly.

European colonists brought new land use concepts such as permanent settlements and political boundaries. They shifted land use from primarily subsistence farming and gathering to harvesting and exporting natural resources (Foss 1992). By 1830, central New England was 80 percent cleared. In Maine, commercial logging for pine began as early as 1650, and all forest types have been cut since 1850 (Lorimer 1977). Archaeological sites from the European contact period have been documented near Carlton Pond WPA. Two sites have produced 17th century objects including kaolin pipes and a metal counters with fleurs-de-lis (Dunn 1968).

Despite initial heavy settlement, by the mid-19th century, many Euro-American settlers had left New England. The California gold rush, industrial revolution, new railroads, richer Midwestern soils, and the Civil War all contributed to movement to new lands. Abandoned farm fields began reverting back to forest. White pine seeded into the fields and pastures, and by 1900 was ready for harvest (Marchand 1987, DeGraaf and Yamasaki 2001). Between 1895 and 1925, 15 billion board feet of lumber was logged from central New England. An understory of hardwoods, released from the shade of white pine, emerged as the new dominant vegetation, a legacy that remains today (Marchand 1987, DeGraaf and Yamasaki 2001).

20th Century Influences

Farming activities dominated the landscape surrounding the town of Unity, including Carlton Pond WPA and the Benton and Sandy Stream units, well into the 1900s. Agriculture is still common today in this area.

Prior to becoming a national wildlife refuge in 1988, the Sunkhaze Meadows Unit was owned by Diamond Occidental Forest, Inc. The general land use in the area during this period was logging. During the 1970s energy crisis, the quality and depth of peat in the Sunkhaze Meadows Unit caught the eye of a peat mining company that wanted to mine the peat for use as a heating source. The sale of the Sunkhaze Meadows Unit to a mining company did not happen, and the land remained in limbo for several years until the Service was able to secure funding, with the help of The Nature Conservancy, to permanently conserve the area as a national wildlife refuge. Much of the surrounding lands remain in private ownership and have been heavily logged.

Socioeconomic Environment

Population

In 2010, the U.S. Census Bureau recorded Maine's population as 1,328,361, which was 0.43 percent of the total U.S. population at that time (308,745,538) (U.S. Census Bureau 2011). The population estimate for Maine is a 4.2 percent increase over the 2000 estimate (1,274,923) and a 3.8 percent increase over the 1990 estimate (1,227,928) (U.S. Census 2010).

The predominant racial group in Maine is identified as white (95.2 percent). Of the remaining 4.7 percent, 1.6 percent identify with two or more racial groups, 1.2 percent identify as black, 1 percent as Asian, 0.6 percent as American Indian or Alaskan native, and 0.3 percent as another race. For the entire state population, for any race, 1.3 percent identifies themselves as Hispanic or Latino.

Compared to the total U.S. population, Maine has a higher proportion of its population in the 45 to 64 years and 65 years and older age groups (see table 3.16).

Table 3.16. Gender and age group breakdown for residents of Maine and the U.S.

	Male	Female	Under 18 years (percent)	18-44 years (percent)	45-64 years (percent)	65 years and older (percent)
Maine	650,056	678,305	274,533 (20.7)	432,072 (32.5)	410,676 (30.9)	211,080 (15.9)
U.S.	151,781,326	156,964,212	74,181,467 (24)	112,806,642 (36.5)	81,489,445 (26.4)	40,267,984 (13)

Also, Maine has a higher median age (42.7 years) compared to the rest of the U.S. The 2010 median age in Maine is older than the median age recorded for the State for 2000 (38.6 years). According to the 2010 U.S. Census, the U.S. median age is 37.2 years (Howden and Meyer 2011).

County Demographics

On a county level, Penobscot County (Sunhaze Meadows Unit) is the most populous of the three counties that include refuge and WPA lands, with 153,923 people reported in 2010. Kennebec County (Benton Unit) had 122,151 people, and Waldo County (Carlton WPA and Sandy Stream Unit) had 38,786 people. At 39.9 years, Penobscot County had the second youngest median age in the State (U.S. Census 2010; MSPO 2011).

Economic Data

Maine's population was projected as growing 0.5 percent from 2000 to 2010, slightly faster than in the 1990s (MSPO 2002). The area surrounding Sunhaze Meadows NWR and Carlton Pond WPA is largely rural. Land in the vicinity of the Sunhaze Meadows Unit is almost entirely forested, while areas near the Benton and Sandy Stream Units and Carlton Pond WPA are in

agricultural or residential use. For decades the forest products industry was the major landowner and employer near the Sunkhaze Meadows Unit in Milford, although recent real estate sales indicate a shift to residential housing development. The lower Penobscot River Watershed ranks number one in the nation for projected housing density increases, more than 310,000 acres of its surface area are predicted to be developed in the next three decades (Stein et al. 2005).

The most current income data for Maine and its counties is for 2009. Table 3.17 provides the per capita and median household income for the U.S., Maine, and the three counties that include refuge and WPA lands as recorded for 2009. Both per capita and median household income in the U.S. are greater than in Maine or in the three counties.

In November 2011, the total civilian labor force in Maine was 691,538, of which 645,005 were employed and 46,533 were unemployed. The unemployment rate was 6.7 percent. The average weekly wage for Maine is equivalent to about \$15.73 per hour or \$32,708 per year, assuming a 40-hour week worked the year around (MDL 2011). By comparison, in 2009, the national average wage totaled around \$45,500 per year (U.S. Census Bureau 2012).

Table 3.17. Per capita and median household income for the U.S., Maine, and selected counties (2009).

	Per Capita Income (\$)	Median Household Income (\$)
United States	27,041	50,221
Maine	24,980	45,708
Kennebec County	24,575	46,368
Penobscot County	22,813	42,366
Waldo County	21,790	41,697

Source: U.S. Census Bureau 2011

The total number of employees located in Maine in 2005 was 594,733. Statewide, the largest major industry sector was Health Care and Social Assistance, with 17 percent of the employment, followed by Retail Trade with 15 percent, and Manufacturing with 11 percent (MDL 2011).

Refuge and WPA Contribution to the Local Economy

According to Carver and Caudill (2007), in fiscal year 2006, recreational use on national wildlife refuges generated almost \$1.7 billion in total economic activity Nationwide. Other key data from that study are as follows:

- Nearly 35 million people visited national wildlife refuges in 2006, supporting almost 27,000 private sector jobs and producing about \$543 million in employment income.
- Recreational spending on refuges generated nearly \$185.3 million in tax revenue at the local, county, State, and Federal level.
- Approximately 82 percent of total expenditures at national wildlife refuges were from recreation other than hunting and fishing; fishing was 12 percent, and hunting was 6 percent.

The 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS 2011) found that more than 90 million Americans, or 38 percent of the U. S. population age 16 years or older, pursued outdoor recreation in 2011. They spent \$145 billion pursuing outdoor activities. More than 71 million people observed wildlife, while 33 million fished and 13.7 million hunted.

Specific data on recreation expenditures associated with Sunhaze Meadows NWR or Carlton Pond WPA are not available. However, statewide data are available for Maine, in the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation report for Maine (<http://www.census.gov/prod/2008pubs/fhw06-me.pdf>; accessed September 2013). Total expenditures statewide for 2006 are listed below in table 3.18. Expenditures include trip-related expenditures, equipment purchases, licenses, contributions, land ownership and leasing, and other items (USFWS 2006).

Table 3.18. Total expenditures in 2006, for wildlife-dependent recreation activities in Maine (U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau 2006).

	Residents and Nonresidents	Residents	Nonresidents
Hunting	\$241,301,000	\$201,439,000	\$39,862,000
Fishing	\$257,124,000	\$132,312,000	\$124,812,000
Wildlife Watching	\$865,644,000	\$724,461,000	\$141,183,000

In addition to revenue sharing payments described under the subsection, Distributing Refuge Revenue Sharing Payments, under Refuge Administration, expenditures such as these have a direct benefit to local economies.

Refuge and WPA Administration

Staffing

Prior to the establishment of Sunhaze Meadows NWR, Carlton Pond WPA was administered by Moosehorn NWR in Calais, Maine. Sunhaze Meadows NWR was first staffed in 1990, and administration for Carlton Pond WPA was transferred to Sunhaze Meadows NWR staff. The refuge's office was located in Old Town, Maine, not far from the Sunhaze Meadows Unit in Milford. Fully staffed, the refuge and WPA employed four permanent staff, including a refuge manager, deputy refuge manager, outdoor recreation planner, and fire management officer, all stationed at Sunhaze Meadows NWR. A seasonal fire crew was also stationed at the refuge. In 1999, the refuge lost three of the permanent positions, leaving just the refuge manager. That position was eliminated in 2008, and administrative responsibilities for Sunhaze Meadows NWR and Carlton Pond WPA shifted to the Maine Coastal Islands NWR Complex located in Rockland, Maine.

Budget

Operations funding includes salaries, supplies, utilities, fuel, and all other operational activities (including wildlife inventories, habitat surveys, and management) that are not funded by special projects. Base maintenance funds, which are used to repair vehicles, equipment, and facilities, have been decreasing over the past 5 years. The replacement of vehicles, larger pieces of equipment (e.g., tractor, backhoe), or larger facilities (buildings) are funded as special projects.

Annual funding fluctuates according to the number and size of special projects funded that year (e.g., vehicle or equipment replacement, visitor service enhancements, and facility improvements). Funding has decreased substantially from the annual budget of nearly \$300,000 in 2006. In 2010, the refuge operated on a budget of \$5,800 for maintenance needs. While the refuge has applied for and received some grants, it did not receive any special project funding from the Refuge System from 2006 through 2011. In 2012, the refuge received about \$67,800 to rehabilitate the Ash Landing trail and parking lot and some of the Johnson Brook trail. This work is scheduled to be conducted in 2013.

Table 3.19 provides the operations, maintenance, and total budget for Sunkhaze Meadows NWR and Carlton Pond WPA from 2006 to 2012. This includes funding for special projects from other Refuge System programs (e.g., Northeast Region Refuge System Roads Program).

Table 3.19. Allocated budget for Sunkhaze Meadows NWR and Carlton Pond WPA, 2006 to 2012.

Fiscal Year	Operations	Maintenance	Total
2006	\$ 130,691	\$ 162,238	\$ 292,929
2007	\$ 127,222	\$ 29,755	\$ 156,977
2008	0	\$ 5,800	\$ 5,800
2009	0	\$ 5,800	\$ 5,800
2010	0	\$ 5,800	\$ 5,800
2011	0	\$ 5,800	\$ 5,800
2012	0	\$ 73,600	\$ 73,600

Land Acquisition

Table 3.20 summarizes the land acquisition history of the refuge. The Service currently owns 11,484 acres within its 11,666-acre approved acquisition boundary of the Sunkhaze Meadows Unit. The Benton and Sandy Stream units are owned in their entirety, 334 acres and 58 acres, respectively. Carlton Pond WPA is also owned in the entirety of the acquisition boundary of 1,068 acres.

One resident of Milford has a right-of-way to access his leased cabin on Carter Meadow Road on the Sunkhaze Meadows Unit. The cabin is owned and maintained by the owner under a life-use

agreement. Bangor Hydro-Electric Company has a 250-foot wide utility right-of-way through the western portion of the refuge to accommodate a 345 kV power transmission line.

Table 3.20. Land acquisition history for Sunkhaze Meadows NWR and Carlton Pond WPA.

Unit Name	Acres	Year	Funding Source*
Sunkhaze Meadows	11,484	1988 to 2007	LWCF
Benton	334	1992	FmHA
Sandy Stream	58	1992	FmHA
Carlton Pond WPA	1,068	1965 to 1968	MBCF
Conservation Easements (named by location)			
Towns of Corinth and Exeter	213.5	1996	FmHA
Town of Starks	36.8	1996	FmHA
Town of Fairfield	15.7	1993	FmHA
Town of Patten	54.2	1990	FmHA

*MBCF = Migratory Bird Conservation Fund: the funding source is receipts from the sale of Federal Migratory Bird Hunting and Conservation Stamps.

LWCF = Land and Water Conservation Fund: funding sources include revenues from the sale of surplus Federal real property, motorboat fuel taxes, fees for recreation on Federal lands, and receipts from mineral leases on the outer continental shelf.

FmHA = Farmers Home Administration

Distributing Refuge Revenue Sharing Payments

Since 1935, the Service has made refuge revenue sharing payments to local municipalities containing lands under its administration. The actual amount of the payments is determined by formulas specified in the Revenue Sharing Act (16 U.S.C. 715) and annual funding appropriated by Congress. The formulas used to determine payments to local municipalities are based on the number of acres in each municipality and the appraised value of refuge lands in their jurisdiction. Currently for Sunkhaze Meadows NWR and Carlton Pond WPA, the Service makes revenue sharing payments to the towns of Milford, Benton, Troy, and Unity. Between fiscal years 2005 and 2009, combined payments to all municipalities have averaged about \$7,500 per year. Between 2010 and 2011, combined payments to all municipalities have averaged about \$4,400 per year (see table 3.21).

No entrance or user fees are charged for admission to any Service-owned lands that are part of Sunkhaze Meadows NWR or Carlton Pond WPA.

Table 3.21. Revenue sharing payments to local municipalities between 2005 and 2011.

Fiscal Year	Amount Paid	Town Receiving Payment	Fiscal Year	Amount Paid	Town Receiving Payment
2005	\$7,298.00	Milford	2009	\$5,011.00	Milford
	\$164.00	Unity		\$107.00	Unity
	\$873.00	Benton		\$569.00	Benton
	\$553.00	Troy		\$361.00	Troy
2006	\$6,755.00	Milford	2010	\$3,531.00	Milford
	\$152.00	Unity		\$76.00	Unity
	\$808.00	Benton		\$401.00	Benton
2007	\$6,874.00	Milford	2011	\$3,784.00	Milford
	\$147.00	Unity		\$81.00	Unity
	\$781.00	Benton		\$430.00	Benton
	\$495.00	Troy		\$273.00	Troy
2008	\$5,333.00	Milford			
	\$114.00	Unity			
	\$606.00	Benton			
	\$384.00	Troy			

Refuge and WPA Facilities

Cabins

When the refuge was established in 1988, there were five active cabin leases on the land. These cabins were owned by individuals while the land was leased under an agreement with the prior owner, Diamond Occidental Corporation. After the Service acquired the Sunkhaze Meadows Unit, the cabin owners were allowed to retain the cabins according to an annual special use permit and fee, but they were not allowed to sell the cabins or transfer ownership. While the Service owns the land, one cabin is still privately owned. The other owners have since given up their lease agreements and the Service acquired ownership of the cabins. One of these four cabins was demolished because the building was not needed and leaving the building posed a potential safety hazard because it was in disrepair.

The remaining cabins are important to achieving refuge purposes because they store materials and equipment for our habitat management and public use programs, and help support activities (including interpretive programs) of the refuge's Friends group.

Roads and Trails

Sunxhaze Meadows Unit has about 4 miles of gravel roads that provide management access. Because of past problems with illegal dumping, these roads are gated to control access. Many of the old logging roads created by previous owners have reverted to forest. Approximately 3 miles of trails are present primarily for management access and wildlife observation. The Sunkhaze

Meadows Unit has six trails: Carter Meadow, Oak Point, Johnson Brook, Ash Landing, North Buzzy Brook, and South Buzzy Brook. There are no roads or dedicated trails on the Benton or Sandy Stream units or Carlton Pond WPA. See maps 2.6 through 2.9 for the location of public use infrastructure and trails. The Benton and Sandy Stream units have snowmobile trails that are maintained by snowmobile clubs through special use permits. Visitors are allowed to walk on these trails during the warmer months.

Other Infrastructure

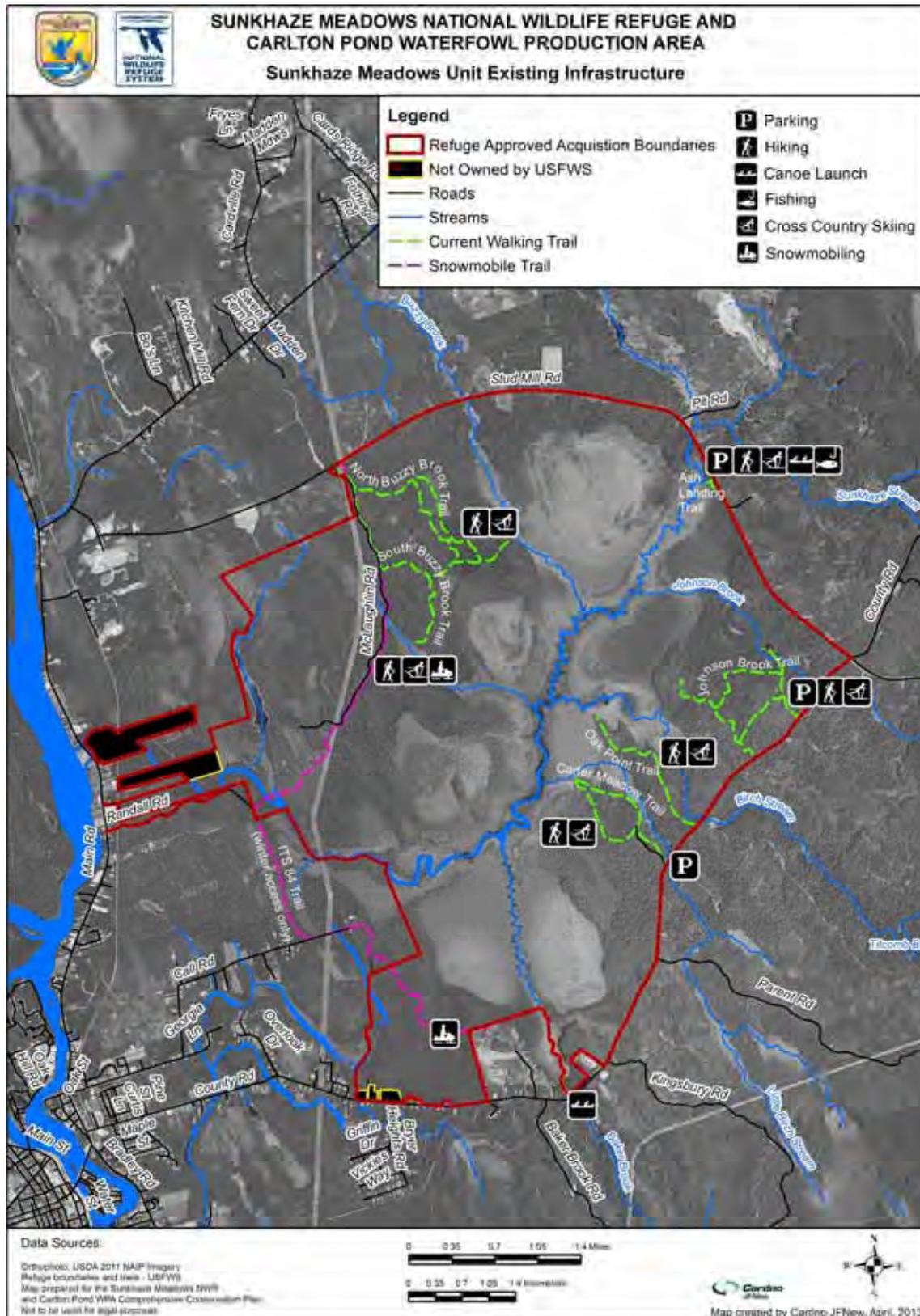
Other infrastructure at the Sunkhaze Meadows Unit includes information kiosks, boardwalks on some trails, three small parking areas, and several locked gates. The infrastructure currently located at Sunkhaze Meadows Unit is summarized in table 3.22.

Developed access to other refuge units and the WPA are more limited, although all are open to public access. Carlton Pond WPA has a water control structure and 150-foot long earthen dike built in 1965. Parking is available along adjacent roadside right-of-ways. There is a small dirt parking lot located on the Benton Unit. At Sandy Stream, visitors can park at an abutting gravel parking area owned by the town.

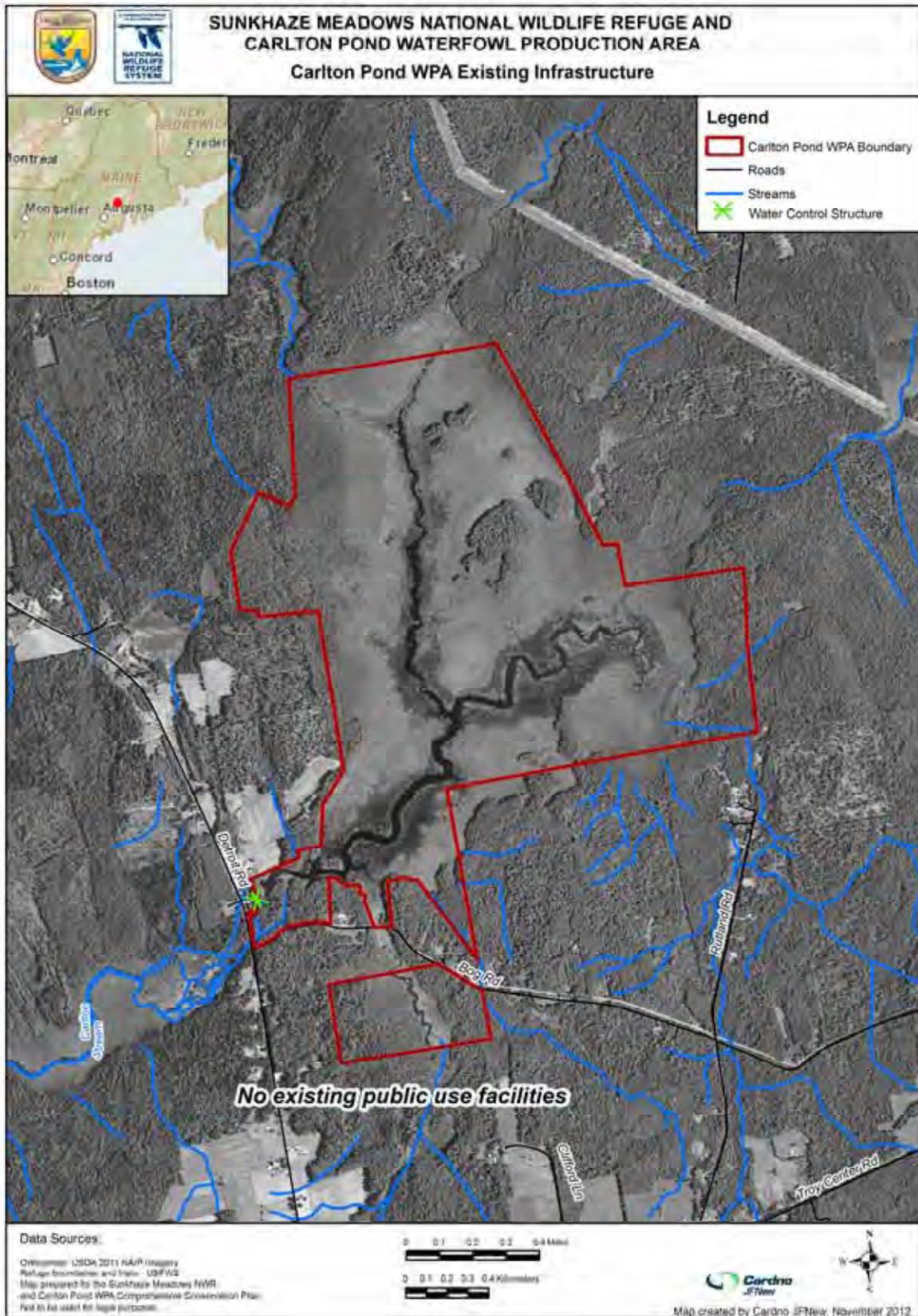
Table 3.22. Sunkhaze Meadows Unit infrastructure.

Infrastructure Type	Location	Date Constructed
Wildlife observation platform	Carter Meadow Trail overlooking the bog	2003
One panel information kiosk	Johnson Brook Trailhead	1999
Small gravel parking area	Along County Road, Johnson Brook Trailhead	1997
Three panel information kiosk	Ash Landing Trailhead	1997
Small gravel parking area	Along Stud Mill Road, Ash Landing Trailhead	1997
Gravel parking area (open only during hunting season)	Along McLaughlin Road, North Buzzy Brook Trailhead	1998
Small gravel parking area	Along County Road, for Carter Meadow/Oak Point Trails	2004
Single panel information kiosk	Carter Meadow/ Oak Point Trails Parking lot	2011
Single panel information kiosk	Off-site at the town of Milford boat launch along the Penobscot River	2011

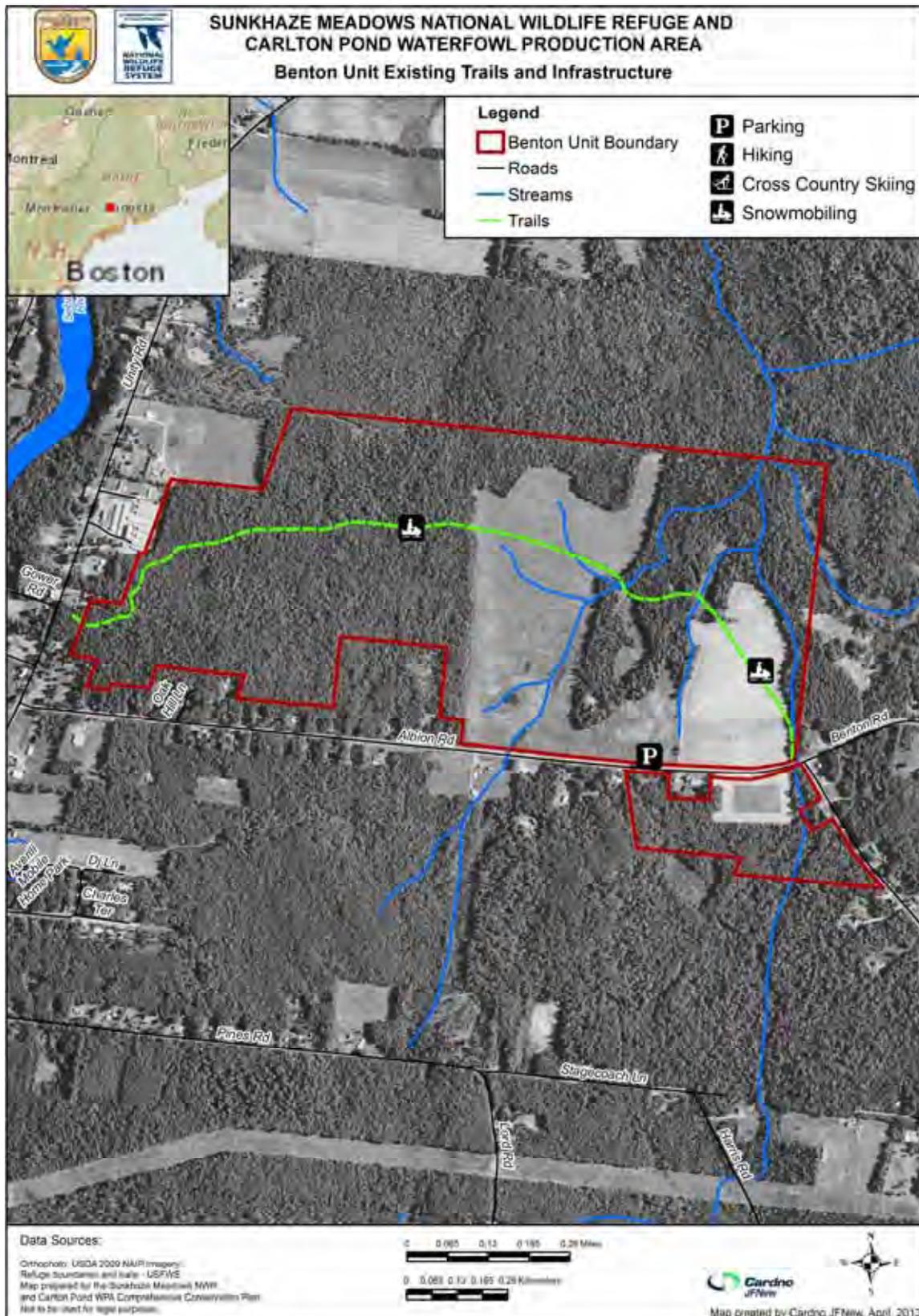
Map 3.6. Existing infrastructure at the Sunhaze Meadows Unit of Sunhaze Meadows National Wildlife Refuge.



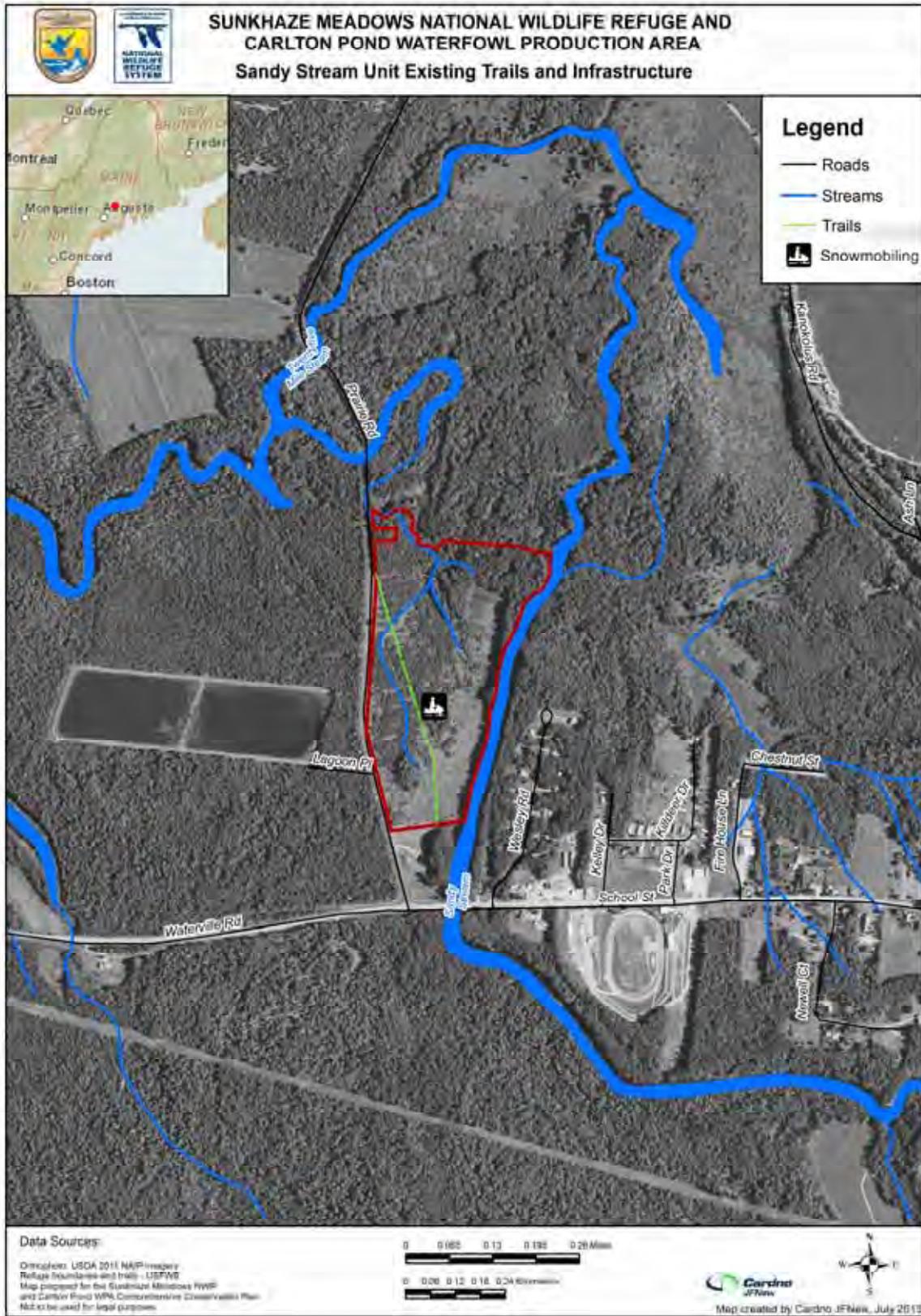
Map 3.7. Existing infrastructure at Carlton Pond WPA.



Map 3.8. Existing infrastructure at the Benton Unit of Sunkhaze Meadows NWR.



Map 3.9. Existing infrastructure at the Sandy Stream Unit of Sunkhaze Meadows NWR.



Special Use Permits, Including Research

Special use permits are issued to individuals, organizations, and agencies that request the use of refuge facilities or resources beyond what is usually available to the public. To ensure that wildlife disturbance is minimized, special conditions and restrictions are analyzed individually for each request.

Currently, the refuge maintains several special use permits for various activities authorized on the various refuge properties:

- The Friends of Sunkhaze Meadows are authorized to access various portions of the refuge for biological management assistance, trail maintenance, and wildlife interpretation programming at the Sunkhaze Meadows Unit.
- The Sebasticook Land Trust has been allowed to provide public interpretive programs on refuge units.
- High school and college teachers are allowed to take classes to refuge units for various instructional activities.
- Researchers are allowed access for specific research projects.
- Trapping is considered a management activity. Individuals are authorized to trap certain wildlife at Sunkhaze Meadows Unit. All trapping on the refuge is subject to State licensing regulations as well as Service seasons and regulations.
- A farmer is permitted to annually mow 72 acres of the existing grasslands at the Benton Unit to maintain grassland habitat. Timing restrictions are included to protect grassland nesting birds during the summer nesting and fledgling period.
- Snowmobile clubs maintain existing snowmobile trails at Sunkhaze Meadows Unit (Maine's Interconnected Trail System [ITS] 84), Benton Unit, and Sandy Stream Unit.
- We currently authorize up to two field trial events for hunting dogs each year at Carlton Pond WPA if requested.

Refuge and WPA Public Use

A variety of public uses are authorized on refuge and WPA lands. By regulation (50 CFR 25.21), refuges are closed to public uses until they are opened by the Service. As discussed in chapter 1, Service and Refuge System Policies and Mandates Guiding Planning, to open a refuge to a public use the refuge staff must first determine if a use is appropriate. If the use is appropriate, we must then determine if it is compatible by analyzing potential effects of the use on the refuge's habitats and wildlife. Only activities that are determined to be both appropriate and compatible are allowed on refuges. In contrast, WPAs are open to fishing (50 CFR 32.4), trapping (50 CFR 31.16), and hunting of migratory game birds, big game, and upland game (50 CFR 32.1) per Federal and State regulations, unless we officially close a WPA to these uses.

To minimize confusion, we have made the authorized public uses on all of the refuge units and the WPA as consistent as practicable. This section describes public access and wildlife recreation opportunities for the refuge units and WPA. Additional information on recreation features on the refuge and at the WPA is available from the refuge Web site and in appendix B.

Public Access and Visitation

In 2011, over 90 million adults in the U.S. (16 years or older) participated in wildlife-related recreation. Of this total, 33.1 million people fished, 13.7 million hunted, and 71.8 million participated in at least one type of wildlife observation activity including observing, feeding, or photographing fish and other wildlife (USFWS and Census Bureau 2012). A similar level of participation is seen in Maine. According to Maine's Statewide Comprehensive Outdoor Recreation Plan (or SCORP), residents participate in outdoor recreation activities at a higher rate than the national average. Maine participation rates are especially high in nature-based activities (MBPL 2009). Sunhaze Meadows NWR and Carlton Pond WPA are both located within a 2-hour drive from urban centers such as Bangor and Augusta and surrounding communities.

Sunhaze Meadows NWR headquarters are located in Rockland, Maine, and are open Monday through Friday from 8 a.m. to 4:30 p.m. The Sunhaze, Benton, and Sandy Stream Units, and Carlton Pond WPA are open daily from sunrise to sunset. The Service does not charge entrance fees for the refuge or WPA. Pedestrian access is allowed both on and off trail at all refuge units and the WPA. The Service currently maintains the following access areas:

Sunhaze Meadows Unit—As described under facilities, there are three parking areas open year-round, although these are not usually plowed by the Service in winter. There are six trails that total approximately 3 miles for visitors to access the Sunhaze Meadows Unit. Visitors may also access this unit via small watercraft in Sunhaze Stream. Canoe and kayak access is offered at Ash Landing for those willing to portage their watercraft in a few hundred yards. Visitors can access the southwest corner of the refuge via the State snowmobile trail (ITS 84).

Benton and Sandy Stream Units—There is one small parking area at the Benton Unit. Public parking for the Sandy Stream Unit is available adjacent to the refuge in a gravel parking area owned by the town. Visitors can also access both of these units via snowmobile trails.

Carlton Pond WPA—There are no public parking areas or trails at Carlton Pond WPA. Visitors usually access the WPA by boat. All launch sites are located off Service property, along roadside right-of-ways or on private lands.

In 2011, the Service completed an internal visitor services review (Toniolo 2011). This review summarized the current state of public use on the refuge and WPA, current programming, and condition of public use infrastructure. This review also provided recommendations for the planning team's consideration during development of this CCP. Much of the background information contained within this section is compiled from this review as well as current estimates provided by Service staff.

Our best estimates of visitation show approximately 6,300 visits were made to the refuge and WPA in 2012 (table 3.23). These visits generally consist of residents from the surrounding communities for each unit or the WPA, birdwatchers, hunters, anglers, snowmobilers, as well as college students and local, State, and Federal officials (Toniolo 2011). This contrasts Statewide trends for Maine public lands, where residents of other states make up 53 percent of day visitors and over 90 percent of overnight visitors (MBPL 2009). Visitors participate in a variety of authorized public uses including bird watching in the spring; fishing, paddling, and hiking in the

summer; hunting primarily in the fall; and snowshoeing and skiing in the winter (see table 3.24). Based on refuge staff observations, overall visitation is highest in August and September, when most visitors are participating in wildlife observation or photography. A refuge visit is defined by the Service as, “the entry of one person onto a Refuge System station to engage in one recreational or educational activity. ...One visitor could account for several visits.” (USFWS 2005).

Table 3.23. Annual visitation estimates for Sunkhaze Meadows NWR and Carlton Pond WPA (based on refuge staff estimations).

Annual Visitation Totals	2005	2006	2007	2008	2009	2010	2011	2012
Sunkhaze Meadows NWR								
Total Visitation	4,606	4,700	4,800	4,870	4,700	4,950	5,100	5,200
Carlton Pond WPA								
Total Visitation	900	950	975	960	975	980	1,050	1,100
Total Combined Visitation	5,506	5,650	5,775	5,830	5,675	5,930	6,150	6,300

Table 3.24. Estimated levels and types of use occurring at Sunkhaze Meadows NWR and Carlton Pond WPA between 2005 and 2008 (based on refuge staff estimations).

Type of Visit	2005	2006	2007	2008
Sunkhaze Meadows NWR				
Total Visitation	4,606	4,700	4,800	4,870
Hunting	626	640	666	656
Fishing	676	680	700	690
Wildlife Observation and Photography	1,020	1,085	1,135	1,162
Environmental Education	475	153	153	44
Interpretive Program	35	20	50	197
Carlton Pond WPA				
Total Visitation	900	950	975	960
Hunting	132	135	145	145
Fishing	518	550	550	550
Wildlife Observation and Photography	210	220	245	240
Environmental Education	53	53	53	0
Interpretive Program	7	25	0	0

We anticipate visitation will continue to increase nominally as populations around the refuge and WPA continue to grow. According to data included in Maine's SCORP (MBPL 2009), the counties surrounding the refuge and WPA have experienced some growth between 2000 and 2008, and this growth is expected to continue. Kennebec County grew approximately 4 percent over this period. Penobscot County grew by approximately 3 percent, and Waldo County by 5 percent (MBPL 2009).

Priority Public Uses

The Refuge Improvement Act identifies six wildlife-dependent public uses that each refuge should evaluate for compatibility with its wildlife-first mandate:

1. Wildlife observation
2. Wildlife photography
3. Environmental education
4. Interpretation
5. Hunting
6. Fishing

All six wildlife-dependent public uses are authorized at Sunhaze Meadows NWR and Carlton Pond WPA. Because of limitations in staff time and resources, the majority of the activities are self-directed, occurring when and where they are allowed by refuge regulations.

Wildlife Observation and Photography

Nationally, over 71 million people participate in some form of wildlife observation activity such as watching, feeding, or photographing wildlife (USFWS and Census Bureau 2012). Citing trends identified by the National Survey on Recreation and the Environment, Maine's SCORP highlights public recreation related to wildlife viewing and observation has experienced an 80 percent increase in participation between 2002 and 2009 across the Northeast (MBPL 2009). According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, Maine's experiences over 800,000 participants in wildlife observation. These participants spent more than \$865 million on activities and equipment related to wildlife watching (USFWS and Census Bureau 2008). Similar State-specific estimates of participation were unavailable for the 2011 survey at the time of this writing. However, according to surveys included in Maine's SCORP, a majority of State residents participate in natural scenery viewing or photography (73 percent) or wildlife observation and photography (62 percent) (MBPL 2009).

Visitors to the Sunhaze Meadows Unit can access six wildlife observation trails and a portion of Maine's ITS snowmobile trail for opportunities to observe and photograph wildlife. Hikers may access the interior of the refuge on the Carter Meadow, Oak Point, Johnson Brook, Ash Landing, North Buzzy Brook, and South Buzzy Brook trails. An observation platform is located on the edge of the Sunhaze Meadows peatlands at the end of the Carter Meadow Trail. Wildlife may also be observed by traversing McLaughlin Road. Visitors also canoe Sunhaze Stream to view wildlife and experience the Sunhaze Meadows Unit wetlands up close. Both Sunhaze Meadows NWR and Carlton Pond WPA allow off trail use for public use access (on foot) for the purposes of wildlife observation, photography, berry picking, snowshoeing, cross country skiing, trapping, and hunting.

We currently use mechanized tools to maintain refuge trails, boardwalks, the observation platform, and other public use facilities in the wilderness study area. However, in recent years, some of the existing infrastructure at the Sunkhaze Meadows Unit has fallen into disrepair. Trails have become blocked by downed trees or overgrown by trailside vegetation. Boardwalks have buckled as a result of frost heave, making them difficult to use (Toniolo 2011). Maintaining trails to remove downed, overhanging, or hazard trees and vegetation relies on many hours of staff and volunteer time. Currently, the refuge cannot maintain all the trails present on the refuge. Based on feedback received during initial CCP scoping, we learned that most visitors use the trails on the south and eastern side of the refuge.

Because Carlton Pond WPA is dominated by open water and emergent wetlands, we have not developed a trail system here. However, many people enjoy paddling Carlton Pond to observe and photograph wildlife. At the Benton and Sandy Stream Units, no formal walking trails exist. Both units have snowmobile trails, allowed through special use permits. While not the primary use of these trails, they are used for occasional wildlife photography and observation during warmer months.

Environmental Education and Interpretation

The Friends of Sunkhaze Meadows NWR provides the majority of environmental education and interpretive programming, but this is limited to the Sunkhaze Meadows Unit. Refuge staff and the Friends of Sunkhaze Meadows NWR work with local teachers and students to help them use the Sunkhaze Meadow Unit for educational purposes. A National Science Foundation-sponsored education consortium conducts annual training seminars for teachers at the University of Maine. Teachers and students who participate in this program use refuge lands as an outdoor laboratory. Other interpretive programming and events sponsored by Friends of Sunkhaze Meadows NWR include presentations, guided walks, and canoe tours. Refuge staff also participate in a small number of educational and interpretive events upon request.

In addition, interpretive kiosks and trail-side exhibits are located in the vicinity of the Johnson Brook Trail on the County Road and the Ash Landing Trail on the Stud Mill Road. There is an additional interpretive kiosk on a single panel located offsite at the town of Milford boat launch along the Penobscot River. These kiosks exhibit information related to the Sunkhaze Meadows Unit, including maps, wildlife profiles, and ecosystem highlights.

There are no kiosks, exhibits, or environmental education or interpretive programs at Carlton Pond WPA or at the Benton or Sandy Stream Units at this time.

Hunting

According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, over 13 million people nationally participate in hunting. Across New England, hunting has experience a slight increase in participation since consistent surveys were started in 1955 (USFWS and Census Bureau 2012). Specific to Maine, in 2006, there were over 146,000 hunters participating in an average of 14 days per hunter that year (USFWS and Census Bureau 2008).

Consistent with Statewide population trends, deer harvests have generally declined across the State and in the towns surrounding the refuge units and WPA (see table 3.25).

Table 3.25. Deer harvest data for Maine and towns surrounding Sunkhaze Meadows NWR and Carlton Pond WPA (MDIFW 2013b).

Year	Maine	Unity	Milford	Benton	Troy
2011	18,839	102	18	60	70
2010	20,063	136	12	92	84
2009	18,092	111	13	82	105
2008	21,061	138	15	91	94
2007	28,884	170	14	121	122
2006	29,918	207	13	132	139
2005	28,148	213	17	142	137

Sunikhaze Meadows NWR and Carlton Pond WPA are open to all hunting seasons established by the MDIFW. This includes, but is not limited to, deer, coyote, bear, waterfowl, and upland game. Refuge hunt seasons coincide with State seasons except for coyote and bear seasons. Hunting has occurred at Sunikhaze Meadows NWR and at Carlton Pond WPA for decades, including prior to refuge and WPA establishment.

The refuge's hunt program follows Federal and State regulations for annual harvest levels and seasons by species. Coyote hunting on refuge lands is limited to October 1 through March 31 (50 CFR 32.38); this is more restrictive than the State season. Bear hunting season is limited to October 1 through the end of the State season (50 CFR 32.38). Non-toxic shot is required for all hunting seasons except deer and turkey (50 CFR 32.2 and 32.38), and, per Refuge System regulations (50 CFR 32.2) the use of bait is prohibited on the refuge and WPA. A refuge-issued permit is not required to hunt on the refuge or WPA. Hunters are responsible for knowing Federal and State laws and regulations that apply on Service-owned lands.

Fishing

In 2011, over 33 million people participated in fishing nationally. Across New England, public participation in fishing has increased slightly since consistent surveys were started in 1955 (USFWS and Census Bureau 2012). According to the 2006 profile for Maine, over 350,000 anglers took to Maine's waters that year (USFWS and Census Bureau 2008).

Fishing is authorized at the Sunikhaze Meadows Unit and Carlton Pond WPA according to State fishing regulations. At the Sunikhaze Meadows Unit, waters are open to sport fishing under State of Maine fishing regulations. Lead-free sinkers are required for all fishing. Areas open for fishing on the refuge include: Baker Brook, Little Birch Stream, Birch Stream, Buzzy Brook, Johnson Brook, Little Buzzy Brook, Dudley Brook, and Sunikhaze Stream. Anglers can fish by boat in Sunikhaze Stream and its tributaries, or on the stream bank.

We have not established any trails or access areas to allow anglers to fish Carlton Pond. However, off-trail use is allowed for pedestrian access only (e.g., walking), and anglers are allowed to fish from the bank, or to ice fish. Anglers are also allowed to fish in Carlton Pond by boat. Fish species commonly sought by anglers include pickerel, yellow perch, bullheads, and black bass (Toniolo 2011).

The Benton Unit does not have access or habitat to support fishing. The Sandy Stream Unit does not have a formal trail system (except for the snowmobile trail) which is located away from the stream. While the Service does not have jurisdiction over Sandy Stream itself, visitors are allowed access to the stream for fishing from refuge lands.

Other Allowed Public Uses

Snowmobiling, cross country skiing, snowshoeing, berry picking, research, bicycling (Sunhaze Meadows Unit only), and boating are currently allowed as other recreational use opportunities on Sunhaze NWR and Carlton Pond WPA. Dog trials are another public use activity allowed only at Carlton Pond WPA. In the 1988 EA establishing the refuge (USFWS 1988), canoeing and snowmobiling are specifically mentioned as uses which we will allow on the refuge at appropriate times or in places where no conflict would occur with the objectives of the Refuge System. In addition, many of the non-priority public uses that we allow are also important for connecting people with nature.

Snowmobiling is currently authorized from December 1 until April 15 when there is enough snow. Snowmobiling is a tradition for the local community who use snowmobiles on a portion of ITS 84 (Statewide Interconnecting Trail System) and a connector trail at the Sunhaze Meadows Unit. It is also allowed on two other trails, one each on the Benton Unit and Sandy Stream Unit of the refuge. These trails existed prior to refuge establishment. The portion of the ITS-84 and the connector trail on the Sunhaze Meadows Unit is approximately 4.6 miles long. Trails on the Benton Unit and Sandy Stream Unit are 1.0 mile and 0.5 miles respectively.

Local snowmobile clubs are responsible for maintaining the trails within the clubs' designated areas of operation, and they coordinate trail maintenance with refuge staff to ensure methods and timing does not adversely affect sensitive species. Trail maintenance activities are authorized through a special use permit, which also include stipulations to ensure minimal impacts to habitat and wildlife. Members of the local clubs are also responsible for placing trail junction, trail number, safety, and speed limit signs along the trails prior to December 1, and then maintaining them through the period of snowmobile use. The clubs then are required to collect the signs and pick up any litter prior to the reopening of refuge roads after the mud season closure (typically before Memorial Day weekend). New trail construction or off trail use is not permitted.

The 4.6-mile-long trail at Sunhaze Meadows Unit runs for a short distance down the powerline right-of-way until it intersects with the McLaughlin Road then follows the road until it ends and crosses Sunhaze Stream (see map 3.6). By allowing the snowmobile traffic on the road for the majority of that distance it minimizes effect to both vegetation and wetlands. The traditional trail route will be maintained into the future, but we reserve the right to adjust the route between the trail and McLaughlin Road to address future safety concerns as the need arises. Trails at the Benton and Sandy Stream Units (one mile and one-half mile respectively) are maintained in the same location each year (See map 3.8 and 3.9).

Bicycling at Sunhaze Meadows NWR is limited to the dirt-surfaced McLaughlin Road at the Sunhaze Meadows Unit, where this use has been allowed in the past. Bicycling on the hiking trails or off trail is not allowed.

Walking and hiking on the refuge and WPA are permitted throughout the year from sunrise to sunset daily. There are no restrictions during hunting season, but visitors are encouraged to wear blaze orange vests. Cross country skiing and snowshoeing, were originally authorized in 1994 on refuge trails when enough snow is present. Cross country skiing and snowshoeing is permitted December through March (Toniolo 2011).

Berry picking is permitted on Sunkhaze Meadows NWR. Visitors can pick raspberries and blackberries in the summer and blueberries and cranberries in the fall. Harvesting is allowed during daylight hours.

Boating is allowed on Sunkhaze Stream and in Carlton Pond. Some visitors believe it's one of the best ways of experiencing these areas. Based on comments from visitors, spring is typically when most motorized boating occurs on the refuge. In spring, Sunkhaze Stream and its tributaries flood sections of peat bog and forested wetland which creates a large lake. During flooding, the stream channel is not visible and navigation can be disorienting. Because there is no easy trailer access to Carlton Pond, boating is largely limited to small boats that can be hand-carried to the water. Boating is also more common at Carlton Pond when water levels are higher.

Retriever trials at Carlton Pond WPA are also occasionally allowed (not more than a few days each year) under a special use permit. This is not a priority public use itself; however, the use of dogs to retrieve downed game is related to the priority public use of hunting.

Archaeological and Historical Resources

Sunikhaze Meadows NWR and Carlton Pond WPA contain cultural resources that indicate use from prehistoric through historic time periods (see "Wildlife Trends and Changes" section above). Archaeological investigations in areas surrounding Sunikhaze Meadows indicate that activities relating to travel, hunting and fishing, fortifications, and group gatherings all likely occurred within the Sunikhaze Meadows Unit (Robinson 2011). There is one documented archaeological resource on the Sunikhaze Meadows Unit. It is the oldest known Native American 'formal' (i.e., a special location used repeatedly) cemetery in Maine (Robinson 2011). While the cemetery was likely completely destroyed in 1922 during road construction, records created by the construction foreman provide detailed information on the cemetery, which dates to at least 7,000 years B.C.E. (Robinson 2011).

Given the known prehistoric activities in the area surrounding the Sunikhaze Meadows Unit and the environmental setting, several additional types of cultural resources may be located within the refuge itself. The Sunikhaze Stream likely was a major access route to the upper tributaries of the Union River (Robinson 2011). As such, campsites near portages may be common along the main channel of Sunikhaze Stream. The wetland-peatland complex and other areas along Sunikhaze Stream may also contain additional archaeological resources dating between 3,000 and 11,000 years ago associated with receding lake and pond shorelines (Spiess, personal communication April 7, 2011). In addition, the wide range of resources located within Sunikhaze Meadows Unit suggests hunting, trapping and fishing all occurred within the refuge from prehistoric through historic times. Given this setting, fishing and trapping gear may be preserved within the permanently saturated conditions of the wetland.

Archaeological investigations near Carlton Pond WPA have located areas of prehistoric settlement and resource procurement and tool manufacture (Shaffer 2011). Documented resources near the Carlton Pond WPA include 17 prehistoric sites dating to the Archaic (from 8500 to 800 B.C.E.), Ceramic (from 800 B.C.E. to Anno Domini (A.D.) 1500), and Contact (A.D. 1500 to 1675) periods, and three historic sites which contain contact-period artifacts as well as early 19th century artifacts. Given that “at least 95 percent of the known prehistoric habitation and workshop sites in Maine are found next to waters that are (or were) navigable by canoe” (Shaffer 2011), there is a high likelihood that additional unidentified archaeological resources are located within Carlton Pond WPA. Historic sites identified near Carlton Pond WPA include a petroglyph, likely representing a surveyor’s mark from the mid-19th century, two contact-period sites containing lithic artifacts as well as kaolin pipes and a metal counters dating to the 17th century, and a late 19th to early 20th century site containing artifacts, the base of a bridge or dam, and a dam-related structure (Shaffer 2011).

Chapter 4

USFWS



Riparian floodplain forest at the Sandy Stream Unit.

Management Direction and Implementation

- **Introduction**
- **Formulating the Management Direction**
- **General Refuge Management**
- **Refuge Goals, Objectives, and Strategies**

Introduction

This chapter presents the array of management actions that, in our professional judgment, will best achieve the refuge and WPA's purposes, vision, and goals, and best respond to public issues. It begins with a description of the process we used to formulate the management direction for Sunkhaze Meadows NWR and Carlton Pond WPA. Next, we present the management direction for the refuge and WPA, including the goals, objectives, and strategies for managing them. Unless otherwise noted, refuge staff will implement all actions.

Formulating the Management Direction

Refuge and WPA goals are intentionally broad, descriptive statements of the desired future condition of their resources. By design, the goals define the targets of our management actions in prescriptive rather than quantitative terms. They also provide a foundation for developing specific management objectives and strategies.

Objectives are steps toward achieving a goal and further define management targets in measurable terms. They provide the basis for developing the strategies that monitor refuge and WPA accomplishments and evaluate progress. "Writing refuge Management Goals and Objectives: A Handbook" (USFWS 2004a) recommends writing "SMART" objectives that possess five properties: (1) specific; (2) measurable; (3) achievable; (4) results-oriented; and (5) time-fixed.

Where possible, we incorporated the principles of SHC in the development of our objectives and strategies. According to "Strategic Habitat Conservation: Final Report of the National Ecological Assessment Team" (USFWS 2006b): "This approach focuses on the ability of the landscape to sustain species as expressed in measurable objectives. Developing a strategy to attain a biological outcome, such as a population objective, requires documented and testable assumptions to determine whether the objective is met." Not only will this approach ensure refuges are contributing to the Refuge System and Service mission and goals in a strategic, standardized, and transparent way, it also helps refuges ensure that they contribute to local and regional conservation priorities and goals as well.

A rationale accompanies each objective to explain its context and importance. We will use the objectives described later in this chapter to write the refuge and WPA step-down plans.

Next we identified strategies, or the actions, tools, and techniques we may use to achieve each objective. The list of strategies in each objective represents the suite of actions we propose to implement. We will evaluate most of them further as to how, when, and where we should implement them when we write our step-down plans. We will measure our successes by how well our strategies achieve our objectives and goals.

We believe the management goals, objectives, and strategies described below provide the best combination of actions to meet the Refuge System mission and policies, meet the refuge and WPA purposes, vision, goals, and respond to public issues.

General Refuge Management

There are some actions we will take in managing Sunkhaze Meadows NWR and Carlton Pond WPA over the next 15 years that are required by law or policy, or represent actions that have undergone previous NEPA analysis, public review, agency review, and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge and WPA's purposes, vision, and goals.

- Continuing land protection by purchasing fee title and conservation easements from willing sellers, and accepting donations, within the current acquisition boundaries.
- Monitoring and controlling invasive species.
- Managing pest species.
- Monitoring and abatement of diseases affecting wildlife and forest health.
- Facilitating or conducting biological research and investigations.
- Managing furbearers.
- Expanding cultural resource protection and interpretation.
- Providing wildlife-dependent recreational opportunities.
- Completing findings of appropriate use and compatibility determinations.
- Administering the refuge, current FmHA conservation easements, and the WPA.
- Completing the wild and scenic river eligibility study.
- Completing refuge and WPA step-down plans.
- Conducting additional NEPA analysis as necessary.
- Employing adaptive management.
- Expanding partnerships to achieve management needs.
- Establishing climate change monitoring protocols.

Protect Land

The Service will continue to work with willing sellers and in partnership with other agencies and organizations, to protect the remaining 92 acres within the refuge's current authorized acquisition boundary.

Although we intend to acquire suitable and available habitat within the approved refuge boundary from willing sellers, acquiring those lands is not a primary focus of refuge management since the Service already owns the majority of lands within the approved boundary. Instead, we will focus on creating partnerships with adjacent and nearby landowners in support of broader conservation issues that affect the refuge (e.g., providing additional public access, reducing habitat fragmentation).

We will continue to protect Service interests in the FmHA conservation easements and Carlton Pond WPA. We have already acquired all of the parcels within the current acquisition boundary for Carlton Pond WPA.

Monitor and Control Invasive Species

The establishment and spread of invasive species, particularly invasive plants, is a significant problem that reaches across all habitat types. For the purposes of this discussion, we use the

definition of invasive species contained in the Service Manual (620 FW 1.4E): “Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. Alien species, or non-indigenous species, are species that are not native to a particular ecosystem. We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere.”

In this section we discuss only nonnative species. In some instances, native species whose overabundance in a particular area interferes with our management objectives are undesirable from a management standpoint, and we address their management in a later section of this chapter.

The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all refuge habitats. In many cases, they have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. Over the past several decades, government agencies, conservation organizations, and the public have become more acutely aware of the negative effects of invasive species. Many plans, strategies, and initiatives target more effective management of invasive species, including *The National Strategy for Management of Invasive Species for the National Wildlife Refuge System* (USFWS 2003), *Silent Invasion—A Call to Action*, by the National Wildlife Refuge Association (NWRA 2002), and *Plant Invaders of Mid-Atlantic Natural Areas*, by the Service and the National Park Service (Swearingen et al. 2010). The Refuge System biological discussion database and relevant workshops continually provide new information and updates on recent advances in control techniques. Sources of funding are also available, both in the Service budget and through competitive grants, to conduct inventory and control programs.

Sunkhaze Meadows NWR and Carlton Pond WPA contain few species targeted for invasive species management, but threats from invasive species are likely to increase over time. Our staff and volunteers continue to be vigilant for other invasive plants and animals should they be identified at Sunkhaze Meadows NWR and Carlton Pond WPA.

Guidance on managing invasive species on Refuge System lands appears in the Service Manual (620 FW 1.7G). The following actions define our general strategies on the refuge and WPA:

- Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function and to prevent new and expanded infestations of invasive species.
- Conduct habitat management to prevent, control, or eradicate invasive species using techniques described through an integrated pest management plan, or other similar management plan. The plans comprehensively evaluate all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions.
- Evaluate native habitat management activities with respect to their potential to accidentally introduce or increase the spread of invasive species and modify our habitat management operations to prevent increasing invasive species populations.
- Refuge integrated pest management planning addresses the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques.

- Manage invasive species under the guidance of the National Strategy for Invasive Species Management (USFWS 2003b) and within the context of applicable policy.

The following actions define our specific strategies for the refuge and WPA:

- Continue the treatment of the most problematic species ranked in management priority based on (a) the extent to which the species is established on the refuge or WPA, (b) the potential ecological impact of the species on refuge or WPA plant communities, and (c) the degree of management difficulty involved in controlling the species.
- Maintain early detection and rapid-response readiness regarding new invasions.
- Maintain accessibility to affected areas for control and monitoring.
- Continue to promote research into biological control alternatives.
- Continue and increase efforts to involve the community in promoting awareness of invasive species issues and seek assistance for control programs on and off the refuge and WPA.

While not currently on the refuge or WPA, two nonnative insect pests found elsewhere do pose a long-term concern for refuge and WPA habitats: emerald ash borer (*Agrilus planipennis*) and the Asian longhorn beetle (*Anoplophora glabripennis*). Emerald ash borer is a nonnative insect originally from Asia. It was first identified in Michigan in 2002. Since then, it has spread to 14 states and 2 Canadian provinces (MSU 2012). Emerald ash borer reduces the health of and often kills the trees it infects. Emerald ash borer feeds exclusively on ash trees, although it does feed on all varieties of ash, including black, green, and white (MDNR 2012). While this pest has not been found in Maine to date, it has been confirmed as close as Pennsylvania and New York. Its rapid spread and devastating effects on ash populations is a concern for the long-term habitats of Sunhaze Meadows NWR and Carlton Pond WPA: both of which contain populations of various ash species. Asian longhorn beetle is a destructive wood-boring beetle that impacts maples and other hardwoods such as birch, elm, and willow. Adults and larvae chew and bore into their host tree, which weakens and often kills the tree. Asian longhorn beetle was first discovered in the U.S. on several hardwood trees in Brooklyn, New York, in 1996. It is currently found within New York, New Jersey, and Massachusetts. It was previously found in Chicago, Illinois, but was successfully eradicated in 2008 (USDA 2012). We will continue to monitor the spread of these pests nationally and continue to evaluate the potential for their presence at both the refuge and WPA.

Manage Pest Species

At times, native plants and animals interfere with management objectives. The Refuge Manual (7 RM 14.4A) defines a pest as “Any terrestrial or aquatic plant or animal which interferes, or threatens to interfere, at an unacceptable level, with the attainment of refuge objectives or which poses a threat to human health.” That definition could include the invasive species defined above, but in this section, we are limiting our discussion to native species that may interfere with management. Currently, we are unaware of any native plant or animal species on the refuge or WPA that meets this definition of a pest species. If we identify pest species on the refuge in the future, we will use established best management practices to control them as appropriate.

Monitor and Abate Wildlife and Plant Diseases

The Service has not yet published its manual chapter on Disease Prevention and Control. In the meantime, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Fish and Wildlife Service and the Secretary of the Interior. The Refuge Manual (7 RM 17.3) lists three objectives for the prevention and control of disease.

1. Manage wildlife populations and habitats to minimize the likelihood of the contraction and contagion of disease.
2. Provide for the early detection and identification of disease mortality when it occurs.
3. Minimize the losses of wildlife from outbreaks of disease.

Chronic wasting disease (CWD) is a disease of concern for many refuges in the Northeastern states. According to the Chronic Wasting Disease Alliance, CWD is a transmissible neurological disease of deer and elk that produces small lesions in brains of infected animals. It is similar to mad cow disease in cattle and can be fatal to deer and elk (CWDA 2012). From Sunhaze Meadows NWR and Carlton Pond WPA, the nearest known location of this disease has been verified in central New York State. Even though this is nearly 400 miles away from the refuge and WPA, the disease has been known to spread rapidly. As of 2012, it has been identified in 19 states across the country. While not currently found within Maine, we continue to monitor the spread of this disease nationally and continue to evaluate the potential for it at both the refuge and WPA.

In addition to diseases that cause serious mortality among wildlife, diseases transmitted through wildlife to humans have received more attention. One example is Lyme disease. In 2002, the Service published a Service Manual chapter (242 FW 5) on Lyme Disease Prevention to inform employees, volunteers, and national service workers about this disease, its prevention, and treatment. Other wildlife diseases may be a concern in the future. While eastern equine encephalitis is not currently known to occur within Maine, it has been found in other parts of the Northeast such as Massachusetts, New Jersey, and New York. West Nile virus has been found in localized areas of Maine and Vermont, but most frequent cases of this disease typically occur in southern New England in states like Connecticut, Massachusetts, and New Jersey (CDC 2012). Eastern equine encephalitis is transmitted by infected mosquitos in and around freshwater hardwood swamps in the Atlantic and Gulf Coast states and the Great Lakes region (CDC 2010). As with other diseases known to occur within the surrounding region, we will continue to monitor the spread of this disease nationally and continue to evaluate the potential for it at both the refuge and WPA.

Biological and Ecological Research and Investigations

The Refuge Manual and the Service Manual both contain guidance on conducting and facilitating biological and ecological research and investigations on refuges. In 1982, the Service published three objectives in the Refuge Manual for supporting research on units of the Refuge System (4 RM 6.2):

1. Promote new information and improve the basis for, and quality of, refuge and other Service management decisions.
2. Expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general.
3. Provide the opportunity for students and others to learn the principles of field research.

In 2006, the Service Manual provided supplemental guidance on the appropriateness of research on refuges: “We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as described in chapter 1. Research that directly benefits refuge management has priority over other research.” (603 FW 1.10D(4))

All research conducted on the refuge must be consistent with an approved finding of appropriateness and compatibility determination for research. If a research project does not fall within the scope of a current finding of appropriateness and compatibility determination, we will need to complete project-specific evaluations before authorizing the research. Research projects may also contribute to specific needs identified by the refuge or the Service. As we note in chapter 3, we have allowed many research projects that meet these criteria. We expect additional opportunities to arise under this CCP. A special use permit will be issued for all research projects we allow. In addition, we will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions.
- Participate in appropriate multi-refuge studies conducted in partnership with the USGS.
- Facilitate appropriate and compatible research by providing compatible access and utilization of the refuge as a location for ongoing research.

Furbearer Management

Under this plan, we will continue to allow trapping on WPA lands and on the Sunkhaze Meadows Unit of the refuge according to refuge and State regulations, as specified in the existing furbearer management plan and EA (USFWS 2001) and compatibility determinations (updated as part of this process). We will continue to conduct furbearer management as a mechanism to collect survey and monitoring information that otherwise will be expensive and difficult to obtain using refuge resources and as a way to collect initial data that may lead to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained, experienced group of trappers, the Service can use their skills and local knowledge to perform or assist in valuable management or research functions. Trappers who participate in the refuge and WPA programs may provide assistance with the implementation of management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and negative effects of species on habitats.

Expand Cultural Resource Protection and Interpretation

As a Federal land management agency, we are responsible for locating and protecting all historic resources: specifically, archaeological sites and historic structures eligible for listing or listed on the National Register of Historic Places. That applies not only to refuge land, but also to land affected by refuge activities, and includes any museum properties.

Recent cultural resource surveys conducted by the University of Maine in Orono identified known and potential locations of cultural resource areas requiring protection and preservation at Sunkhaze Meadows Unit (Robinson 2012). At this time, no management actions are proposed that we believe will impact known or suspected cultural resources. The Penobscot Indian Nation

has expressed interest partnering with us in the future management of Sunkhaze Meadows Unit to ensure protection of cultural resources and interpretive opportunities available at that site. Under this plan, the Service will use results from the cultural resource overview to develop a step-down cultural resource management plan. This plan outlines considerations for the ongoing protection of cultural resources on Service lands as well as identifies opportunities for expanding cultural resource interpretation both on and off refuge.

Under this plan, we will evaluate the potential for our management activities to impact archeological and historical resources as required, and will consult with the Service's regional archaeologists, Maine Historic Preservation Commission, and federally recognized tribes as appropriate to ensure compliance with Section 106 of the National Historic Preservation Act and any other applicable laws and regulations. That compliance may require any or all of the following: a survey of State historic preservation records, a literature survey, or a field survey.

Wildlife-dependent Recreational Program

The Refuge System Improvement Act designated six priority public uses on national wildlife refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Per the Service Manual (605 FW 1), we will continue to use the following criteria for a quality wildlife-dependent recreation program in developing refuge programs. According to this policy, quality, wildlife-dependent recreation:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan.
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.
- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.
- Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources.
- Provides reliable/reasonable opportunities to experience wildlife.
- Uses facilities that are accessible to people and blend into the natural setting.
- Uses visitor satisfaction to help to define and evaluate programs.

While no formal assessment has been conducted, Service staff and volunteers have observed that most visitors to the refuge and WPA engage in some form of wildlife-dependent recreation. Wildlife observation, fishing, and hunting are the three of the most common activities (see chapter 3). Under this plan, we will continue to offer opportunities for all six priority uses.

Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for determinations of appropriateness and compatibility. Appendix B includes appropriateness and compatibility determinations consistent with implementing this plan. Our final CCP includes all approved findings of appropriateness and compatibility determinations. These activities will be evaluated based on whether or not they contribute to meeting or facilitating refuge purposes, goals, and objectives. As noted above, environmental education and interpretation, wildlife observation and photography, hunting, and

fishing are the priority, wildlife-dependent uses of the Refuge System. According to the Refuge System Improvement Act and the Service Manual (605 FW 1), these uses are automatically considered to be appropriate and should receive preferential consideration in refuge planning and management.

Activities Not Allowed

As specified in the Refuge Administration Act, we cannot, “initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge” unless we have determined that the use is compatible. In addition, certain uses are generally or specifically prohibited on refuges by Service regulation (see 50 CFR 27 for details). Federal regulations for WPAs are different. As specified in 50 CFR 31.16, 32.1, and 32.4, WPAs are open to hunting, fishing, and trapping unless closed. However, WPAs are closed to other public uses unless opened. The refuge and WPA are closed to public uses except those specified. According to Service policy (603 FW 1), if the refuge manager finds a use is not appropriate, it can be denied without determining its compatibility. We are not required to formally document all activities that are not found to be appropriate; however, if a use is requested frequently by several individuals or organizations we may choose to prepare a finding of appropriateness and compatibility determination if warranted. Historically, we have received requests for activities that are typically not allowed on refuges or WPAs (e.g., ice skating, firewood and peat harvesting at Sunkhaze Meadows Unit). Other areas nearby or elsewhere provide most of these activities, so the lack of refuge or WPA access does not eliminate opportunities for these activities within the region.

Activities Allowed

As part of the CCP process, we have reviewed all existing public uses of the refuge and WPA. In addition to the six priority public uses, we have determined that several other existing public uses are appropriate and compatible on refuge and WPA lands under certain conditions. These non-priority public uses include: boating; skiing and snowshoeing; snowmobiling on designated trails (Sunkhaze Meadows NWR Units only); gathering of blueberries, blackberries, strawberries, raspberries, cranberries, mushrooms, fiddleheads, and antler sheds for personal use; dog walking on trails (Sunkhaze Meadow Unit only); limited dog trials (Carlton Pond WPA only); bicycling; orienteering; commercial guiding; geocaching; and certain types of scientific research conducted by non-Service personnel. Authorized scientific research conducted by non-Service personnel is expected to contribute to goals 1, 2, 3, and 6. It is subject to Refuge Manual (4 RM 6.2) and Service Manual (603 FW 1.10D(4)) guidance on allowing research on Refuge System lands.

Please see the compatibility determination for this use in appendix B for additional information. The other non-priority public uses contribute to goals 3, 4, and 5 of this document, and support commitments we made in the refuge’s establishing documentation that we will allow certain traditional uses of the refuge, if compatible (USFWS 1988). Boating, skiing, snowshoeing, bicycling, commercial guiding, and orienteering also facilitate visitor participation in priority public uses during certain times of year.

The current snowmobile trail runs through the middle of the Sandy Stream Unit. Under this plan we will work with the local snowmobile club to relocate the snowmobile trail at the Sandy Stream Unit. It will be closer to Prairie Road in order to reduce habitat fragmentation and maximize the riparian buffer width along Sandy Stream itself.

We will continue to allow all six priority public uses and the existing, compatible public uses outlined above. Details on how we will administer the six priority public uses and scientific research, and how we will continue to administer boating; skiing, snowshoeing, gathering of berries, antlers etc. for personal use; dog walking on trails (Sunhaze Meadow Unit only); and limited dog trials (Carlton Pond WPA only) are described below. Additional details on all of these authorized public uses and how we will administer them are also available in appendix B.

Under this plan, we will:

- Allow limited dog trials in a small area of Carlton Pond WPA no more than 4 days a year.
- Allow recreational boating on Carlton Pond WPA waters and the Sunhaze Meadows Unit of Sunhaze Meadows NWR.
- Allow visitors to gather, for personal use only, blueberries, blackberries, strawberries, raspberries, cranberries, mushrooms, fiddleheads, and antler sheds at Sunhaze Meadows NWR.
- Allow motorized and non-motorized boating on Sunhaze Stream, its tributaries, and Carlton Pond.
- Allow cross-country skiing and snowshoeing, on and off trail, at all units of Sunhaze Meadows NWR and Carlton Pond WPA.
- Allow dog walking on trails at the Sunhaze Meadows Unit only.
- Allow use and maintenance of about 6 miles of snowmobiling trails at the Sunhaze Meadows Unit, Benton Unit, and Sandy Stream Unit of Sunhaze Meadows NWR through a special use permit to local snowmobile organizations.
- Open Sunhaze Meadows NWR to geocaching, orienteering, and commercial guiding for priority public uses.
- Work with local snowmobile clubs to relocate the snowmobile trail at the Sandy Stream Unit closer to Prairie Road (see map 4.6).

Refuge and WPA Staffing and Administration

Our proposals in this document do not constitute a commitment for staffing increases or funding for operations, maintenance, or future land acquisition. Congress determines our annual budgets, which the Service's national headquarters and regional offices distribute to the field stations.

Permanent Staffing and Operational Budgets

Permanent staffing and operational budgets for the refuge and WPA are subject to the annual discretion of the Service's Northeast Regional Chief of the National Wildlife Refuge System and allocations provided through the Federal budget. As noted in chapter 3, Sunhaze Meadows NWR and Carlton Pond WPA have been unstaffed as of 2008. Under this plan, Sunhaze Meadows NWR and Carlton Pond WPA will continue to be administered and supported, at least in part, by staff at Maine Coastal Islands NWR Complex.

Under this plan, our objective is to achieve levels of annual funding and staffing that allow us to achieve refuge purposes, as described by the goals, objectives, and strategies that we will establish in the final CCP. Implementing the described management actions will be dependent on the level of staffing available over the 15-year life of the CCP. Appendix E identifies current and proposed staffing levels.

Facilities Construction and Maintenance

Some minor infrastructure including observation platforms, boardwalks, and trails will continue to be maintained (to varying degrees). Only non-essential structures, including unused cabins and building remnants, will be eliminated from refuge lands. This plan includes identifying and acquiring an appropriate site for refuge management facilities on or near the Sunkhaze Meadows Unit.

Previous owners of refuge lands at the Sunkhaze Meadows Unit authorized five leases for private cabins. Four of these cabins are no longer used by the former occupants, and we have purchased the cabins. We will continue to maintain two of these buildings at the Sunkhaze Meadows Unit to store refuge equipment and provide work space for refuge staff and occasional use by the Friends of Sunkhaze Meadows. We will remove the remaining two cabins we currently own. We do not need these structures and it is wise practice to remove unused buildings that are not needed rather than let them deteriorate and invite vandalism. If we acquire interests in the remaining privately-owned cabin, we will determine whether to maintain or remove the structure after assessing its condition and refuge needs.

We intend to renew the annual agreement with a private citizen allowing access to and use of the one remaining cabin, provided the agreement remains in good standing. Maintenance of the cabin will continue to be the sole responsibility of the owner; the Service will not be responsible for any maintenance on this building. Once the agreement is terminated, we will acquire interests in this last cabin as needed. We will not enter into any additional agreements allowing private use of refuge cabins.

There are no Service buildings on the other units or Carlton Pond WPA. We will continue to maintain the dam at Carlton Pond WPA.

Distributing Refuge Revenue Sharing Payments

As discussed in chapter 3, we pay local municipalities annual refuge revenue sharing payments based on the number of acres in each municipality and the appraised value of refuge lands in their jurisdiction. We will continue these payments as long as they are authorized by the Revenue Sharing Act or other legislation, commensurate with changes in the appraised market value of refuge lands and new appropriation levels dictated by Congress.

Refuge and WPA Operating Hours

This plan includes keeping the refuge and WPA open for authorized public uses from official sunrise to sunset, 7 days a week. Additionally, the refuge and WPA maintains extended hours specifically for hunting access: a half hour both before sunrise and a half hour after sunset. They are also open to night hunting of coyote and raccoon per refuge and State regulations. In addition, the refuge manager has the authority to issue special use permits to allow access outside those periods. For example, we may permit access for research personnel or organized groups to conduct nocturnal activities such as wildlife observation, and educational and interpretive programs.

Complete a Wild and Scenic Rivers Review

The Wild and Scenic Rivers Act (Public Law 90-543 as amended: 16 U.S.C. 1271 through 1287) established a method for providing Federal protection for free-flowing rivers that possess one or more “outstandingly remarkable” natural or cultural values, and are judged to be of more than regional or local importance. A Wild and Scenic River designation preserves these rivers and their immediate environments for the use and enjoyment of present and future generations. Wild and Scenic River designation seeks to protect and enhance a river's current condition; therefore, current uses and activities are incorporated into the review process and are generally allowed to continue.

Similar to the Wilderness Review, as part of the CCP process, we are required to consider rivers and streams within the refuge and WPA boundaries for inclusion in the National Wild and Scenic River System. The process for recommending rivers for inclusion in the National Wild and Scenic River System has three steps: eligibility, classification, and suitability. Our review only applies to rivers and streams within the refuge and WPA boundaries. Also, because of time constraints, our review only includes the first two steps, determining eligibility and a tentative classification. Our findings of river eligibility and classifications assigned during this review are subject to further consideration during the study phase which we will complete after the CCP.

Based on our analysis, we determined that Sunkhaze Stream and its tributaries meet the criteria for wild and scenic river eligibility and we have tentatively classified these as scenic under the act. We will need to complete the study phase, including additional public review, to determine final classification and suitability. If we determine these waters are suitable for designation under the Wild and Scenic Rivers Act, we will make a recommendation to Congress. Only Congress may act to designate rivers or segments as wild and scenic under this act.

Once a river or river segment is found eligible by an agency, the agency must evaluate any subsequent actions within its jurisdiction to ensure the actions do not affect potential wild and scenic river designation. In other words, for Sunkhaze Stream and its tributaries, we need to ensure that Service activities do not affect the characteristics of the stream that make it eligible for designation. We do not expect the results of the review process, or designation if it occurs, to affect any of the existing public uses or proposed habitat management of the refuge's or WPA's lands or waterways. For more details, please see the Wild and Scenic River Review (appendix D).

Monitor and Enforce Farmers Home Administration Easements

As discussed in chapter 1, from the late 1980s to the mid-1990s, the FmHA acquired many properties throughout the country through foreclosure sales. Before reselling the properties, the FmHA placed permanent conservation easements on most of these properties to protect important habitats. The responsibility for monitoring and enforcing those easements and managing the retained properties rests with the Service, which has usually delegated it to the manager of the closest refuge.

Sunhaze Meadows NWR currently administers four FmHA easements. Under this plan, the responsibility for administering these properties is expected to remain with the refuge manager responsible for managing Sunhaze Meadows NWR. Currently, refuge staff check on Service

interests in these properties once a year, additional visits may be made, in response to land owner calls. Routine annual visits usually take three staff days. It is difficult to predict how much additional time and effort will be required to administer these interests in the future.

We will continue to implement the following strategies to meet our obligations on FmHA properties:

- Respond to reports of violations or possible violations as we learn of them. Work with landowners and partners to cooperatively resolve and remedy any violations. If necessary, work with the Northeast Region Solicitor's Office or Assistant U.S. Attorney's Office to ensure remediation and future compliance.
- Have refuge staff, typically the law enforcement officer, check on Service interests in these lands once per year.

Complete Refuge and WPA Step-down Plans

Service planning policy identifies up to 25 step-down plans that may be applicable on any given refuge. The refuge and WPA's existing step-down plans are summarized previously in Chapter 1, Conservation Plans and Initiatives Guiding the Proposed Action.

Under this plan, we have identified a few of these step-down plans that we consider to be of highest priority for updating or completing after the CCP is finalized. In particular, we will update the fisheries management plan and hunting management plan within 5 years of completing the CCP. We will also revise and finalize the habitat management plan (HMP) after we complete the final CCP. We will also develop annual habitat work plans and an inventory and monitoring plan to assist us in addressing CCP objectives and measuring our progress. To keep them relevant, we will modify and update them as we obtain new information. Below is a more detailed description of the HMP, annual habitat management plan, and inventory and monitoring plans. The completion of these plans supports all refuge goals.

Habitat Management Plan

An HMP for the refuge is the first step toward achieving the habitat-based goals and objectives. For example, this plan will identify specific "what, which, how, and when" actions and strategies that will be implemented over the 15-year period to achieve those objectives. Specifically, the habitat management plan will define management areas and treatment units, identify the type or method of treatment, establish the timing for management actions, and define how we will measure success over the next 15 years. In this CCP, the goals, objectives, and strategies in each objective identify how we intend to manage habitats on the refuge. We base both the CCP and HMP on current resource information, published research, and our own field experiences. We will update our methods, timing, and techniques as new, credible information becomes available. To facilitate our management, we will regularly maintain our GIS database, documenting any major changes in vegetation as needed.

Annual Habitat Work Plan and Inventory and Monitoring Plan

The annual habitat work and inventory and monitoring plans for the refuge are also priorities for completion upon CCP approval. These plans are vital for implementing habitat management actions and measuring our success in meeting the objectives. Each year, we will generate an annual habitat work plan based on the habitat management plan. The annual habitat management plan will outline specific management activities for that year. The inventory and monitoring plan

will outline the methodology to assess whether our original assumptions and proposed management actions support our habitat and species objectives. We will prioritize our inventory and monitoring needs in this plan. The results of inventories and monitoring will provide us with more information on the status of our natural resources and allow us to make more informed management decisions.

Additional NEPA Analysis

For all major Federal actions, NEPA requires the site-specific analysis and disclosure of their impacts, either in an EA or in an environmental impact statement (EIS). NEPA categorically excludes other, routine activities from that requirement.

Most of the major actions proposed and fully analyzed in this CCP are described in enough detail to comply with NEPA, and will not require additional environmental analysis. Although this list is not all-inclusive, the following projects fall into that category:

- Completing the habitat management plan, including its specified restoration projects and habitat management programs (provided no major changes from the CCP).
- Completing the inventory and monitoring plan.
- Controlling invasive plants.
- Implementing a predator or pest management program.
- Constructing small kiosks, signs, parking areas, and other small-scale visitor facilities.
- Enhancing our priority public use programs.

The refuge's fire program (including all three refuge units and Carlton Pond WPA) went through a separate NEPA process in 2001. At that time, the fire management plan and associated EA were completed (USFWS 2001). The fire management plan is in the process of being updated.

Adaptive Management

This plan includes some flexibility in management to allow us to respond to new information, spatial and temporal changes and environmental events, whether foreseen or unforeseen, or other factors that influence management. The need for flexible management is very compelling today because our present information on refuge species and habitats is incomplete, provisional, and subject to change as our knowledge base improves.

Adaptive management requires formulating predictions about habitat or species responses to management actions, implementing management actions, and then monitoring to determine if species or their habitats are responding as predicted. Secretarial Order No. 3270 provides guidance on policy and procedures for implementing adaptive management in departmental agencies. In 2007, an intradepartmental working group developed a guidebook to assist managers and practitioners. This adaptive management guidebook was updated in 2009 (Williams et al. 2009). It defines adaptive management, the conditions under which we should consider it, and the process for implementing it and evaluating its effectiveness. The guidebook defines adaptive management as, "a decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood."

For the refuge, monitoring key resources and management actions and outcomes, will be critical to implementing an adaptive management process. It is designed to facilitate more effective decisions and enhanced benefits. Habitat management to benefit showy lady's slipper or the northern white cedar exemplary plant community are examples of refuge activities where an adaptive management approach will be implemented and refined under this plan. The refuge manager will be responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes in management actions from what we present in the CCP may warrant additional NEPA analysis and public comment.

Generally, we can increase monitoring and research that support adaptive management without additional NEPA analysis. Our inventory and monitoring plan will determine future survey efforts and prioritize inventory and monitoring efforts (see "Annual Habitat Work Plan and Inventory and Monitoring Plan" under "Completing Refuge Step-down Plans" below).

Expand Partnerships to Achieve Management Needs

The Service will expand its involvement in partnerships with State, Tribal, and local agencies and organizations, as well as academic institutions, to achieve its management goals. Under this plan, we will explore partnership opportunities to inventory use of habitat by reptiles, amphibians, and priority birds of conservation concern as well as monitor or research variables related to climate change on Service-owned lands.

Refuge staff will work with Moosehorn NWR staff, Umbagog NWR, MDIFW, town representatives, and members of the Penobscot Indian Nation and other Tribes as warranted, collaborating on natural resource and public use management.

Establish Climate Change Monitoring Protocols

There is consensus among the scientific community that global climate change, occurring in part as a result of emissions of carbon dioxide and other greenhouse gases from human activities, will lead to significant impacts across the U.S and the world (National Academies 2005). We discuss the potential effects of climate change on refuge and WPA resources in chapter 3, under Climate.

Uncertainty about the future effects of climate change requires refuge managers to use adaptive management to maintain healthy ecosystems in light of unpredictability (Inkley et al. 2004). This involves improving or adjusting policies and practices based on the outcomes of monitoring or management activities and may result in changes to regulations, shifts in active habitat management, or changing management objectives. Refuge managers can plan and respond to changing climate conditions. A few recommendations include managing for diverse and extreme weather conditions (e.g., drought and flood) and maintaining healthy, connected, genetically diverse wildlife populations (see Inkley et al. 2004).

Under this plan, the Service proposes establishing baseline monitoring protocols that will allow us to evaluate climate change impacts over time. These protocols may track the status of habitats, individual species, or ecological processes over time. The exact protocols will be developed based on available data, climate change projections, and availability of funding and expertise. In conjunction with the partnerships emphasis noted below, the Service will explore partnership opportunities to monitor or research variables related to climate change on Service-owned lands.

Refuge Goals, Objectives, and Strategies

Habitat Management

Under this plan, we emphasize refuge management focused on preservation of the peat bog complex and surrounding mature forest lands within the Sunkhaze Meadow Unit. We also propose improvements to protect the ecological integrity of other refuge units and their habitats through supporting naturally-occurring successional processes and more targeted management. At the same time, we promote more grassland and shrubland habitat management at Benton and Sandy Stream Units. Management of Carlton Pond WPA will largely remain unchanged under this plan.

Refuge Administration

We used the Refuge System's national staffing model developed in 2008 to guide proposed staffing under this plan. The Staffing model was developed to answer the question, "What level of staffing is needed to operate and manage a station to achieve the station's purpose, contribute to the mission and goals of the Refuge System, and comply with the Refuge Improvement Act and other laws, regulations, and policy?" The model estimates the total number of full-time employees needed at a station to do the work, but management must still decide the best mix of disciplines to do that work and whether to deploy part-time, seasonal, or full-time employees.

In addition to this national staffing model, the Refuge System and the International Association of Chiefs of Police began working together in 2003 on a law enforcement staffing and deployment model. The goal for this effort was to develop a defensible staffing model to quantify law enforcement resource needs for the Refuge System, help refuge managers deploy law enforcement resources, and justify budget requests. The result was a "Deployment Model for the National Wildlife Refuge System" (International Association of Chiefs of Police), completed in May 2005.

Under this plan, the refuge and WPA will continue to be administered as satellites with ultimate management responsibility residing at Maine Coastal Islands NWR Complex or possibly Moosehorn NWR. We used the national staffing model to help determine the appropriate level of non-law enforcement staffing, and the law enforcement deployment model to determine the proposed number of law enforcement staff. Based on our priorities, we are proposing five full-time staff. They will be stationed at or near the Sunkhaze Meadows Unit, but will be responsible for activities occurring at the other refuge units and at Carlton Pond WPA.

The five positions we propose, based on the staffing models, are:

- One wildlife refuge specialist.
- One park ranger (visitor services).
- One wildlife biologist.
- One maintenance worker.
- One park ranger (law enforcement).

The staff for Sunkhaze Meadows NWR and Carlton Pond WPA will be supported by staff at Maine Coastal Islands NWR Complex. If additional staff is hired in the future, the Service will

identify and acquire an appropriate site for refuge management facilities, located on or near Sunkhaze Meadows Unit. Please see appendix E for the current and proposed staffing charts.

As discussed previously, actual staffing levels are subject to approval of the Service's Northeast Regional Chief of the National Wildlife Refuge System and are based on Federal budget allocations. This document does not represent a commitment of resources. While a few of the strategies proposed could be implemented at current funding and staffing levels, most will depend on additional funding and staff.

Public Use

We will work closely with partners to increase and enhance the public use experience at all refuge units and Carlton Pond WPA. If staffing is increased as proposed under this plan, we will enhance public use of Sunkhaze Meadows NWR and Carlton Pond WPA. For example, we will increase Service-led programming and update and maintain public use infrastructure such as signs and trails.

Goals, Objectives, and Strategies

Goal 1. Sunkhaze Meadows Biological Management. Promote the environmental health of Sunkhaze Meadows Unit wetland, forest, and aquatic habitats to protect water quality and sustain native rare plants, natural communities, and wildlife, including species of conservation concern.

Objective 1.1 Sunkhaze Meadows Unit: Freshwater Wetland-Peatland Complex

Conserve the 3,461-acre freshwater wetland-peatland complex on Sunkhaze Meadows Unit that includes open water, marsh, beaver marsh, and shrub swamp to protect and buffer the ecological integrity of the 1,649 acres of peatland, protecting water quality, rare plants, and habitat for American black duck and other breeding waterfowl, bitterns, sedge wren, yellow rail, rusty blackbird, and other wetland-peatland dependent-species. Specifically, we will work to maintain:

- The peatland with the full assemblage of native plants including rare bog bedstraw and showy lady's slipper, and less than 5 percent cover of nonnative, invasive plants such as purple loosestrife.
- Beaver activity and minimal human disturbance to support black duck breeding (Diefenbach and Owen 1989).

Rationale

With 3,461 acres of contiguous freshwater-peatland wetland, this diverse wetland complex includes a mix of open water and emergent marsh communities, along with the unique peatland system. Davis et al. (1983) ranked Sunkhaze Meadows' peatlands high in ecological value among 31 other peatlands in Maine based on its developmental-morphological diversity, pristine character, and exemplary quality of peatland type or feature. It is the second largest peatland in the State (MNAP 2011). Protecting this peatland system was the primary purpose for the establishment of Sunkhaze Meadows NWR.

The wetland-peatland complex is just part of the diverse mix of natural communities and habitats on this unit (see map 4.1). An exemplary floodplain forest lies next to the peatland, Sunkhaze Stream meanders through a portion of this habitat, and the wetland complex is surrounded by a

mix of wetland and upland forest. One of the current potential threats to the integrity of the Sunkhaze Meadows Unit's wetland-peatland complex is expansion of invasive species populations. The impacts of invasive species have been described previously under the section titled "General Refuge Management."

Thousands of acres of open wetlands provide breeding habitat for wetland-dependent birds on this unit. This large wetland system supports breeding American black duck and other waterfowl. The American black duck is one of the Service's national focal species and is a highest priority species in the Atlantic Northern Forest Bird Conservation Region (BCR 14) (Dettmers 2006) and is of high priority in the North American Waterfowl Management Plan (NAWMP) (USFWS 2004). Black ducks were once the most abundant freshwater duck in North America. However, their populations have dropped steadily since the 1950s, reaching an all-time low in the 1980s. Black duck pairs arrive in Maine by April and the peak hatch is from June 1st through 10th (Longcore et al. 2000). They are quite intolerant of human disturbance even during brood rearing stage so minimizing human disturbance from late May through June may be important (Longcore et al. 2000).

Breeding pairs and calling males of the sedge wren and yellow rail have both been observed (and may breed) in an area of tall emergent vegetation along the Sunkhaze Stream shore (MDIFW 2005). The sedge wren, a State endangered species, reaches its northeastern limit in Maine. The sedge wren breeds in freshwater meadows of sedges and grasses, shallow sedge marshes, and in the moist edges of freshwater wetlands. Objective 3.2 provides more details on the habitat needs of the sedge wren. The yellow rail is a Service bird of national conservation concern (USFWS 2008a). It is a small, secretive wetland bird that breeds in sedge meadows; it hides and runs beneath vegetation. Their numbers have declined across their range, although accurate population assessments are difficult given their elusive nature. Yellow rails build their nest on damp ground among marsh vegetation and feed on insects, snails, and seeds. The yellow rail and sedge wren are considered birds of greatest conservation need in the Maine Comprehensive Wildlife Conservation Strategy (MDIFW 2005).

American and least bitterns have been observed during the breeding season at Sunkhaze Meadows Unit. Both are priority species for the Service (2008) and the State (MDIFW 2005). Both species may be affected by a decline in wetland habitat quality including encroachment by the invasive purple loosestrife (MDIFW 2005). Several other bird species nest in the unit's peatland habitat including olive-sided flycatcher, Lincoln's sparrow, swamp sparrow, and palm warbler. The olive-sided flycatcher, a species of conservation concern (MDIFW 2005, Dettmers 2006, USFWS 2008a) breeds on the refuge. It favors openings in conifer forests and forest edges with tall spruce and high exposed snags from which to forage and sing. Edges of bogs, wooded streams, and burned over areas are also favored habitats (DeGraaf and Yamasaki 2001).

Current threats to the integrity of the Sunkhaze Meadows wetland-peatland complex include potential degradation of water quality from surrounding land uses (e.g., runoff and spills from roads, timber harvesting), expansion of invasive species populations, and changing hydrologic regimes.

Aquatic habitats, including peatlands and coldwater rivers and streams, are likely to be affected by temperature increases, hydrology changes, and invasive species expansion resulting from climate change over the next 100 years (Whitman et al. 2010). North American peatlands have been sustained for millennia over long wet and dry periods, but their future stability under climate change is uncertain (Environment Canada 2004). Peatlands occur in northern latitudes. Maine's peatlands are found near the southern extent of their range. This may cause them to be more vulnerable to climate change than peatlands farther north because their distribution is determined primarily by climate (Davis and Anderson 2001). Projected increases in summer drought, despite overall increasing precipitation, could impair southern peatlands (Gorham 1991, Burkett and Kusler 2000). Overall, climate change might cause some peatlands to decline and community compositional changes in other peatlands, such as bog plant communities slowly converting into fen plant communities (Almendinger and Leete 1998, Siegel and Glaser 2006). Under this plan, we will begin a monitoring program that will help us to track any potential changes to this habitat associated with climate change.

Strategies

Continue to:

- Allow natural processes to maintain wetland system in this unit.
- Control invasive species infestations, such as purple loosestrife, as opportunities arise.

Within 5 years of CCP approval and with at least one full-time employee:

- Develop baseline monitoring protocols for climate change monitoring.
- Limit invasive plant infestation to less than 5 percent of the area.
- Work with MDIFW to establish a waterfowl banding program, particularly for American black duck, to contribute to the Atlantic Flyway waterfowl banding goals.

Over the 15-year life of this CCP and three full-time positions:

- Develop an index of ecological integrity to measure and track the biological diversity, integrity, and environmental health of the Sunhaze Meadows freshwater wetland-peatland complex.
- Evaluate the effectiveness of allowing natural processes to maintain the ecological communities of the peatlands.
- Explore the establishment of a waterfowl banding program to collaborate with other Federal and State partners and to help track movements of priority species such as American black duck.
- Use standard protocols to conduct migratory and breeding bird surveys. Surveys will be designed to detect species presence/absence and long-term population trends. We will focus on priority species including rusty blackbird, olive-sided flycatcher, American black duck, sedge wren, yellow rail, and bitterns.

Objective 1.2 Sunhaze Stream and Aquatic Habitats

Preserve 17 miles of Sunhaze Stream and its tributaries that flow through the refuge to protect the water quality and biological integrity by maintaining vegetated streambanks and safeguarding the absence of human-created barriers (physical, chemical, or thermal) along the stream to benefit native species like Atlantic salmon, brook trout, wood turtles, and breeding and migrating birds like American black duck. In particular, maintain waters that have low turbidity

levels, suitable dissolved oxygen levels, suitable water temperatures, and are free of environmental contaminants at concentrations injurious to fish and wildlife.

Rationale

The Sunkhaze Meadows Unit encompasses 5 miles of the approximately 20-mile Sunkhaze Stream, which bisects the unit, flowing from the northeast to southwest. The refuge has another 16 miles of tributary streams that include Buzzy, Little Buzzy, Baker, Dudley, and Johnson Brooks, and Birch and Little Birch Streams (see map 4.1).

Optimal brook trout habitat includes clear, cold water; a silt-free rocky substrate in riffle-run areas; an approximate 1:1 pool-riffle ratio with areas of slow, deep water; well vegetated stream banks; abundant stream cover; and relatively stable water flow, temperature regimes, and stream banks. Fifty to 75 percent midday shade is optimal for trout streams and optimal water temperatures are 11 to 17 °C (51 to 63 °F) and no higher than 24 °C (75 °F). Brook trout are not highly tolerant of competition from other fish species and thrive in waters not inhabited by other species (Smithwood and McKeon 1999).

Beavers inhabit permanent streams of up to 15 percent gradient, with adequate food resources, that do not have major fluctuations in discharge (Allen 1983). They are active in the Sunkhaze Meadows wetland system. Beaver flowages are attractive to many species of dabbling duck, particularly American black duck and wood duck, as well as other waterfowl, water birds, raptors, songbirds, mammals, amphibians, and reptiles. The effects of beavers on brook trout vary. Beavers may negatively affect brook trout in lowland streams by inhibiting passage (Salyer 1935, Reid 1952); however, brook trout may benefit from increased food resources in beaver impoundments (Rupp 1954).

Riparian ecosystems are areas adjacent to water bodies and nonforested wetlands and are often areas with high species richness with dynamic and complex biophysical processes. Riparian areas along rivers provide important structural habitat components including large nest and roost trees for eagles and ospreys and cavity trees for wood ducks, hooded mergansers, and songbirds. Mature riparian forests are important for many species. For example, wood ducks, common goldeneyes, and hooded and common mergansers nest in cavities in live trees with a diameter at breast height (DBH) of 18 inches or more (Bellrose 1976, Peck and James 1983, Robb 1986, Soulliere 1990). Riparian areas often contain a mix of native shrubs including alder, elderberry, and viburnum that provide food and cover for nesting and migrating songbirds. The wood turtle, a species of special concern in Maine, has been observed in the Sunkhaze Stream system. Wood turtles are often considered one of the most terrestrial of Maine's turtles; however, they still depend on the streams and associated riparian areas with sufficient natural cover (Hunter et al. 1999).

Current potential threats to the integrity of Sunkhaze Stream and its tributaries include degradation of water quality from surrounding land uses (e.g., runoff and spills from roads, residential and commercial development), expansion of populations of invasive species, and changing hydrologic regimes as a result of predicted climate change. According to a recent report on climate change and effects on biodiversity in Maine, streams and rivers in the State are projected to undergo a significant hydrological shift from a snowmelt-dominated regime (with high-flow and ice scouring conditions in the spring) to a rain-dominated regime with reduced

high-flow conditions in winter (Whitman et al. 2010). Based on modeling results for various climate change scenario's in Hayhoe et al. (2007), if low emissions scenarios prevail, Maine could retain much of its snow season, between 2 and 4 weeks of snow cover per winter month. If a high emissions scenario results are accurate, Maine's snow season could decline by about half by 2050.

Strategies

Continue to:

- Allow natural processes to maintain the water quality and biological integrity of Sunkhaze Stream and its tributaries.
- Respond to reports of invasive species as needed.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Evaluate surrounding land uses at least every 2 years for potential impacts on water quality in refuge waterways.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Monitor brook trout populations every 1 to 5 years in Sunkhaze Stream and its tributaries in collaboration with MDIFW, Penobscot Indian Nation Fisheries Biologist, the Service's Fisheries Program, and other partners.
- Annually, work with at least two partners or area land owners to protect streams and riparian areas within the Sunkhaze Stream watershed for example, by providing technical support on best management practices for maintaining healthy riparian habitats or by finding ways to conserve and protect land and water.

Objective 1.3 Sunkhaze Meadows Unit: Northern White Cedar Woodland Fen and Cedar-Spruce Seepage Forest

Protect the 390-acre exemplary northern white cedar woodland fen at Sunkhaze Meadows Unit, to ensure a continued canopy dominated by northern white cedar ranging between 4 to 23 inches diameter DBH, with 20 to 60 percent canopy closure, and less than 5 percent invasive plant species cover, to maintain the population of the State-listed, threatened showy lady's slipper, and to provide habitat for species of conservation concern that breed in this habitat type including boreal chickadee and Canada warbler.

Rationale

In a recent survey of the Sunkhaze Meadows Unit, MNAP (2010) mapped an exemplary 390-acre northern white cedar woodland fen (see map 4.1). The cedar woodland fen is a broad, flat peatland dominated by a canopy of northern white cedar, with a dense mix of rough-leaved alder, winterberry, and black ash. Most of the cedar trees are small, although some are up to 23 inches (60 cm) DBH. Sphagnum and other mosses dominate the abundant hummocks, but hollows are largely unvegetated and often saturated. The woodland fen is bordered by a narrow swath of cedar-spruce seepage forest, then upland softwood forest on the southeast side, a road on the east side, and by the extensive open wetlands of the Sunkhaze Meadows peatland complex on the remaining sides (MNAP 2010). Beaver dams constructed over the past decade have increased water levels in some portions of the cedar woodland fen. At this time, we are unsure of the long-term impact of this altered hydrology on the northern white cedars. Under this plan, we will

evaluate the current and potential impacts of beaver dams and any other sources of altered hydrology on the cedar woodland fen.

Northern white cedar seepage forests are found primarily in the northern region of Maine. Most known occurrences of this rare (S3) community type in Maine were harvested in the past. Although timber harvest generally does not result in permanent conversion of this type, more than a century may be required for recovery from heavy cutting as northern white cedar is slow to regenerate (MNAP 1998, Gawler and Cutko 2010). This forested wetland at Sunhaze Meadows Unit contains a very dense stand of small cedar trees with an average diameter of less than 5 inches (MDIFW 2005). Northern white cedar is a long-lived, shade tolerant species; browsing by white-tailed deer and snowshoe hare can limit the regeneration of northern white cedar seedlings. At the nearby Penobscot Experimental Forest researchers observed extensive browsing on cedars by deer, and recommended reducing deer populations to encourage advance regeneration, browsing control to minimize seedling stress, and thinning of white cedar saplings in subsequent entries to promote height growth of the remaining white cedar (Larouche et al. 2010).

The showy lady's slipper, a State-listed, threatened plant species, has been found on this unit. Showy lady's slippers apparently require constant moisture, some sunlight and neutral pH soil conditions. In acid bogs, their roots go under the acid *Sphagnum* moss to more neutral groundwater below. In clearings or woods edges, colonies may be very large and flowering abundant, but plants in deep shade often lack flowers. The seeds seem to germinate best at depths of at least 2 inches. It has been suggested that this may account for the presence of dense colonies in deer yards where the deer hooves may help to push seeds to the appropriate depth. Showy lady's-slipper takes about 15 years to reach flowering age, which explains why they are slow to reappear after colonies have been dug up. The foliage of nonflowering plants emerges in early spring and may be mistaken for false hellebore (*Veratrum viride*). Flowering plants are unique with tall leafy stems bearing one or two large flowers with white petals and sepals contrasting with magenta pink pouch. In Maine, it flowers from late June to July (MNAP 2004).

The showy lady's slipper is a rare plant in Maine due in part to habitat destruction and over picking. Orchids are popular among some specialty gardeners, and populations of this species are vulnerable to unauthorized collection. Plants dug from the wild usually do not survive; more importantly, removing these plants harms the natural population and may cause its eventual disappearance. Tissue-culture propagation of this species has been tried in limited instances, but any plants offered for sale have almost certainly been dug from the wild (MNAP 2004). Harvesting of plants, including orchids, is not permitted on the refuge.

Some bird species that typically nest in spruce-fir or mixed softwood forests, may also nest or forage in the northern white cedar swamp. These include palm warbler, yellow-bellied sapsucker, boreal chickadee, and Canada warbler. The Canada warbler is a high-priority conservation species for the Service (USFWS 2008a), the State (MDIFW 2005), and in BCR 14 (Dettmers 2006). It breeds in a range of habitat types including deciduous forested swamps, cedar bogs, and cool, moist, mature forest or streams and swamps with dense undergrowth. Forests with dense understory particularly along streams, swamps, bogs, or other moist areas are

important to Canada warblers (DeGraaf and Yamasaki 2003). The white cedar woodland fen at Sunkhaze Meadows Unit does not contain a dense shrub understory, but it still may contain suitable foraging and breeding habitat for Canada warbler. In reviewing habitat requirements, Reitsma et al. (2010) note that they can nest in wet, mossy areas within forest among ferns, mossy hummocks, stumps, and fallen logs. The boreal chickadee, a BCR 14 priority species, depends on forests containing softwood trees with suitable cavities (DeGraaf and Yamasaki 2001).

Climate change could pose long-term concerns for this exemplary community type at the Sunkhaze Meadows Unit. Projected changes in precipitation could negatively alter ground water levels, which play a crucial role in the accumulation and decay of organic matter and governs plant community structure in fens (Seigel and Glaser 2006). Under most climate change scenarios, ground water levels will fall as evapotranspiration increases with temperature, unless it is offset by an increase in summer precipitation (Moore et al. 1997, Myer et al. 1999). Some fens that have deep groundwater systems may be resilient to these changes (Winter 2000). To better understand current conditions and future changes, this plan includes monitoring refuge habitats using an ecological index that we will develop. This will aid refuge staff in monitoring and adapting management to projected climate change impacts.

Strategies

Continue to:

- Allow natural disturbances and natural plant succession to maintain the northern white cedar woodland fen.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Assess regeneration of northern white cedar in the woodland fen and in the seepage forest.
- Study which factors (e.g., browsing by white-tailed deer) are affecting showy lady's slipper and northern white cedar regeneration.
- Develop management prescriptions (e.g., selective harvest, seedling planting, beaver control) if feasible for improving the regeneration of northern white cedar and for sustaining the exemplary community.
- Develop management prescriptions (e.g., invasive species control, deer exclosures, and understory vegetation management) and implement adaptive management if feasible for maintaining or increasing the unit's showy lady's slipper population.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Conduct annual migratory and breeding bird surveys for identified focal species according to standardized protocols to detect presence/absence and long-term trends as staff resources and time allow.
- Work with partners to develop an index of ecological integrity and monitoring protocol for the northern white cedar woodland fen and cedar-spruce seepage forest. After the index and monitoring protocol are developed, monitor for changes to this index every 1 to 3 years.
- Collect baseline data and monitor for habitat changes, particularly changes potentially associated with climate change.

Objective 1.4 Sunkhaze Meadows Unit: Conifer and Northern Hardwood-Mixed Forests

Manage and preserve 2,904 acres of conifer and 5,002 acres of northern hardwood-mixed forests on the Sunkhaze Meadows Unit to promote a self-sustaining, mature forest characteristic of the Atlantic northern forest, to benefit a suite of species of conservation concern in BCR 14 including bay-breasted warbler, Cape May warbler, northern parula, Blackburnian warbler, olive-sided flycatcher, black-throated blue warbler, and wood thrush. Forests should include trees greater than 70 years old, some trees more than 100 years old, canopy dominated by shade tolerant species, trees greater than 16 inches DBH, presence of large logs on forest floor, presence of trees with long (greater than 6 inches) *Usnea* spp. (lichen), and presence of *Collema* and *Leptogium* lichen species.

Rationale

Although there are large tracts of privately owned forest land in the region, very little, if any, old-growth forest remains outside refuge boundaries. Old forests and their associated features are declining globally. In Maine, old-growth forest accounts for about 4 to 6 percent of the State's forestland (Cutko 2009). Estimates of pre-settlement forests suggest that 50 percent or more of Maine supported stands over 150 years old (Lorimer 1977). Economic pressures make it difficult for private landowners to retain or restore late successional conditions (Whitman and Hagan 2007). The refuge can fulfill an important role by providing these late successional stages (i.e., older forests) that are significantly under-represented in the region.

Late successional and old growth forests are important to conserving forest biodiversity. They contain forest features not found in young forests including large trees, snags and logs, large amounts of dead wood, and diverse vertical structure (Whitman and Hagan 2007). While many of the bird species of conservation concern in the northeast are not entirely dependent on late successional or old growth forest, some bird species may have higher abundances in older forests (Hagan and Grove 1999). There are other types of at-risk species that are dependent on the habitat features found in older forests. These tend to be species such as mosses, fungi, lichen, and insects (Hagan and Whitman 2003). In addition, older forests have ecological processes that are mostly absent from young forests, such as trees and roots tipped over and torn up by winds (Whitman and Hagan 2007). Therefore, a management emphasis on late successional forest is important to sustaining the biological integrity, diversity, and environmental health of the Atlantic northern forest region since it provides an important component largely missing from the landscape at present.

The largest suite of priority landbird species in BCR 14 is associated with spruce-fir habitats, especially mature or late successional stages (Dettmers 2006). High priority bird species in BCR 14 that also prefer mature spruce or other conifers include the olive-sided flycatcher (tall spruce), Cape May warbler (mature spruce), and boreal chickadee (conifer forests with decaying trees). Moderate priority species identified as moderate priority in BCR 14 include the northern parula, Blackburnian warbler, and black-throated green warbler (Dettmers 2006), all of which are associated with mature conifer (DeGraaf and Yamasaki 2001). The northern parula is associated with mature moist forests and forested riparian habitats dominated by spruce, hemlock, and fir with an abundance of lichens (especially *Usnea* spp.) that they use in nest building. In some areas where the northern parula has declined, such as southern New England, the decline may be related to the decline of *Usnea* spp., a lichen that is sensitive to air pollution (DeGraaf and

Yamasaki 2001). The bay-breasted warbler, one of the highest priority species, which is at the southern edge of its breeding range on the refuge; this species requires mature conifer habitat. Other priority species, such as wood thrush, favors large mature mixed hardwood forests for breeding (Evans et al. 2011).

Species such as the bay-breasted warbler that have southern range extent near Sunhaze Meadows NWR may be vulnerable to warmer temperatures and increased pest outbreaks resulting from climate change. As a result, these species could shift their range further north (Whitman et al. 2010). Preserving large expanses of self-sustaining, mature Atlantic northern forest can help these species accommodate these large scale transitions in climate and population range.

The MDIFW (2005) also identified bay-breasted warbler, Cape May warbler, northern parula, blackburnian warbler, olive-sided flycatcher, black-throated blue warbler, and wood thrush associated with conifer forests or deciduous-mixed forest as high conservation priorities. The State identified several risk factors for these species and associated forest habitats including large-scale logging operations that convert stands to other species and that use short rotations. Habitat loss to development is also a threat (MDIFW 2005).

The presence of downed trees and logs are an important characteristic of late successional and old growth forests that support a variety of migratory birds. Small downed trees and snags that are greater than 12 inches DBH help support species such as black-backed woodpecker. Larger snags and downed trees help support species such as pileated woodpecker and boreal chickadee by providing conditions suitable for cavity nest site excavation and foraging for insects (Flatebo et al. 1999).

The diversity in plant species composition in the northern hardwood-mixed forest explains, in part, the great diversity of bird species of concern that occur in this habitat type. A majority of high priority species in this habitat, including the black-throated blue warbler and wood thrush, are dependent on a relatively dense forest understory for foraging and nesting. The wood thrush inhabits a wide variety of deciduous and mixed forests throughout Maine. The wood thrush breeds in cool, mature, lowland, mixed or more typically, deciduous forests, particularly mesic to damp woodlands with an abundance of saplings, often near swamps or water (Kendeigh 1948, Dilger 1956, DeGraaf and Rappole 1995). It prefers a shrub sub-canopy layer, shade, and an intermediate soil moisture regime (Morse 1971, Bertin 1977, Roth et al. 1996). The highest density of wood thrush is found in forest patches greater than 200 acres, with a sharp decline in abundance below 100 acres. The black-throated blue warbler occurs in large areas of northern hardwood forests with a dense understory of deciduous or coniferous shrubs or saplings (Darveau et al. 1992).

The rusty blackbird is a priority species of concern for the Service (USFWS 2008a) and the State of Maine (MDIFW 2005), and within BCR 14 (Dettmers 2006). Although the breeding bird survey (BBS) trend for Maine is unreliable for rusty blackbird, there is strong anecdotal evidence of significant, long-term decline (MDIFW 2005). The rusty blackbird nests in riparian areas, boreal wooded wetlands, and beaver flowages in northern New England and Canada (DeGraaf and Yamasaki 2001, Rich et al. 2004). Rusty blackbirds are monogamous and live in very loose

colonies during the breeding season. Their bulky nests are made of twigs and are almost always placed near water (Avery 1995), usually less than 10 feet high in thick foliage near the trunk of a young spruce or fir or in a shrub thicket. Some disturbance (e.g., windthrow, fire, beaver activity) helps create forest openings allowing regeneration of softwoods creating nesting habitat (Avery 1995). During migration rusty blackbirds congregate in flocks in wooded swamps (DeGraaf and Yamasaki 2001) and are known to use Sunhaze Meadows Unit wetlands during spring and fall migration. The rusty blackbird shows some aversion to clearcutting which creates suitable habitat for competitors including red-winged blackbird and common grackle (Dettmers 2006). Other causes for the severe decline of rusty blackbird across its range are attributed to loss of wintering habitat, blackbird control programs, logging, peat extraction, and drought conditions in parts of its range (Rich et al. 2004).

Climate change projections indicate that northern hardwood forests in the Northeast may change significantly in the next 100 years (Prasad et al. 2007). Under high emission scenarios, the extent of oak and pine forests is projected to increase and expand into central and possibly northern Maine (Iverson et al. 2008). Under the lowest emissions scenario, Maine will likely retain its northern hardwood forest. Northern hardwood tree species may have increased growth rates under any emissions scenario due to higher temperatures, a longer growing season, and increases in photosynthesis and water-use efficiency (Whitman et al. 2010). Similar shifts or changes in species are expected for conifer and boreal forests as well. Tang and Beckage (2010) and Prasad et al. (2007) both project a significant decline of boreal conifer forest over the next 100 years. Under this plan we will initiate monitoring of this habitat type using an ecological index developed by Service staff. This will aid refuge staff in monitoring and adapting management to projected climate change impacts.

This habitat also supports a deer overwintering yard mapped by MDIFW. These areas are utilized by whitetail deer during winters with heavy snow because of their added shelter from wind and snow. In conjunction with our habitat management for priority bird species, we will work with our State partners to ensure that our habitat management activities do not alter the conditions needed to sustain these habitats.

The threat of nonnative pest species, such as emerald ash borer, was detailed earlier in General Refuge Management. Under this plan, we will utilize the eventual addition of staff to implement a more thorough early detection and rapid response program to identify potential infestations early on and react appropriately to prevent or minimize its impact to the northern hardwood-mixed forest.

Strategies

Continue to:

- Allow natural disturbances and natural plant succession to maintain this forested habitat.
- Use mechanical, biological, chemical and prescribed fire, as appropriate, to control invasive plants. The control method varies by invasive species and should follow recommendations by invasive species subject matter experts. Ice storms, strong winds, insect and disease outbreaks all cause damage to forest health and contribute to unnatural or excessive buildup of dead, woody vegetation at the surface, increasing the risk of a

damaging wildfire. When these events occur, consult with regional fire staff for ways to mitigate risks and restore forest health.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Work with the Refuge System regional forester (stationed at Moosehorn NWR) to ground truth and update the forest stand land cover type data derived from aerial photography interpretation.
- Work with the Refuge System regional forester to inventory and delineate forest stand types and dominant species.
- Work with the State to ensure refuge management for priority species in conifer forest areas does not decrease the quality of potential and existing deer yards.
- Meet or exceed State of Maine best management forestry practices if we conduct forest management activities.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Manage remaining 2,904 acres of forest stands using best management practices to promote forest health and provide the best mix of forest age class and structural diversity to benefit nesting and migratory birds, and other native species (e.g. deer) across the landscape. Consider the most appropriate management of age classes given the surrounding land ownership and management and what unique role the refuge can fulfill over time.
- During active forest management maintain nut-producing oak and beech trees, snags, cavity trees, and downed woody material to benefit pileated woodpecker and boreal chickadee, and bears.
- Prior to any active forest management, survey for presence of any vernal pools. Implement seasonal restrictions or buffer zones around any vernal pools identified near proposed work areas to prevent impacts to this sensitive habitat and associated species (e.g., amphibians).
- Identify and monitor potential forest pest species such as emerald ash borer using early detection and rapid response protocols.
- Work with the Service's Northern Forest Land Management Research and Demonstration (LMRD) biologist stationed at Umbagog NWR to coordinate management with recommendations from the LMRD Program.
- Conduct a forest health and condition assessment, as well as stand exams, to determine the current condition of the forest and its species and structural characteristics and to determine if any active forest management is needed to promote mature spruce-fir forest.
- Monitor rare plant populations and the 100-acre exemplary floodplain forest in collaboration with the MNAP to confirm population size and long-term viability.

Objective 1.5 Sunkhaze Meadows Unit: Early Successional Habitats

Over the life of the plan, support at least 107 acres of early successional habitats, primarily shrubland, on the Sunkhaze Meadows Unit to benefit species of conservation concern such as American woodcock and chestnut-sided warbler. Specifically:

- Work with the electric companies to manage their 107-acre transmission line right-of-ways as primarily shrubland with over 30 percent areal coverage of native tree and shrub

species, no more than 5 percent bare ground, and at least 95 percent of the area comprised of native species.

- Allow natural processes to maintain or create additional acres of young forest habitat, shrubland, or grassland dominated by trees less than 40 years old and less than 40 feet tall (Whitman and Hagan 2007).

Rationale

Early successional habitats include a range of habitat types depending on their age and disturbance frequency: from grassland dominated by non-woody species, to shrublands dominated by various shrubs and small trees, to young forests (typically less than 40 years old) dominated by small trees less than 40 feet tall (Whitman and Hagan 2007). While early successional wildlife habitats have become rare in much of the eastern U.S. (Trani et al. 2001), and the Northeast (Brooks 2003), the proportion of early-successional habitat in northern industrial forests (such as those commonly found around the refuge and WPA) is currently several times that which occurred in presettlement times (Lorimer and White 2003). Historically, early successional habitat was created by natural disturbances such as flooding, beaver activity, severe storms, landslides, insect outbreaks, treefalls, and fire. These communities sometimes occur as a relatively short-lived vegetation stage after natural disturbance, agricultural abandonment, or logging (Rosenberg and Hodgman 2000).

Research conducted by Anderson (1999) and others suggests that even in preserved areas, early successional habitat (which may include areas of shrublands and grasslands) may account for as much as 25 percent of the cover resulting from natural disturbances, particularly in softwood-dominated stands that are subject to spruce budworm, wind events, and beaver inundation (Cutko 2009). Seymore et al. (2002) noted that “most such disturbances will occur regardless of human activity.” These young forest conditions scattered throughout a matrix of older forests will also be used by bird species that are linked to mature forest, as they often forage for insects and other food sources in these openings. Most migratory birds rely on seeds, fruits, and insects to sustain them through migration. Opportunities to manage shrub and young forest habitat to increase seed, fruit, and insect production will be an important consideration.

Large-scale, right-of-way clearing for transmission line right-of-way management generally occurs on reoccurring multiple-year intervals, between every 5 to 10 years depending on the vegetation type and growth. This periodic clearing can temporarily remove all woody vegetation within the right-of-way easement within the Sunhaze Meadows Unit. We understand the need for right-of-way management in light of Federal energy regulations.

Under this plan, we will work with the electric companies and their vegetation management contractors to selectively remove trees where possible and maintain primarily shrubland within their right-of-ways. In doing so, we will sustain long-term shrub growth and adequate migration and breeding cover for species that prefer shrublands, such as American woodcock and chestnut-sided warbler. Not only will this improved coordination sustain long-term and consistent shrubland cover, it will also prevent the intermittent loss of habitat that occurs during and immediately following large-scale clearing for right-of-way vegetation management.

Additional acres of young forest habitat created by natural processes will also provide suitable habitat for American woodcock and chestnut-sided warbler for the near future. Wind throws or ice storms are examples of natural processes that can occasionally create openings for young forest habitat.

Strategies

Continue to:

- Coordinate as needed with the electric companies as they maintain their existing 107-acre right-of-ways for the transmission lines that traverse the refuge.
- Maintain the two current American woodcock demonstration plots, totaling 2 acres, near the Johnson Brook Trail by mowing or burning approximately every 15 years.
- Allow natural disturbances and natural successional processes to create a continuum of successional habitat, including a component of early successional conditions elsewhere on the unit.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Work more actively with the electric companies to ensure best management practices for vegetation control are used to retain native shrubland community in the transmission line corridor through the Sunkhaze Meadows Unit.
- Over the life of the plan, allow natural processes to maintain or create a mixture of grassland, shrubland, and young forest habitats on the refuge unit.

Goal 2. Carlton Pond WPA Biological Management. Promote the environmental health of forest, open water, and emergent wetland habitat at Carlton Pond WPA to benefit waterfowl and sustain a diversity of wildlife including species of conservation concern.

Objective 2.1 Carlton Pond WPA: Open Water – Emergent Marsh

Manage the combined 783 acres of open water (295 acres), emergent marsh (455 acres), and the 34 acres of treed peat bog on the Carlton Pond WPA to maintain appropriate water levels for the nesting population of State-listed, endangered black terns. Emergent wetlands will be dominated by pickerel weed, cattail, bulrush, and wild rice with less than 5 percent invasive species cover to sustain breeding habitat for American black duck and other breeding waterfowl, and other migratory bird species of conservation concern, including American bittern, least bittern, and marsh wren.

Rationale

Service manages water levels in the WPA by removing or adding boards within a water control structure as needed. Monitoring the integrity of the earthen dam and the spillway are an important part of managing Carlton Pond WPA.

Nationwide, the Refuge System has acquired nearly 3,000 waterfowl production areas covering 668,000 acres nationwide. Carlton Pond WPA is the easternmost waterfowl production area in the nation; nearly 95 percent of WPA's are located in the prairie wetlands. While waterfowl production areas, easements, and national wildlife refuges account for less than 2 percent of the

landscape, they are responsible for producing nearly 23 percent of the Nation's waterfowl (USFWS 2007).

Carlton Pond WPA supports one of the largest breeding colonies of black terns in Maine, with approximately 24 pairs annually (Gilbert 1995). The black tern has experienced rangewide population declines for unknown reasons and is listed as endangered in Maine. The Maine population is detached from the core of the species range in the prairie-pothole region of the Great Plains. Black terns nest semi-colonially in large, emergent wetlands and feed their young both insects and fish. Terns select emergent wetlands that are at least 12 acres and prefer wetlands greater than 50 acres (Gilbert 1995). They build nests of sticks and reeds on floating mats of dead vegetation or small mud flats. Flooding and predation on eggs and chicks, not habitat availability, seem to be the limiting factors (McCollough et al. 2003). Therefore, maintaining a stable water level during the tern breeding season is essential to prevent flooding.

Carlton Pond WPA was established because of the high numbers of breeding waterfowl observed there. In particular, American black duck, wood duck, blue-winged teal, ring-necked duck, and common goldeneye are thought to be common. American black ducks prefer shallow, emergent wetlands of reeds, sedges, pondweed, and floating-leaved plants that are rich in invertebrates (Longcore et al. 2000). Maintaining water levels to benefit nesting black terns also supports habitat that benefits the American black duck as well as other species of waterfowl.

A population of nonnative, invasive purple loosestrife was found at Carlton Pond WPA in 1993. In 1995, the Service initiated a biological control program by releasing *Galerucella pussilla* beetles. Control efforts have continued since then, although not in every year. The beetles are most effective in large infestations of loosestrife. The Carlton Pond loosestrife population may be too small to be effectively controlled by the beetles, although it seems to have contained any spread.

Strategies

Continue to:

- Use the existing water control structure to manage water levels in Carlton Pond to benefit black terns and other native species, particularly during the black tern incubation period from May 25 to July 15.
- Maintain current water control structure and spillway including annual maintenance and certified inspection every 5 years. Keep emergency spillway clear at all times (e.g., cleaning out beaver debris) and keep dike free of woody vegetation.
- Contact Unity College and MDIFW to gather historical waterfowl survey information for Carlton Pond.
- Provide wood duck nesting boxes from existing supplies upon request, as long as volunteers continue to clean, maintain, and monitor use of the boxes.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Initiate aquatic invasive plant prevention through monitoring, early detection and rapid response, and public outreach.

Over the 15-year life of this CCP and with the hiring of up to three full-time positions:

- Work cooperatively with landowners adjacent to the Carlton Pond WPA wetlands on maintaining a sufficient vegetated buffer (for example, leave existing trees, don't mow to the shore line) to prevent runoff of sediments and pollutants into Carlton Pond.
- Explore the establishment of a waterfowl banding program to collaborate with other Federal and State partners and to help track movements of priority species such as American black duck.
- Work with interested neighbors and partners to protect streams and riparian areas within the Carlton Pond WPA watershed, including working with area land trusts or other partners to explore the possibility of acquiring interests in some parcels adjacent to Carlton Pond's inlet if there is interest from willing sellers.
- Once the existing supply of nesting boxes is exhausted, phase out wood duck nesting boxes as they deteriorate, or remove the boxes if volunteers are no longer able to maintain them.

Objective 2.2 Carlton Pond WPA: Conifer and Northern Hardwood-Mixed Forest

Preserve 45 acres of conifer forest and 239 acres of northern hardwood-mixed forest on the Carlton Pond WPA to promote a self-sustaining, mature forest characteristic of the Atlantic northern forest, to provide a buffer for emergent wetlands, and to provide stopover habitat for a suite of migratory bird species of conservation concern in BCR 14, including bay-breasted warbler, Cape May warbler, northern parula, blackburnian warbler, and olive-sided flycatcher. Specifically:

- Forests should include trees greater than 70 years old, with some trees more than 100 years old.
- Forest canopies should be dominated by shade tolerant tree species, with a median DBH greater than 16 inches.
- Large logs should be present on the forest floor.
- Some trees with long (greater than 6 inches) lichen (*Usnea* spp.), and presence of *Collema* and *Leptogium* lichen species should also be present.

Rationale

The upland mixed forest at Carlton Pond WPA provides important habitat and water quality benefits to Carlton Pond by buffering and filtering potential effects from surrounding land uses that might be detrimental to water quality. The mature forest provides structural habitat components including large nest and roost trees for raptors and cavity trees for wood ducks, hooded mergansers, and songbirds. Migrating songbirds often use forested habitats located adjacent to water bodies such as Carlton Pond. American black ducks nest in the uplands surrounding the emergent wetlands.

Because the upland forest surrounding Carlton Pond WPA is relatively small, it does not require active habitat management, except for the monitoring and control of invasive plant species. In the mid-1970s, the State and the Service initiated a wood duck nest box program that was successful in helping cavity-nesting ducks rebuild their populations. Currently, the Service is moving away from using artificial nest boxes, with a shift toward maintaining habitat that contains natural nest cavities. See objective 1.4 for a more detailed discussion of habitat needs of migratory birds using these upland forests.

Carlton Pond WPA is still within a largely unfragmented region with large blocks of undeveloped open space remaining within the watershed. However, residential development, logging, and other uses may impact the integrity of the habitats and water quality on the WPA. The nearby Unity College and the Sebasticook Regional Land Trust are important potential partners in helping the Service work with interested landowners around the Carlton Pond WPA on land stewardship and land conservation.

Strategies

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Conduct invasive species inventory and monitoring to prevent new invasions.
- Remove any duck boxes that are in disrepair and over time remove remaining artificial nest boxes to allow a shift toward natural cavities.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Work with neighbors and partners to protect forested areas within the Carlton Pond watershed, for example, provide technical expertise on best management practices for forest management.
- Work with area land trusts or other partners to explore the possibility of acquiring interests in some parcels adjacent to Carlton Pond's inlet if there is interest from willing sellers.

Goal 3. Benton and Sandy Stream Biological Management. Promote the environmental health of forest, grassland, and shrubland habitat at Benton and Sandy Stream Units to sustain a diversity of wildlife, including species of conservation concern.

Objective 3.1 Benton Unit: Grassland Habitat

Manage at least 92 acres on the Benton Unit as grassland and explore conversion of an additional 22 acres of conifer forest to grassland to provide nesting, migratory, and wintering habitat for birds of conservation concern such as bobolink, sedge wren, and American woodcock, by maintaining a diverse mix of species comprising at least 90 percent native grass and forb cover, less than 10 percent shrub cover.

Rationale

Historically, most of the Northeast was forested, except for a period following European settlement when much of the region was cleared for agriculture and subsequently grasslands and open fields became abundant. In pre-settlement times, permanent, large openings were uncommon, except for selected coastal areas. Scattered openings occurred along large river floodplains, around beaver flowages, in coastal heathlands and in other areas of regular disturbance. Large grasslands are now in decline and the region is becoming more forested (Rothbart and Capel 2006).

Many species of grassland birds require relatively large blocks of habitat for nesting areas. Some species, such as Henslow's sparrow, are not likely to be found in grassland patches of less than 75 acres. Other species will use smaller patch sizes, but grasslands of less than 25 acres generally

do not meet the requirements for most grassland nesting birds (Mitchell et al. 2000). Ochterski (2006) and others cite Mitchell et al. (2000) in noting that many hayfields are mowed twice a year (early summer and mid to late summer) for hay and hence are less suitable for ground nesting grassland dependent birds. Although there is uncertainty about the extent of grassland habitat and associated wildlife prior to European settlement, grasslands can provide a desirable contribution to habitat diversity (Jones and Vickery 1997). In addition, the uncertainties presented by climate change and the expected change in species' distributions make conservation of various habitat types, including grasslands, important safeguards to allow species to adjust their ranges and adapt to climate change.

The refuge maintains grasslands at the Benton Unit (see map 4.2) to provide: 1) nesting habitat for bobolink, 2) roosting habitat and areas for courtship displays for woodcock, and 3) migrating and wintering habitat for landbirds such as meadowlarks and sparrows. Maintaining grasslands in a specific area requires active management to prevent natural succession to shrubland and eventually to forest. Most of the grassland bird species (e.g., grasshopper, vesper, and savannah sparrows, and eastern meadowlark) that have declined in the region require 20 acres or more of contiguous grassland habitat (Jones and Vickery 1997). Small grasslands surrounded by forest or shrubland and isolated from each other are unlikely to provide quality nesting and feeding habitat for these birds; however, small forest openings do provide singing grounds for woodcock and foraging areas for a variety of wildlife, including foraging habitat for post-fledging and migrating mature forest birds. Mixed grasses 8 to 12 inches in height provide nesting and feeding habitat for bobolink, savannah sparrow, and other resident and migratory birds, as well as resting and feeding habitat for overwintering birds such as snow buntings, horned larks, and Lapland longspurs (Sibley 2003).

Grasslands usually require active management (e.g., mowing, prescribed burning) to prevent natural succession to shrubland and forest. Most of the grassland bird species (e.g., grasshopper, vesper, and savannah sparrows, and eastern meadowlark) that have declined in the region require 20 acres or more of contiguous grassland habitat (Jones and Vickery 1997). Small grasslands surrounded by forest or shrubland and isolated from each other are unlikely to provide quality nesting and feeding habitat for these birds; however, small forest openings provide singing grounds for woodcock and foraging areas for a variety of wildlife, including foraging habitat for post-fledging and migrating mature forest birds. Larger units (greater than 20 acres) of grassland are rare within the landscape surrounding the Benton Unit. Mixed grasses of variable species and height provide nesting and feeding habitat for bobolink, savannah sparrow, and other resident and migratory birds (Wiens 1969, Bollinger and Gavin 1992). Currently the Service relies on a local farmer, through a special use permit, to mow the grassland after July 15th. This is a cost-effective and efficient method for maintaining this habitat on a property that is a long distance from the refuge headquarters (see map 4.2).

Under this plan we will also evaluate and potentially expand the grassland area at the Benton Unit by 22 acres. This will entail converting 22 acres of forest to grassland. Currently, this forested area almost divides the unit's grasslands into two sections (see map 4.2). Our intent is to create one grassland area on the refuge over 100 acres. This larger grassland will provide more habitat for grassland species, higher quality habitat (by providing a larger area and less edge), and will support a wider variety of grassland species because of its larger size. Before converting this area to grassland we need to evaluate the soils and topography of this area, as well as the

logistics and costs of conversion and long-term maintenance, as these may not be conducive to establishing or maintaining it as grassland.

In addition, the Benton Unit grasslands provide an opportunity for environmental interpretation of the importance of grassland habitat and a demonstration area for other landowners, including farmers, on how to modify mowing regimes to benefit wildlife.

Strategies

Over the 15-year life of this CCP:

- Within 5 years, work with Unity College to study presence and abundance of bird species using the Benton Unit grasslands. Use this information to inform decisions about habitat management at the Benton Unit.
- Annually mow 72 acres of the existing grasslands after July 15th through a special use permit to maintain the habitat and protect ground nesting birds. Reevaluate mowing timing restrictions and change as needed when warranted for species protection.
- Allow the 3 acres of grassland in the northern property boundary to succeed to mature forest.
- Use prescribed burning to maintain 20 acres of existing grassland, which is too rocky to mow.
- Conduct invasive species inventory and monitoring to prevent new invasions as resources allow.

With the hiring of at least three full-time positions, we will:

- Evaluate soils and topography and convert if feasible 22 acres of conifer forest within the central portion of the unit to grassland to create a larger and more contiguous grassland habitat.
- If we determine these acres are conducive to grassland habitat and resources are available, we will convert them. Because of the topography, we will likely maintain these acres as grassland through prescribed burning.

Objective 3.2 Benton Unit: Sedge Meadow and Open Marsh

Maintain 13 acres of sedge meadow dominated by sedges and grasses averaging 3.5 feet tall, including 2.4 acres of emergent marsh-open water dominated by cattail and a mix of sedge species at the Benton Unit to sustain the quality and natural function of the freshwater wetlands as breeding and migratory habitat for species of conservation concern such as sedge wren, rails, and other wetland-dependent wildlife, and as potential foraging areas for bitterns.

Rationale

The sedge wren, a State-listed endangered species, reaches its northeastern limit in Maine. The sedge wren breeds in freshwater meadows of sedges and grasses, shallow sedge marshes, and in the moist edges of freshwater wetlands. Sedge wrens prefer areas with sedges and grasses averaging 3.5 feet tall, scattered shrubs, with an absence of standing water (McCollough et al. 2003). The species is considered nomadic, so absence from an area does not necessarily indicate poor habitat (NHFG 2005). A sedge wren was recorded for the Benton Unit when it was established in 1990, but has not been documented there since. Sedge wrens can be difficult to identify as they closely resemble other wren species (Herkert et al. 2001). Even though they have

not been confirmed since 1990, management has continued to maintain habitat suitable for this species. The sedge wren will use small patches (less than 20 acres) of wet sedge meadow in the midst of a large grassland, as occurs at Benton. Burning and mowing of wet meadows can aid in maintaining suitable habitat but should be implemented after the breeding season ends on August 31.

Shallow, freshwater wetlands with an abundance of tall emergent vegetation interspersed with open water are important for bitterns and rails. The 1.9 acres of restored wetlands at the Benton Unit offer foraging habitat for these wading birds and are breeding habitat for other common wetland birds including tree swallows and red-winged blackbirds (see map 4.2). The cattails, while unsuitable for sedge wrens, are ideal for bitterns. Both American bittern and least bittern are species of concern in BCR 14, in the State, and for the Service. The small, emergent marsh wetlands at Benton are more likely to function as alternative foraging sites for bitterns; typically, these secretive marsh birds breed in larger wetlands (greater than 10 acres) (NHFG 2005).

This habitat also may benefit other species such as amphibians and reptiles. Unfortunately, at this time, we do not have inventory records of these and other species groups. Under this plan, we will pursue such inventories through partnerships with agencies, organizations, or academic institutions.

Strategies

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Evaluate, and modify if needed, the mowing regime around the sedge meadow and freshwater wetlands to enhance wetland conditions for sedge wren, bitterns, and other wetland-dependent bird species.
- Explore partnership opportunities to inventory use of habitat by reptiles, amphibians, and priority birds of conservation concern, including sedge wren.
- Continue to allow natural process to maintain the sedge meadow habitat.

Objective 3.3 Benton Unit: Northern Hardwoods-Mixed Forest and Conifer Forest

Manage 155 acres of northern hardwood-mixed forest and 52 acres of conifer forest on the Benton Unit to promote a self-sustaining, mature forest characteristic of the Atlantic northern forest, to benefit a suite of species of conservation concern in BCR 14 including northern parula, blackburnian warbler, black-throated blue warbler, and wood thrush. Specifically:

- Forests should include trees greater than 70 years old, with some trees more than 100 years old.
- Forest canopies should be dominated by shade tolerant species with an average DBH greater than 16 inches.
- Large logs should be present on the forest floor.

Rationale

Same as objective 1.4, plus:

The northern hardwood-mixed forest and conifer forest at Benton Unit comprise a little over half of this refuge unit. While in itself, this unit contains a small amount of forest, it is bordered to the north by a large expanse of nearly 400 acres of contiguous northern mixed hardwood and conifer

forests. Similar to the Sunkhaze Meadows Unit, this larger expanse of forests supports overwintering habitat for white-tailed deer (i.e., a deer yard). A portion of this deer yard extends into the northern portions of the Benton Unit.

Strategies

- Over the 15-year life of this CCP, allow 3 acres of grassland in the northern property boundary to naturally convert to forest.

With the hiring of at least three full-time positions:

- Conduct a forest health and condition assessment, as well as stand exams, to determine the current condition of the forest, its species, and its structural characteristics. Use this information to determine if any active forest management is needed to promote mature mixed conifer-hardwood forest.
- Explore partnership opportunities (e.g., with Unity College) to inventory use of forest habitat by reptiles, amphibians, and priority birds of conservation concern.

Objective 3.4 Sandy Stream Unit: Shrubland Habitat

Manage 37 acres of shrubland habitat dominated by alder species with some gray dogwood and red maple on the Sandy Stream Unit to provide nesting and migratory habitat for birds of conservation concern such as American woodcock.

Rationale

The loss and degradation of naturally maintained shrublands has been extensive throughout New England and beyond. Shrubland-associated birds consistently rank near the top of lists of species showing population declines. Of 40 bird species associated with shrubland habitats, 22 are undergoing significant population declines in eastern North America. Shrubland communities are habitat patches with woody plants typically less than 10 feet tall with scattered open patches of grasses and forbs. Patches dominated by shrub clones (e.g., alder and dogwood) are relatively stable and can last up to 40 years with little management (Tefft 2006). Vegetation structure, microhabitat conditions, and landscape context are the most important habitat features for shrub-dependent birds, rather than specific plant species (Dettmers 2003). Other priority bird species will also benefit from the management objective to maintain native shrublands, particularly during fall migration, including American woodcock, willow flycatcher, eastern towhee, and Canada warbler.

Coastal states have the primary responsibility for most of the native shrubland habitat in the region (Dettmers 2003, Litvaitis 2003); therefore, restoration and maintenance of naturally occurring shrublands is recommended as a priority for coastal states. Managing small patches (less than 25 acres) as shrubland habitat can be more effective for many of the shrubland breeding birds than managing such relatively small patches for other habitat types such as grassland or forest because of the relatively low patch size sensitivity exhibited by many shrubland birds compared to some of the grassland and forest birds.

Given the small size of the Sandy Stream Unit, managing for shrubland habitat is expected to provide the most benefit for priority species of conservation concern. The current condition and site capability lends itself to maintaining shrubs and small trees including speckled alder, gray

birch, willows, and hawthorn, among others. The site is also relatively free of invasive plant species.

Under this plan, we will maintain most of the existing shrubland habitat. We will also work with the local snowmobiling club that maintains the snowmobile trail on Sandy Stream Unit to relocate the trail closer to Prairie Road to reduce fragmentation of the shrub habitat (see map 4.3).

Strategies

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Work with the snowmobile club to relocate the snowmobile trail so it is adjacent to Prairie Road to provide a more contiguous habitat unit.
- Work with the snowmobile club to coordinate snowmobile trail maintenance with refuge's shrubland management to minimize disturbance.

Over the 15-year life of this CCP:

- Use vegetative treatments such as by prescribed burning or mowing every 10 years, or as needed, to maintain 37 acres of shrubland habitat and to help control invasive plants.

Objective 3.5 Sandy Stream Unit: Forested Riparian Habitat

Expand the existing forested riparian buffer to at least 90 feet along Sandy Stream to protect the water quality and biological integrity that sustains native brook trout, rare freshwater mussels, wood turtle, other aquatic organisms, and breeding and migrating birds.

Rationale

While we do not own any interests in Sandy Stream itself, the Service, through its management of the Sandy Stream Unit, helps maintain water quality important to downstream aquatic organisms including the rare mussels. Two State-listed, threatened freshwater mussels, the tidewater mucket and yellow lampmussel, occur in Sandy Stream. Both mussel species are declining rangewide, and in Maine the populations are fragmented and restricted to discrete areas within three mid-coast drainages. Freshwater mussels are particularly vulnerable and sensitive to habitat changes and environmental contaminants, and have a high risk for extirpation when habitat is degraded. Changes to hydrology, sedimentation, invasive species, water pollution, degradation of riparian areas, and loss of fish hosts are some of the threats to freshwater mussels (MDIFW 2005). The Benton and Sandy Stream Units are both within the Unity Wetlands focus area identified in the Maine Comprehensive Wildlife Conservation Strategy (MDIFW 2005); the primary conservation strategy identified for this focus area was to maintain or improve water quality.

The size and quality of the riparian buffer is critical to protecting the water quality of the adjacent waterways and for providing wildlife habitat. The existing riparian buffer of 25 feet along some stretches of the Sandy Stream Unit is not optimal for protecting water quality and providing riparian habitat for nesting and foraging birds. Forested buffers of at least 90 feet proposed for Sandy Stream (see map 4.3) will help protect water quality which is critical to invertebrates and freshwater mussels (Kiffney et al. 2003). It will also improve shade for the river which will benefit brook trout, wood turtles, and other aquatic species. Over time, the

expanded riparian forest will offer additional natural cavities for nesting ducks (such as wood ducks and mergansers), roosting bats, and resting places for other wildlife (Hawes and Smith 2005, Bryan 2007).

Strategies

- Over the 15-year life of this CCP, expand the riparian forest along Sandy Stream to at least 90 feet by ceasing brush cutting and allowing natural succession to develop a mature riparian forest.

Goal 4. Sunkhaze Meadows Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the wetlands, woods, wildlife, and cultural resources of the Sunkhaze Meadows Unit.

Objective 4.1 Wildlife Observation and Photography – Sunkhaze Meadows Unit

Provide visitors with opportunities for wildlife observation and photography along four existing walking trails, a new trail, the ITS snowmobile trail (in winter), and the existing boat access site at the Sunkhaze Meadows Unit to connect visitors with nature and inspire stewardship in their everyday lives.

Rationale

Visitors will continue to have opportunities to access the Sunkhaze Meadows Unit for wildlife observation and photography. Providing high quality opportunities for wildlife observation and photography on the refuge promotes visitor appreciation and support for the refuge and the Refuge System, while also benefitting the local economy.

Under this plan, opportunities for wildlife observation and photography will be enhanced, as outlined in the strategies below. This CCP will continue to allow access along 6 miles of existing trails (Johnson Brook, Carter Meadow, Ash Landing, and Oak Point) and along the 3.2-mile-long McLaughlin Road. We will improve access by creating a new connector trail along Carter Meadow Road (see map 4.4).

The North and South Buzzy Brook Trails combined contain nearly 4.4 miles of trail requiring maintenance. Under this plan, we will close the North and South Buzzy Brook Trails because they appear to be less used and are already largely inaccessible because of fallen trees and overhanging vegetation. This will allow refuge staff to focus resources on maintaining the remaining four trails as well as developing additional facilities and programs. Access on the north and western portions of the refuge will still be provided via McLaughlin Road.

This plan proposes some new facilities to improve visitor experience and safety (see map 4.4). A new trail will be created, eliminating the need for visitors to walk down Carter Meadow Road to access Carter Meadow Trail. This new trail will improve the visitor experience by being relocated off of the current gravel road. Two new gravel parking lots will be developed as well. The first will be located near the entrance of Carter Meadow Road off of County Road. The other will be located off of County Road as well, near the Oak Point trailhead. These added parking areas will improve access opportunities to these areas by creating local parking availability. They

also will help improve visitor safety. Currently, visitors must park in the existing parking lot north of the Oak Point Trail and walk along County Road to access either of these areas. By creating new parking areas, we will prevent visitors from needing to walk along the road to access these trails.

Boating is probably the best way to observe the refuge's wildlife and habitats at certain times of year. Currently, boat access to Sunkhaze Stream and its tributaries on the refuge is limited. Under this plan, we will partner with others to create additional access points to the stream and, if feasible, one or more tributaries. Due to extensive wetlands and other important habitats, refuge lands do not offer good opportunities to develop boat access, so we plan to work with willing landowners to establish boat access on lands and waters near or adjacent to the refuge. We will explore opportunities to develop boat access points along Sunkhaze Stream near its mouth as well as upstream near the current Ash Landing access point. In addition, navigating Sunkhaze Stream itself can be disorienting, particularly in spring when the stream is flooded. The lack of easily distinguishable landmarks can make it easy for those unfamiliar with the stream and its tributaries to become lost. Commercially guided tours of the refuge could expand opportunities for visitors to explore the refuge safely.

We will also work to better orient, inform, and guide the visiting public, and help create a more fulfilling wildlife observation and photography experience through a variety of means, including additional updating of the refuge's Web site, refuge brochure, and interpretive panels.

Strategies

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Improve the refuge's Web site to encourage visitation by adding trail maps, bird lists, and recent observations.
- Close North and South Buzzy Brook Trails due to maintenance difficulty.
- Explore feasibility of adding a trail from the Carter Meadow parking lot that will allow access to Spruce Loop and Oak Point Trails without walking on County Road.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Improve directional trail signs to better access and identify trailheads.
- Develop a new trail from the entrance of Carter Meadow Road to the existing Carter Meadow trailhead.
- Develop two gravel parking areas: one at the entrance of Carter Meadow Road and the other near the Oak Point trailhead.
- Replace boardwalks along Johnson Brook Trail.
- Expand wildlife observation opportunities by exploring the potential for commercial guided canoe and kayak trips along Sunkhaze Stream.
- Work with willing landowners to establish boat access on lands and waters near or adjacent to the refuge, including exploring opportunities to develop boat access points along Sunkhaze Stream near its mouth as well as upstream, and if feasible, on tributaries.

Objective 4.2 Hunting

Annually, allow access for hunting of big game, upland game, and migratory game birds in accordance with State and refuge regulations and consistent with sound biological principles to create opportunities for connecting visitors with nature by providing participants with reasonable harvest opportunities, uncrowded conditions, and minimal conflicts with other users.

Rationale

Hunting is one of the six priority public uses to receive enhanced consideration on national wildlife refuges according to the 1997 Refuge Improvement Act. Hunting is also an historic, traditional, and popular activity on the refuge and in the Refuge System. Providing wildlife-dependent recreational opportunities like hunting helps foster an appreciation for wildlife and the habitats that sustain them. At Sunhaze Meadows Unit, hunting is a public use that draws a number of visitors to the refuge.

To the extent practicable, refuge hunting regulations coincide with State hunting regulations. The Sunhaze Meadows Unit is currently open according to State hunting seasons except for the coyote and bear seasons. Sunhaze Meadows Unit is open to coyote and bear hunting, but refuge seasons are shorter than State seasons. Currently, Maine State regulations for coyote hunting allow daytime hunting all year and night hunting from October 1 to August 31. The refuge's regulations allow daytime and nighttime hunting for coyotes between October 1 and March 31. The refuge's bear hunting season starts October 1, and lasts through the end of the State season. The State's 2013 bear hunting season ends November 1. These shortened seasons are intended to limit potential disturbance to nesting raptors and ground nesting birds in the spring and summer, and migrating birds in the spring and fall (for additional discussion see "Expanding the Refuge and WPA Coyote Season" under "Actions Considered but Eliminated from Further Study"). This shortened season is also intended to minimize potential conflicts with other users during August and September, when there are more visitors to the refuge.

According to State regulations, anyone who hunts with a firearm during any open firearm season on deer is required to wear two articles of solid-colored hunter orange clothing which is in good and serviceable condition and which is visible from all sides. One article must be a hat. The other must cover a major portion of the torso, such as a jacket, vest, coat, or poncho containing at least 50 percent of hunter orange in color. To minimize confusion for hunters, the refuge has recently updated its hunter orange requirements to coincide with State regulations.

In addition, under this plan we propose improvements to the refuge Web site to better inform hunters regarding refuge-specific regulations.

Strategies

- Continue to keep the refuge open to hunting according to current Federal, State, and refuge-specific regulations.
- Within 1 year of CCP approval, update and maintain the refuge's Web site with current, refuge-specific, hunting regulations.

Objective 4.3 Fishing

Annually provide anglers with access to fishing opportunities at Sunkhaze Stream and its tributaries at the Sunkhaze Meadows Unit to create opportunities for connecting visitors with nature.

Rationale

Fishing is one of the six priority public uses to receive enhanced consideration on national wildlife refuges, according to the 1997 Refuge Improvement Act. Fishing is also a historic, traditional, and popular activity in central Maine and in the Refuge System. At Sunkhaze Meadows Unit, fishing is a public use that draws visitors to the refuge. Fishing opportunities are available in 5 miles of Sunkhaze Stream and another 16 miles of tributary streams that include Buzzy, Little Buzzy, Baker, Dudley, and Johnson Brooks, and Birch and Little Birch Streams (see map 4.4). Most of these streams are accessed for trout fishing from road crossings surrounding the perimeter of the unit. Fishing interior portions of Sunkhaze Meadows Unit via boat or canoe is less frequent due to the difficulty of boat or canoe launch access.

Under this plan, we will update the refuge Web site with current fishing regulations and information to better inform anglers of fishing opportunities at the refuge. As described previously, we will work to improve boating access to the refuge, which will enhance fishing opportunities since anglers frequently fish from boats on refuge waters. As discussed under objective 4.1, we will work with willing landowners to develop additional boat access areas. Also discussed under objective 4.1, navigating Sunkhaze Stream itself can be disorienting, particularly in spring when the stream is flooded. The potential for commercially guided services of Sunkhaze Stream and its tributaries could expand opportunities for visitors to explore the refuge safely.

Strategies

Continue to:

- Offer fishing opportunities and access on refuge lands.
- Allow boat access to Sunkhaze Stream.

Within 5 years of CCP and with the hiring of at least one full-time position:

- Improve signs, brochures, and the Web site related to fishing opportunities on the refuge.

Over the 15-year life of the CCP and with the hiring of at least three full-time position:

- Expand fishing opportunities by exploring commercial guided services along Sunkhaze Stream.
- Work with willing landowners to establish boat access on lands and waters near or adjacent to the refuge, including exploring opportunities to develop boat access points along Sunkhaze Stream near its mouth as well as upstream, and if feasible, on tributaries.

Objective 4.4 Environmental Education and Interpretation

Over the life of the plan, we will improve environmental education and interpretation at the refuge by developing and implementing Service-led environmental education programs, providing additional support to existing, volunteer-led programs (i.e., Friends of Sunkhaze

Meadows), and working with new partners to promote understanding of the refuge and the role of the Refuge System.

Rationale

Environmental education and nature interpretation are identified in the Refuge Improvement Act of 1997 as priority public uses. They serve as valuable tools in the protection of our Nation's wildlife and habitat resources. Educating people about wildlife conservation fosters an appreciation of the important role the refuge plays in support of these efforts and motivates individuals to make responsible environmental choices in the future.

Environmental education in the Refuge System incorporates onsite, offsite, and distance-learning materials, activities, programs, and products that address the audience's course of study, the mission of the Refuge System, and the management purposes of the refuge. The goal of environmental education is to promote an awareness of the basic ecological foundations for the interrelationships between human activities and natural systems. Through curriculum-based environmental education, onsite and offsite, refuge staff and partners hope to motivate students and other persons interested in learning the role of management in maintaining healthy ecosystems and conserving our fish and wildlife resources.

Interpretation is an educational activity aimed at revealing relationships, examining systems, and exploring how the natural world and human activities intertwine. It typically includes educational programming that does not fit within a curriculum-based education program. One of its goals is to stimulate additional interest and positive action. Interpretation is both educational and recreational in nature. That is, participants voluntarily become involved in interpretive activities because they enjoy them, and in the process, they learn about the complex issues confronting fish and wildlife resource managers.

Under this plan, we will expand upon our current, volunteer-led, environmental education and interpretation programs. Local schools are incorporating wildlife and wetland topics into their curriculums to meet science-based standards of learning and help students understand scientific concepts, principles, and theories pertaining to their physical setting and living environment. The refuge can provide educational materials as well as an outdoor laboratory to augment the teachers' existing curriculum and tie into learning standards. With the addition of staff, we propose developing relationships with local schools to provide and promote the use of Sunkhaze Meadows Unit for environmental education programming. Over the 15-year life of the CCP, we will develop and conduct a series of Service-led environmental education and interpretation programs as well as continuing to support the ongoing efforts of the Friends of Sunkhaze Meadows.

We will work closely with partners such as the town of Milford, the Penobscot Indian Nation, and others to develop regional cultural and eco-tourism opportunities to increase refuge visitation. In doing so, we will support these partners in achieving their cultural resource and economic development goals, while encouraging visitation to the Sunkhaze Meadows Unit and increasing appreciation of and support for the refuge and the Refuge System.

With the addition of staff and potential increase in visitation, we will update existing interpretive displays, signs, and materials.

Over the 15 year life of the CCP, we will work with the Penobscot Indian Nation to develop interpretive materials to better inform refuge visitors about the significance of the lands and waters comprising Sunkhaze Meadows Unit to Penobscot Indian Nation history and culture. Through these partnerships we intend to improve the public's understanding of the role of the Refuge System.

Strategies

Continue to:

- Allow local high school and college instructors and classes to access Sunkhaze Meadows Unit for environmental education purposes upon request.
- Rely on the Friends of Sunkhaze Meadows NWR to promote and conduct approximately one environmental interpretive program each month.
- Allow partners to conduct education and interpretive programs on refuge lands upon request.
- Maintain existing signs and displays as resources allow.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Update the existing signs on the unit, develop at least one additional interpretive display, and update existing general brochure.
- Develop relationships with at least two local schools to provide at least one environmental education program or teacher training each year.
- Work with the Town of Milford, the Penobscot Indian Nation, and other partners to develop at least one program (e.g., presentation) and one outreach material (e.g., brochure) to encourage regional, cultural, and ecological tourism, and increase refuge visitation.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Work with the Penobscot Indian Nation, town of Milford, Friends, and others to develop interpretive materials (brochures, signs, Web site) to educate the public about the refuge's cultural resources.
- Conduct an average of four or more interpretive programs each month across all refuge units and Carlton Pond WPA, led by Service staff.
- Explore opportunities to create a collaborative visitor contact station with space included for refuge staff, collaborative interpretive exhibits, Friends group office, and bookstore with opportunities to market Tribal and locally produced merchandise.

Goal 5. Carlton Pond WPA Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the wetlands, woods, and wildlife at Carlton Pond WPA.

Objective 5.1 Wildlife Observation and Photography, Hunting, Fishing, Environmental Education and Interpretation

Allow visitors at Carlton Pond WPA to participate in wildlife observation and photography, hunting, and fishing to create opportunities for connecting visitors with nature.

Rationale

See objectives 4.1, 4.2, 4.3, and 4.4, for discussion of the importance of hunting, fishing, wildlife observation and photography, and environmental education and interpretation to the Refuge System.

Under this plan, with the addition of staff, we propose developing relationships with local organizations, academic institutions, and schools to provide and promote the use of Carlton Pond WPA for environmental education and interpretive programming. Over the 15-year life of the CCP, we will also begin conducting Service-led environmental education and interpretation programs.

Strategies

Continue to:

- Allow local high school and college instructors to access Carlton Pond WPA for environmental education purposes upon request.
- Allow partners to conduct education and interpretive programs on WPA lands upon request.
- Maintain existing signs as resources allow.
- Keep the refuge open to hunting according to Federal, State, and refuge-specific regulations.
- Allow up to two field trial events for hunting dogs each year at Carlton Pond WPA if requested.

Within 5 years of CCP approval and with the hiring of at least one full-time position:

- Develop at least one partnership (e.g., with Unity College, the Sebecook Land Trust) to promote environmental education, interpretation, and public use at Carlton Pond WPA.
- Develop relationships with at least one local school to provide at least one environmental education program or teacher training.

Over the 15-year life of this CCP and with the hiring of at least three full-time positions:

- Maintain and update as needed existing signs and develop at least one brochure for Carlton Pond WPA.
- Maintain a few wood duck boxes at Carlton Pond WPA for interpretive purposes and develop an interpretative display or brochure.

- Conduct an average of four interpretive programs (onsite or offsite) each month across all refuge units and Carlton Pond WPA, led by Service staff.

Goal 6. Benton and Sandy Stream Units Public Use. Engage visitors, students, and nearby residents in the Refuge System's six priority public uses, as well as other compatible public uses, to enhance public understanding, enjoyment, and environmental stewardship of the shrublands, woods, grasslands, and wildlife at the Benton and Sandy Stream Units.

Objective 6.1 Wildlife Observation and Photography, Hunting, Fishing, Environmental Education and Interpretation

Provide visitors opportunities for wildlife observation and photography, hunting, and fishing at the Benton and Sandy Stream Units to create opportunities for connecting visitors with nature.

Rationale

See objectives 4.1, 4.2, 4.3, and 4.4, for discussion of the importance of hunting, fishing, wildlife observation and photography, and environmental education and interpretation to the Refuge System.

We will continue to allow local snowmobile clubs to maintain existing snowmobile trails under special use permits at the Benton and at the Sandy Stream Units, which provide for other public use access throughout the year. However, we will collaborate with those organizations to relocate the snowmobile trail at Sandy Stream Unit so it will be closer to Prairie Road, as described in objective 3.4, to reduce habitat fragmentation and maximize the riparian buffer width along Sandy Stream itself.

With the addition of staff, we propose developing relationships with local organizations, academic institutions, and schools to provide and promote the use of Sandy Stream Unit for environmental education and interpretive programming. We will also create a pedestrian connector trail at Benton Unit to allow access for wildlife observation and photography from the parking lot, and will open the snowmobile trail to pedestrian traffic during the growing season (see map 4.5).

Strategies

Continue to:

- Allow local high school and college instructors to access these units for environmental education purposes upon request.
- Maintain the gravel parking area at Benton Unit as resources allow.
- Keep the refuge open to hunting according to Federal, State, and refuge-specific regulations.

Over the 15-year life of this CCP:

- Collaborate with snowmobile clubs to relocate the snowmobile trail on Sandy Stream Unit closer to the road to provide a more contiguous habitat unit.

- With the hiring of at least one full-time position, develop at least one partnership (e.g., with Unity College, the Sebasticook Land Trust) to promote environmental education, interpretation, and public use at Benton and Sandy Stream Units.
- Develop interpretive display and programs (at least one for each unit) to interpret the benefits of grassland management at Benton Unit and riparian buffer management at Sandy Stream Unit.
- Create a 0.25-mile long pedestrian connector trail between the parking lot and existing snowmobile trail at the Benton Unit to allow pedestrian access to the snowmobile trail when not in use by snowmobiles.
- Explore the feasibility of and interest in including Benton Unit in a regional trail system upon request.

Goal 7. Partnership Coordination. Communicate and collaborate with local communities, Federal and State agencies, local and Tribal representatives, and other organizations throughout Maine and the region to further the purposes of the refuge and the mission of the National Wildlife Refuge System.

Objective 7.1 Refuge Friends Group

Support regular interpretive programming and events sponsored by the Friends of Sunkhaze Meadows at the Sunkhaze Meadows Unit by allowing access to refuge facilities, maintaining facilities, and staff involvement.

Rationale

Active Friends organizations are important contributors to refuge management across the Refuge System. The importance of the Friends of Sunkhaze Meadows NWR is all the more crucial given the absence of onsite staff for Sunkhaze Meadows NWR and Carlton Pond WPA. It is primarily through the dedication of these volunteers that environmental education and interpretive programming about the refuge and WPA are available to visitors. These volunteers also act as the eyes and ears of the refuge in the absence of permanent staff. Observant volunteers from the Friends of Sunkhaze Meadows identified purple loosestrife in portions of the Sunkhaze Meadows Unit in 2012. They reported this to refuge staff, and provided assistance in implementing control efforts later that year. The Service will continue to partner with the Friends to support their efforts to the extent possible given limited staff time and resources. With the proposed addition of staff, the Service will increase its coordination and support to the Friends organization to support and build the membership that helps us achieve our management goals.

With the proposed addition of staff and establishment of a refuge office facility, we will seek to provide space for the Friends to use as well. This will help improve coordination with Service staff as well as provide a centralized location for the Friends to use for program development and organizational needs.

Strategies

Over the 15-year life of this CCP, pending additional staff :

- Increase staff coordination and support the Friends organization through organizing volunteer activities, developing special projects, obtaining grant funding, and providing information and presentations.

- Support the long-term sustainability of the Friends organization through mentoring and training programs, as well as by providing assistance in obtaining capacity building grants for the group.
- Provide office space for the Friends organization in the new refuge visitor contact station and administrative offices, if feasible.

Objective 7.2 Agency, Tribal, Academic, and Other Partnerships

Work with State agencies, Tribal partners, schools, and others to develop interpretive programs and research projects at Sunkhaze Meadows NWR and Carlton Pond WPA.

Rationale

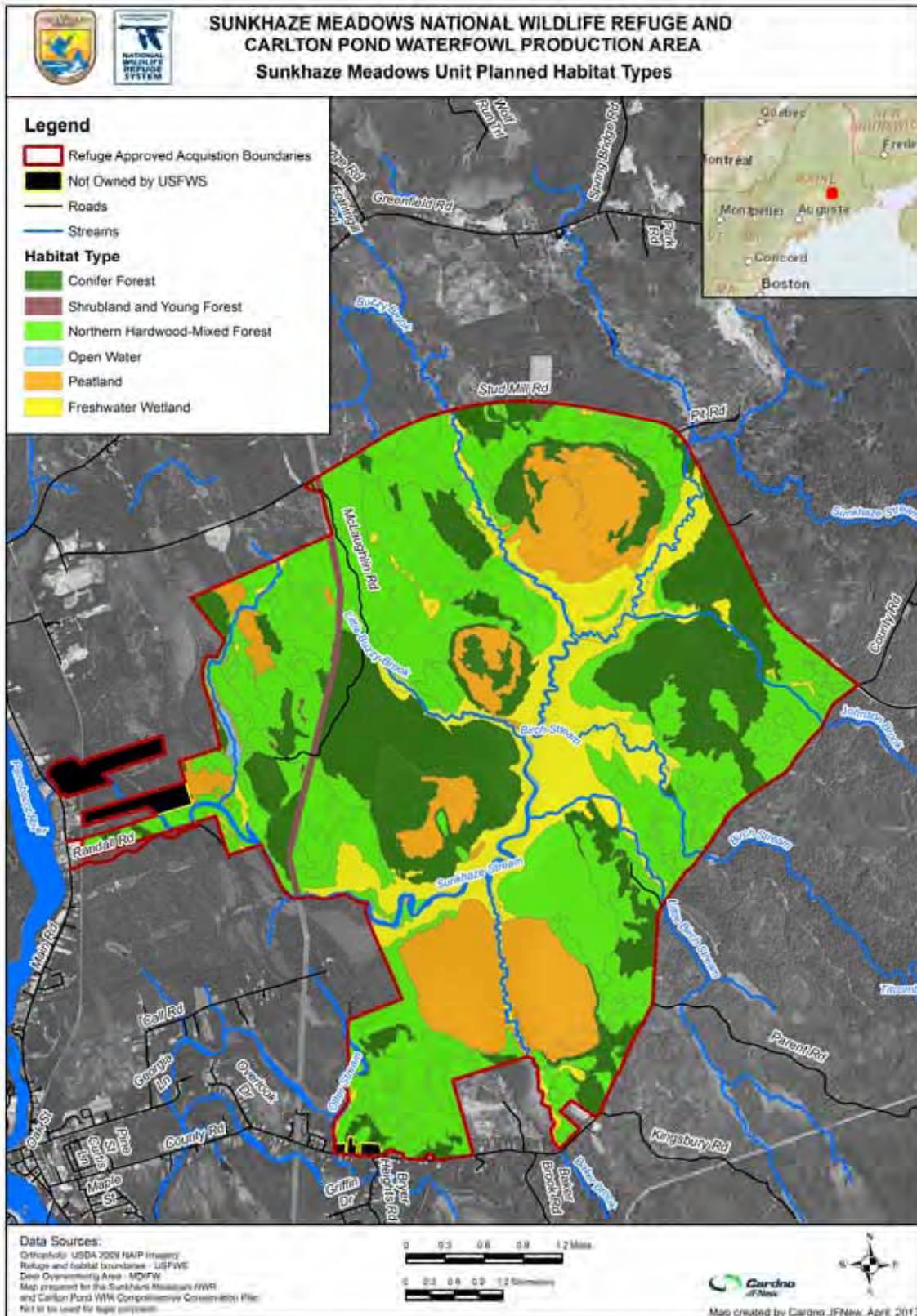
Similar to objective 7.1, the role of partnerships is important to achieving the management objectives outlined for Sunkhaze Meadows NWR and Carlton Pond WPA. The Service currently collaborates with State agencies, Tribal partners, universities, schools, and other organizations as opportunities arise. Under this plan, with the proposed addition of staff, we will increase our collaboration with partners by proactively seeking cooperation in achieving mutual management and public use objectives.

Strategies

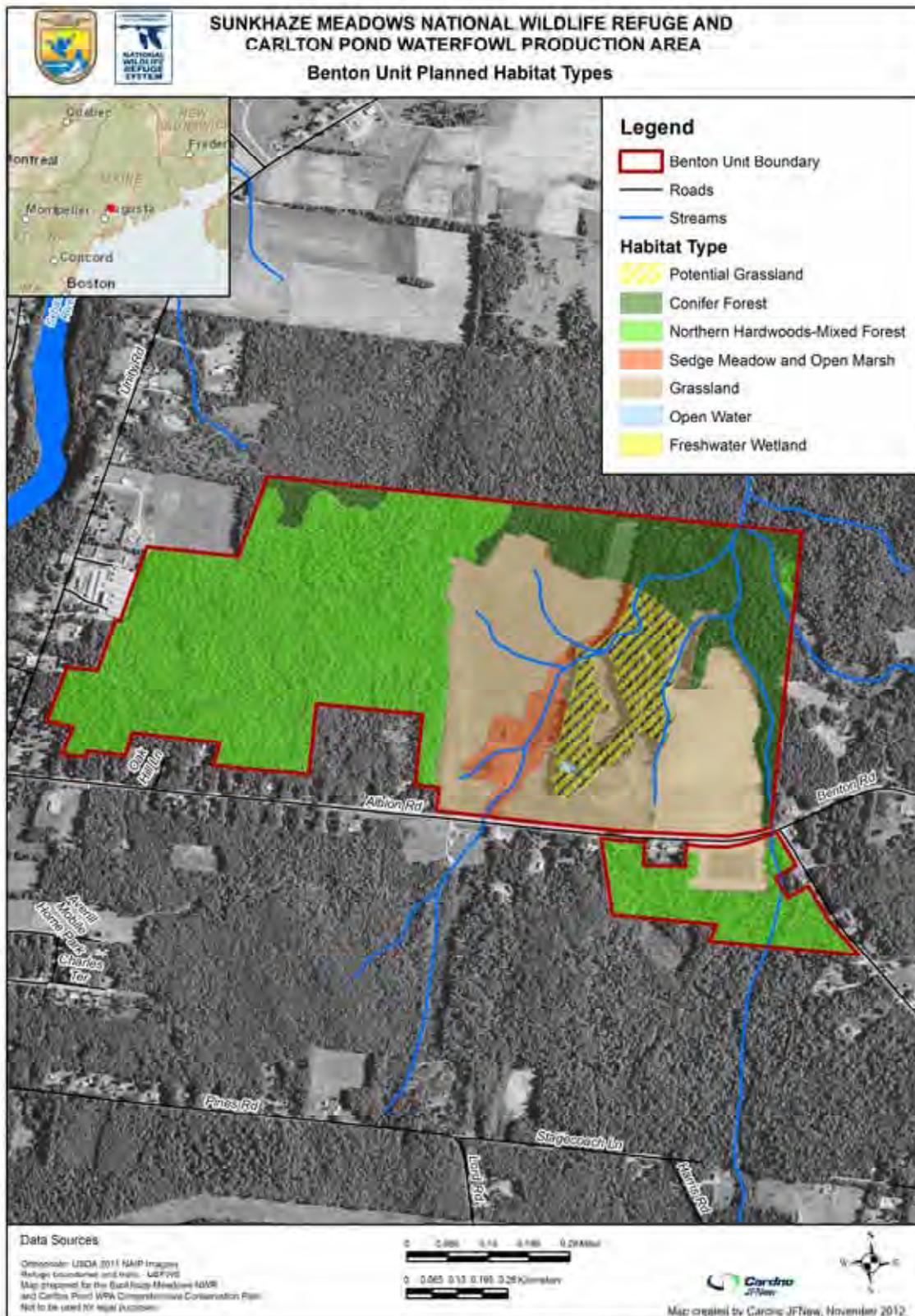
Over the 15-year life of this CCP, with additional staff:

- Identify research and monitoring projects and needs at each refuge unit to foster partnerships with universities and other partners.
- Establish an annual coordination meeting among Moosehorn NWR, Sunkhaze Meadows NWR, and members of the Penobscot Indian Nation and other Tribes as warranted to collaborate on natural resource and public use management.
- Work with Tribes to identify and quantify existing ash populations when completing other forest inventory work to help determine if sustainable harvest is feasible for Tribal cultural uses.
- Work with partners to ensure consistent refuge and Refuge System messaging in partner-sponsored environmental education and interpretive programming.
- Work with the Penobscot Indian Nation to explore opportunities for developing materials and programming interpreting cultural resources on the refuge.
- Explore partnerships with Unity College, Sebasticook Land Trust, and other partners for assistance in managing and interpreting Benton, Sandy Stream, and Carlton Pond WPA, and conservation within the watershed.
- Explore partnerships with the town of Milford, Penobscot Indian Nation, and others as part of local and regional tourism efforts to promote the Sunkhaze Meadows Unit and the Refuge System mission.

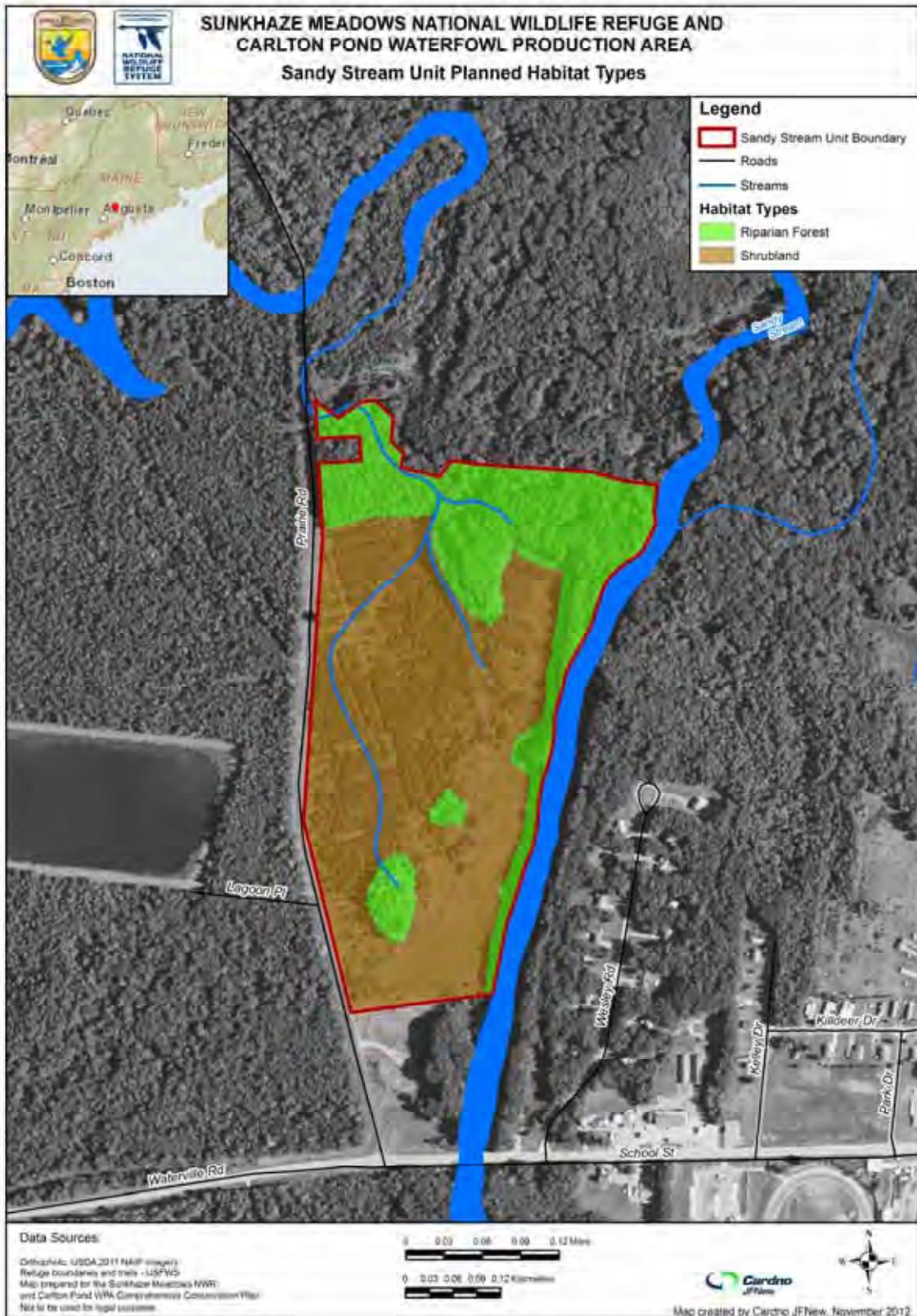
Map 4.1. Projected habitats for the Sunk haze Meadows Unit of Sunk haze Meadows National Wildlife Refuge.



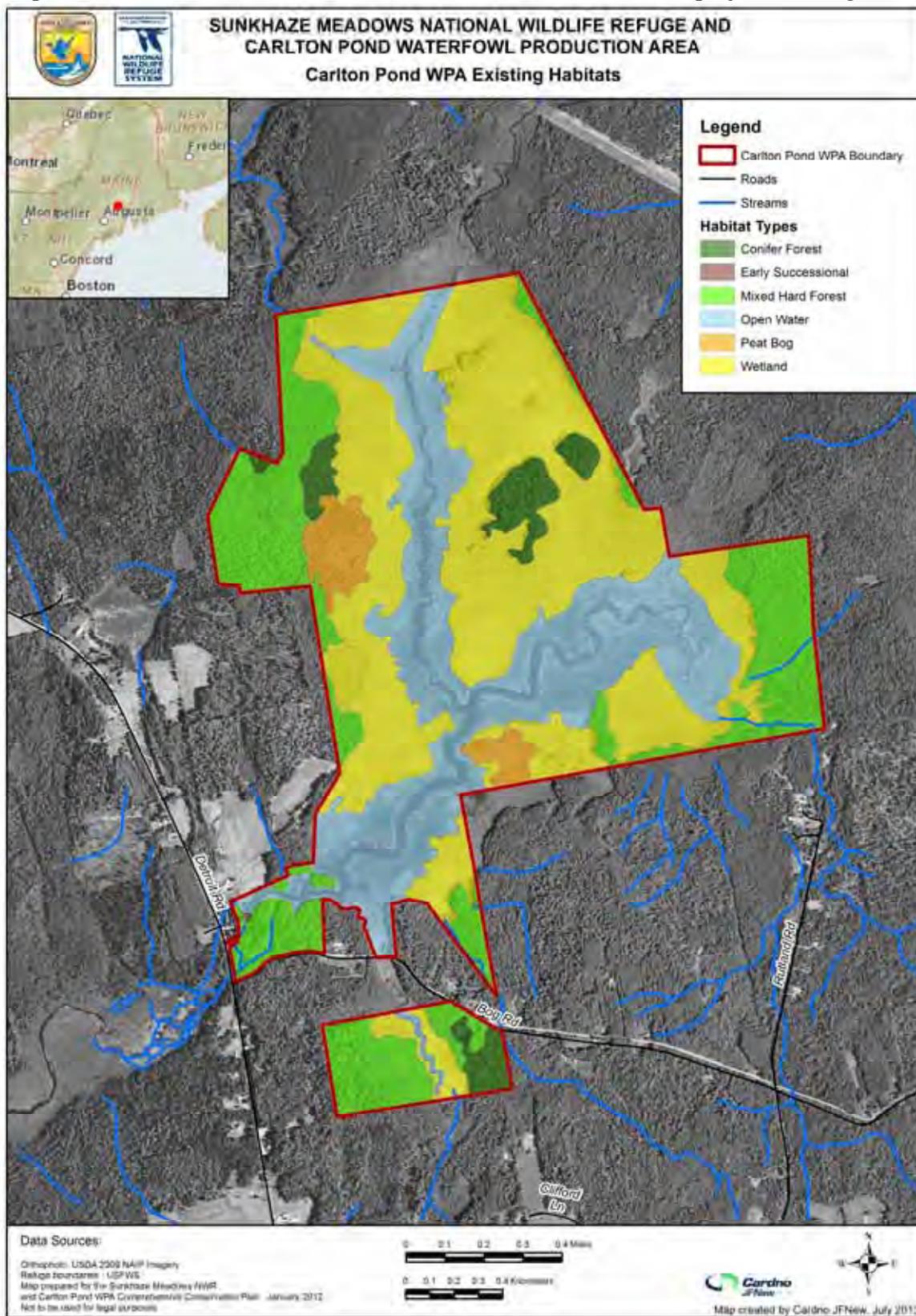
Map 4.2. Projected habitats for the Benton Unit of the Sunhaze Meadows National Wildlife Refuge.



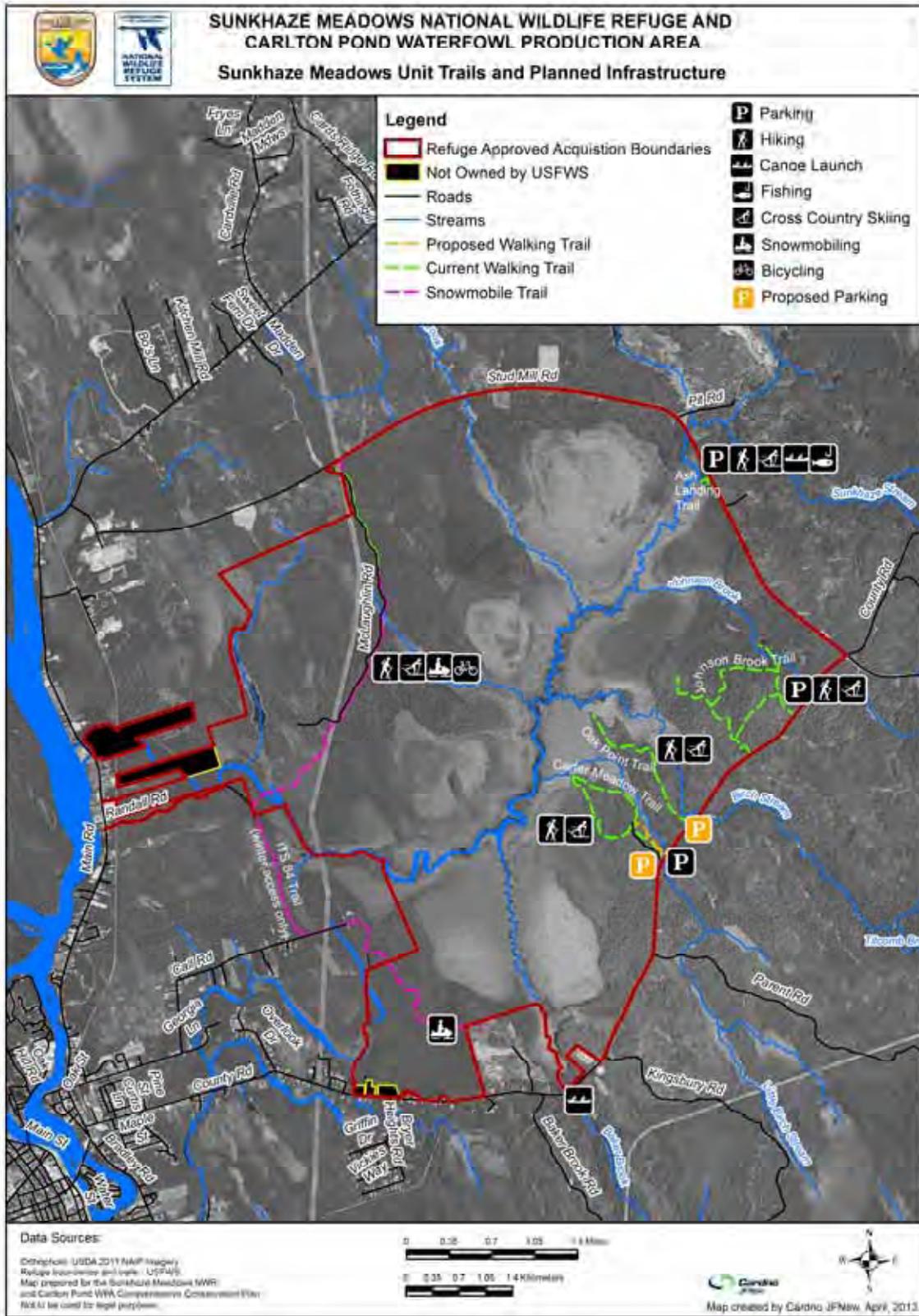
Map 4.3. Projected habitats for the Sandy Stream Unit of the Sunhaze Meadows National Wildlife Refuge.



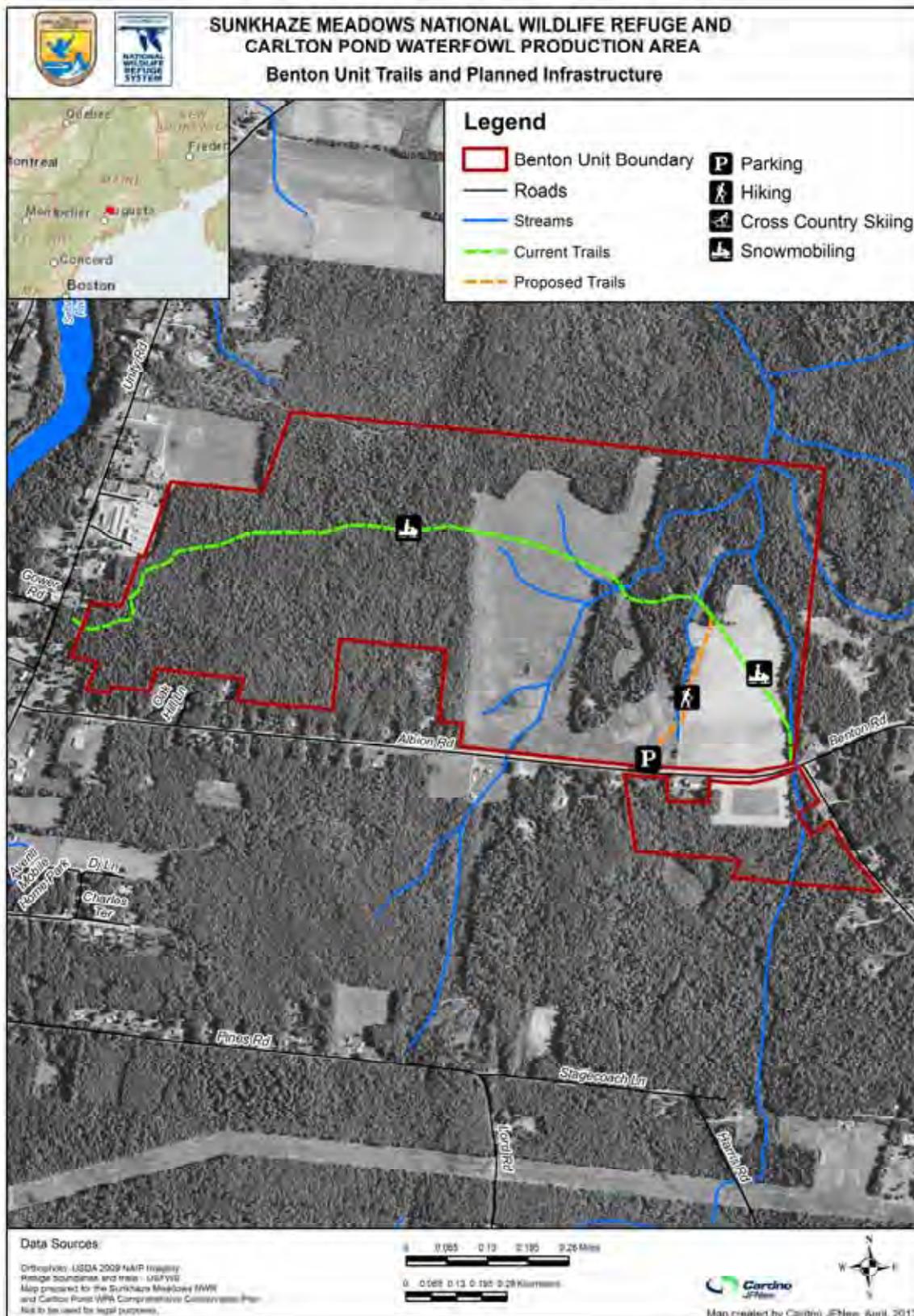
Map 4.4. Habitats for Carlton Pond Waterfowl Production Area (no projected changes).



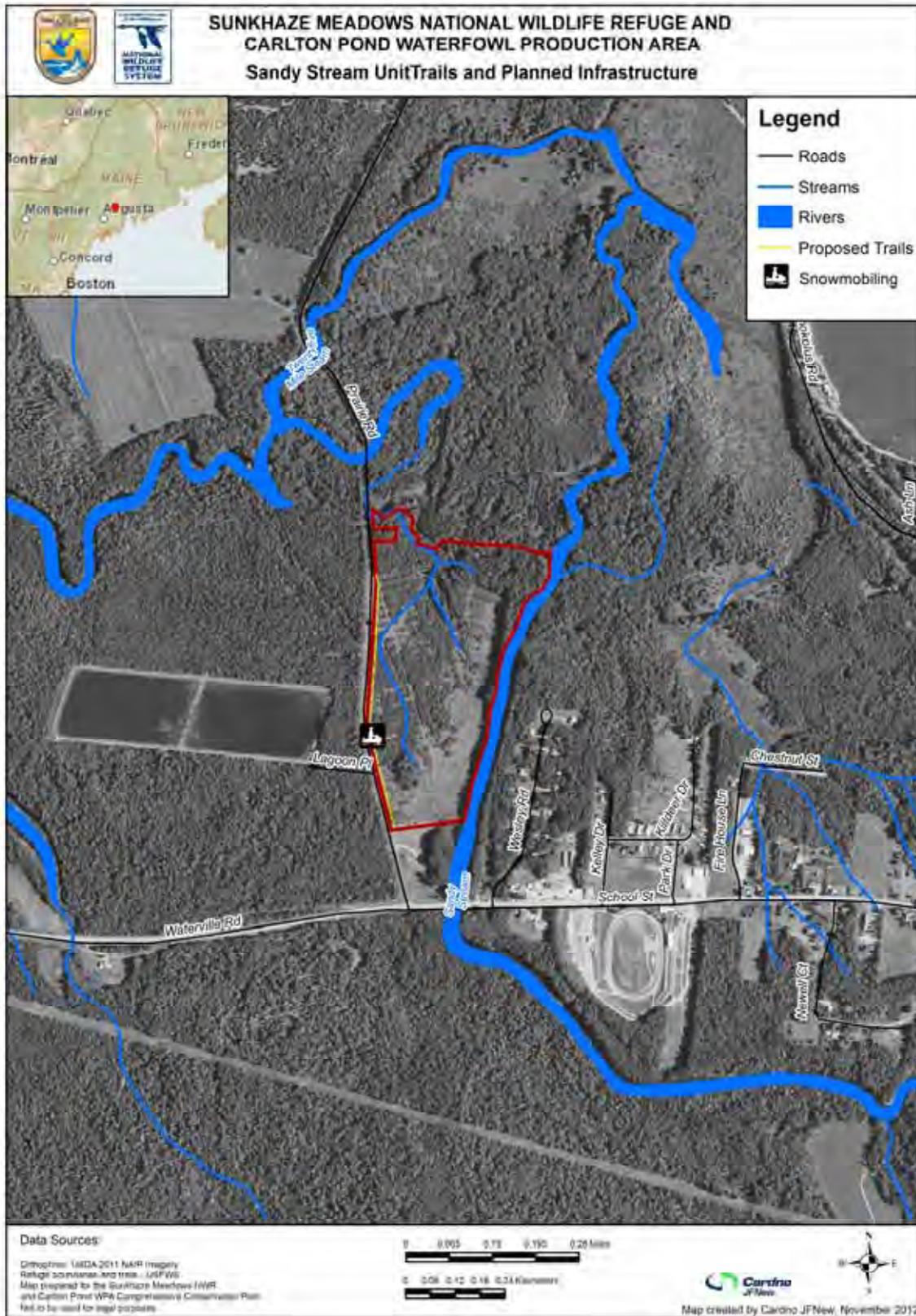
Map 4.5. Current and planned infrastructure for the Sunk haze Meadows Unit of the Sunk haze Meadows National Wildlife Refuge.



Map 4.6. Current and planned infrastructure for the Benton Unit of Sunhaze Meadows National Wildlife Refuge.



Map 4.7. Planned infrastructure for the Sandy Stream Unit of Sunk haze Meadows National Wildlife Refuge.



Chapter 5

Leigh Osgood, Friends of Sunkhaze Meadows



Bunchberry and pink lady's slipper at the Sunkhaze Meadows Unit.

Consultation and Coordination

- **Introduction**
- **Planning to Protect Land and Resources**
- **Partners Involved in Refuge Planning**
- **Contact Information**

Introduction

We presented in chapter 1, figure 1.1, the steps in the comprehensive conservation planning process and how it integrates NEPA requirements including public involvement. This chapter describes how we engaged others in developing this CCP. In chronological order, it details our efforts to encourage the involvement of the public and conservation partners: other Federal and State agencies, Tribes, county officials, civic groups, non-governmental conservation and education organizations, and user groups. It also identifies who contributed in writing the plan or significantly contributed to its contents.

It does not detail the numerous informal discussions the refuge manager and her staff have had over the last year where the CCP was a topic of conversation. Those involved a wide range of audiences, including local community leaders and other residents, refuge neighbors, refuge visitors, and other interested individuals. During those discussions, the refuge manager and her staff often would provide an update on our progress and encourage comments and other participation.

According to Service policy, we must review and update our final CCP at least once every 15 years. We may update the plan sooner, if we determine that we might need to markedly change management direction or, if the Service's Director or our Regional Director deem it necessary. If so, we will publicly announce our intent to revise the plan encourage your participation.

Planning to Protect Land and Resources

January 2011

On January 26, 2011, a conference call was held between refuge staff, regional office staff, and contractors to identify data needs, obtain input on the contact database, discuss the initial newsletter, review the CCP process, and discuss agenda and logistics for the kick-off meeting.

February 2011

Our pre-planning activities in February included a 2-day kick-off meeting held at the Maine Coastal Islands NWR office on February 8 and 9, 2011.

March 2011

On March 7, 2011, the refuge manager emailed 29 local, county, State, and Federal agency contacts with an invitation to an agency partner scoping meeting. A follow-up reminder email was sent to this same group of contacts on March 17, 2011.

On March 18, 2011, the NOI was published in the *Federal Register*, officially announcing the beginning of public scoping for the Sunhaze Meadows NWR and Carlton Pond WPA CCP. The project planning Web site and the refuge Web site were also updated at this time.

On March 23, 2011, the core team contacted approximately 394 contacts included in the planning contacts database compiled for the CCP. The refuge manager emailed 44 of those contacts and invited them to participate in our scoping process, attend our public open houses in April, and included an electronic copy of the scoping newsletter. The remaining 350 contacts were mailed copies of the scoping newsletter containing a similar invitation to participate.

On March 24, 2011, the core team held our agency scoping workshop at the Maine Department of Inland Fisheries and Wildlife, Bangor Research Office. The workshop was attended by six representatives from municipal, State, and Federal agencies. Refuge and planning team staff were also in attendance at the meeting.

April 2011

Two public scoping meetings were held on April 12, 2011, in Milford, Maine at the Milford Town Hall from 2 to 4 p.m. and another session at 6 to 8 p.m. A third public scoping meeting was held in Unity, Maine, at the Unity College on April 13, 2011. On April 30, 2011, the official comment period for initial scoping of CCP issues identification ended.

May through December 2011

The core planning team spent the next several months developing alternatives, completing and compiling appendixes, and writing and editing the various chapters included within the draft CCP and EA.

December 2011 through February 2012

In December 2011, we initiated outreach efforts to obtain additional information about public uses of the refuge and public comment on potential wilderness designation at the Sunkhaze Meadows Unit.

In January 2012, we developed a newsletter and sent it to approximately 452 individuals and organizations included in the planning contacts database compiled for the CCP. The refuge manager emailed 112 of those contacts an electronic version of the newsletter which explained what designated wilderness is under the Wilderness Act. The newsletter also invited interested parties to attend a public meeting at 6:30 p.m. on February 9, 2012, in Milford, Maine. We invited the remaining 340 contacts to participate by mailing them copies of the newsletter. On February 9, 2012, we held a public meeting to solicit public input on existing public uses of the refuge and the potential for designating wilderness at the Sunkhaze Meadows Unit.

March 2012 through April 2013

Following the January 2012 meeting, the Service reviewed and considered comments received and determined not to pursue special designations at the Sunkhaze Meadows Unit. In early August 2012, the Service distributed a newsletter updating the public on the Service's decision not to pursue a wilderness area designation as well as update interested contacts on the status of the CCP process. This newsletter was distributed to the same 452 contacts noted in the January 2012 newsletter distribution.

On September 18, 2012, the refuge manager presented an update on the CCP process and status, as well as findings of the Wild and Scenic Rivers Review, to the town of Milford selectmen at their monthly meeting. The Service also prepared another CCP update newsletter that was released in the weeks following this meeting.

Throughout the fall and winter of 2012, the Service finalized alternatives and analyzed impacts for the draft CCP and EA.

April through Fall 2013

We published our Notice of Availability in the *Federal Register* announcing the release of the draft CCP and EA, preparing and distributing a newsletter, and by distributing the document for public review. The draft CCP and EA was released for public review and comment on April 23, 2013. Four public meetings were held on April 25 and 26, two in Milford and two in Unity, Maine. The official public review and comment period ended on May 31, 2013. We received 17 sets of comments, including at the meetings and by regular mail and electronic mail. After the comment period ended, we reviewed and summarized all of the comments we received in order to develop our responses, which are included as appendix G.

We compiled the final CCP for review by the Regional Chief of Refuges and Regional Solicitor's Office before submitting it to the Regional Director for review and approval. The Regional Director determined a FONSI is appropriate, and has certified that the final CCP meets agency compliance requirements, achieves refuge purposes, and helps fulfill the mission of the Refuge System. With an affirmative FONSI and other positive findings, the Regional Director has approved the final CCP. Shortly after this plan is finalized, we will distribute a newsletter and publish another NOA in the *Federal Register* to publicly announce the availability of the final plan.

Partners Involved in Refuge and WPA Planning

Refuge programs enjoy a great deal of support from outside the Service in many areas: conducting biological surveys, enhancing public use and refuge programs, restoring habitat, and protecting land. Our partnerships will continue to expand under the increasing interest in conserving refuge resources. Since January 2011, we have contacted the following partners to apprise them of the planning process and encourage their involvement.

American Rivers
Aroostook Band of Micmacs
Atlantic Salmon Federation
Country Cousins Snowmobile Club
Ellsworth American
Forest Society of Maine
Friends of Sunhaze Meadows
G and G Trailblazers Snowmobile Club
Houlton Band of Maliseet Indians
Kennebec Messalonskee Trails
Maine Cooperative Fish and Wildlife Research Unit
Maine Department of Conservation
Maine Department of Environmental Protection
Maine Department of Inland Fisheries & Wildlife
Maine Retriever Trial Club, Inc.
Maine Sportsman, The
Marine Audubon
Natural Resources Council of Maine
Northern Research Station - Penobscot Experimental Forest

Northwestern University
Passamaquoddy Tribe Indian Township
Penobscot Experimental Forest
Penobscot Indian Nation
Penobscot River Restoration Trust
Pine Tree Snowmobile Club
Pleasant Point - Passamaquoddy
Sebasticook Regional Land Trust
SERC Institute
State Historic Preservation Commission
State of Maine
The Nature Conservancy
The Wilderness Society
Town of Benton
Town of Milford
Town of Unity
Trout Unlimited
Troy Snow Beaters Snowmobile Club
Unity Snow Dusters Snowmobile Club
University of Maine
USDA - Forest Service
U.S. Environmental Protection Agency
U.S. Geological Survey

Contact Information

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Chapter 6



USFWS

Wild turkeys at Sunhaze Meadows Unit.

List of Preparers

- **Members of the Core Planning Team**
- **Assistance from Other Service Personnel**

Members of the Core Planning Team

Service Personnel	<i>Beth Goettel</i>	<i>Refuge Manager, Maine Coastal Islands NWR Complex, Sunkhaze Meadows NWR, and Carlton Pond WPA.</i>
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	<i>Lia McLaughlin</i>	<i>Natural Resource Planner, National Wildlife Refuge System, Northeast Regional Office</i>
State Agency Personnel	<i>Mark Caron</i>	<i>Regional Wildlife Biologist, Maine Department of Inland Fisheries and Wildlife</i>
Tribal Personnel	<i>Bonnie Newsom</i>	<i>(former) Tribal Historic Preservation Officer, Penobscot Indian Nation Cultural and Historic Preservation Department</i>
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Glossary and Acronyms

Dan Salas, Cardno JFNew



View of conifer forest along Carter Meadows Road.

Glossary and Acronyms

Glossary

accessibility	The state or quality of being easily approached or entered, particularly as it relates to complying with the Americans With Disabilities Act.
accessible facilities	Structures accessible for most people with disabilities without assistance; facilities that meet UFAS standards; ADA-accessible [e.g., parking lots, trails, pathways, ramps, picnic and camping areas, restrooms, boating facilities (docks, piers, gangways), fishing facilities, playgrounds, amphitheaters, exhibits, audiovisual programs, and wayside sites].
agricultural land	Land now or recently kept as pastures or crops
alternative	A reasonable way to fix an identified problem or satisfy a stated need [40 CFR 1500.2] (see “management alternative”).
anadromous fish	Anadromous fish spend all or part of their adult life in salt water and return to freshwater streams and rivers to spawn.
anthropogenic	Caused or produced by humans
appropriate use	A proposed or existing use on a refuge that meets at least one of the following three conditions: <ol style="list-style-type: none"> 1. The use is a wildlife-dependent one; 2. The use contributes to fulfilling the refuge purpose(s), the System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the National Wildlife Refuge System Improvement Act was signed into law; or 3. The use has been determined appropriate as specified in the policy.
approved acquisition boundary	A project boundary that the Director of the U.S. Fish and Wildlife Service approves upon completion of the planning and environmental compliance process. An approved acquisition boundary only designates those lands which the Service has authority to acquire or manage through various agreements. The approval of an acquisition boundary does not grant the Service jurisdiction or control over lands within the boundary, and it does not make lands within the refuge boundary part of the National Wildlife Refuge System. Lands do not become part of the System until the Service buys them or they are placed under an agreement that provides for their management as part of the System.
aquatic	Growing in, living in, or dependent upon water.
best management practices	Land management practices that produce desired results. [Usually describing forestry or agricultural practices effective in reducing non point source pollution, like reseeding skidder trails or not storing wastes in a flood plain. In their broader sense, practices that benefit target species.]
biological diversity or biodiversity	The variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
biological integrity	Biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities.

breeding habitat	Habitat used by migratory birds or other animals during the breeding season.
categorical exclusion	Pursuant to the National Environmental Policy Act (NEPA), a category of Federal agency actions that do not individually or cumulatively have a significant effect on the human environment [40 CFR 1508.4].
community	An assemblage of plants occurring together at any point in time.
community type	A particular assemblage of plants and animals, named for its dominant characteristic.
compatible use	“The term ‘compatible use’ means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”—National Wildlife Refuge System Improvement Act of 1997 [Public Law 105-57; 111 Stat. 1253]
compatibility determination	A required determination for wildlife-dependent recreational uses or any other public uses of a refuge.
comprehensive conservation plan (CCP)	Mandated by the Improvement Act, a document that provides a description of the desired future conditions and long-range guidance for the project leader to accomplish purposes of the refuge system and the refuge. CCPs establish management direction to achieve refuge purposes [P.L. 105-57; FWS Manual 602 FW 1.4].
concern	See “issue.”
conservation	Managing natural resources to prevent loss or waste. [n.b. Management actions may include preservation, restoration, and enhancement.]
conservation easement	A legal agreement between a landowner and a land trust (e.g., a private, nonprofit conservation organization) or government agency that permanently limits the uses of a property to protect its conservation values.
cool-season grass	Introduced grass for crop and pastureland that grows in spring and fall and is dormant during hot summer months.
cooperative agreement	A usually long-term habitat protection action, which can be modified by either party, in which no property rights are acquired. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System.
critical habitat	According to U.S. Federal law, the ecosystems upon which endangered and threatened species depend.
cultural resources	Archaeological sites, historic structures, and historic landscapes.
cultural resource overview	A comprehensive document prepared for a field office that discusses, among other things, project prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement of how program objectives should be met and conflicts resolved. [An overview should reference or incorporate information from a field office’s background or literature search described in section VIII of the Cultural Resource Management Handbook (cf. FWS Manual 614 FW 1.7).]

database	A collection of data arranged for ease and speed of analysis and retrieval, usually computerized.
degradation	The loss of native species and processes due to human activities such that only certain components of the original biodiversity persist, often including significantly altered natural communities.
designated wilderness area	An area designated by Congress as part of the National Wilderness Preservation System [FWS Manual 610 FW 1].
digitizing	The process of converting maps into geographically referenced electronic files for a geographic information system (GIS).
disturbance	Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.
donation	A citizen or group may wish to give land or interests in land to the Service for the benefit of wildlife. Aside from the cost factor, these acquisitions are no different than any other means of land acquisition. Gifts and donations have the same planning requirements as purchases.
easement	An agreement by which landowners give up or sell one of the rights on their property (e.g., landowners may donate rights-of-way across their properties to allow community members access to a river). See “conservation easement.”
ecological processes	A complex mix of interactions among animals, plants, and their environment that ensures maintenance of an ecosystem’s full range of biodiversity. Examples include population and predator-prey dynamics, pollination and seed dispersal, nutrient cycling, migration, and dispersal.
ecoregion	A territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.
ecosystem	A natural community of organisms interacting with its physical environment, regarded as a unit.
ecotourism	Visits to an area that maintains and preserves natural resources as a basis for promoting its economic growth and development.
emergent wetland	Wetlands dominated by erect, rooted, herbaceous plants.
endangered species	A Federally or State-listed protected species in danger of extinction throughout all or a significant portion of its range.
environmental education	Curriculum-based education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them.
environmental health	The composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.
Environmental Assessment (EA)	A public document that discusses the purpose and need for an action, its alternatives, and provides sufficient evidence and analysis of its impacts to

	determine whether to prepare an environmental impact statement or a finding of no significant impact (q.v.) [cf. 40 CFR 1508.9].
exemplary community type	An outstanding example of a particular community type.
extirpated	Status of a species or population that has completely vanished from a given area but that continues to exist in some other location.
exotic species	A species that is not native to an area and has been introduced intentionally or unintentionally by humans; not all exotics become successfully established.
Federal land	Public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges.
Federally listed species	A species listed either as endangered or threatened under the Endangered Species Act of 1973, as amended.
fee-title acquisition	The acquisition of most or all of the rights to a tract of land; a total transfer of property rights with the formal conveyance of a title. While a fee-title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (e.g., the ability to continue using the land for a specified time period, such as the remainder of the owner's life).
Finding of No Significant Impact (FONSI)	Supported by an environmental assessment, a document that briefly presents why a Federal action will have no significant effect on the human environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13].
fire regime	The characteristic frequency, intensity, and spatial distribution of natural fires within a given ecoregion or habitat.
floodplain	Flat or nearly flat land that may be submerged by floodwaters; a plain built up or in the process of being built up by stream deposition.
forested land	Land dominated by trees. For impacts analysis in CCP's, we assume all forested land has the potential for occasional harvesting; we assume forested land owned by timber companies is harvested on a more intensive, regular schedule.
forested wetlands	Wetlands dominated by trees.
fragmentation	The disruption of extensive habitats into isolated and small patches. Fragmentation has two negative components for biota: the loss of total habitat area; and, the creation of smaller, more isolated patches of habitat remaining.
geographic information system (GIS)	A computerized system to compile, store, analyze, and display geographically referenced information (e.g., GIS can overlay multiple sets of information on the distribution of a variety of biological and physical features).
grassland	A habitat type with landscapes dominated by grasses and with bio-diversity characterized by species with wide distributions, communities being relatively resilient to short-term disturbances but not to prolonged, intensive burning or grazing. In such systems, larger vertebrates, birds, and invertebrates display extensive movement to track seasonal or patchy resources.

groundwater	Water in the ground that is in the zone of saturation, from which wells and springs and groundwater runoff are supplied.
habitat fragmentation	The breaking up of a specific habitat into isolated and small patches. [n.b. A habitat area that is too small may not provide enough space to maintain a breeding population of the species in question.]
habitat conservation	Protecting an animal or plant habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced.
habitat	The place where a particular type of plant or animal lives. [n.b. An organism's habitat must provide all of the basic requirements for life, and should be free of harmful contaminants.]
historic conditions	The composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human-related changes to the landscape.
hydrologic or flow regime	Characteristic fluctuations in river flows.
hydrology	The science of waters of the earth: their occurrences, distributions, and circulations; their physical and chemical properties; and their reactions with the environment, including living beings.
impoundment	A body of water, such as a pond, confined by a dam, dike, floodgate, or other barrier, which is used to collect and store water for future use.
indigenous	Native to an area.
interpretive facilities	Structures that provide information about an event, place, or thing by a variety of means, including printed, audiovisual, or multimedia materials (e.g., kiosks that offer printed materials and audiovisuals, signs, and trail heads).
interpretive materials	Any tool used to provide or clarify information, explain events or things, or increase awareness and understanding of the events or things (e.g., printed materials like brochures, maps or curriculum materials; audio/visual materials like video and audio tapes, films, or slides; and, interactive multimedia materials, CD ROM or other computer technology).
invasive species	A non-indigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
invertebrate	Any animal lacking a backbone or bony segment that encloses the central nerve cord.
issue	Any unsettled matter that requires a management decision (e.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concern, or the presence of an undesirable resource condition). [n.b. A CCP should document, describe, and analyze issues even if they cannot be resolved during the planning process (FWS Manual 602 FW 1.4).]
Land Protection Plan (LPP)	A document that identifies and prioritizes lands for potential Service acquisition from a willing seller, and describes other methods of providing protection. Landowners within project boundaries will find this document, which is released with environmental assessments, most useful.

landscape	An aggregate of landforms, together with its biological communities.
management alternative	A set of objectives and the strategies needed to accomplish each objective [FWS Manual 602 FW 1.4.].
management concern	See “issue” and “migratory nongame birds of management concern.”
management opportunity	See “issue.”
management plan	A plan that guides future land management practices on a tract. [N.b. In the context of an environmental impact statement, management plans may be designed to produce additional wildlife habitat along with primary products like timber or agricultural crops (see “cooperative agreement”).]
management strategy	A general approach to meeting unit objectives. [N.b. A strategy may be broad, or it may be detailed enough to guide implementation through specific actions, tasks, and projects (FWS Manual 602 FW 1.4).]
mesic soil	Sandy-to-clay loams containing moisture-retentive organic matter, well-drained (no standing water).
minerotrophic	Areas that receive water primarily from underground or surface sources; has higher nutrient concentrations because the water picks up nutrients as it passes through soil and bedrock, which raises nutrient levels and reduces acidity.
mission statement	A succinct statement of the purpose for which the unit was established; its reason for being.
mitigation	Actions to compensate for the negative effects of a particular project (e.g., wetland mitigation usually restores or enhances a previously damaged wetland or creates a new wetland).
National Environmental Policy Act of 1969 (NEPA)	42 U.S.C. 4321 et seq. requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (cf. 40 CFR 1500).
National Wildlife Refuge System (NWRS, System)	All lands and waters and interests therein administered by the Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish and wildlife, including those that are threatened with extinction.
native	A species that other than as a result of an introduction historically occurred or currently occurs in a particular ecosystem.
native plant	A plant that has grown in the region since the last glaciation, and occurred before European settlement.
natural disturbance event	Any natural event that significantly alters the structure, composition, or dynamics of a natural community (e.g., floods, fires, and storms).
non-consumptive, wildlife-oriented recreation	Wildlife observation and photography and environmental education and interpretation (see “wildlife-oriented recreation”).

nonnative species	See “exotic species.”
nonpoint source pollution	A diffuse form of water quality degradation in which wastes are not released at one specific, identifiable point but from diffuse sources or a number of points or that are spread out and difficult to identify and control.
Notice of Intent (NOI)	An announcement we publish in the Federal Register that we will prepare and review an environmental impact statement or an environmental assessment [40 CFR 1508.22].
Notice of Availability (NOA)	An announcement we publish in the Federal Register that we have prepared an environmental impact statement or an environmental assessment and that it is available for public review and comment.
objective	See “unit objective.”
old fields	Areas formerly cultivated or grazed, where woody vegetation has begun to invade. [N.b. If left undisturbed, old fields will eventually succeed into forest. Many occur at sites marginally suitable for crops or pasture. They vary markedly in the Northeast, depending on soil and land use and management history.]
oligotrophic	Areas having a deficiency of plant nutrients that is usually accompanied by an abundance of dissolved oxygen.
ombrotrophic	Areas that receive their water from precipitation resulting in lower nutrient concentrations.
outdoor education	Educational activities that take place in an outdoor setting.
partnership	A contract or agreement among two or more individuals, groups of individuals, organizations, or agencies, in which each agrees to furnish a part of the capital or some service in kind (e.g., labor) for a mutually beneficial enterprise.
payment in lieu of taxes	cf. Revenue Sharing Act of 1935, Chapter One, Legal Context.
point source	A source of pollution that involves discharge of waste from an identifiable point, such as a smokestack or sewage-treatment plant outfall pipe.
population monitoring	Assessing the characteristics of populations to ascertain their status and establish trends on their abundance, condition, distribution, or other characteristics.
prescribed fire	The application of fire to wildland fuels, either by natural or intentional ignition, to achieve identified land use objectives [FWS Manual 621 FW 1.7].
priority public use	A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation or photography, or environmental education or interpretation.
private land	Land owned by a private individual or group or non-government organization.
private landowner	See “private land.”
private organization	Any non-government organization.
protection	Mechanisms like fee title acquisition, conservation easements, or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintaining species populations at a site.

public	Individuals, organizations, and non-government groups; officials of Federal, State, and local government agencies; Native American tribes, and foreign nations—includes anyone outside the core planning team, those who may or may not have indicated an interest in the issues, and those who do or do not realize that our decisions may affect them.
public involvement	Offering an opportunity to interested individuals and organizations whom our actions or policies may affect to become informed; soliciting their individual opinions. We thoroughly study public input, and give it thoughtful consideration in shaping decisions about managing refuges.
public land	Land owned by the local, State, or Federal Government.
rare species	Species identified for special management emphasis because of their uncommon occurrence within a watershed.
rare community types	Plant community types classified as rare by any State program; includes exemplary community types.
refuge goals	According to “Writing Refuge Management Goals and Objectives: A Handbook,” refuge goals are “...descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units.”
refuge purposes	According to the National Wildlife Refuge System Improvement Act of 1997, “The terms ‘purposes of the refuge’ and ‘purposes of each refuge’ mean the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.”
refuge lands	Lands in which the Service holds full interest in fee title or partial interest like an easement.
restoration	Management of a disturbed or degraded habitat that results in the recovery of its original state (e.g., restoration may involve planting native grasses and forbs, removing shrubs, prescribed burning, or reestablishing habitat for native plants and animals on degraded grassland).
riparian	Referring to the interface between freshwater habitats and the terrestrial landscape.
riparian habitat	Habitat along the banks of a stream or river (see note above).
riverine	Within the active channel of a river or stream.
riverine wetlands	Generally, all the wetlands and deepwater habitats occurring within a freshwater river channel not dominated by trees, shrubs, or persistent emergents.
runoff	Water from rain, melted snow, or agricultural or landscape irrigation that flows over a land surface into a water body (see “urban runoff”).
Service presence	Service programs and facilities that it directs or shares with other organizations; public awareness of the Service as a sole or cooperative provider of programs and facilities.

shrublands	Habitats dominated by various species of shrubs, often with many grasses and forbs.
species of concern or species of conservation concern	Species not Federally listed as threatened or endangered, but about which we or our partners are concerned.
species diversity	Usually synonymous with “species richness,” but may also include the proportional distribution of species.
species richness	A simple measure of species diversity calculated as the total number of species in a habitat or community.
State agencies	Natural resource agencies of State governments.
State land	State-owned public land
State-listed species	See “Federally listed species.”
step-down management plan	A plan for dealing with specific refuge management subjects, strategies, and schedules, e.g., cropland, wilderness, and fire [FWS Manual 602 FW 1.4.].
strategy	A specific action, tool, technique, or combination of actions, tools, and techniques for meeting unit objectives.
succession	The natural, sequential change of species composition of a community in a given area.
surface water	All waters whose surface is naturally exposed to the atmosphere, or wells or other collectors directly influenced by surface water.
sustainable development	The attempts to meet economic objectives in ways that do not degrade the underlying environmental support system. Note that there is considerable debate over the meaning of this term. . .we define it as “human activities conducted in a manner that respects the intrinsic value of the natural world, the role of the natural world in human well-being, and the need for humans to live on the income from nature’s capital rather than the capital itself.”
terrestrial	Living on land.
threatened species	A Federally listed, protected species that is likely to become an endangered species in the foreseeable future over all or a significant portion of its range.
tributary	A stream or river that flows into a larger stream, river, or lake, feeding it water.
trust resource	A resource that the Government holds in trust for the people through law or administrative act. [N.b. A federal trust resource is one for which responsibility is given wholly or in part to the Federal Government by law or administrative act. Generally, federal trust resources are nationally or internationally important no matter where they occur, like endangered species or migratory birds and fish that regularly move across state lines. They also include cultural resources protected by Federal historic preservation laws, and nationally important or threatened habitats, notably wetlands, navigable waters, and public lands like s national wildlife refuges.]

unfragmented habitat	Large, unbroken blocks of a particular type of habitat.
upland	Dry ground (i.e., other than wetlands).
upland meadow or pasture	Upland pastures are areas maintained in grass for livestock grazing; upland meadows are hay production areas. [N.b. Meadows may occur naturally in tidal marshes and inland flooded river valleys or, more frequently, at upland sites where vegetation has been cleared and grasses planted. Eventually, meadows will revert to old fields and forest if they are not mowed, grazed, or burned. Grasses in both managed meadows and pastures usually are similar, but pasture herbs often differ because of selective grazing.]
urban runoff	Water from rain, melted snow, or landscape irrigation flowing from city streets and domestic or commercial properties that may carry pollutants into a sewer system or water body.
vernal pool	Depressions holding water for a temporary period in the spring, and in which various amphibians lay eggs.
vision statement	A concise statement of what the refuge could achieve in the next 10 to 15 years.
watershed	The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.
wetlands	Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. These areas are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted to life in saturated soil conditions.
wilderness study areas	Lands and waters identified by inventory as meeting the definition of wilderness and being evaluated for a recommendation they be included in the Wilderness.
wilderness	See “designated wilderness area.”
wildfire	A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands [FWS Manual 621 FW 1.7].
wildlife-dependent recreation	Recreational activities in which wildlife is the focus of the experience. According to the National Wildlife Refuge Improvement Act of 1997, “The terms ‘wildlife-dependent recreation’ and ‘wildlife-dependent recreational use’ mean a use of a refuge involving hunting, fishing, wildlife observation or photography, or environmental education or interpretation.”
wildlife-dependent recreational use	A use of a national wildlife refuge involving hunting, fishing, wildlife observation or photography, or environmental education or interpretation (National Wildlife Refuge System Administration Act of 1966).
wildlife management	Manipulating wildlife populations, either directly by regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors.

Acronyms

Acronym	Full Name
AQI	Air quality index
BCE	Before Current Era
BCR	Bird Conservation Region
CCP	Comprehensive Conservation Plan
CD	Compatibility Determination
CFR	Code of Federal Regulations
CWD	Chronic Wasting Disease
DBH	Diameter at Breast Height
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FmHA	Farmers Home Administration
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GIS	Geographic Information System
GOM DPS	Gulf of Maine Distinct Population Segment
HMP	Habitat Management Plan
LCC	Landscape Conservation Cooperative
LMRD	Land Management Research and Demonstration
MANEM	Mid-Atlantic/New England/Maritimes
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDEP	Maine Department of Environmental Protection
MNAP	Maine Natural Areas Program

NABCI	North American Bird Conservation Initiative
NEPA	National Environmental Policy Act
NVCS	Natural Vegetation Classification Standard
NWPS	National Wilderness Preservation System
NWR	National Wildlife Refuge
PCB	Polychlorinated biphenyls
PIF	Partners in Flight
RONs	Refuge Operating Needs System
SAMMS	Service Asset Maintenance Management System
SCORP	State Comprehensive Outdoor Recreation Plan
SHC	Strategic Habitat Conservation
TNC	The Nature Conservancy
U.S.	United States
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WCS	Water Control Structure
WPA	Waterfowl Production Area

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White-tailed deer

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Appendix A

Edward Peter Steenstra, USFWS



Male adult Atlantic salmon.

Species of Conservation Concern on Sunhaze Meadows NWR and Carlton Pond WPA

Appendix A

Species of Conservation Concern on Sunhaze Meadows NWR and Carlton Pond WPA

Species*	Seasons on Refuge ¹	Federal T&E ²	Maine T&E ³	BCR 14 ⁴	PIF 27 and 28 ⁵	ME Comprehensive Wildlife Conservation Plan ⁶	USFWS Birds of Conservation Concern ⁷	Fish Species of Conservation & Mgmt. Concern ⁸	Shorebird Plan-Atlantic Flyway ⁹	Waterbird Plan ¹⁰	Waterfowl Plan ¹¹
WATERBIRDS											
American bittern	B			M		2	X				
Black-crowned night-heron	M		T	H		2				M	
Black tern	B		E			1				M	
Common loon	B			M		2					
Common moorhen	M		T								
Great blue heron	M		SC								
Herring gull	YR			H							
Least bittern	B		E			2	X				
Pied-billed grebe	M					2	X				
Yellow rail	M		SC	M		2	X				
WATERFOWL											
American black duck	B			HH	II	2					D
Atlantic Canada goose	B			H							I
Blue-winged teal	B										I
Bufflehead	M										I
Common goldeneye	M			M							NT
Gadwall	M										I
Green-winged teal	B										I
Hooded merganser	B										I
Mallard	B										NT
Northern pintail	M										D
Red-breasted merganser	M										I
Wood duck	B			M							I
SHOREBIRDS											
American woodcock	B			HH	I	2			5		
Black-bellied plover	M			H					3		
Common snipe	B								3		
Greater yellowlegs	M					2			4		
Killdeer	B			M					2		
Least sandpiper	M			M					3		
Lesser yellowlegs	M						X		2		
Semipalmated sandpiper	M		SC	HH		2	X		4		
Solitary sandpiper	M						X		3		
Spotted sandpiper	B								3		
Upland sandpiper	M		T	H	II	1	X		4		

Species*	Seasons on Refuge ¹	Federal T&E ²	Maine T&E ³	BCR 14 ⁴	PIF 27 and 28 ⁵	ME Comprehensive Wildlife Conservation Plan ⁶	USFWS Birds of Conservation Concern ⁷	Fish Species of Conservation & Mgmt. Concern ⁸	Shorebird Plan-Atlantic Flyway ⁹	Waterbird Plan ¹⁰	Waterfowl Plan ¹¹
LANDBIRDS											
American redstart	B		SC	H							
Bald eagle	B,M		SC	M		2	X				
Baltimore oriole	B					2					
Bank swallow	M			M							
Barn swallow	M		SC	M		2					
Barred owl	B					2					
Bay-breasted warbler	B			HH	I	2	X				
Black-and-white warbler	B		SC			2					
Black-backed woodpecker	B			M	II						
Black-billed cuckoo	B			M	II	2					
Blackburnian warbler	B			M	II	2					
Blackpoll warbler	B			M	II						
Black-throated blue warbler	B			H	II	2					
Black-throated-green warbler	B			M	II	2					
Blue-gray gnatcatcher	M					2					
Blue-winged warbler	M		SC	H		1	X				
Bobolink	B			H	II	2					
Boreal chickadee	B			H	II						
Brown creeper	B			M							
Brown thrasher	B		SC			2					
Canada warbler	B		SC	HH	I	2	X				
Cape May warbler	B			H	I	2					
Chestnut-sided warbler	B		SC	H	II	2					
Chimney swift	M		SC	H	II	2					
Common nighthawk	B			H		2					
Eastern kingbird	B		SC			2					
Eastern meadowlark	M		SC			2					
Eastern towhee	M		SC			2					
Eastern wood-pewee	B		SC	H	II						
Evening grosbeak	YR		SC								
Field sparrow	B		SC			2					
Fox sparrow	M		SC								
Grasshopper sparrow	B		E			2					
Gray catbird	B				II						
Gray jay	B			M							
Great-crested flycatcher	B					2					
Least flycatcher	B		SC		II						
Long-eared owl	YR			H		2					
Marsh wren	B					2					
Nelson's sparrow	M		SC	HH	I	2	X				
Northern flicker	B			M		2					
Northern goshawk	B			M							

Species of Conservation Concern on Sunkhaze Meadows NWR and Carlton Pond WPA

Species*	Seasons on Refuge ¹	Federal T&E ²	Maine T&E ³	BCR 14 ⁴	PIF 27 and 28 ⁵	ME Comprehensive Wildlife Conservation Plan ⁶	USFWS Birds of Conservation Concern ⁷	Fish Species of Conservation & Mgmt. Concern ⁸	Shorebird Plan-Atlantic Flyway ⁹	Waterbird Plan ¹⁰	Waterfowl Plan ¹¹
Northern harrier	B		SC	M							
Northern parula	B			M	II	2					
Northern rough-winged swallow	M		SC								
Olive-sided flycatcher	B		SC	H	II	2	X				
Orchard oriole	M		SC								
Ovenbird	B			M	II						
Palm warbler	B			M							
Peregrine falcon	M		E	M		1	X				
Pine grosbeak	M			M	II						
Purple finch	B			H	II	2					
Purple martin	M		SC			2					
Red crossbill	YR					2					
Rose-breasted grosbeak	B			M	II	2					
Ruffed grouse	B			M	II						
Rusty blackbird	M		SC	H		2	X				
Scarlet tanager	B				II	2					
Sedge wren	M		E		II	1					
Short-eared owl	YR			M		1					
Spruce grouse	B			H	II						
Tennessee warbler	B		SC								
Tree swallow	B		SC								
Veery	B		SC	H	II	2					
Vesper sparrow	B			M		2					
Whip-poor-will	M		SC	M	II	2					
White-throated sparrow	B		SC								
Willow flycatcher	B					2					
Wood thrush	B		SC	HH	I	2	X				
Yellow-bellied flycatcher	B			M							
Yellow-bellied sapsucker	B			H	II	2					
Yellow-billed cuckoo	M		SC								
Yellow warbler	B		SC								
MAMMALS											
Hoary bat			SC								
Little brown bat			SC								
Red bat			SC								
Silver-haired bat			SC								
AMPHIBIANS											
Blue-spotted salamander	YR		SC								
Northern leopard frog	YR		SC								
Northern spring salamander	YR		SC								

Species*	Seasons on Refuge ¹	Federal T&E ²	Maine T&E ³	BCR 14 ⁴	PIF 27 and 28 ⁵	ME Comprehensive Wildlife Conservation Plan ⁶	USFWS Birds of Conservation Concern ⁷	Fish Species of Conservation & Mgmt. Concern ⁸	Shorebird Plan-Atlantic Flyway ⁹	Waterbird Plan ¹⁰	Waterfowl Plan ¹¹
INVERTEBRATES											
Flat-headed mayfly			E								
Harpoon clubtail			SC								
Pygmy snaketail dragonfly			T			2					
Subarctic damer dragonfly			SC								
Tomah mayfly			T			1					
REPTILES											
Northern ribbon snake			SC								
Wood turtle			SC			2					
FISH											
American eel			SC			1		X			
American shad								X			
Atlantic salmon								X			
Bridle shiner			SC								
Brook trout						2		X			
Burbot						2					
FRESHWATER MOLLUSK											
Tidewater mucket			T								
Yellow lampmussel			T								

¹ Seasons on the Refuge: B=Breeding, M=Migration, YR=Year-Round

² Federal T&E = Federal Endangered Species List: T=Threatened, E=Endangered

³ State T&E= State of Maine Threatened and Endangered Species List: T=Threatened, E=Endangered, SC=Special Concern

⁴ BCR 14 = Bird Conservation Region 14: Atlantic Northern Forest; Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest (Dettmers 2006)

⁵ PIF 27 and PIF 28: Partners in Flight Landbird Conservation Plan: Physiographic Area 27 – Northern New England (Hodgman and Rosenberg 2000) and Physiographic Area 28 – Eastern Spruce-Hardwood Forest (Rosenberg and Hodgman 2000)

⁶ Maine State Comprehensive Wildlife Conservation Plan; Species priorities 1 (highest) and 2 (high)

⁷ USFWS Birds of Conservation Concern for BCR 14 (USFWS 2008)

⁸ Fish Species of Conservation and Management Concern, USFWS Northeast Region Fisheries Program, Strategic Plan Fiscal Years 2009-2013

⁹ Shorebird Plan-Atlantic Flyway = Clark and Niles 2000 North Atlantic Regional Shorebird Plan

¹⁰ Waterbird Plan: James A. Kushlan, Melanie J. Steinkamp, Katharine C. Parsons, Jack Capp, Martin Acosta Cruz, Malcolm Coulter, Ian Davidson, Loney Dickson, Naomi Edelson, Richard Elliot, R. Michael Erwin, Scott Hatch, Stephen Kress, Robert Milko, Steve Miller, Kyra Mills, Richard Paul, Roberto Phillips, Jorge E. Saliva, Bill Sydeman, John Trapp, Jennifer Wheeler, and Kent Wohl. 2002. Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan, Version 1. Waterbird Conservation for the Americas. Washington, DC, U.S.A. H=High Risk, M=Moderate Risk, L=Low Risk, NR=Not Currently At Risk

¹¹ Waterfowl Plan: North American Waterfowl Management Plan: Strengthening the Biological Foundation: 2004 Strategic Guidance. Population Trends: I=Increasing, D=Decreasing, NT=No Trend

Appendix B



USFWS

Visitors paddle along Sunkhaze Stream at Sunkhaze Meadows National Wildlife Refuge.

Findings of Appropriateness and Compatibility Determinations

Findings of Appropriateness and Compatibility Determinations

Sunkhaze Meadows NWR

Compatibility Determination	Wildlife Observation and Photography, Environmental Education and Interpretation	B-1
Compatibility Determination	Fishing	B-19
Compatibility Determination	Hunting	B-31
Compatibility Determination	Furbearer Management	B-47
Findings of Appropriateness	Ice Skating	B-59
Findings of Appropriateness	Recreational Gathering	B-61
Compatibility Determination	Recreational Gathering	B-63
Findings of Appropriateness	Boating	B-77
Compatibility Determination	Boating	B-79
Findings of Appropriateness	Privately-owned Recreational Cabin	B-87
Compatibility Determination	Privately-owned Recreational Cabin	B-89
Findings of Appropriateness	Bicycling	B-93
Compatibility Determination	Bicycling	B-95
Findings of Appropriateness	Dog Walking on Trails	B-105
Compatibility Determination	Dog Walking on Trails	B-107
Findings of Appropriateness	Geocaching	B-115
Compatibility Determination	Geocaching	B-117
Findings of Appropriateness	Commercial Guiding for Wildlife-dependent Recreation	B-125
Compatibility Determination	Commercial Guiding for Wildlife-dependent Recreation	B-127
Findings of Appropriateness	Commercial Haying	B-141
Compatibility Determination	Commercial Haying	B-143
Findings of Appropriateness	Orienteering	B-157
Compatibility Determination	Orienteering	B-159
Findings of Appropriateness	Cross-country Skiing and Snowshoeing	B-167
Compatibility Determination	Cross-country Skiing and Snowshoeing	B-169
Findings of Appropriateness	Snowmobiling	B-179
Compatibility Determination	Snowmobiling	B-181

Findings of Appropriateness	Research Conducted by Non-Service Personnel	B-205
Compatibility Determination	Research Conducted by Non-Service Personnel	B-209

Carlton Pond WPA

Compatibility Determination	Wildlife Observation and Photography, Environmental Education and Interpretation	B-215
Compatibility Determination	Fishing	B-229
Compatibility Determination	Hunting	B-241
Compatibility Determination	Furbearer Management	B-253
Findings of Appropriateness	Retriever Hunt Test and Field Trial	B-263
Compatibility Determination	Retriever Hunt Test and Field Trial	B-265
Findings of Appropriateness	Boating	B-275
Compatibility Determination	Boating	B-277

COMPATIBILITY DETERMINATION

USE: Wildlife Observation and Photography, Environmental Education and Interpretation

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-406k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." ((16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resource and their habitats within the United States for the benefit of present and future generations of Americans." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

(a) What are the uses? Are they priority public uses?

The uses are wildlife observation, photography, environmental education, and interpretation. These four uses are among the six priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the uses be conducted?

Wildlife observation, photography, environmental education and interpretation will be allowed to occur throughout the Sunkhaze Meadows National Wildlife Refuge (NWR, refuge), including the Sunkhaze Unit, Benton Unit, and Sandy Steam Unit, during open hours. Designated trails exist on the various units and most visitor use is focused on and around these trails. Visitors also use canoes or kayaks to access the various streams and other wetland areas within the refuge. There is one elevated structure at the end of the Carter Meadow Trail to provide a panoramic

view of the wetland, but no structures provided specifically as photography blinds, as none of the refuge's units have high concentrations of wildlife in a given location. The exact locations of environmental education and interpretation activities and events by outside groups will be at the discretion of the refuge manager through required special use permits (SUP).

(c) When will the uses be conducted?

Wildlife observation, photography, environmental education and interpretation will be allowed on all the units of the Sunkhaze Meadows NWR daily, year-round, from sunrise to sunset, unless a conflict with a management activity or an extenuating circumstance necessitates deviating from this. Closures for snow or ice storms, or other events affecting human safety, or for nesting season and other sensitive times of the year are examples of times when the refuge may require these uses be temporarily suspended or require temporary spatial closures of certain areas.

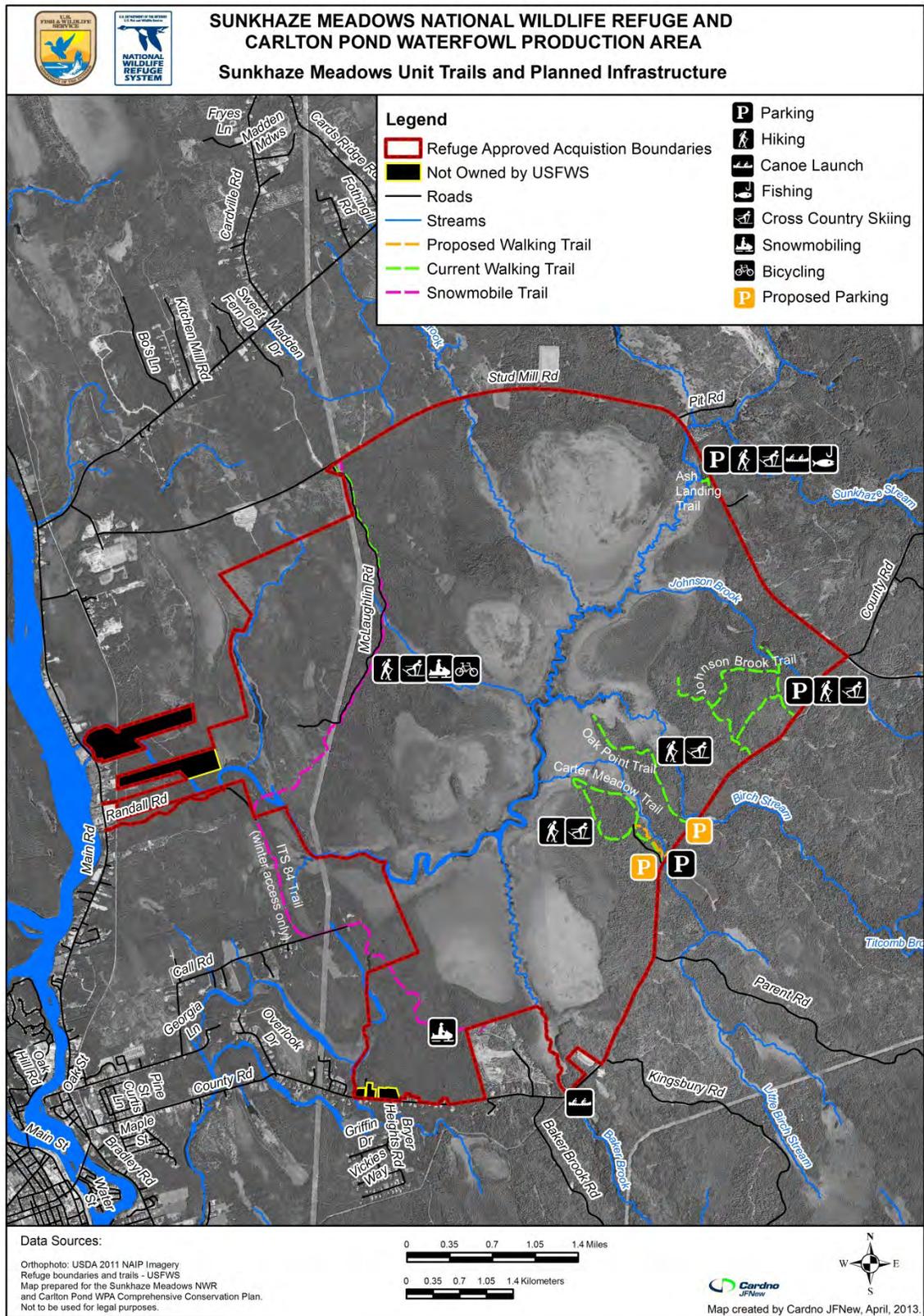
(d) How will the uses be conducted?

Refuge staff will be responsible for providing law enforcement; maintaining boundaries and signs; meeting with adjacent landowners and the interested public or responding to their inquiries; recruiting and supervising volunteers; preparing information on these uses to be delivered via Web sites, brochures, and other means; developing necessary signs; monitoring and evaluating impacts; regulating the use of the area by groups through SUPs; and, if sufficient staff exists, preparing and delivering environmental education and interpretation programs. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

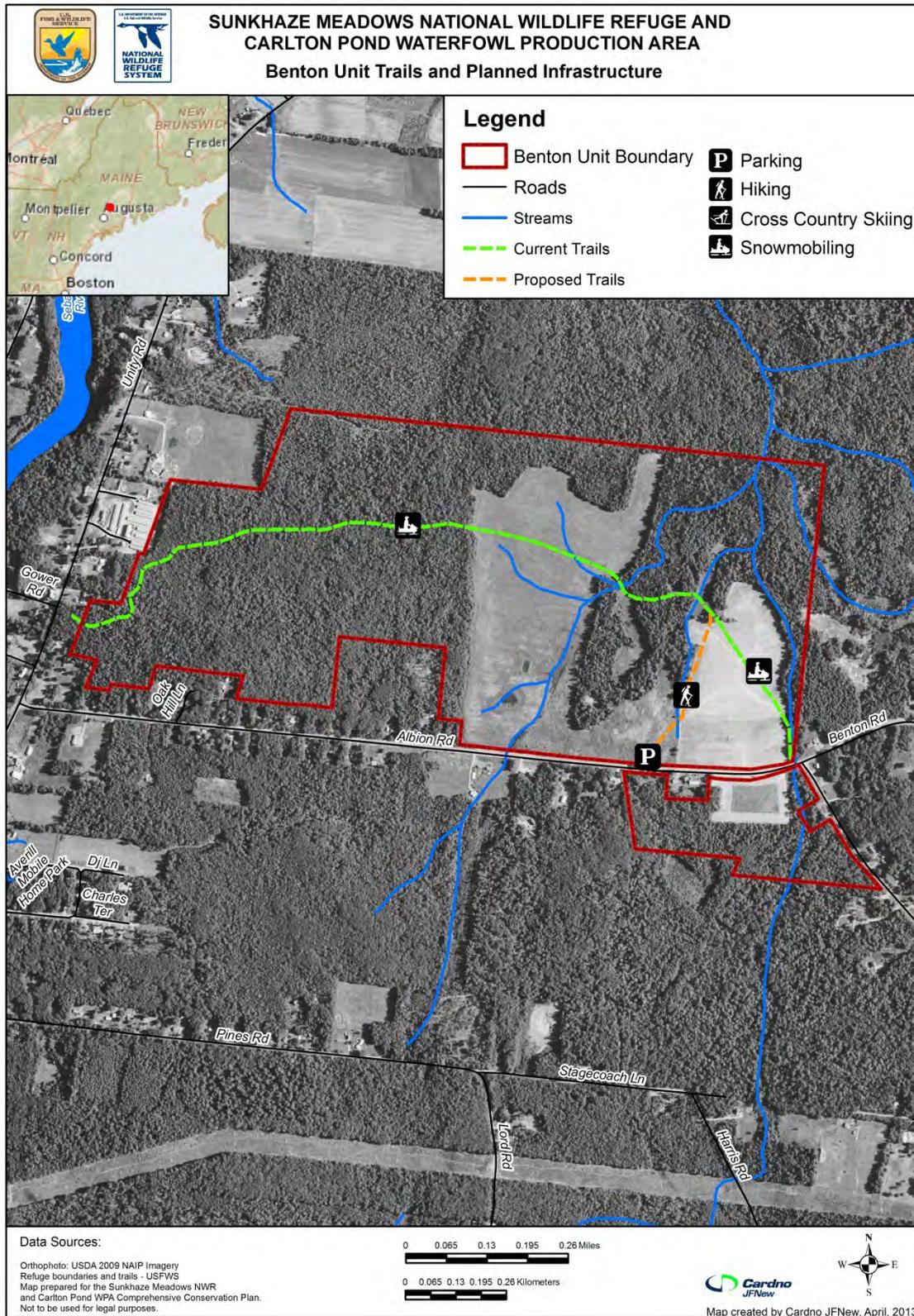
(e) Why are these use(s) being proposed?

Wildlife observation, wildlife photography, environmental education, and interpretation are priority public uses as defined by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). If compatible, they are to be facilitated on refuges. These uses will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resources and to gain understanding and appreciation for fish and wildlife and habitats, ecology and wildlife management. These uses provide opportunities for visitors to relax and enjoy wildlife in a wholesome, safe, unstructured outdoor environment at their own pace, and to provide the psychological and health benefits attendant to that type of outdoor enjoyment. As visitors enjoy the recreational aspects of these activities, they may be drawn to engage in the more structured educational opportunities offered, and thereby, enhance their understanding of natural resource management programs and ecological concepts. This, in turn, will enable them to better understand ecological issues and problems affecting refuge resources and become better advocates and stewards for those resources. Photographs that are taken on refuges are sometimes shared with others by the photographer or shared with the refuge staff and donated for use in U.S. Fish and Wildlife Service outreach materials and can provide the public increased exposure to refuge assets.

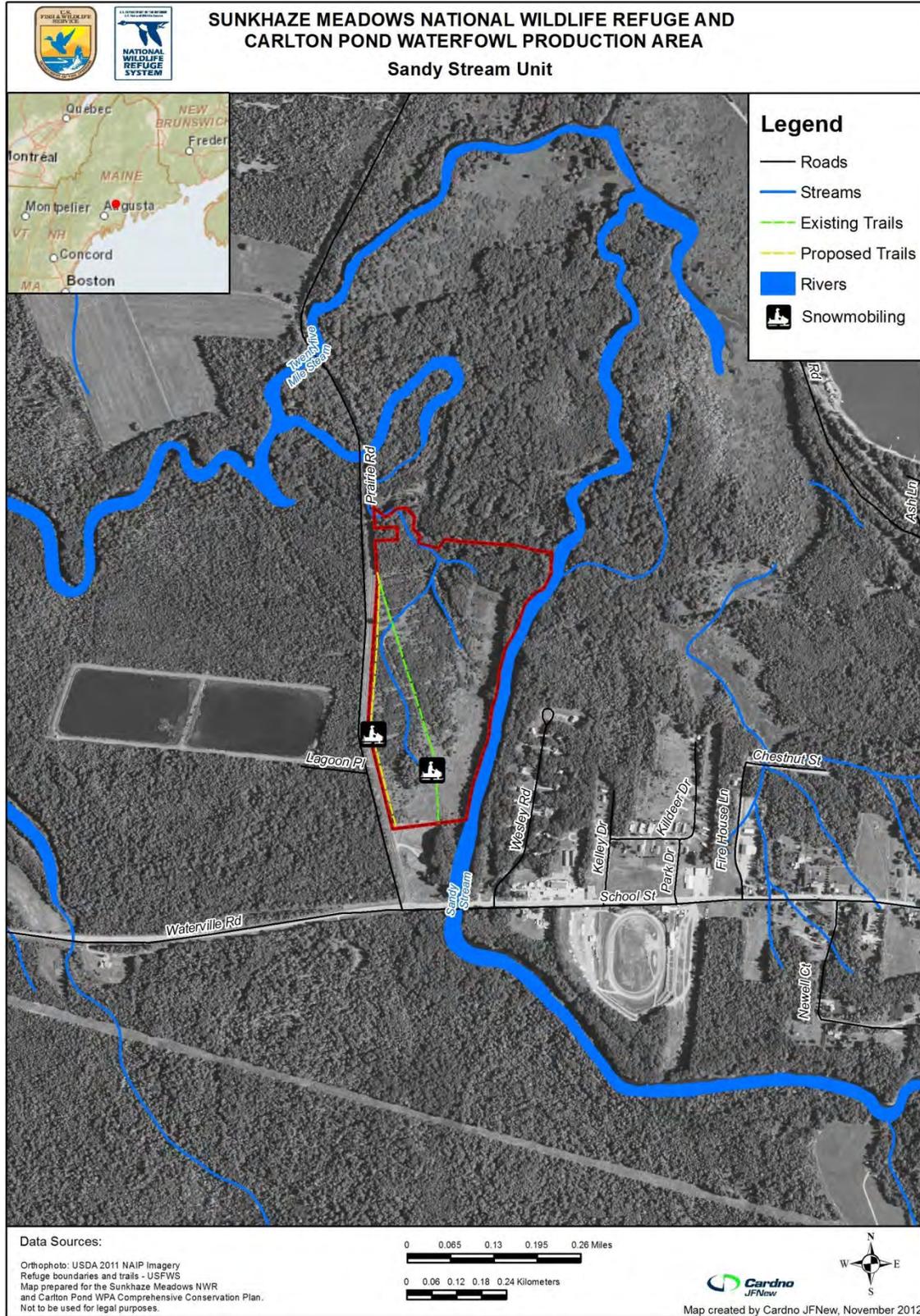
Map B.1. Current and proposed infrastructure for the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



Map B.2. Current and planned infrastructure for the Benton Unit of Sunkhaze Meadows National Wildlife Refuge.



Map B.3. Current and planned infrastructure within the Sandy Stream Unit of Sunhaze Meadows NWR.



AVAILABILITY OF RESOURCES:

Sufficient refuge resources in terms of personnel and budget are available to administer these uses.

Cost Breakdown

The following are estimated costs to the refuge to administer and manage the refuge programs for wildlife observation, wildlife photography, environmental education, and interpretation.

Maintenance:	\$5,000	annually to maintain kiosks, trails and parking lots
Install improved signs:	\$3,000	one-time expense
Monitoring:	\$2,000	annual
Law Enforcement:	\$6,000	annual
Estimated Total:	\$16,000	

ANTICIPATED IMPACTS OF THE USE:

Wildlife observation and photography, environmental education, and interpretation can have positive or negative impacts to the refuge's wildlife and habitats.

In general, visitors engaged in these uses will be traveling by foot, either by walking or hiking, in designated areas and along designated trails and roads. The positive impacts of these uses include providing visitors with a better appreciation and more complete understanding of the wildlife and habitats associated with the refuge. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service, as well as wildlife conservation in general.

The negative effects of these uses include impacts to plants, soils, hydrology, and wildlife from both visitors walking and hiking on the refuge and from building and maintaining public use facilities.

Vegetation Impacts:

Pedestrian travel can have indirect impacts to plants by compacting soils and diminishing soil porosity, aeration, and nutrient availability that affect plant growth and survival (Kuss 1986). Hammitt and Cole (1998) note that compaction limits the ability of plants to re-vegetate affected areas. Repeated foot travel can directly impact plants by crushing the plants themselves. Rare plants with limited site occurrence are particularly susceptible to such impacts. Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss 1986). Moist and wet soil conditions are present at the refuge, particularly during spring and early summer.

It is anticipated that allowing this use will cause vegetation loss on designated routes. Foot travel may increase root exposure and trampling effects; however, refuge staff have only observed minimal impacts to refuge vegetation associated with current use because most visitors remain on established roads and trails. Designated routes for pedestrian travel consist of existing trails, many with hardened surfaces or are existing trails that have been used for many years.

For these reasons, we expect only negligible increases in impacts to this resources associated with the projected moderate increase in use. Refuge staff will monitor trails and refuge lands. If any problem areas are identified, we will take the appropriate restoration and protection measures.

Designated routes do not have any known occurrences of rare plant species on their surface that will be impacted by this use. Continuing pedestrian travel on these routes is not likely to cause any significant impacts to plants or plant communities.

People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. Once established, invasives can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. Staff will work to educate the visiting public to reduce introductions and will also monitor and control invasives.

Soils Impacts:

Soils can be compacted and eroded as a result of continued use of pedestrian routes (Cole and Landres 1995). It is anticipated that some soil erosion will occur as a result of continuing pedestrian access on designated routes. Under current levels of use, impacts to soils (erosion, compaction) are not likely to be significant.

Hydrologic Impacts:

Roads and trails can affect the hydrology of an area, primarily through alteration of drainage patterns. It is anticipated that existing roads and trails will continue to influence hydrology regardless of pedestrian travel. Maintenance will be required to create adequate and proper drainage to avoid hydrologic impacts. Trail construction may also cause erosion and run-off of sediment into nearby waterways from exposed soils.

Since all the units of the refuge are fairly flat, erosion is not a large problem, but impacts to wet areas can occur when bridging is inadequate and visitors widen or go off the trail to avoid wet spots. Properly sited, designed, and maintained trails minimize this impact. Based on the current level of use, pedestrian travel is not likely to significantly increase erosion, incision, or stream alteration. Therefore, no significant hydrologic impacts are anticipated from this use.

Habitat Impacts:

Peatlands are particularly vulnerable to damage by visitors who may walk through them or collect plants. At Sunkhaze Meadows NWR, the peatlands are difficult to access due to the large area of wetlands that exist between the streams and the peat domes; there are no designated trails to access these sensitive areas. Plant collecting is also prohibited. Visitors wishing to see a bog can visit the boardwalks that access the nearby Orono Bog.

Wildlife Impacts:

Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. The responses of wildlife to human activities includes: avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or

habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). 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.” These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat. Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during the breeding season and winter months.

Impacts on Birds

Trails can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased 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” (e.g., American robins (*Turdus migratorius*)) were found near trails and “specialist” species (e.g., grasshopper sparrows (*Ammodramus savannarum*)) were found farther from trails. Nest predation was also found to be greater near trails (Miller et al. 1998).

Visitors engaged in wildlife observation, photography, environmental education, and interpretation have the potential to impact shorebird, waterfowl, and other migratory bird populations feeding and resting near the trails during certain times of the year. Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Flight in response to disturbance can lower nesting productivity and cause disease and death.

Studying the effects of human visitation on waterbirds at J.N. “Ding” Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Herons and bitterns were quite tolerant of people; however, the presence of people did disturb these birds when hunting terrestrial prey. Great blue herons (*Ardea herodias*), tricolored herons (*Egretta tricolor*), great egrets (*Casmerodius albus*), and little blue herons (*Egretta caerulea*) were disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States.

Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske et al. (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities has at least temporary effects on the behavior and movement of birds within a habitat or localized area.

Research has shown that: 1) birds avoided places where people were present and when visitor activity was high (Burger 1981, Klein et al. 1995, Burger and Gochfeld 1998); 2) bird disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.; 3) visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993); 4) speed and type of pedestrian activity affects bird disturbance, e.g., joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers) (Burger 1981, 1986, Burger et al. 1995, Knight and Cole 1995); and 5) noise caused by visitors resulted in increased levels of bird disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998).

Overall adverse impacts birds are expected to be minimal. These are ongoing uses of the refuge, and Service staff have not observed unacceptable adverse effects on refuge resources. Refuge use is currently low and increases in use will be monitored by Service staff to ensure impacts to wildlife are minimal. Most of the use is spread out over the 11,484-acre Sunkhaze Meadows Unit, the largest refuge unit. This minimizes potential adverse impacts on birds. Most boat use is non-motorized, and Service staff are not aware of excessive disturbance associated with this

activity. Most visitors participating in these activities are alone, or in small groups (less than 10 people).

Organized environmental education or interpretation activities (e.g., nature walks, canoe trips with multiple canoes) are more likely to involve larger groups. Because larger groups are more likely to disturb habitats and wildlife, we will require program leaders to obtain a SUP prior to conducting the event. This will allow us to collect specific information on the number of people involved, the type of event or program, limit locations for the activity (if needed), and include any other stipulations that may be warranted to protect refuge resources.

Impacts on Other Wildlife

Adverse effects to wildlife have been shown to be directly proportional to increases in the number of users (Beale and Monaghan 2004). According to the study, groups of visitors using trails were more likely to cause behavioral changes in the animals studied when compared to individual visitors.

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole 1991). There is evidence to suggest that species most likely to be adversely affected are those where available habitat is limited, constraining them to stay in disturbed areas and suffer the costs of reduced survival or reproductive success (Gill et al. 2001).

Lenth et al. (2006) found, in areas that prohibited dogs, mule deer were less active up to 50 meters from recreational trails. In areas that allowed dogs, mule deer showed reduced activity within at least 100 meters of trails. While the refuge does not have mule deer, this may hold true for white-tailed deer as well. The same study found similar adverse effects for small mammals including squirrels, rabbits, chipmunks, and mice. This means that there is a certain area around recreational trails that becomes unsuitable habitat for certain wildlife species, even though the habitat will otherwise be suitable (Lenth et al. 2006).

Wildlife disturbance may be compounded by seasonal needs. For example, causing mammals to flee during winter months could consume stored fat reserves that are necessary to get through the winter. Hammitt and Cole (1998) found white-tailed deer females with young are more likely to flee from disturbance than those without young.

While little information is available on human disturbance and reptiles and amphibians, it is possible that visitors participating in wildlife observation, photography, environmental education, and interpretation may have adverse effects on these species. Because of their small size and tendency to hide under vegetation, visitors may not be aware of these species until they flee. Visitors may inadvertently injure or kill individuals when walking on or off-trail. Most of these species on the refuge are wetland species, which are areas typically avoided by visitors (except by boat) because of problems accessing these areas. Because these species are dormant in winter months, visitors are not likely to disturb them during this season.

Overall adverse impacts to mammals, reptiles, and amphibians are expected to be minimal. Refuge use is currently low and increases in use will be monitored by Service staff to ensure impacts to

wildlife are minimal. Most of the use is spread out over the 11,484-acre Sunkhaze Meadows Unit, the largest refuge unit. This minimizes potential adverse impacts to wildlife. Most visitors participating in these activities are alone, or in small groups (less than 10 people). Organized environmental education or interpretation activities (e.g., nature walks, canoe trips) are more likely to involve larger groups. Because larger groups are more likely to disturb habitats and wildlife, we will require program leaders to obtain a SUP prior to conducting the event. This will allow us to collect specific information on the number of people involved, the type of event or program, limit locations for the activity (if needed), and include any other stipulations that may be warranted to protect refuge resources.

Summary of Impacts:

Specifically at Sunkhaze Meadows NWR, no impacts are expected on any threatened or endangered species, whether federally listed or State-listed. Trail use may discourage animal use of habitat very close to the trails, but the area impacted by trails is small compared to the area available to wildlife away from any trail. Overall, effects should not be significant since the units of the refuge all experience a low level of public use and we anticipate only moderate increases over the next 15 years.

Based on observations and knowledge of the areas involved, there is no evidence that cumulatively, the proposed wildlife-dependent uses will have unacceptable adverse effects on refuge resources. Although a substantial increase in the cumulative impacts from public use is not expected in the near term, it will be important for refuge staff to monitor use and respond, if necessary, to conserve the existing high quality wildlife resources.

No additional effects from wildlife observation, wildlife photography, environmental education, and interpretation area anticipated. Therefore allowing these uses poses only minimal threats to goal 1 of the CCP, “Promote the biological integrity, diversity, and environmental health of the Sunkhaze Meadows Unit’s wetland, forest, and aquatic habitats to protect water quality and sustain native plant communities, rare plants, and wildlife, including species of conservation concern.” In addition, these uses help fulfill goal 4 of the CCP.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

On refuge lands:

- Refuge staff will continue to monitor the refuge for the presence of threatened or endangered species and ensure that unusual or critical conditions relative to habitat or disturbance are not present. If conditions dictate, uses of all or any part of the area may be temporarily suspended by posting.
- Periodic law enforcement will ensure compliance with regulations and area closures and discourage prohibited activities and vandalism.
- Outside individuals, groups, or organizations wishing to visit the refuge to provide environmental education or interpretation activities will be required to obtain a SUP. This will allow the refuge staff to provide important information about access, resources, and specific stipulations to reduce disturbances that may be caused by groups compared to individuals. It will also help the refuge quantify and monitor these uses on the refuge.

JUSTIFICATION:

Wildlife observation, wildlife photography, environmental education, and interpretation are priority public uses for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife resources (Executive Order 12996, March 25, 1996, and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997). The Service's policy is to provide opportunities for these uses when compatible and consistent with sound fish and wildlife management.

Allowing wildlife observation and photography, environmental education and interpretation on Sunkhaze Meadows NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. These uses will not materially interfere with or detract from the wildlife and habitat protection aspects of the purposes because at the scales and level of current visitor use, wildlife and habitats are not appreciably negatively affected by these uses. We have made this determination based on lack of observed habitat degradation and because disturbance to wildlife will be short term, use is focused around established trails, and the trails that are used for these activities are designed to protect sensitive resources. Wildlife observation, photography, environmental education, and interpretation will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species that occur on the refuge. Therefore, no significant adverse effects from wildlife observation, photography, and environmental education or interpretation are anticipated. Allowing these uses supports CCP goals and objectives as described in the refuge's CCP (USFWS 2013) and the refuge's purpose associated with allowing wildlife-oriented recreational opportunities. These activities will not materially interfere with or detract from the mission of the Service, because providing these wildlife-dependent recreational opportunities is a focus of the National Wildlife Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Scott B. Kuhn 9/17/2013
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/17/2028

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COMPATIBILITY DETERMINATION

USE: Fishing

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

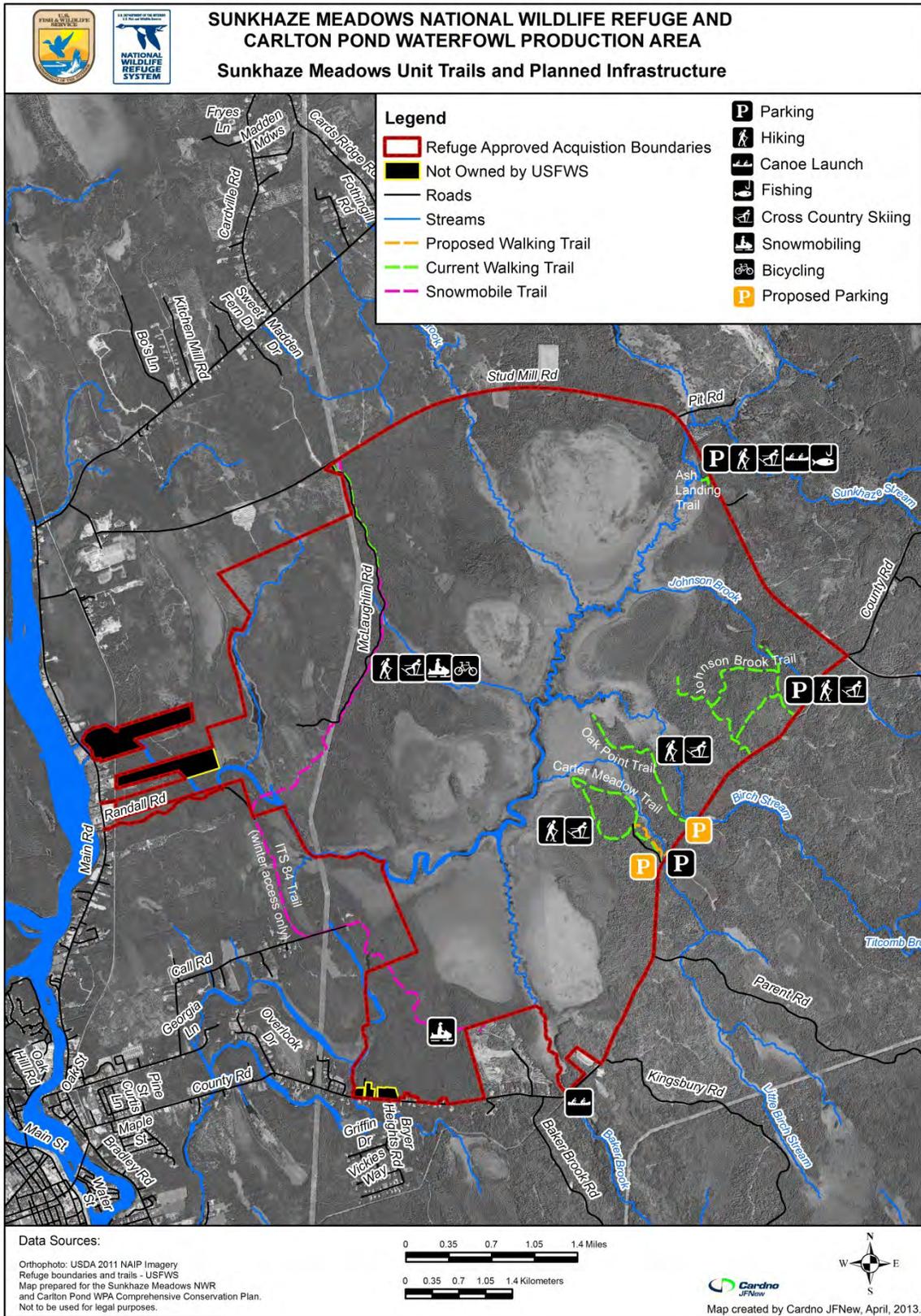
(a) What is the use? Is the use a priority public use?

The use is public fishing, a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the use be conducted?

The use will be conducted on and from the banks of all refuge bodies of water that are open to fishing including Baker Brook, Birch Stream, Buzzy Brook, Dudley Brook, Johnson Brook, Little Birch Stream, Little Buzzy Brook, Sandy Stream, and Sunkhaze Stream. Since many of these banks are relatively inaccessible, we expect that fishing from banks will be concentrated where these streams intersect County Road or Stud Mill Road. Fishing may also be conducted by fishermen in waders walking in the waterways, and from boats in those brooks and streams that are navigable.

Map B.4. Streams open to fishing at the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



(c) When will the use be conducted?

The use will be conducted during the seasons specified in the fishing regulations of the State of Maine and will occur between the hours of sunrise and sunset.

(d) How will the use be conducted?

The use will be conducted under Maine State fishing regulations for open water and ice-fishing, with some additional restrictions, discussed below, to protect fish, wildlife, and habitat, and to reduce potential public use conflicts. A valid State of Maine fishing license will be required to fish on the refuge. This compatibility determination applies to both shoreline fishing and fishing from motorized and non-motorized boats. Visitors participating in approved public uses are allowed off trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

Public boat launches are available at Ash Landing located off the Stud Mill Road and off Route 2 in Milford along the Penobscot River. Prior to launching the public should inspect motor boats and trailers and clean them of aquatic invasive species before launching. Maine Statute Title 38: 419B-420 prohibits the transport of any aquatic plant or parts of any aquatic plant, including roots, rhizomes, stems, leaves or seeds, on the outside of a vehicle, boat, personal watercraft, boat trailer or other equipment on a public road. Cleaning of boats should take place on dry ground well away from the water. Exotic, nuisance plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively impact native fish and plant species. Sunkhaze Meadows and its associated tributaries appear to be relatively free of aquatic invasive plants, and cleaning of boats, trailers, and other equipment will help keep them that way. Signs, education, and periodic courtesy checks will help prevent the spread of invasive aquatic plants. Unauthorized introductions of both nonnative and native fish can also significantly disrupt aquatic ecosystems and destroy natural fisheries. No fish of any species may be introduced into refuge waters without appropriate State and refuge permits. This includes unused bait fish and eggs. Bait fish may be trapped by State regulation from refuge waters for personal use, but not for commercial purposes.

At the discretion of the refuge manager, some areas may be seasonally, temporarily, or permanently closed to fishing, if wildlife or habitat impacts or user conflicts become an issue. In cooperation with State fisheries biologists, we may manipulate the fisheries or habitat to promote or improve the fishery resource, if warranted. That may include changing fishing regulations (season dates, creel limits, and methods of take), introducing or removing fish barriers, manipulating instream or streambank habitat, and designating riparian buffers. Lead fishing sinkers or jigs will not be permitted on the refuge due to the potential for the lead to poison loons, waterfowl, and other waterbirds.

(e) Why is the use being proposed?

We have proposed this use because fishing is a wildlife-dependent public use that is supposed to receive enhanced consideration as specified in the Refuge Improvement Act and it is an historic use of the refuge. We have the opportunity to provide public fishing opportunities in a manner and location that will offer high-quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values.

AVAILABILITY OF RESOURCES:

Facilities or materials needed to support fishing include annual review of the refuge fishing plan, signing and monitoring of fishing access points, and law enforcement patrols. The refuge also plans to upgrade the hand carry boat launch and access trail at Ash Landing which is a funded project in the 2012 budget and will be a 1-year cost.

Upgrade parking area and trail to Ash Landing boat launch:	\$7,000
Annual review of fishing plan:	\$450
Signing and monitoring fishing access sites:	\$300
Law enforcement patrol:	\$3,600
Program Cost:	\$11,350

ANTICIPATED IMPACTS OF THE USE:

Some wildlife disturbance is created by fishing activity. Disturbance during the summer is limited to waterfowl, shorebirds, aquatic species, and marsh and wading birds.

The Sunkhaze Meadows Unit provides habitat for both warm water and coldwater fish species, although it is primarily warm water fish habitat (table B.1). Smithwood and McKeon (1999) compiled a list of 17 fish species as part of a fisheries management plan. Included in this list is Atlantic salmon, which has been reported entering the lower reaches of Sunkhaze Stream from the Penobscot River during warmer summer months. The Penobscot River is a major migratory pathway for Atlantic salmon. Brook trout and American eel are native to the Sunkhaze Stream system, while smallmouth bass were introduced sometime prior to the 1940s. Smithwood and McKeon (1999) found no data that blueback herring or alewife ever inhabited the refuge waters.

The primary brook trout habitat on the refuge appears to be a reach of Sunkhaze Stream from Stud Mill Road extending 200 meters downstream. During warm periods of the year they appear to move farther upstream. Brook trout are also found in Little Birch Stream. Nearly 40,000 brook trout were released into Sunkhaze Stream between 1940 and 1950, and another 500 were stocked in Sunkhaze and Birch Streams from 1974 to 1975, the last year that any fish were stocked on lands now encompassed by the refuge. The stocking period coincided with heavy fishing pressure, especially on brook trout (Smithwood and McKeon 1999).

A study of fish assemblages in the Penobscot River and some tributaries by Kiraly et al. (2011) included sampling of Sunkhaze Stream. The researchers used electro shocking from boats to measure the dominant fish species. For Sunkhaze Stream the dominant fish were golden shiner, brown bullhead, and pumpkinseed. Other species that were captured during the study included redbreast sunfish, yellow perch, chain pickerel, and common shiner.

Table B.1. Fish species captured on Sunkhaze Meadows Unit during summer 1997 (from Smithwood and McKeon 1999).

Species	Sunkhaze Stream			Birch Stream	Little Birch Stream
	Section 1	Section 2	Section 3		
American eel				X	
Blacknose dace				X	

Species	Sunhaze Stream			Birch Stream	Little Birch Stream
	Section 1	Section 2	Section 3		
Brook trout					X
Brown bullhead		X			
Burbot				X	X
Chain pickerel	X	X	X		
Creek chub				X	X
Fallfish	X	X	X	X	
Golden shiner		X	X		
Pumpkinseed		X	X		
Redbreasted sunfish		X			
Smallmouth bass	X	X			
White sucker	X	X	X	X	
Yellow perch	X	X	X		

Potential impacts of public fishing on the refuge follow.

Impacts on Fish Species:

Recreational fishing by the public can have negative impacts on fish populations if it occurs at high levels or is not managed properly. Potential impacts from fishing include direct mortality from harvest and catch and release; injury to fish caught and released, changes in age and size class distribution, changes in reproductive capacity and success, loss of genetic diversity, altered behavior, and changes in ecosystems and food webs (Lewin et al. 2006, Cline et al. 2007).

These impacts are often disproportionate among fish species, sizes, ages, sexes, and based on other behavioral traits because anglers selectively catch fish based on these factors (Lewin et al. 2006). In general, anglers tend to target larger and older fish. The selective removal of larger and older fish can have a variety of impacts of fish population dynamics. First, it can decrease the age and size class distribution in fish populations. Second, larger and older fish tend to have greater reproductive capacity because they are better able to compete for spawning areas and generally have higher egg outputs. Because of this, their selective removal may reduce the populations overall reproductive success. Depending upon the species, anglers may also be more likely to catch males (e.g., some male largemouth bass are more aggressive towards lures) or females (e.g., in some species females grow faster). Also, fish that are more active during the day are often more vulnerable to being caught (Lewin et al. 2006).

Catch-and-release fishing can also have impacts on individual fish, including immediate or delayed mortality. The likelihood of mortality is related to the type of fishing gear used, where the fish is hooked, how the fish is handled, angler experience, and environmental conditions. In general, circle hooks tend to cause less damage than barbed hooks. Also, fish hooked in the lips or jaws tend to have minimal mortality as compared to fish hooked in the gills, esophagus,

intestine, or eyes. Fish caught and released with nonlethal injuries may also be exposed to parasites, or bacterial or fungal infections. Individuals that are caught and then handled may also experience stress, which can lead to changes in physiology and behavior which can in turn impact their growth, reproduction, and immune system (Lewin et al. 2006).

Since fishing generally removes individuals from a population, at high levels it can lead to reduced population sizes and loss of genetic diversity. The loss of genetic diversity can ultimately reduce a population's fitness, resilience, and ability to adapt to environmental changes and stressors, such as climate change. The higher the fishing mortality, the greater these types of impacts will be (Lewin et al. 2006).

While fishing does remove individuals from the population, we do not anticipate that current or projected fishing pressure will affect the refuge's fish populations as a whole. The State sets catch limits, designated waters, and fishing seasons to protect the State's fish populations. Sunkhaze Stream and its tributaries are dominated by warm water species (Kiraly 2012). Fish species usually sought are smallmouth and largemouth bass. While popular with anglers, smallmouth and largemouth bass are not native to Maine (MDIFW 2001). According to Maine Department of Inland Fisheries and Wildlife (MDIFW), there has been an increase of 47 percent in the number of lakes with one or more species of bass between 1980 and 2000 (MDIFW 2001). Given the distribution of these species and the State's estimates of abundance, we do not expect fishing pressure at Sunkhaze Meadows NWR to have adverse effects on these species. Illegal take can also impact fish populations. Our refuge officer in cooperation with Maine State game wardens will continue to periodically patrol the refuge to help reduce illegal take.

Impacts on Other Wildlife:

Since fishing occurs along and in wetland areas, it has the greatest impact of any proposed use on aquatic and semi-aquatic species in refuge fishing areas. In particular, fishing has the potential to disturb waterfowl and waterbird species. Fishing seasons in Maine coincide in part with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Anglers can also affect the number, behavior, and temporal distribution of some species of birds, including bald eagles, common ravens, and American crows (Knight et al. 1991). Human activity, including both walking along trails and boat use, has the potential to affect the distribution, abundance, and species richness of water birds by disturbing birds that are overwinter, resting, foraging, reproducing, and nesting.

Disturbance from recreational activities vary with the wildlife species involved and the activity's type, level, frequency, duration, and the time of year it occurs. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Anglers and other boaters may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting in egg mortality. Based on observations by Service staff and reports from

volunteers, flushing of nesting birds is not problematic at this time. If this becomes a problem we will close refuge areas seasonally to fishing and boating around sensitive nest sites, in conjunction with the state of Maine if necessary. Most boating is non-motorized at this time which significantly reduces potential impacts.

Visitors to the refuge engaged in fishing will generally be walking along refuge trails and roads or using motorized or nonmotorized boats in refuge ponds and lakes. A study by Miller, Knight, and Miller (1998) indicates that species composition and nest predation was altered adjacent to trails in both forested and grassland habitats. It appears that species composition changes are due to the presence of humans and not the trail or roadway itself. On the other hand, nest predation does appear to be a function of the trail which allows access to mammalian nest predators. Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Klein et al. 1995, Rodgers and Smith 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbances from recreation activities have at least temporary effects on the behavior and movement of birds within a habitat or localized area.

The use of boats, particularly motorized boats, for fishing can also have impacts on fish and other species. Potential impacts include direct impacts, such as mortality from waves and propeller action, and indirect impacts, including increased stress levels, increased water turbidity, loss of food sources, and the dislodging of eggs and larvae from their substrate. Motorized boats can also disturb wildlife by creating loud noises, which may interfere with hearing, and by releasing toxic inorganic and organic compounds into the water and air (Lewin et al. 2006).

Lost fishing tackle may harm waterfowl, eagles, and other birds externally by catching and tearing skin. Fishing line may also become wrapped around body parts and hinder movement (legs, wings), impair feeding (bill), or cause constriction with subsequent reduction of blood flow and tissue damage. An object above or below the water surface may snag entangled animals, from which they are unable to escape. Nineteen percent of loon mortalities in Minnesota were attributed to entanglement in fishing line (Ensor et al. 1992). Entanglement in fishing line has also caused mortality in bald eagles. Birds may also ingest sinkers, hooks, floats, lures, and fishing line. Ingested tackle may cause damage or penetration of the mouth or other parts of the digestive tract, resulting in impaired function or death. Lead tackle is particularly toxic to wildlife. An investigation into causes of mortality in loons in New England found 52 percent of loon carcasses submitted to Tufts University Wildlife Clinic had died of lead poisoning from ingestion of lead sinkers (Pokras and Chafel. 1992). Maine law prohibits the sale of lead sinkers that weigh less than 0.5 ounces (Maine Title 12, part 13, subpart 4, chapter 923, subchapter 5, 12663-A), and the Service prohibits the use of any lead fishing sinkers or jigs on the refuge. The refuge and the State will continue to provide education and outreach on the hazards of lead sinkers and discarded fishing tackle. Our refuge officer will help in that public outreach.

Water Quality Impacts:

Pollutants from motorboats, human waste, and litter have the potential to have negative impacts on water quality. Extensive water quality testing on Sunhaze Stream and its tributaries has not been carried out. As such, the levels of pollutants from boat fuel and impacts on local aquatic

systems are unknown. Hydrocarbon contamination can be harmful to fish; however, because of the size of the stream and limited access most boating on the refuge is currently non-motorized so we believe there is little contamination coming from this source. We will initiate public outreach and education on littering, pollutants, and proper waste disposal if the use increases substantially above current use levels to help mitigate water quality impacts. Water quality testing will be carried out as funding levels permit.

Bank and trail erosion from human activity (boat landings, boat wakes, foot traffic) may increase aquatic sediment loads of streams and rivers, or alter riparian or streamside habitat/ vegetation in ways harmful to fish or other wildlife. Boat access will be restricted to designated areas only. The trail to the Ash Landing boat launch will be ‘hardened’ to further reduce any erosion potential. Wetlands guard much of the refuge shoreline, making it extremely difficult to access for shore-based fishing. We do not intend to construct any new trails or boardwalks to provide shore-based fishing access. Therefore, at current levels of use, we do not expect trail erosion to increase because of foot traffic related to fishing. The majority of boat use that occurs on the refuge is non-motorized through the use of canoes and kayaks. When motors are used they are either low horsepower or electric trolling motors, therefore we do not anticipate any significant bank erosion due to boat wakes.

Other Impacts:

Accidental or deliberate introductions of nonnative fish may negatively impact native fish, wildlife, or vegetation. The refuge will continue to work cooperatively with the State in providing educational outreach and signs on preventing introductions of nonnative fish and try to contain introductions if they occur.

Accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to fishing boats may also impact native vegetation, wildlife, and habitats. With the exception of a few isolated occurrences of purple loosestrife, refuge waters appear to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys of aquatic invasives. We can mitigate the potential for introductions by having boaters clean their boats before launching and after retrieving. We will also post launch sites with educational materials and have law enforcement officers make spot checks of vessels for compliance and to educate boaters on proper methods for checking for aquatic hitchhikers.

The 2011 national survey of fishing, hunting, and wildlife-associated recreation reveals that 341,000 Maine residents and nonresidents 16 years old and older fished in Maine (USFWS 2011). Sunkhaze Meadows NWR was a destination for some of this wildlife-dependent recreation. Visitors fishing on the refuge benefit the local economy by purchasing gas, food, fishing equipment, and lodging.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Fishing access areas where streams intersect roads have been designated and signed.
- All boats, trailers, motors, and fishing gear will be encouraged to be inspected by the owner for plant material and cleaned prior to launching and after retrieval.
- Compliance with regulations will be achieved through education, signage, and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife.
- No commercial fishing or collecting bait for commercial purposes is allowed.
- Maine law prohibits the sale of lead sinkers weighing less than 0.5 ounces (Maine Title 12, part 13, subpart 4, chapter 923, subchapter 5, 12663-A). Use of any lead fishing sinkers or jigs is prohibited on the refuge.
- The refuge will be open to fishing during regular refuge hours, sunrise to sunset.

JUSTIFICATION:

Fishing is a priority public use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife resources (the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997). The Service's policy is to provide opportunities for this use when compatible and consistent with sound fish and wildlife management. Fishing is also a popular, traditional recreation activity in Maine that is strongly supported by the Maine Department of Inland Fisheries and Wildlife.

Allowing fishing at Sunkhaze NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, fishing is a wildlife-dependent priority public use with minimal adverse impacts on refuge resources. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on fishing, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Fishing will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from fishing are anticipated. Allowing this use supports CCP goals and objectives as described in the refuge's CCP (USFWS 2013) and the refuge's purpose associated with allowing wildlife-oriented recreational opportunities. This activity will not materially interfere with or

Wildlife Refuge System. Fishing will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from fishing are anticipated. Allowing this use supports CCP goals and objectives as described in the refuge's CCP (USFWS 2013) and the refuge's purpose associated with allowing wildlife-oriented recreational opportunities. This activity will not materially interfere with or detract from the mission of the Service, because providing this wildlife-dependent recreational opportunity is a focus of the National Wildlife Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sean B. Kuhn 9/17/2013
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/17/2028

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COMPATIBILITY DETERMINATION

USE: Hunting

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

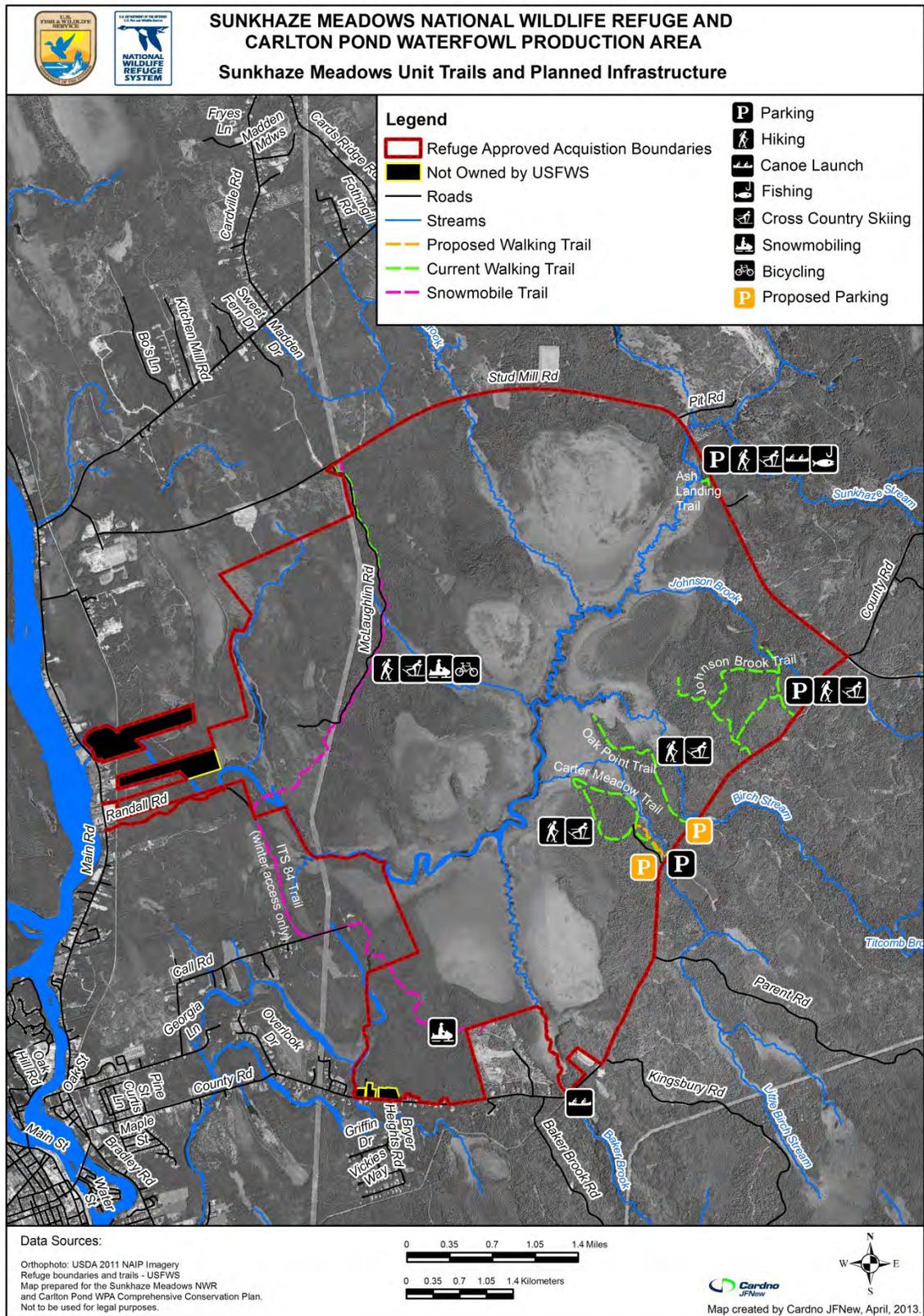
(a) What is the use? Is the use a priority public use?

The use is public hunting of migratory game birds (e.g., waterfowl), big game, and upland game. Hunting is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

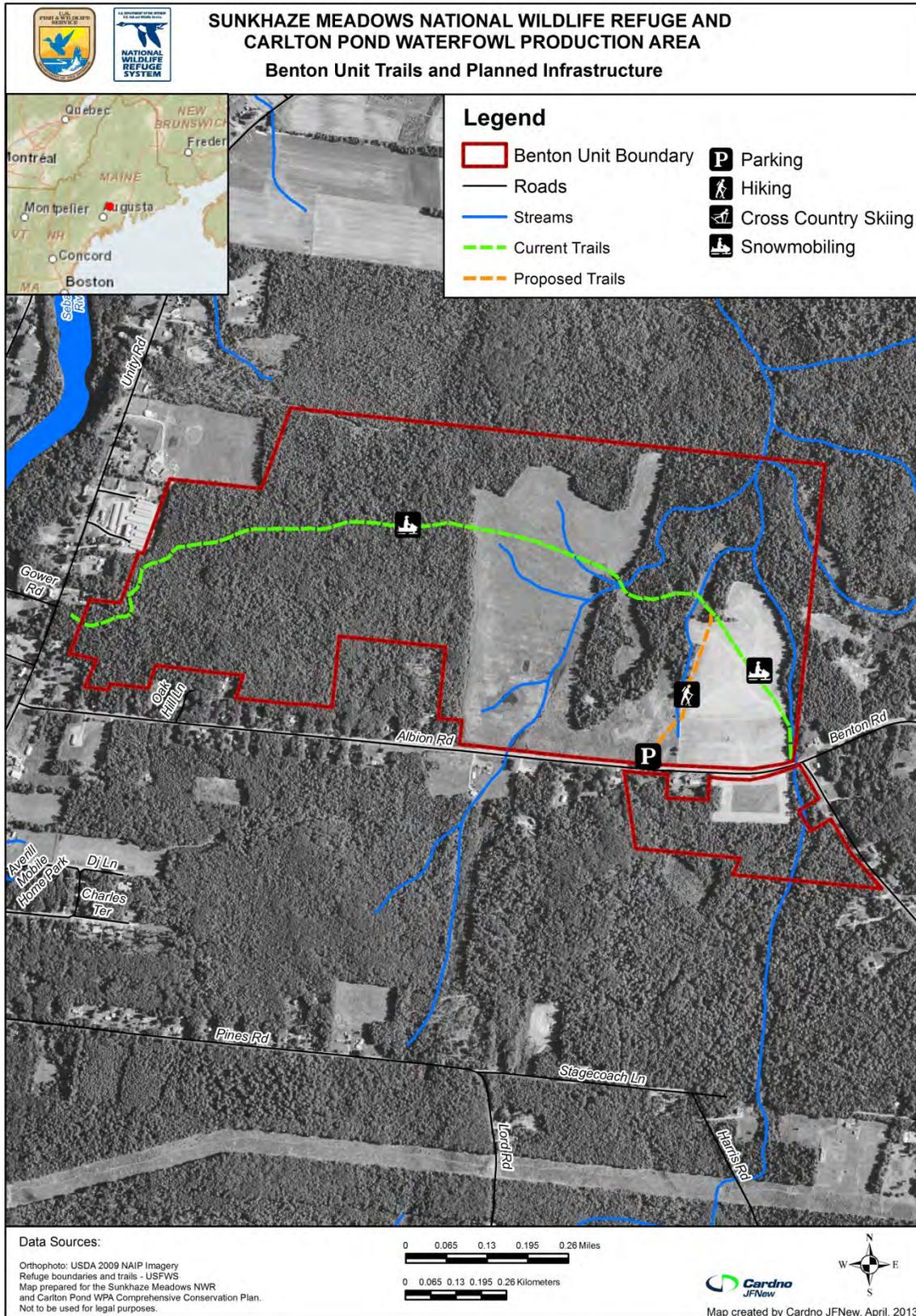
(b) Where will the use be conducted?

Sunkhaze Meadows National Wildlife Refuge (NWR, refuge) has been open to public hunting of big game, upland game, and migratory game birds, for all Service-owned lands within the refuge boundary, since 1990 (USFWS 1990b). All Service-owned land within the three refuge units is open to hunting as specified in this CD and the annual hunt plan (see maps B.5 through B.7).

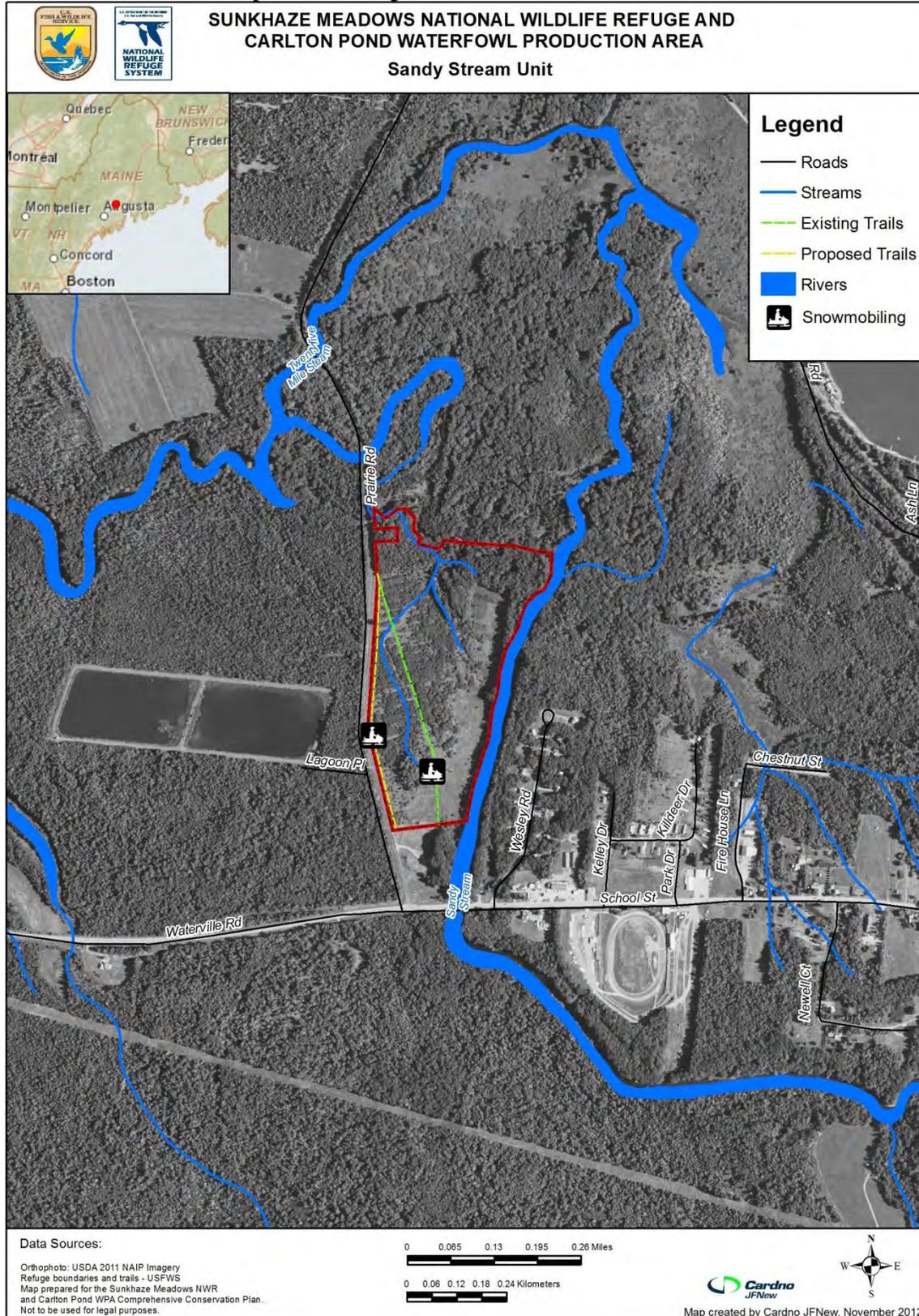
Map B.5. Areas open to hunting within the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR (all Service-owned land is open to hunting).



Map B.6 Areas open to hunting within the Benton Unit of Sunkhaze Meadows National Wildlife Refuge (all Service-owned land is open to hunting).



Map B.7. Areas open to hunting within the Sandy Stream Unit of Sunkhaze Meadows NWR (all Service-owned land is open to hunting).



c) When will the use be conducted?

Hunting will be conducted during State of Maine seasons for big game, upland game, and waterfowl hunting seasons and will be in accordance with Federal and State regulations. In cooperation with the State, hunt season dates and bag limits may be adjusted in the future as needed to achieve balanced wildlife population levels and to limit conflicts with other user groups.

(d) How will the use be conducted?

The refuge permits hunting in accordance with State and Federal guidelines. Federal regulations contained in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as refuge-specific regulations, and stipulations in this compatibility determination will apply.

Hunters access the refuge on foot from the roadways, parking lots or trails, or via boats. In winter they may access the refuge via snowshoes or skis.

All areas of the refuge will continue to be open to the public for hunting season. Visitors participating in approved public uses are allowed off trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing). Signage at parking areas mentions that hunting is allowed and reminds visitors to wear blaze orange during appropriate time periods. Should visitor conflicts increase significantly, the refuge may consider zoning for different uses or area closures.

(e) Why is the use being proposed?

Hunting is one of the priority uses outlined by Congress in the Refuge Improvement Act of 1997. The Service supports and encourages priority uses on national wildlife refuge lands where appropriate and compatible. Hunting is used in some instances to manage wildlife populations. Hunting is also a traditional form of wildlife-oriented recreation that can be accommodated on many National Wildlife Refuge System lands.

AVAILABILITY OF RESOURCES:

Additional fiscal resources to conduct this activity will be minimal as the refuge has been open to hunting since 1990 and since hunting will occur under State regulations and not as a refuge regulated hunting program. Costs associated with administration of this use include:

Preparation of Annual Hunt Plan:	\$500	GS-11 Wildlife Biologist GS-12 Deputy Refuge Manager
Preparation and updating of refuge hunting brochure:	\$300	GS-12 Deputy Refuge Manager GS-9 Refuge Officer
Dispensing information during year:	\$200	GS-6 Administrative Assistant
Law enforcement/outreach:	\$3,000	GS-9 Refuge Officer
Estimated Total:	\$4,000	

Based on a review of the budget allocated for hunting management, funding is adequate to ensure compatibility, and administer and manage the recreational use listed. Sufficient resources are available to continue the existing hunting program. Our existing staff and budget provide sufficient resources to continue current management.

ANTICIPATED IMPACTS OF THE USE:

Wildlife Impacts – Migratory Game Bird Species:

While individual birds are harvested as part of the refuge’s hunt program, because of the Service’s and the State’s efforts to monitor and regulate harvest of these species, we do not expect adverse impacts at the population level from harvesting these species. Additional information on harvests and efforts to manage these species follows.

Waterfowl

Adverse effects on waterfowl populations are not expected because of the hunting regulations and bag limits that have been set in place by the Federal and State agencies (USFWS Migratory Bird Office and the Maine Department of Inland Fisheries and Wildlife (MDIFW)) that manage the harvest of waterfowl populations. Significant conservation measures and extensive pre- and post-season population monitoring and the institution of Adaptive Harvest Management are safeguards inherent in waterfowl management. Adverse effects on other game species are not expected, because hunting will occur under State and Federal regulations. The MDIFW and the Service set harvest limits that take into account game species population data collected by State biologists and wildlife species assessments.

Woodcock

Restrictive hunting regulations have been in effect for American woodcock since 1985 when surveys indicated a decline in numbers since the 1960s. The Service and State agencies monitor the population closely through a Migratory Bird Harvest Information Program (HIP) and also spring singing male counts (SGS) throughout the birds range, and use this information to set bag limits that are intended to protect woodcock population levels.

Based on data from the HIP, 7,100 woodcock hunters harvested 31,700 woodcock in Maine last year. The long-term trend (1968 to 2011) indicates a decline in woodcock numbers across their range; however, 2011 was the eighth year in a row that the population appears stable. In 2011, the number of males heard on SGS routes (3.58) was slightly higher than 2010 (3.41) and was above the 10-year average of 3.42 (MDIFW 2011a). Based on these data, we do not expect adverse effects at the population level.

Wildlife Impacts - Resident Game Species:

The MDIFW is responsible for the management of resident wildlife including game mammal species. They use a variety of methods to assess population levels and develop harvest strategies. While individual mammals are harvested as part of the refuge’s hunt program, because of the State’s efforts to monitor and regulate harvest of resident mammal species, we do not expect adverse impacts at the population level from harvesting these species. Additional information on harvests and State efforts to manage resident game species follows.

White-tailed Deer

During 2011, 198,107 deer hunting licenses were sold in Maine with hunter densities averaging about seven per square mile. Statewide, these hunters spent an estimated 1.08 million hunter days pursuing deer during Maine's 79-day deer hunting season. Deer hunting success was estimated at 11 percent in 2011 with 18,784 deer harvested. Wildlife Management District (WMD) 18, which includes the Sunhaze Meadows Unit, had 258 deer harvested. WMD 23, which includes the Benton and Sandy Stream Units, had 1,657 deer harvested.

Deer populations vary considerably from region to region in the State largely due to severity of winter conditions with highest densities found in southern Maine and lowest numbers found to the north. MDIFW allocates a specific number of permits and take methods across 29 individual Wildlife Management Districts based on previous harvest data, and deer abundance aerial surveys to ensure healthy populations of deer within the State.

Moose

The annual allocation of moose permits is a function of specific management goals for each WMD. Permits were awarded to applicants by a computerized lottery with 49,889 applying for 3,903 permits. In 2011, 2,582 moose were checked into hunt stations. Of those, 38 moose were harvested in the WMD which includes the Sunhaze Meadows Unit and 2 moose were harvested in the WMD which includes the Benton and Sandy Stream Units. Statewide, the success rate for last year's hunt was 79 percent which is equal to the average success rate for the last 9 years.

Aerial surveys are conducted in nine WMDs to count the number of bulls, cows, and calves. Based on these surveys, MDIFW estimated the 2011 Statewide moose population to be 76,000. These surveys, combined with data collected on female moose reproduction, survival rates obtained by aging teeth, and hunter sight-rate data, allows MDIFW to ensure that the harvest is in keeping with a healthy moose population.

Black Bear

The forests of Maine support the largest black bear population in the Eastern United States. For more than 35 years, MDIFW has closely monitored bears to ensure their management decisions are based on current and sound information. Harvest levels are determined based on harvest data and samples of teeth collected which help to show population trends and the number of bears present in the population.

The State regulates harvest by setting season length, bag limit, and legal methods of hunting. Most bears are harvested by hunting over bait (75 percent), 12 percent using dogs, 6 percent by deer hunters, 4 percent by still hunting¹, and 3 percent in traps. The total harvest in 2011 was 2,400 with 137 taken in the WMD that includes the Sunhaze Meadows Unit. Eight bears were harvested in WMD 23 which includes Benton and Sandy Stream Units. No baiting is allowed on the refuge, and the refuge hunt season will be shorter than the State season (which starts August 26, 2013), which reduces harvest compared to surrounding areas.

¹ Rather than being completely 'still,' still hunters move slowly, deliberately, and quietly through the habitat looking for tracks, movement, fur, or other signs of the animal.

Furbearers and Small Mammals

In Maine, many mammals are harvested for their pelt value. Many of the species are harvested by trapping, but the following are also hunted: coyote, bobcat, raccoon, skunk, snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel.

Currently the State's coyote population is between 10,000 to 12,000 in the winter and increases to 19,000 in spring. This number decreases due to the low number of pups that survive after birth. The coyote population will likely remain relatively constant unless wolves reestablish themselves in the State and then it is believed the coyote population will drastically decline (Jakubas 1999). The coyote population in Maine has been the center of controversy in recent years because of its potential role in affecting deer populations. There is a desire by some public to control or eliminate coyote populations. However, hunting and trapping has been shown to have little effect in determining Statewide population levels. There will need to be mortality rates greater than 70 percent for there to be a reduction in the population (Jakubas 1999). In 2011, 1,623 coyotes were taken in Maine through hunting and trapping.

The red fox population is distributed Statewide (Caron 1986) and is currently considered to be abundant and stable (Jakubas 2004). Red fox are hunted but most of the take for this species is through trapping. Harvests across the State in 2011 through trapping and hunting totaled 922.

The bobcat is a trapped and hunted species that is distributed over most of the State (Morris 1986). The Bobcat Management System is used to manage bobcat populations in the State (McLaughlin 1995). The number of bobcat harvested in 2011 through trapping and hunting was 305.

Population trends for the striped skunk, porcupine, and woodchuck are unknown according to the State of Maine since harvests are not recorded.

Human Disturbance Effects

Hunting can have direct and indirect impacts on both target and non-target species. These impacts include direct mortality of individuals; changes in wildlife behavior; changes in wildlife population structure, dynamics, and distribution patterns; and disturbance from noise and hunters walking on- and off-trail (Cole and Knight 1990, Cole 1995, Bell and Austin 1985). In many cases, hunting removes a portion of the wildlife population that will otherwise naturally succumb to predation, disease, or competition (Bartmann et al. 1992). Typical changes in deer behavior in response to hunting include avoidance of certain areas, becoming more wary, staying closer to cover, and shifting feeding times (e.g., feeding more at night) (King and Workman 1986). For waterfowl species, hunting may also make them more skittish and prone to disturbance, reduce the amount of time they spend foraging and resting, alter their habitat usage patterns, and disrupt their pair and family bonds (Raveling 1979, Owen 1977, White-Robinson 1982, Madsen 1985, Bartelt 1987).

In general, visitors to the refuge engaged in hunting will be walking off-trail in designated areas open to hunting. General disturbance from recreational activities, including hunting, vary with the wildlife species involved and the activity's type, level, frequency, duration, and the time of year it occurs. The responses of wildlife to human activities, such as hunting, include avoidance

or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). The amount of disturbance tends to increase with decreased distance between visitors and birds (Burger 1986).

Some bird species flee from human disturbance, which can lower their nesting productivity and cause disease and death (Knight and Cole 1991). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased 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 common species (i.e., American robins) were found near trails and more specialized species (i.e., grasshopper sparrows) were found farther from trails. Nest predation also was found to be greater near trails (Miller et al. 1998). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, makes males rely more heavily on physical deterrents in defending territories, which are time and energy consuming (Ewald and Carpenter 1978).

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples 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.

The hunt at the refuge has been conducted since 1990 with no significant disturbance noted due to this use. Although the refuge has been unstaffed since 2008, weekly law enforcement patrols have been occurring since 2010. Since no permit system is in place, exact numbers of hunters using the refuge are not known. A number of hunters participate in the hunt, but they are dispersed over such a large area that disturbance in any one place has not been significant. With the exception of bald eagles, hunting takes place outside of the nesting period for migratory birds, further minimizing the potential effects on these species. Disturbance to bald eagles associated with this activity is expected to be minimal because 1) the overlap between hunting seasons and bald eagle nesting is limited (about 1 to 2 months), and 2) this is an existing use of the refuge and adverse impacts to this species have not been observed to date.

Impacts on Vegetation:

The physical effects on vegetation from hunting various game species on the refuge are expected to be minimal. All-terrain vehicles will not be allowed on the refuge. Other vehicles are restricted to designated roadways. Hunter use is generally dispersed over large areas. Hunters will have little to no impact on the vegetation.

Positive, indirect effects on the vegetation will result from a reduction in the white-tailed deer population. The impacts of dense deer populations on forest regeneration and the composition and diversity of the herbaceous understory have been well documented (Tierson et al. 1966,

Behrend et al. 1970, Tilghman 1989). Well-managed hunting can effectively control deer and produce dramatic changes in the forest vegetation (Behrend et al. 1970). The impact of deer hunting on the vegetation will be positive and result in better regeneration of forest canopy species and an increase in the diversity of the herbaceous understory. In summary, there will be few if any negative impacts from this use on the refuge's vegetation, but there will be beneficial impacts from the decrease of deer browse on the refuge's vegetation due to the decrease in the number of deer on refuge lands.

Possible negative cumulative impacts of the proposed activity include temporary trampling of vegetation and light soil erosion. Most hunting occurs during the fall and winter when the ground is either frozen, covered in snow, or when plants are dormant. For these reasons, cumulative impacts to plant communities and soils are not likely to be significant.

Impacts on Soils:

It is anticipated that minor impacts to soils will occur as a result of allowing hunting access on the refuge. Erosion potential will likely vary during the season based on soil moisture and temperatures. During much of the hunting season, soils may be frozen or covered in snow, thereby reducing the impacts greatly. At the current use level, impacts to soils (erosion, compaction) are not likely to be significant.

Impacts on Air and Water Quality:

Air quality and water quality impacts will be minimal and only due to refuge visitors' automobile emissions and run-off on roads and trails. These effects will not only come from hunters but from a majority of users of wildlife-dependent recreation on the refuge. Given the traditional low number of hunters, the effects on overall air and water quality in the region will be negligible, compared to the effects from non-refuge sources.

Economic Impacts:

The 2011 national survey of fishing, hunting, and wildlife-associated recreation reveals that 1,117,000 Maine residents and nonresidents 16 years old and older fished, hunted, or watched wildlife in Maine. Of that total, 341,000 fished, 181,000 hunted, and 838,000 participated in wildlife watching activities, including observing, feeding, and photographing wildlife (USFWS 2011). While we do not have exact numbers of hunters on the refuge units, visitors participating in this use provided some economic benefit to the local economies by purchasing goods and services (e.g., food, lodging, gas) in and around the three refuge units.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The hunt program will be managed in accordance with Federal and State regulations. The program will be reviewed annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants. Stipulations are based on the refuge's Final Amended Environmental Assessment: Public Hunting (USFWS 1990a) and Hunting Management Plan (USFWS 1990b).

Refuge-specific regulations will further minimize negative impacts of the hunt on refuge habitat and wildlife. Compliance with regulations will be achieved through education, signage, and law enforcement. Refuge-specific regulations for 2012 are listed below (see also 50 CFR 32.38):

- *Migratory Game Bird Hunting.* We allow hunting of migratory game birds on all areas of the refuge in accordance with State regulations.
- *Upland Game Hunting.* We allow hunting of upland game on all areas of the refuge in accordance with State regulations subject to the following conditions:
 1. Shotgun hunters may possess only approved nontoxic shot while in the field (see 50 CFR 32.2(k)).
 2. We allow eastern coyote hunting from October 1 to March 31.
 3. We allow hunters to enter the refuge 1 hour before legal shooting hours (0.5 hours before legal sunrise in the State of Maine), and they must exit the refuge by 1 hour past legal shooting hours (0.5 hours after legal sunset in the State of Maine), except for hunters pursuing raccoons and coyotes at night.
 4. The hunter must retrieve all species, including coyotes, harvested on the refuge.
- *Big Game Hunting.* We allow hunting of black bear, bobcat, moose, and white-tailed deer on all areas of the refuge in accordance with State regulations subject to the following conditions:
 1. We require hunter-orange clothing in accordance with State of Maine regulations.
 2. We allow hunters to enter the refuge 1 hour before legal shooting hours (0.5 hours before legal sunrise in the State of Maine), and they must exit the refuge by 1 hour past legal shooting hours (0.5 hours after legal sunset in the State of Maine).
 3. We allow bear hunting from October 1 to the end of the State-prescribed season. We prohibit the use of bait during the hunting of bears.
 4. All tree stands must be removed by the last day of the white-tailed deer hunting season (see 50 CFR 27.93).

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COMPATIBILITY DETERMINATION

USE: Furbearer Management (Trapping)

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

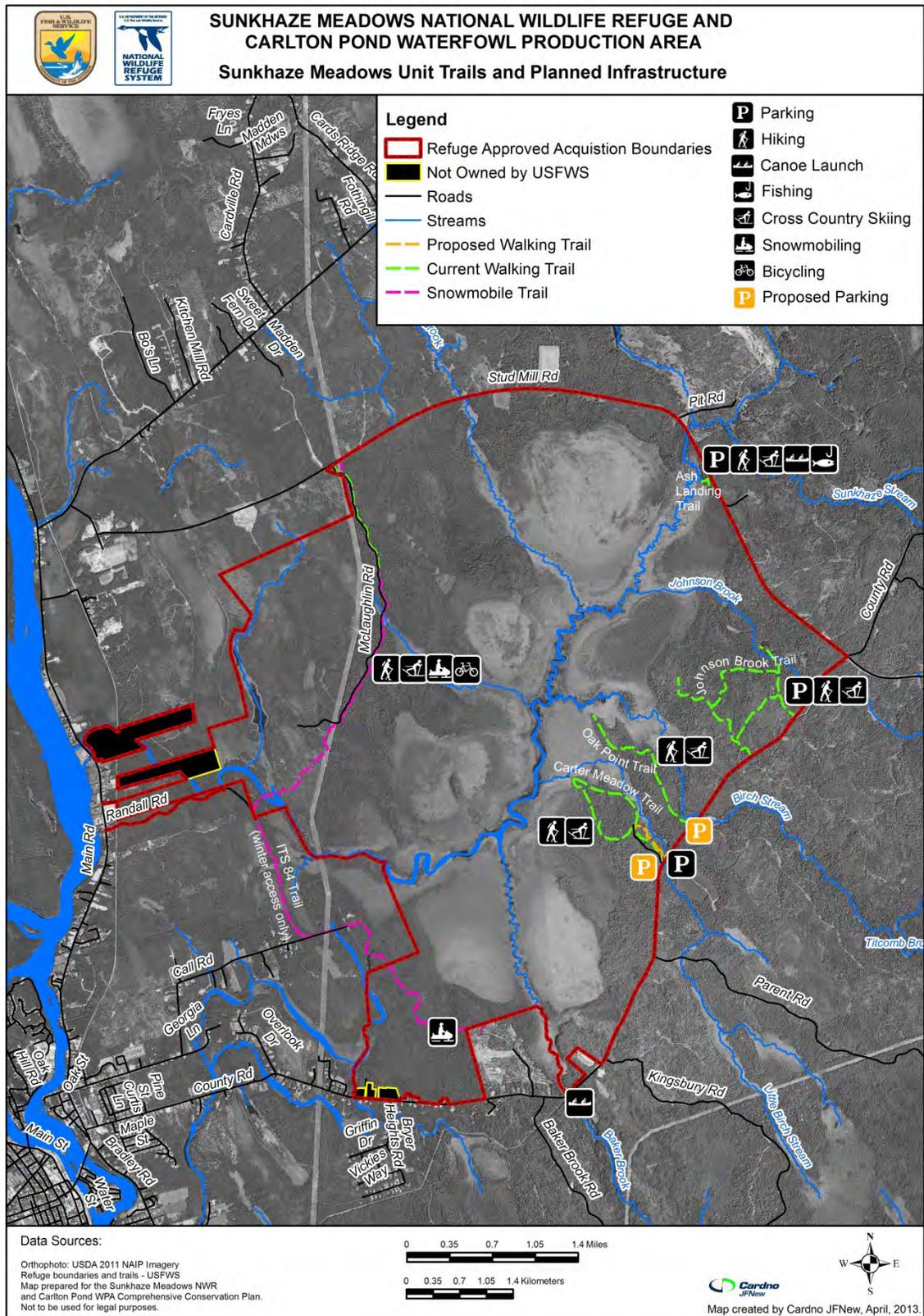
(a) What is the use? Is it a priority public use?

The use is furbearer management. We consider furbearer management to be a refuge management economic activity. It is not a priority public use of the National Wildlife Refuge System (Refuge System) under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

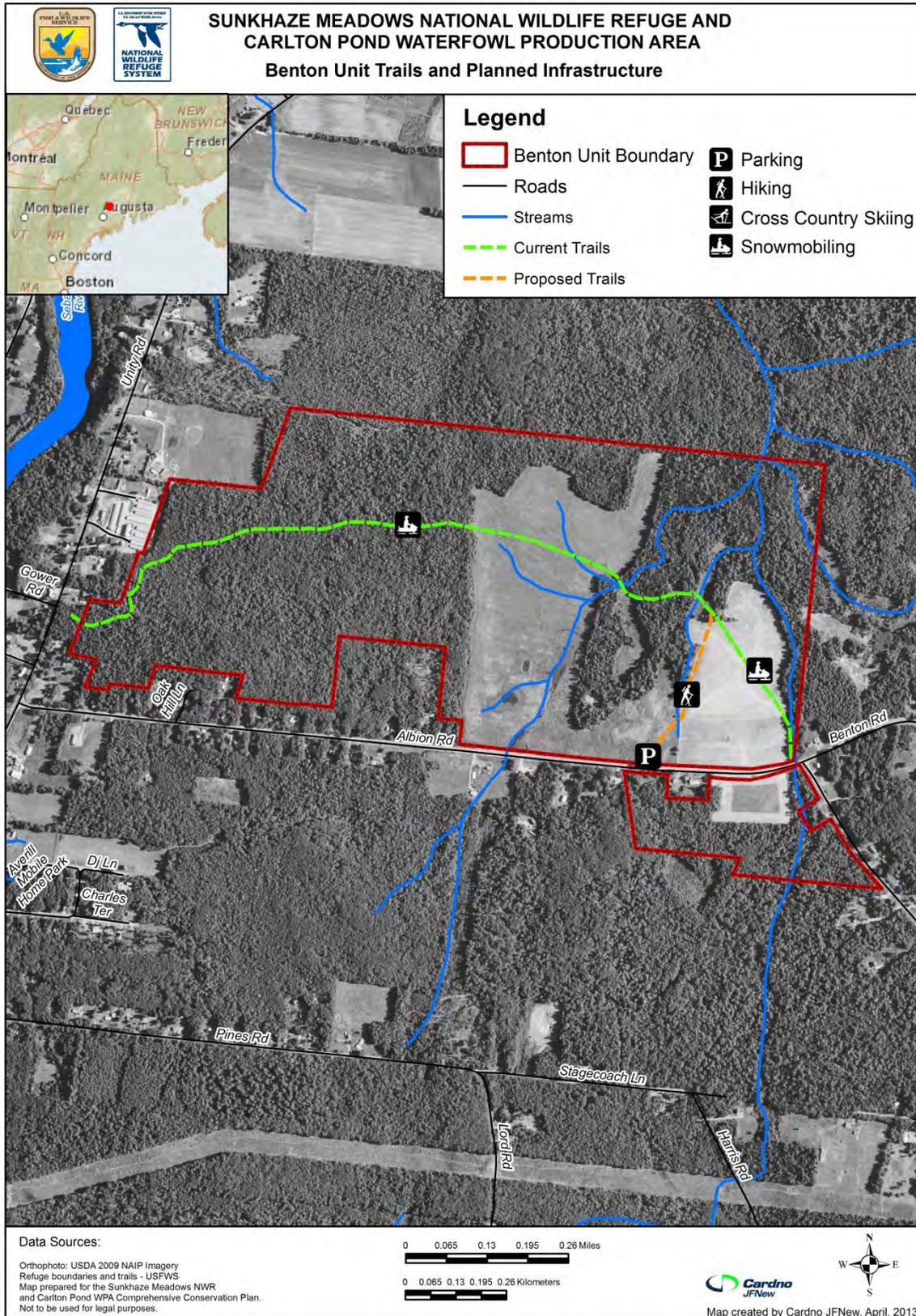
(b) Where will the use be conducted?

Furbearer management through trapping is an allowable practice in Maine and will be conducted in locations where it will accomplish refuge goals and objectives. Currently, trapping is allowed at the Sunkhaze Meadows Unit and the Benton Unit, but not at the Sandy Stream Unit (maps B.8 and B.9). Traps may be set anywhere within these two units, except that no traps are to be set where they can be easily seen from visitor vantage points, nor within 100 feet of roads or trails (see Stipulations section below).

Map B.8. Areas open to furbearer management within the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR (see text for details).



Map B.9. Areas open to furbearer management within the Benton Unit of Sunkhaze Meadows NWR (see text for details).



Refuge law enforcement will ensure that trappers on the refuge comply with State and refuge regulations and that the data submitted to the refuge are accurate.

(c) When will the use be conducted?

Furbearer management will be conducted in accordance with the Maine State seasons. Maine furbearer management seasons usually run from mid-October to the end of December, with beaver trapping in Wildlife Management District 18, where the Sunkhaze Meadows Unit is located, allowed until mid-April.

(d) How will the use be conducted?

The refuge will be open to furbearer management for the following species: beaver, bobcat, mink, fisher, marten, coyote, fox, muskrat, opossum, otter, raccoon, red squirrel, skunk, and weasel. Although bear trapping is allowed in Maine, bears are not considered a furbearer. Bear trapping is not allowed on the refuge. Data collected over the 9 years from 2001 through 2010 shows that trappers at the Sunkhaze Meadows Unit are overwhelmingly targeting beaver and muskrat. Trapper reports show that total take has been an average of 15 beavers per year and 11 muskrats per year during that time period. Other than these rodents, which have a high reproductive capacity, only one bobcat, one coyote, three fisher, four mink, six otters, one raccoon, and two skunks have been taken in that time.

As specified in the Furbearer Management Plan, we will conduct furbearer management activities following Maine State regulations and impose any necessary refuge-specific restrictions through issuance of a special use permit (SUP). The refuge will allow furbearer management during State seasons under State limits for the targeted species. The refuge manager reserves the authority to regulate the numbers of target species taken in any one location as well as the number of trappers or number of traps per trapper allowed. If we determine that limits on the number of trappers is necessary, we will follow the procedures outlined in the Service's Refuge Manual (5 RM 17.11) and other applicable laws and regulations (see also 50 CFR 29.1). Trappers are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

Sunkhaze Meadows National Wildlife Refuge (NWR, refuge) has had fairly light demand for trapping. Analyzing the averages since 2001, trappers have requested an average of 8.4 permits per year, but only six trappers per year have actually trapped. Therefore, zones have not been established nor limits set. However, if necessary, such controls could be implemented to meet our goals for protecting refuge resources.

We will continue to manage the furbearer management program through the SUP process and, if needed, will work with the State to have special furbearer management regulations.

Administering the program under an annual SUP will allow the refuge manager to have a ready list of contacts for requests for specific management needs to accomplish refuge objectives.

We will require a harvest report from each trapper following the close of the trapping season. The report will include data about the trapping effort (trap-days), the time span of trapping by species, the number of target and non-target species harvested, the refuge areas trapped, and remarks on observations of wildlife or other noteworthy ecological information. Those data will

provide a basis for catch-per-unit effort and population trend analyses. We will continue to use these data to monitor potential impacts of this use on refuge populations of furbearers, as well as the overall status of refuge furbearer populations. If the required information is lacking for a trapper from the previous year, we will not issue the SUP for the next year.

(e) Why is this use being proposed?

Because trapping is considered an economic use, per Federal law (see 16 U.S.C. 715(s)) and Service regulations (50 CFR 29.1), we may only allow economic uses of a refuge or WPA natural resource where the use contributes to achieving refuge or WPA purposes or the Refuge System mission. We will conduct furbearer management: (1) as a tool to manage habitat and maintain the predator-to-prey balance, (2) as a mechanism to collect survey and monitoring information that otherwise will be expensive and difficult to obtain using refuge resources, and (3) as a way to collect initial data that may lead to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained, experienced group of trappers, the Service can use their skills and local knowledge to perform or assist in valuable management or research functions. Trappers could potentially provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications.

A trapping program also fosters the appreciation of wildlife and nature, wildlife observation, environmental education, a greater understanding of ecological relationships, stewardship of natural resources, and inter-generational passage of the methodologies of renewable resource use. Trapping is an activity in which family members and friends often participate and share joint experiences that broaden appreciation of natural resources and ecological awareness (Daigle et al. 1998).

AVAILABILITY OF RESOURCES:

The financial resources necessary to provide and administer this use at its current level are now available, and we expect them to be available in the future. The refuge manager will provide overall administration of the program. A wildlife biologist will be required to evaluate furbearer activity, potential and current impacts on refuge resources, and potentially prescribe harvest objectives or quotas. The biologist will also evaluate trapper data and compile trapping reports. An administrative assistant will be required to help process SUPs. The refuge’s law enforcement officer, in coordination with other law enforcement agencies, will check refuge trappers and ensure compliance with State and refuge regulations.

A breakdown of the projected annual cost of the trapping programs is shown below:

Administration:	\$60
Law Enforcement and Monitoring:	\$800
Biological Staff Time (Program Oversight):	\$500
Estimated Total:	\$1,360

ANTICIPATED IMPACTS OF THE USE:

The impacts of furbearer management on the purposes of the refuge and mission of the Refuge System can be either direct or indirect, and may have negative, neutral, or positive impacts on refuge resources. We have incorporated impacts of trappers using snowshoes or skis to access traps under “Anticipated Impacts of the Use” in the compatibility determination for snowshoeing and cross-country skiing.

Direct effects of trapping include the removal of individuals of both target (i.e., furbearer) and non-target species. Indirect impacts include reduced production among migratory birds resulting from disturbance during the pair bonding/nesting season, increased recruitment of birds as a result of removing predators of birds or their nests, or habitat change as a consequence of the removal of species that alter habitats (e.g., beavers or muskrats).

Impacts to Furbearers:

The impacts of the furbearer management program obviously include those on the furbearer populations themselves. Trapping harvests and removes individuals of the species. The anticipated direct impacts of trapping on wildlife will be a temporary reduction of furbearer populations in those areas where surplus furbearers exist. The removal of excess furbearers from those areas will maintain furbearer populations at levels compatible with the habitat and with refuge objectives, minimize furbearer damage to facilities and wildlife habitat, minimize competition with or interaction among wildlife populations and species that conflict with refuge objectives, and minimize threats of disease to wildlife and humans.

Maine Department of Inland Fisheries and Wildlife considers most furbearer populations around the Sunkhaze Meadows Unit to be stable (J. DePue, MDIFW 2013 personal communication). There is some concern about recent declines in fisher and bobcat harvests in this area; there is also concern about over harvest of river otters in this area (J. DePue, MDIFW 2013 personal communication). As noted above, trapper reports show that an average of 15 beavers and 11 muskrats have been taken per year between 2001 and 2010. Other than these species, which have a high reproductive capacity, only one bobcat, one coyote, three fisher, four mink, six otters, one raccoon, and two skunks have been taken between 2001 and 2010. Because most furbearer populations are considered to be stable in the area and because of the low harvest levels of other species (i.e., bobcat, fisher, and otter), we do not expect the refuge’s trapping program to have adverse effects on furbearers at the population level.

A national program operated under the guidance of the Fur Resources Technical committee of the International Association of Fish and Wildlife Agencies (IAFWA 1998) systematically improves the welfare of animals in trapping through trap testing and the development of “Best Management Practices (BMPs) for Trapping Furbearers in the United States.” The refuge will cooperate with and contribute to the development and implementation of those BMPs by practicing an integrated, comprehensive approach to furbearer management, wherever and whenever possible.

Impacts to Other Wildlife:

Non-target species could be taken incidentally through this trapping program. Traps will be set specifically around areas of targeted species activity to reduce the risk of taking species other

than targeted species. The experience of the trappers and the selection of the appropriate trap size will reduce non-target captures (Northeast Furbearer Resources Technical Committee 1996, Boggess et al. 1990). State regulations require that bait be covered, so birds of prey are not able to see the bait from above. Lynx (federally listed as endangered) have not been documented on the refuge. Therefore, potential impacts to lynx are negligible or nonexistent. If lynx are someday identified on the refuge, the refuge manager will work with the State of Maine to implement measures to prevent accidental take of lynx. The refuge manager will ensure that measures are utilized to avoid take of waterfowl and other non-target species.

Trappers may temporarily disturb wildlife while walking around the refuge. Disturbances will vary by wildlife species involved and the type, level, frequency, duration, and the time of year activities occur. Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole 1991). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. In this study, common species (e.g., American robins) were found near trails and rare species (e.g., Blackburnian warblers) were found farther from trails. In some cases there is a clear link between the extent of disturbance and either the survival or reproductive success of individuals (e.g., Schulz and Stock 1993), but in many cases disturbance acts in a more subtle way, by reducing access to resources such as food supplies or nesting sites (Gill et al. 1996). Bird flight in response to disturbance can lower reproductive success by exposing individuals and nests to predators. For recreation activities that occur simultaneously (e.g., hiking, biking) there will likely be compounding negative impacts to wildlife (Knight and Cole 1991). However, because of the temporal separation of trapping activities and breeding wildlife using the refuge, disturbance of migratory birds by trappers will be negligible, and can be further reduced by regulating trapping activity in certain areas at times when such birds are likely to be present.

Conflicts with Other Public Uses:

A program of regulated furbearer management on the refuge as described under this compatibility determination is not expected to conflict with public use on the refuge. Conflicts with public uses are not expected because trapping is generally an inconspicuous activity, traps are usually hidden from view, and they are usually checked in the early morning when other visitation is low. Stipulations set forth in this CD also require that traps will continue to be set only where traps or trapped furbearers are not readily visible from public highways, overlooks, or other visitor facilities. No land sets may be set within 100 feet of any road or trail open to the public. These characteristics serve to limit the potential for encounters between traps or captured animals and those engaged in other public use activities.

In addition, Maine furbearer management seasons usually run from mid-October to the end of December, with beaver trapping in Wildlife Management District 18, where the Sunhaze Meadows Unit is located, allowed until mid-April. Trappers usually rely on thick ice to get out to where they set their beaver and muskrat traps, and although other visitors snowshoe and ski in the winter, these visitors are not as likely to ski or snowshoe in this very coldest weather, nor are they as likely to go all the way out to the streams.

Other Beneficial Impacts:

Regulated trapping has been documented to provide a variety of ecological benefits including prevention and alleviation of habitat degradation, facilitation of habitat and wildlife restoration, reduction of predation on key species of management concern, protection of rare and endangered species, dampening of disease transmission and severity of disease outbreaks among wildlife and between wildlife and humans, and the conservation and enhancement of biological and genetic diversity (Boggess et al. 1990, Organ et al. 1996).

Implementation of a regulated trapping program on the refuge provides a mechanism to collect survey and monitoring information, and possibly contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. The ecological and monitoring benefits are management services that will be accomplished through minimal or even no cost to the government, compared to costs associated with using salaried staff or contractual arrangements with private individuals or organizations, other agencies, or refuge staff. By maintaining a trained and experienced cadre of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions (Mason 1990). Trappers who participate in the refuge program will provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation and protection of the ecological integrity of the refuge so they can continue trapping. Accordingly, they are valuable assets for the refuge manager in providing on-site reports concerning the fundamental status of habitat, wildlife, and refuge conditions.

Furbearers are considered a renewable natural resource with cultural and economic values (Andelt et al. 1999, Boggess et al. 1990, Northeast Furbearer Resources Technical Committee 1996, Payne 1980). Several human dimensions studies have documented trapper profiles, cultural aspects of trapping, and the socioeconomic role of trapping in the United States (Andelt et al. 1999, Boggess et al. 1990, Daigle et al. 1998, Gentile 1987). A regulated trapping program on the refuge also fosters the appreciation of wildlife and nature, wildlife observation, environmental education, a greater understanding of ecological relationships, stewardship of natural resources, and inter-generational passage of the methodologies of renewable resource use. Trapping is an activity in which family members and friends often participate together and share joint experiences that broaden the sense of appreciation for natural resources and ecological awareness, and indeed even a sense of community (Glass et al. 1991, Daigle et al. 1998).

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Permittees must comply with all conditions of the refuge furbearer management SUP and all State regulations relating to trapping .
- Traps shall be set only where traps or trapped furbearers are not readily visible from public highways, overlooks, or other visitor facilities. No land sets may be set within 100 feet of any road or trail open to the public.
- Permittees, when requested by refuge staff or Federal or State enforcement officers, must display for inspection their State trapping license, refuge trapping permit, trapping equipment, and all animals in their possession.
- Ingress to and egress from the refuge shall be only by routes that are currently open for travel. Motorized vehicles are restricted to McLaughlin Road when the gate is open during hunting season, and travel by snowmobile only allowed on ITS 84. Use of all-terrain vehicles is prohibited anywhere on the refuge. Permittees will use good judgement to avoid damage to refuge roads, lands, and waters, and will promptly report any such damage caused or observed. Permittees must not interfere with or cause hazards to vehicular or snowmobile travel, or the activities of other refuge visitors.
- Permittees shall, no later than 30 days after the last day of the refuge trapping season, submit to the refuge manager the trapping report form provided with the trapper permit, even if no trapping was conducted or no animals taken.
- Use of all-terrain vehicles is prohibited anywhere on the refuge. Trappers must not interfere with or cause hazards to vehicular travel, or the activities of other refuge visitors.
- The use of exposed bait and setting traps adjacent to naturally occurring carcasses are prohibited.
- Permittees will be issued the booklet “How to Avoid Incidental Take of Lynx.” Any lynx capture will be handled according to established refuge protocol for reporting, investigating, and releasing a lynx which is incidentally caught. That will include the immediate notification of and cooperation with the Service, Maine Department of Inland Fisheries and Wildlife, and the Maine Warden Service.
- Permittees must immediately release non-target species (other than lynx) that are uninjured and report those captures by species and number as part of the annual report. Injured or killed animals must be reported as specified by the Maine Department of

Inland Fisheries and Wildlife trapping regulations and also mentioned in the annual report to the refuge.

JUSTIFICATION:

We have determined that allowing trapping on the refuge will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System or the purposes for which the refuge was established for the following reasons. First, furbearer populations, with local exceptions, are stable or increasing in Maine and the furbearer management program on the refuge does not have any known negative impacts on furbearer populations. Second, at current and projected levels of use, adverse impacts to wildlife and habitat are expected to be minimal because of the temporal separation of trapping activities (usually fall and winter) and breeding wildlife (usually in spring) using the refuge.

In fact, based on the analysis presented above, we have determined that it will contribute to the mission of the National Wildlife Refuge System and the purposes for which the refuge was established. Furbearer management through trapping on the refuge is a useful tool in maintaining balance between furbearers and habitat. High populations of predators can decrease the survival and nesting success of migratory birds, thus compromising the central purpose of the refuge. Trapping may provide survey and monitoring information that otherwise will be expensive and difficult to obtain using refuge resources; and potentially may contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained, experienced group of trappers, the Service can use their skills and local knowledge to perform or assist in valuable management or research functions. Trappers who participate could provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications; maintenance of the vigor and health of furbearer populations; and safeguarding the refuge infrastructure critical to habitat management for focal fish and wildlife species. Trapping also helps build appreciation for natural resources, ecological awareness, and support for the Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/13
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sean B. Kuhn 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunhaze Meadows National Wildlife Refuge

Use: Ice skating

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?		X
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: X

Appropriate:

Refuge Manager: Beth Ebbett

Date: 8/19/13

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Grabe W Taylor

Date: 9/11/2013

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Ice skating

Narrative:

Ice skating is not a priority public use of the National Wildlife Refuge System (Refuge System), as defined under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

Occasionally, conditions are such that ice skating on Sunkhaze Stream is tempting. Refuge staff have received reports that some people have participated in this use on the refuge in the past. Ice skating is generally safe on ponds and lakes in Maine when the winter is cold and the ice is thick enough. However, ice thicknesses over moving water are sometimes not uniform. Based on our evaluation, we have found ice skating not appropriate at Sunkhaze Meadows National Wildlife Refuge because it is not consistent with public safety. There is the potential for ice skaters to fall through areas of thin ice and become injured.

Finding of Appropriateness of a Refuge Use

Refuge Name: Sunxhaze Meadows National Wildlife Refuge

Use: Recreational gathering of blueberries, blackberries, strawberries, raspberries, cranberries, mushrooms, fiddleheads, and antler sheds

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate:

Appropriate: X

Refuge Manager: Beth Goettel

Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Grady Taylor

Date: 9/11/2013

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Recreational gathering of blueberries, blackberries, strawberries, raspberries, cranberries, mushrooms, fiddleheads, and antler sheds

Narrative:

Federal regulations (50 CFR 27.51(a) and 27.21) prohibit the destruction or collection of plants and the taking of plants or animals (except as allowed by regulated hunting) on national wildlife refuges. However, picking and gathering blueberries, raspberries, blackberries, cranberries, and mushrooms involves the removal of fruiting bodies only and does not harm the plants, which are left in place. Similarly, the removal of fiddleheads involves removing only some of the fronds as they sprout, similar to harvesting asparagus. Again, the plant itself is not destroyed or collected. Antler sheds are a discarded animal part; collecting these does not harm the deer or moose that have shed them.

The gathering of berries, mushrooms, fiddleheads, and antler sheds are historic uses of Sunkhaze Meadows National Wildlife Refuge (refuge) and have occurred continuously on refuge lands for decades. These uses are not priority public uses of the National Wildlife Refuge System, as defined by the Refuge System Improvement Act of 1997 (Public Law 105-57). However, the gathering of these materials can foster a connection to, and appreciation for, the area's natural resources, and they often occur concurrently with other public uses, including priority public uses. Current levels of these uses are low and we are not aware of any conflicts with other public uses or negative effects on refuge resources from these uses. This use only allows the collection of parts of plants and animals, such as berries and antler sheds, and not the collection of entire plants or wildlife.

We have determined that continuing to allow these uses is consistent with the environmental assessment prepared for the refuge's establishment (see page 35 in USFWS 1988), and with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

Reference:

U.S. Fish and Wildlife Service (USFWS). 1988. Final environmental assessment: proposal to establish Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 5. Newton Corner, Massachusetts.

COMPATIBILITY DETERMINATION

USE: Recreational Gathering of Blueberries, Blackberries, Strawberries, Raspberries, Cranberries, Mushrooms, Fiddleheads, and Antler Sheds

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

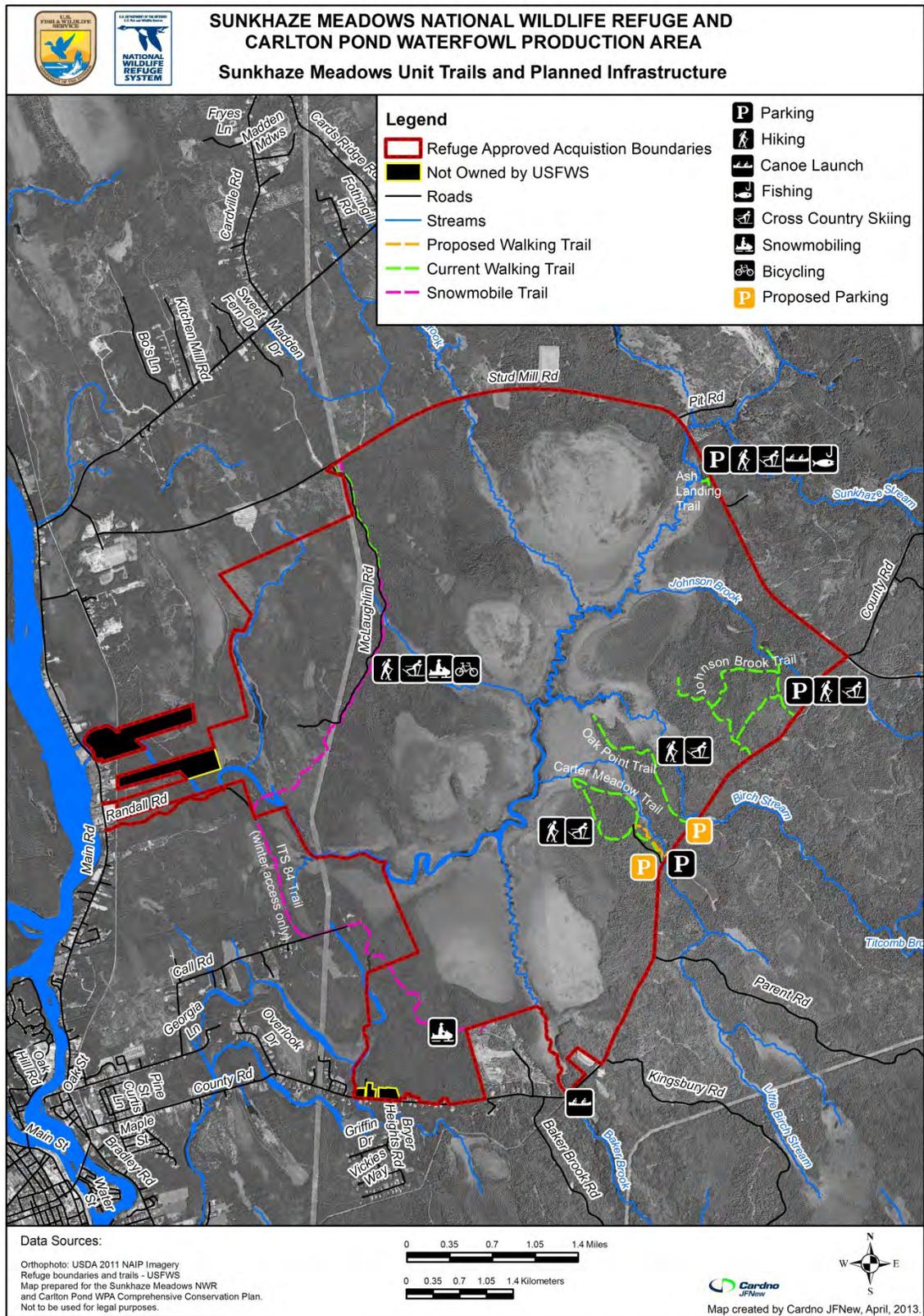
(a) What is the use? Is the use a priority public use?

The primary use is recreational gathering of blueberries, blackberries, strawberries, raspberries, cranberries, mushrooms, fiddleheads, and antler sheds. "Tipping," the collection of evergreen boughs for the making of wreaths, and the cutting of evergreens for Christmas trees is not included under this compatibility determination and is not allowed. This is not a priority public use of the National Wildlife Refuge System (Refuge System) under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the use be conducted?

The use will be allowed on the Sunkhaze Meadows Unit of the refuge (map B.10).

Map B.10. Areas open to gathering within the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR (see text for details).



(c) When will the use be conducted?

These uses are seasonal in nature, as they naturally occur. Antler sheds are typically found during the late winter to early spring. Fiddleheads are typically gathered in early spring. Blueberries, blackberries, strawberries, raspberries, and cranberries are typically gathered from July to September and mushrooms may be available at varying times during the growing season.

(d) How will the use be conducted?

Raspberries, strawberries, blackberries, and blueberries are found in refuge fields and woodlands. Cranberries are found in a few specific locations in the Sunkhaze Meadows bog. Visitors participating in this use park at refuge parking areas and walk along the Buzzy Brook, Oak Point or Johnson Brook Trails. Berry picking is often incidental to walking and hiking along these trails. The vast majority of berry picking occurs along the 8 miles of designated trails on the Sunkhaze Meadows Unit. These trails are located in the spruce-fir-deciduous upland that surrounds the Sunkhaze Meadows bog. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing). Some visitors may come specifically to engage in berry picking or other allowed collecting; this is one more way to engage the public in getting outdoors and observing wildlife. Berry pickers are limited to collecting only enough for personal or family consumption. Nearly all berries that are collected are consumed in the field. All areas of the refuge are open to this activity, but physical access to areas beyond the trail system is difficult and this rarely occurs. Biting insects discourage even the hardest visitors during the summer.

At the discretion of the refuge manager, some areas may be seasonally, temporarily, or permanently closed to gathering of natural materials if wildlife or habitat impacts, or if user conflicts become an issue. Furthermore, the refuge manager may modify daily and yearly limits of natural materials to be collected. No plants may be introduced or transplanted on refuge lands to promote recreational gathering of berries and no plants (other than mushrooms and fiddleheads) are to be removed from the refuge.

(e) Why is this use being proposed?

Gathering of these natural materials has occurred in the area for many years and this use was specifically requested by the public while we were developing the comprehensive conservation plan (CCP) for Sunkhaze Meadows NWR. Current use levels for this activity are very low and the use primarily occurs along roads and in disturbed areas like log landing and roadsides. This use is typically a family activity and provides an opportunity for families to connect with the natural environment. While people engage in this activity they often observe and gain an appreciation for wildlife and refuge habitats.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer this use are available within current and anticipated refuge budgets. Staff time associated with the administration of this use is primarily related to answering general questions from the public and monitoring impacts of the use on refuge resources. This activity is administered by the refuge staff which assesses interactions among user groups and any related user impacts. Resource impacts will be monitored by refuge staff, under the supervision of the refuge manager. The use of refuge staff to monitor the impacts of public uses on refuge resources, and visitors is required for administering all refuge public

uses. Therefore, these responsibilities and related equipment are accounted for in budget and staffing plans.

Costs associated with gathering natural materials are estimated below:

Law enforcement—patrol/visitor-resource protection/ public use monitoring/enforcement/outreach:	\$2,000	GS-9 Refuge Officer
Resource impacts/monitoring:	\$1,000	GS-11 Wildlife Biologist
Estimated Total Cost:	\$3,000	

ANTICIPATED IMPACTS OF THE USE:

The gathering of natural materials will have impacts to refuge resources that are similar to those discussed in the compatibility determination for wildlife observation, photography, environmental education, and interpretation. In general, visitors engaged in these uses will be traveling by foot, either by walking or hiking, in designated areas and along designated trails and roads. Visitors will likely engage in gathering natural resources while participating in priority public uses on the refuge. Engaging in priority public uses provides visitors with a better appreciation for and more complete understanding of the wildlife and habitats associated with the refuge. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service, as well as wildlife conservation in general.

The negative impacts of this use include impacts to plants, soils, hydrology, and wildlife from visitors walking and hiking on the refuge, we have described these impacts below; however, because most visitors gathering natural materials are also participating in other compatible public uses, we do not expect pedestrian impacts associated with this use to be additive.

Vegetation Impacts:

Pedestrian travel can have indirect impacts to plants by compacting soils and diminishing soil porosity, aeration, and nutrient availability that affect plant growth and survival (Kuss 1986). Hammitt and Cole (1998) note that compaction limits the ability of plants to re-vegetate affected areas. Repeated foot travel can directly impact plants by crushing the plants themselves. Rare plants with limited site occurrence are particularly susceptible to such impacts. Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss 1986). Moist and wet soil conditions are present at the refuge, particularly during spring and early summer.

It is anticipated that allowing this use will cause vegetation loss on designated routes. Foot travel may increase root exposure and trampling effects; however, it is anticipated that under current levels of use the incidence of these problems will be minor. Designated routes for pedestrian travel consist of existing trails, many with hardened surfaces or are existing trails that have been used for many years. Designated routes do not have any known occurrences of rare plant species on their surface that will be impacted by this use. Continuing pedestrian travel on these routes is not likely to cause any significant impacts to plants or plant communities.

People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. Once established, invasives can out-compete native plants, thereby altering

habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. Staff will work to educate the visiting public to reduce introductions and will also monitor and control invasives.

Soils Impacts:

Soils can be compacted and eroded as a result of continued use of pedestrian routes (Cole and Landres 1995). It is anticipated that some soil erosion will occur as a result of continuing pedestrian access on designated routes. Under current levels of use, impacts to soils (erosion, compaction) are not likely to be significant.

Hydrologic Impacts:

Roads and trails can affect the hydrology of an area, primarily through alteration of drainage patterns. It is anticipated that existing roads and trails will continue to influence hydrology regardless of pedestrian travel. Maintenance will be required to create adequate and proper drainage to avoid hydrologic impacts. Trail construction may also cause erosion and run-off of sediment into nearby waterways from exposed soils.

Since this unit is are fairly flat, erosion is not a large problem, but impacts to wet areas can occur when bridging is inadequate and visitors widen or go off the trail to avoid wet spots. Properly sited, designed, and maintained trails minimize this impact. Based on the current level of use, pedestrian travel is not likely to significantly increase erosion, incision, or stream alteration. Therefore, no significant hydrologic impacts are anticipated from this use.

Habitat Impacts:

Peatlands are particularly vulnerable to damage by visitors who may walk through them or collect plants. At Sunkhaze Meadows Unit, the peatlands are difficult to access due to the large area of wetlands that exist between the streams and the peat domes; there are no designated trails to access these sensitive areas. Plant collecting is also prohibited. Visitors wishing to see a bog can visit the boardwalks that access the nearby Orono Bog.

Wildlife Impacts:

Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. The responses of wildlife to human activities includes: avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). 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.” These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat.

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples 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) noted that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during the breeding season and winter months.

Trails can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased 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” (e.g., American robins (*Turdus migratorius*)) were found near trails and “specialist” species (e.g., grasshopper sparrows (*Ammodramus savannarum*)) were found farther from trails. Nest predation was also found to be greater near trails (Miller et al. 1998).

Visitors engaged in wildlife observation, photography, environmental education, and interpretation have the potential to impact shorebird, waterfowl, and other migratory bird populations feeding and resting near the trails during certain times of the year. Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Flight in response to disturbance can lower nesting productivity and cause disease and death.

Studying the effects of human visitation on waterbirds at J.N. “Ding” Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Herons and bitterns were quite tolerant of people; however, the presence of people did disturb these birds when hunting terrestrial prey. Great blue herons (*Ardea herodias*), tricolored herons (*Egretta tricolor*), great egrets (*Casmerodius albus*), and little blue herons (*E. caerulea*) were disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the Northeastern United States.

Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske et al. (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads in the Eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981, Klein et al. 1995, Burger and Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger and Gochfeld 1981, Burger et al. 1995, Knight and Cole 1995, Rodgers and Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986, Burger et al. 1995, Knight and Cole 1995). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998), though noise was not correlated with visitor group size (Burger and Gochfeld 1998).

There are no known federally listed threatened or endangered species occurring on the Sunhaze Meadows Unit; therefore, this activity is not expected to impact any threatened or endangered species here. Disturbance to other species is expected to be negligible. Trail use may discourage use of habitat by nesting birds very close to the trails, but the area impacted by trails is small

compared to the area available to wildlife away from any trail. In addition, wildlife observers and photographers generally seek to minimize disturbance, as it interferes with their activity.

Summary of Impacts:

We do not expect these disturbances to be significant, i.e. cause wildlife or habitats to be negatively impacted, since current and anticipated levels of use are low. Providing the opportunity for recreational gathering of natural materials on the refuge provides the public with an opportunity to observe wildlife and to view Service wildlife habitat management projects. There have been no indications that the current levels of limited harvesting of these natural materials causes problems for wildlife other than minimal and temporary disturbance caused by the mere presence of humans. Due to the great numbers of mosquitoes and other biting insects during this time period, the actual number of refuge visitors is quite low. Any berry picking that occurs is incidental and is usually limited to areas near roads and trails.

PUBLIC REVIEW AND COMMENT:

As part of the CCP process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

On the Sunkhaze Meadows Unit:

- A refuge officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.
- Refuge staff will promote good harvest practices through communicating with the public when new information on harvesting comes out. Example: when harvesting fiddleheads you should limit take of three heads per plant to ensure a healthy plant in the future (so the plant is not killed). No digging is permitted at any time.
- Refuge staff will continue to monitor the unit for the presence of federally threatened or endangered species and ensure this use continues to have an insignificant impact on wildlife. We may close some or all of this unit to this use if significant wildlife or habitat disturbance is identified.
- The Sunkhaze Meadows Unit will be open to this use during regular refuge hours, sunrise to sunset.

JUSTIFICATION:

Recreational gathering of these materials at the Sunhaze Meadows Unit will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. These uses do not adversely impact the wildlife and habitat protection aspects of the purposes because at the scales and level of current visitor use, wildlife and habitats are not appreciably negatively affected by these uses. We have made this determination based on lack of observed habitat degradation and because the use is focused around established trails. Recreational gathering of the specified materials will not materially interfere with or detract from the endangered species aspect of the refuge’s purposes, because there are no federally listed threatened or endangered species that occur on the refuge. Therefore, no significant adverse effects from this use are anticipated. Allowing these uses does not affect CCP goals and objectives as described in the refuge’s CCP (USFWS 2013) and may support the refuge’s purpose associated with allowing wildlife-oriented recreational opportunities. These activities will not materially interfere with or detract from the mission of the Service, because of the limited impacts to refuge resources and the opportunity to build support for the Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 9/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sam B. Kuhn 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunxhaze Meadows National Wildlife Refuge

Use: Boating

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate:

Appropriate: X

Refuge Manager: Beth Ebbett

Date: 8/19/13

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Grady W Taylor

Date: 9/11/2013

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Boating

Narrative:

Boating is an historic use of Sunkhaze Meadows National Wildlife Refuge (refuge) that occurred before the refuge was created. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the National Wildlife Refuge System (Refuge System). The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Motorized and non-motorized boating is an appropriate means of facilitating these priority public uses on the refuge since much of the refuge is only accessible by water. Jet skis will not be permitted on refuge waters due to their environmental impact, noise, speed, and excessive wildlife disturbance. There a currently no motor or speed limitations since the refuge waterways are so narrow and beaver dam obstructions limit their use. The use has been allowed on the refuge since it was established with no significant adverse effects observed. The staff will continue to monitor the use and could implement both motor and speed limitations if wake or speeds become harmful to wildlife or habitat, or in the interest of public safety.

By allowing this use, we are providing opportunities and facilitating refuge programs in a manner and location that offer high-quality, wildlife-dependent recreation and maintains the level of current fish and wildlife values. For these reasons, we have determined that allowing this use is consistent with the U.S. Fish and Wildlife Service policy on the appropriateness of refuge uses.

COMPATIBILITY DETERMINATION

USE: Boating

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

“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.”(16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

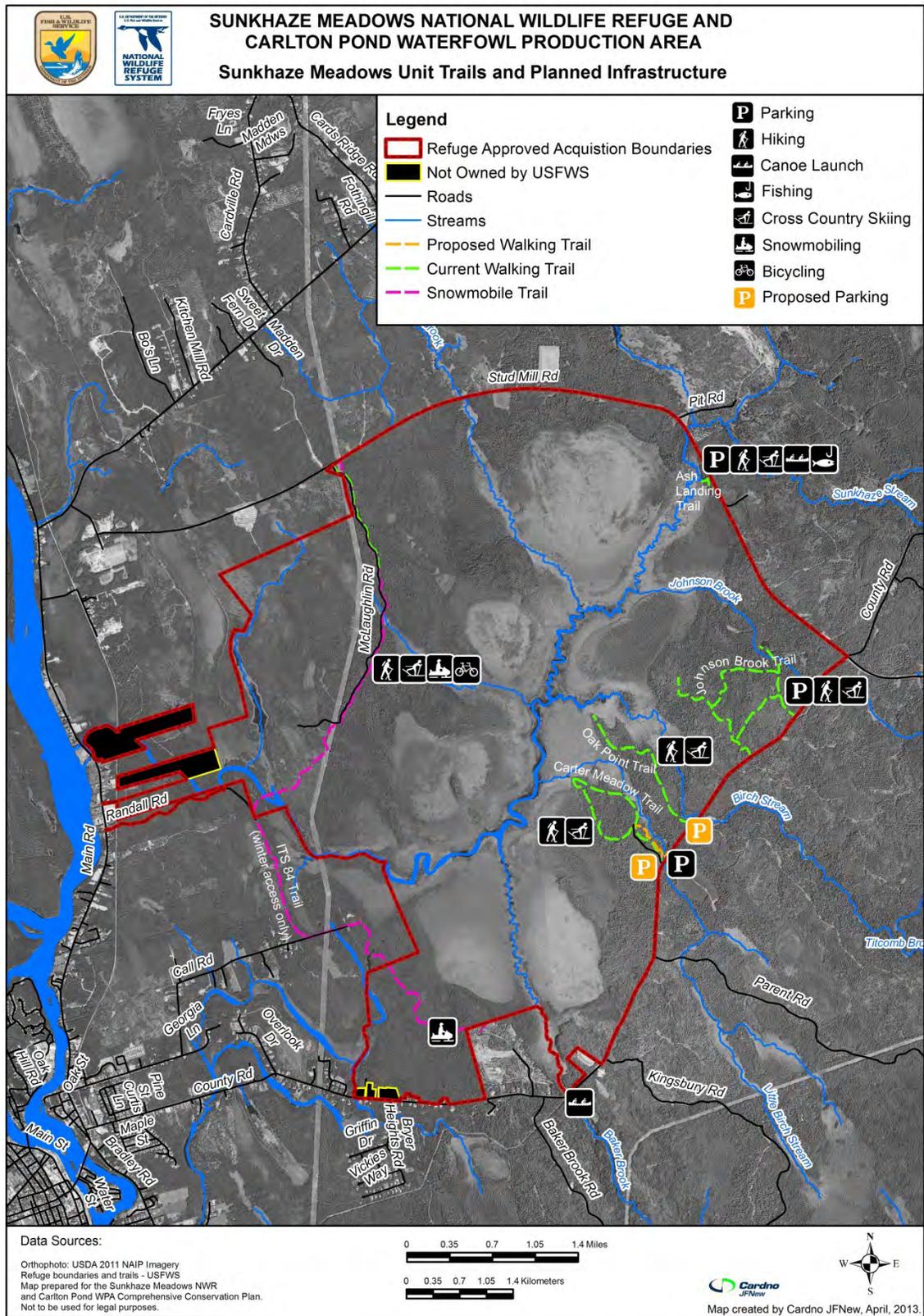
The use is motorized and non-motorized boating. Motorized and non-motorized boating are not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997, however they facilitate priority public uses.

Refuge visitors often use small boats, motorized and non-motorized, on refuge streams to access otherwise inaccessible portions of the refuge in support of fishing, hunting, environmental education, wildlife photography, and wildlife observation.

(b) Where will the use be conducted?

Motorized and non-motorized boating will continue to be allowed on all open waters within the Sunkhaze Meadows Unit of the refuge.

Map B.11. Sunkhaze Stream, its tributaries, and public use facilities within the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



(c) When will the use be conducted?

Motorized and non-motorized boating will be allowed year round when waters are ice-free from sunrise to sunset and one hour before and after sunset in support of hunting.

(d) How will the use be conducted?

Visitors will use parking lots at Ash Landing and on the Penobscot River off Route 2 near the mouth of Sunkhaze Stream. A trailhead kiosk is located at Ash Landing and a roadside interpretive display is located at the Route 2 site. At present, trailered boats can only be launched at the Route 2 site, and entry from there includes traversing a shallow area in the mouth of the stream, limiting boat and engine size most of the year; the exception will be when the Penobscot River floods in spring, backing up into the Sunkhaze Meadows and flooding it. At that time, larger boats with 25 horse power engines may use the area. Canoes and kayaks launched from the Route 2 site have a long way to paddle on the Penobscot to get to the mouth of Sunkhaze Stream. At Ash Landing, boats and motors must be carried a small distance from the parking lot to reach the stream. In addition, the upper portion of Sunkhaze Stream south of Ash Landing contains a dozen or so beaver dams to be passed over. These conditions generally limit the size of boats using the stream within the refuge to john boats, canoes, and kayaks, with no, or relatively small motors.

All boats launching or landings on refuge lands must follow State boating regulations and, if applicable, show State registration. Maine Statute Title 38: 419B-420 prohibits the transport of any aquatic plant or parts of any aquatic plant, including roots, rhizomes, stems, leaves or seeds, on the outside of a vehicle, boat, personal watercraft, boat trailer or other equipment on a public road. The public should inspect all boats and boat trailers and clean them of aquatic invasive species before launching at refuge sites. That cleaning should take place on dry ground well away from the water. Nonnative, invasive plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively affect native fish and plant species. Sunkhaze Stream and its associated tributaries appear to be relatively free of aquatic invasive plants, and cleaning boats, trailers, and other equipment will help to keep them that way. Signs, public outreach, and periodic enforcement will help educate and remind the public of the importance of inspecting and cleaning watercraft and Maine State laws prohibiting transport of aquatic plants.

(e) Why is the use being proposed?

Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System. Where these uses are determined to be compatible, they are to receive enhanced consideration over other uses. Motorized and non-motorized boating facilitate these priority public uses. By allowing this use, we are providing opportunities and facilitating refuge programs in a manner and location that offer high quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values. Most of the refuge will be inaccessible to the public without using a boat. This use may also provide individuals with a connection to the natural world and an increased appreciation of natural resources, in addition to exposing them to the Refuge System.

AVAILABILITY OF RESOURCES:

Facilities or materials needed to support boating include annual maintenance of the parking and trail at Ash Landing, signing and monitoring of boating access points including the launch on Route 2, and routine law enforcement patrols. The refuge plans to upgrade the hand carry boat launch and access trail at Ash Landing which is a funded project in the 2012 budget. These costs (\$7,000) are not included in the budget projection for public fishing and will be a one year cost.

Annual maintenance for parking area and trail to Ash Landing boat launch:	\$500
Signing and monitoring boat access sites:	\$300
Law enforcement patrol:	\$2,000
Update interpretive/informational trailhead signage	\$600
Estimated Program Cost:	\$3,400

ANTICIPATED IMPACTS OF THE USE:

Accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to fishing boats: With the exception of a few isolated occurrences of purple loosestrife, refuge waters appear to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys of aquatic invasive species. We can mitigate the potential for introductions by having boaters clean their boats before launching and after retrieving. We will also post launch sites with educational materials and have law enforcement officers make courtesy spot checks of vessels for compliance and to educate boaters on proper methods for checking for aquatic hitchhikers.

Disturbance of wildlife: Boating seasons in Maine coincide in part with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Anglers and other boaters may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting in egg mortality. If this becomes a problem we will close refuge areas seasonally to boating around sensitive nest sites, in conjunction with the state of Maine if necessary.

Though motorized boats generally have a greater impact on wildlife, even non-motorized boats can alter distribution, reduce use of particular habitats by waterfowl and other birds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). However, compared to motorboats, canoes and kayaks appear to cause fewer disturbances to most wildlife species (DeLong 2002). The refuge waterways restrict motor and boat size due to the number of beaver dams you must cross. The only time a larger boat can access the refuge is during spring flood, before most migratory species have arrived. If we encounter problems in the future, we could implement a size limit; thus far it has not been an issue and most people don't use a motor due to the hassle.

Negative impacts on water quality from motorboat and other pollutants, human waste, and litter: Extensive water quality testing on Sunkhaze Stream and its tributaries has not been carried out. The levels of pollutants from boat fuel and impacts on local aquatic systems are unknown. Hydrocarbon contamination can be harmful to fish. Currently most boating is non-motorized so we feel there is little contamination coming from this source. We will initiate public outreach and education on littering, pollutants, and proper waste disposal if the use increases substantially above current use levels to help mitigate water quality impacts. Water quality testing will be carried out as funding levels permit.

Bank and trail erosion from human activity (boat landings, boat wakes) may increase aquatic sediment loads of streams and rivers, or alter riparian or streamside habitat/vegetation in ways harmful to fish or other wildlife. Boat access will be restricted to designated areas only. The trail

to the Ash Landing boat launch will be ‘hardened’ to further reduce any erosion potential. Therefore, at current levels of use, we do not expect trail erosion to increase because of foot traffic related to boating. The majority of boat use that occurs on the refuge is non-motorized through the use of canoes and kayaks. When motors are used they are either low horsepower or electric trolling motors, therefore we do not anticipate any significant bank erosion due to boat wakes.

Negative impacts from fishing boats and foot traffic to sensitive wetlands or peatlands and rare wetland plants: Boat access sites and trails are located away from sensitive wetlands, peatlands, and rare plants.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Boating access areas have been designated and signed.
- Refuge staff will continue to monitor the refuge for the presence of threatened or endangered species and ensure that boat use has no significant impact on them. If needed in the future, closure of any stream or portion thereof will be coordinated with the State of Maine which maintains jurisdiction in navigable waters.
- Motor or speed limitations could be implemented if wake or speeds become harmful to wildlife or habitat, or in the interest of public safety.
- Jet skis will not be permitted on refuge waters due to the potential for environmental impact, noise, speed, and excessive wildlife disturbance.
- All boats, trailers, motors, and fishing gear will be encouraged to be inspected by the owner for plant material and cleaned prior to launching and after retrieval.
- Compliance with regulations will be achieved through education, signage and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife.
- The refuge will be open to this use during regular refuge hours, sunrise to sunset.

JUSTIFICATION:

While boating is not a priority public use of the National Wildlife Refuge System (The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997), it does facilitate priority public uses, particularly at the Sunkhaze Meadows Unit which largely consists of wetlands and streams.

Allowing boating at Sunkhaze NWR will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, boating is a use that supports wildlife-dependent priority public uses with minimal adverse impacts on refuge resources. Use by boaters is estimated to be less than 700 visits per year. Due to numerous other opportunities in the area, the demand for boating is expected to be relatively constant in the future. Waterfowl use tributary stream and pothole habitats in the meadows portion of the refuge more heavily than Sunkhaze Stream where most boating occurs, so minimal and temporary disturbance of waterfowl is anticipated from boating activity there. Erosion of stream banks by wakes from motorized boats is insignificant since most boating is non-motorized and dense vegetation and thickly matted roots protect the bog edge. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

Boating will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from boating are anticipated. By supporting priority public uses, allowing this use supports CCP goals and objectives as described in the refuge's CCP (USFWS 2013) and the refuge's purpose associated with allowing wildlife-oriented recreational opportunities. This activity will not materially interfere with or detract from the mission of the Refuge System, because of the limited impacts to refuge resources, it facilitates priority public uses, and the opportunity to attract visitors to the refuge and build support for the Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/13
(Signature) (Date)

CONCURRENCE:

Regional Chief: Scott B. Kahn 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunxhaze Meadows National Wildlife Refuge

Use: Privately owned recreational cabin

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: **Appropriate:** X

Refuge Manager: Beth Goettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graban W Taylor Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Privately-owned recreational cabin

Narrative:

The Spruce cabin is one of five cabins that were on Sunkhaze Meadows National Wildlife Refuge (refuge) at the time of its establishment. The cabin has occupied leased land from Diamond Occidental Forest Inc., the previous landowner, for many decades. We phased out the other four private cabins as the historic lease holders declined the option to obtain or renew their special use permits (SUP). One cabin was purchased during refuge acquisition, and the other three were purchased in the years following refuge establishment. One privately-owned cabin remains. We manage this use by issuing a SUP and charging the owner an annual fee. The fee is adjusted annually to reflect changes in the cost of living. As part of phasing out use of private cabins, we do not intend to issue SUPs to anyone but the present owner. We expect to purchase this last cabin when the owner is no longer interested in renewing the annual SUP. In the meantime, this use has little impact on refuge management activities, wildlife, or wildlife habitat since the site has been occupied for nearly 100 years. As documented in this form, continuing to allow this use is consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

COMPATIBILITY DETERMINATION

USE: Privately-owned Recreational Cabin

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is the occupancy and use of a privately-owned recreational cabin. It is not a priority public use of the National Wildlife Refuge System, under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

The cabin is one of five cabins that were on the refuge at the time of its establishment. The cabin has occupied land leased from Diamond Occidental Forest Inc., the previous landowner, for many decades. We phased out the other four private cabins as the historic lease holders declined the option to obtain or renew their special use permits (SUP). One cabin was purchased during refuge acquisition, and the other three were purchased in the years following refuge establishment. A single cabin remains, which is managed through the issuance of a SUP and charging of an annual fee. The fee is adjusted annually to reflect changes in the cost of living. As part of phasing out the use of private cabins, we do not intend to issue SUPs to anyone but the present owner. We expect to purchase this last cabin when the owner is no longer interested in renewing the annual SUP.

(b) Where will the use be conducted?

The use will occur at the cabin site located on Carter Meadow Road just north of the County Road in the town of Milford.

(c) When will the use be conducted?

The cabin is occupied sporadically throughout the year with highest use occurring during the summer months. The cabin has been used during these times at this site for almost 100 years.

(d) How will the use be conducted?

Under Service land ownership, the use and occupancy of this camp will be administered through the issuance of an SUP, the conditions of which are analogous to the former lease. We will review and issue the permit annually. The annual fee is adjusted annually to reflect changes in the cost of living. The cabin owner is allowed to access the cabin off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

As part of phasing out use of private cabins, we do not intend to issue SUPs to anyone but the present owner. We expect to purchase this last cabin when the owner is no longer interested in renewing the annual SUP.

(e) Why is the use being proposed?

This use existed before refuge ownership and has been managed in this manner since refuge establishment in 1988. At the time of Service acquisition from Diamond Occidental Forest Inc. there were five cabins, built by families that were leasing the underlying land. Since refuge establishment, the Service has purchased four of the cabins and phased them out. By working with the last cabin owner, the Service is following through on earlier commitments which were made at the time of sale.

AVAILABILITY OF RESOURCES:

The refuge staff time associated with administering this use primarily relates to processing annual permit fees, answering the questions of the cabin owner concerning conditions of the permits, monitoring compliance with those conditions, and monitoring potential impacts of the use on refuge resources and visitors. Costs associated with administration of this use include:

Reviewing SUP conditions, landowner contacts:	\$100	GS-13 Refuge Manager
Issuing SUP:	\$30	GS-6 Administrative Assistant
Cabin Monitoring:	\$200	GS-9 Refuge Officer
Total:	\$330	

Based on a review of the budget allocated for management of this cabin, funding is adequate to ensure compatibility, and to administer and manage the use listed. Our existing staff and budget have provided sufficient resources to manage this use historically.

ANTICIPATED IMPACTS OF THE USE:

This cabin site has little impact on refuge management activities, wildlife, or wildlife habitat since the site has been occupied for nearly 100 years. The cabin is located along a road which provides walking access to Carter Meadow Trail which is adjacent to the cabin. Activities by the

cabin owner do not differ substantially in intensity from those of the general public in allowed, daily uses. The occasional occupancy of the cabin could disturb resident wildlife, such as chipmunks, squirrels, mice, skunks, and a few species of songbirds, but these impacts will be temporary, localized, and not significant. No impacts are expected on any threatened or endangered species, whether federally or State listed species.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

The conditions for the SUP for the cabin will be reviewed annually to ensure continued compatibility. Current conditions of the permit include:

- The permittee is responsible for removing all trash from the refuge and disposing of it in approved trash dumps.
- Refuge staff will inspect the cabin site at least once a year to ensure that all provisions and conditions of the SUP are being followed. If conditions are not being met, the permittee will be notified in writing and given a minimum of 30 days to comply. Failure to do so will result in revocation of the permit.
- The permittee is responsible for the payment of personal property tax as assessed by and to the town of Milford, Maine. Failure to pay will result in revocation of the permit.
- The permit does not grant the permittee the right to erect any additional buildings or improvements to the cabin site without prior notification and approval of the refuge manager.

JUSTIFICATION:

This use has been determined to be compatible, provided that the conditions of the SUP are implemented. The use will not pose significant adverse effects on trust species or other refuge resources, will not interfere with public use of the refuge, or cause an undue administrative burden. For these reasons, we have determined that continuing to allow this use on the refuge will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System or the purposes for which the refuge was established

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sean B. Kuhn 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

Finding of Appropriateness of a Refuge Use

Refuge Name: Sunhaze Meadows National Wildlife Refuge

Use: Bicycling

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate:

Appropriate: X

Refuge Manager: Beth Lobette

Date: 8/19/13

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Gabe W. Taylor

Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Bicycling

Narrative:

Bicycling is an historic recreational use of Sunkhaze Meadows National Wildlife Refuge (refuge) that occurred before the refuge was created, and has occurred on the refuge since its establishment. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the National Wildlife Refuge System (Refuge System). The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Bicycling can facilitate these priority public uses and provide the public with an additional way to enjoy the great outdoors. This use is also consistent with the environmental assessment prepared for the refuge's establishment (USFWS 1988, pg. 35). Current levels of this use are low and not expected to increase substantially. No adverse impacts have been observed.

For these reasons, we have found that continuing to allow this use is consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

Reference:

U.S. Fish and Wildlife Service (USFWS). 1988. Final environmental assessment: proposal to establish Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 5. Newton Corner, Massachusetts. 56 pp.

COMPATIBILITY DETERMINATION

USE: Bicycling

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

Allow bicycling at Sunkhaze Meadows NWR, only on McLaughlin Road. This use is not a priority public use of National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

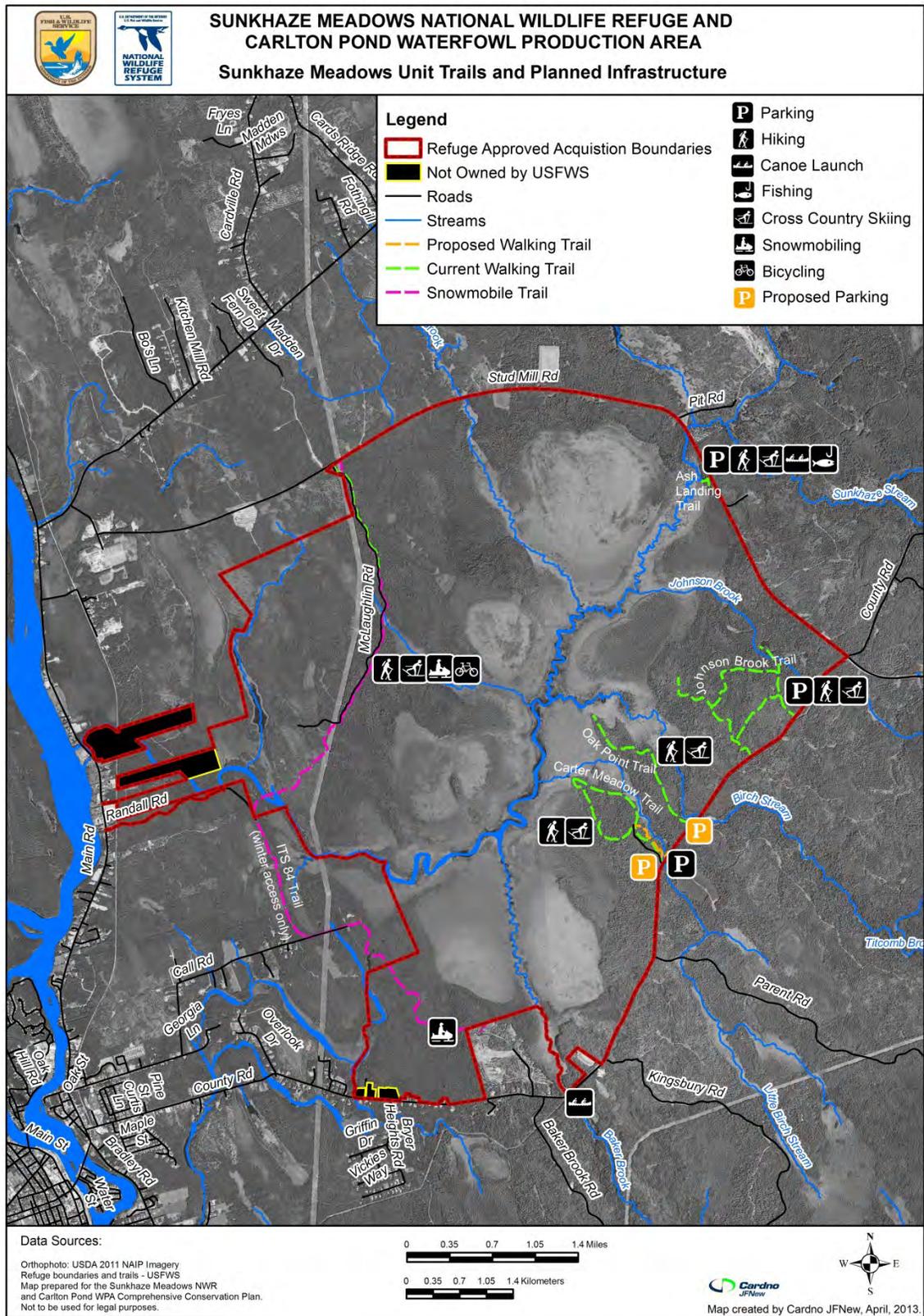
(b) Where will the use be conducted?

Bicycling will be limited to the dirt-surfaced McLaughlin Road, where this use has been allowed in the past. Bicycling on the hiking trails or off-trail will not be allowed.

(c) When will the use be conducted?

Use will be allowed during the refuge's normal open hours. The refuge is open daily sunrise to sunset. People bicycle in every season except winter, when snow cover impedes this activity. There is a locked gate on the McLaughlin Road intended to exclude cars and trucks to protect the road, especially during mud season, but bicycles will be able to pass. This gate is left open during the hunting season.

Map B.12. Trail where bicycling is authorized at the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



(d) How will the use be conducted?

Bicyclists will either drive with bikes on car racks and park at Ash Landing, or ride for many miles on other dirt roads to get to the McLaughlin Road. The use will be self-regulating, with signs and brochures indicating the availability of this road for this use. Should damage be caused from bicycles using the road when it is very muddy, signs will be put up to close the road to bicycles during particularly muddy time periods. If bicyclists go on trails closed to bicycling or off-trail, our law enforcement officer will enforce refuge restrictions.

Groups of 10 cyclists or more will be required to obtain a special use permit (SUP), allowing the refuge to monitor how much of this kind of use is occurring. No motorcycles or engine powered cycles of any kind will be allowed.

(e) Why is the use being proposed?

This is an ongoing use of the refuge, and has been occurring without any evidence that it is disruptive or causing any damage. Bicyclists currently bike on the dirt roads bordering and surrounding the Sunhaze Meadows Unit, County Road and Stud Mill Road. Allowing bicycling on the dirt McLaughlin Road increases their options and introduces them to the refuge, encouraging them to engage in wildlife observation. Allowing it will encourage those people who enjoy the outdoor sport of bicycling to visit the refuge and enjoy it.

AVAILABILITY OF RESOURCES:

The refuge maintains the McLaughlin Road for other management purposes. Allowing occasional bicycles on this road will not increase the maintenance or operational needs.

Law Enforcement Patrol:	\$800
Estimated Total:	\$800

Based on a review of the budget allocated for management of this activity, I certify that funding is adequate to ensure compatibility, administer and manage the use listed. Our existing staff and budget have provided sufficient resources to manage this use historically.

ANTICIPATED IMPACTS OF THE USE:

Bicycling has the potential to affect a variety of migratory and resident wildlife and their habitats. Possible negative effects include disturbing wildlife, removing or trampling vegetation, littering, vandalism, and entering closed areas. Refuge staff will monitor the impacts of this use on McLaughlin Road to assess potential negative effects. In the event of persistent disturbance to habitat or wildlife, the activity will be restricted or discontinued.

Impacts on Soils:

Bicycle wheels can cause physical impacts to soil surfaces. Cessford (1995) notes the shearing action of wheels creates damage to roads and trails, which increases when 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). Since McLaughlin Road is relatively flat and is a hardened

surface (gravel and compacted dirt) designed to withstand truck traffic, this is not expected to be a major problem.

Impacts on Hydrology and Water Quality:

This use has the potential to introduce soil sedimentation from bicycling into small streams and wetlands. The refuge minimizes adverse effects on water resources in a variety of ways. Refuge staff routinely monitor McLaughlin Road for damage and remediate problem areas as needed. These activities include maintenance of culverts, adding gravel and grading as necessary to control ruts, and brushing-in areas where “bootleg” trails are becoming evident. Through regular maintenance refuge staff will ensure any potential negative effects are avoided or minimized

As noted above, sedimentation problems will be minimized because McLaughlin Road is relatively flat and has hardened surfaces. Impacts will be more severe if cyclists go off road on existing trails or create “bootleg” trails. These activities are not allowed and will be dealt with by law enforcement.

Impacts on Vegetation:

Bicycle use can cause compaction of presently uncompacted soils, particularly when soils are wet, which can degrade plant communities associated with fragile organic soils. Soil compaction can diminish the soil porosity, aeration, and nutrient availability. These directly affect plant growth and survival (Kuss 1986). Compaction can also limit the re-colonization of areas due to increased difficulty for root growth and penetration in the affected soils (Hammit and Cole 1998). Kuss (1986) found plant species adapted to wet or moist habitats are the most sensitive, and increased moisture content reduces the ability of the soil to support recreational traffic.

It is anticipated that bicycling will have no impacts on refuge plant communities, since bicycling is restricted to the road surface where the soil is already compacted and there are no plants. No rare plants have been documented in habitat adjacent to McLaughlin Road. Impacts of off-trail bike riding can be minimized through proper law enforcement.

Exposed soil and an abundance of sunlight along roads and trails provide ideal conditions for the establishment of invasive plant species. Bicycle use may impact vegetation and create bare soil conditions, thus creating conducive conditions for invasive species growth. Invasions result from the use of foreign material to construct and maintain roads and trails, and from seed transport via visitors and vehicles traveling on roads and trails.

Invasive plants, if allowed to establish and spread, can cause major damage to native plant assemblages and the wildlife they support. We will monitor for invasive species and control or eliminate them annually. We will take proper care in cleaning and maintaining all refuge equipment to avoid introduction or transport of invasive plants through refuge- or volunteer-based trail maintenance programs. Based on current monitoring results, invasive species presence along McLaughlin Road is low. Therefore it is likely that the current levels of bicycle use and all other public uses permitted here are not causing significant increases in invasive plants relative to the current vegetative community on designated routes.

The refuge minimizes adverse effects on vegetation in a variety of ways. Refuge staff routinely monitor McLaughlin Road for damage and remediate problem areas as needed. Staff and volunteers also monitor the refuge for the presence of invasive species with the intent of controlling or eliminating them. Because bicycle use is limited to an existing road of packed earth or gravel, direct effects of vegetation impacts will be minimal.

If future evidence of unacceptable adverse impacts appears, we will close McLaughlin Road to this use.

Impacts on Wildlife:

Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year that human activities occur. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Mammals may become habituated to humans making them easier targets for hunters. Disturbance can cause shifts in habitat use, abandonment of habitat and increased energy demands on affected wildlife (Knight and Cole 1991).

The effects of roads and trails on plants and animals are complex and not limited to the trail width. Trail use can disturb areas outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). 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 roads and trails, where common species (e.g., American robins) were found near trails and rare species (e.g., grasshopper sparrows) were found farther from trails. Songbird nest failure was also greater near trails (Miller et al. 1998).

Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, makes males rely more heavily on physical deterrents in defending territories, which are time- and energy-consuming (Ewald and Carpenter 1978).

Noise caused by visitors resulted in increased levels of disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998), though noise was not correlated with visitor group size (Burger and Gochfeld 1998).

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 can compound the effect of disturbance on wildlife. Examples 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. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during breeding season.

Wildlife associated with aquatic habitats may also be affected by bicycles on trails. Impacts may be indirectly caused by erosion and subsequent sedimentation of streams and vernal pools as a result of poorly designed trails and bicycle travel over bare soils and around drainages. Increased sediment loads can reduce aquatic vegetation and dissolved oxygen concentrations (Sadoway 1986). Sedimentation can directly kill aquatic invertebrates, affecting the success of amphibian larvae and adults (Sadoway 1986). Observations by refuge staff in 2002 document numerous occurrences of amphibian egg masses that failed after becoming coated in sediment from eroding trails and roads nearby. Bartgis and Berdine (1991) report that sedimentation was damaging habitat in Canaan Valley and could cause impacts to rare plants, impair water quality and possibly affect habitat of the southern water shrew (*Sorex palustris punctulatus*), a State species of concern. This was a direct result of vehicle use and road construction prior to the refuge's acquisition of the property. Trail work conducted since 2002 has begun to address sedimentation and erosion issues on refuge trails. Because trails designated for bicycle use are upland areas or locations of existing (compacted) logging roads, the use of bicycles is not expected to significantly increase erosion or sedimentation problems. Through proper trail maintenance and construction, trail drainage will be improved to minimize the effects of erosion and sedimentation on wildlife.

Short-term localized adverse impacts to fish populations also may result from soil erosion and sedimentation into refuge waterways associated with this activity. Long-term adverse impacts from increased trail miles and trail use might pose another concern to refuge fisheries. Trails that have stream and river crossings will likely degrade over time with increased use and contribute to downstream sedimentation and turbidity, which has been found to be a stressor to brook trout (Sweka and Hartman 2001) and reddsides (Holm and Crossman 1986) populations that are sensitive to habitat degradation.

Anticipated impacts of bicycle use on wildlife include temporary disturbances to species using habitats on the trail or directly adjacent to the trail. Bicycle use typically only occurs from spring through fall and usually when the ground is dry. It is restricted to McLaughlin Road, thus impacting only a small area of the refuge. Only a relatively small number of cyclists are believed to be using the road, although on occasional nice days in fall the use may be significant. Use of the roads may cause direct impacts such as mortality (e.g., crushing amphibians) or nest abandonment of bird species nesting on trails. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time.

The refuge also recognizes that large group sizes may amplify negative effects to wildlife; therefore, groups larger than 10 are required to notify the refuge prior to visiting to obtain a SUP.

We will take all appropriate measures to avoid or minimize any negative effects. We will evaluate the road periodically to prevent habitat degradation. If there is evidence of unacceptable adverse impacts on wildlife, we will limit this use as deemed appropriate. We will post and enforce refuge regulations, and establish, post, and enforce closed areas as needed. Based on the information provided above, this use is not anticipated to significantly increase wildlife habitat fragmentation or cause significant impacts on wildlife through disturbance.

Impacts on Threatened and Endangered Species:

No impacts are expected on any threatened or endangered species, whether Federal or State listed. No critical habitat has been identified in the vicinity of McLaughlin Road. There has been no indication that bicycling on this road in Sunkhaze Meadows NWR causes problems for wildlife other than minimal and temporary disturbance caused by the mere presence of humans.

Summary:

Bicyclists must either drive with bikes on car racks and park at Ash Landing, or ride for many miles on other dirt roads to get to the McLaughlin Road, so current use is light and not expected to dramatically increase. Bicycles going off-trail can cause significant soil erosion and damage to vegetation, but since bicycles will be limited to a flat road designed to support trucks, we do not expect any additional impacts of this kind to occur.

Any effects of bicycling on designated roads and trails are not considered, separately or cumulatively, to constitute significant short-term or long-term impacts. Assessment of potential future impacts was based on available information and current and anticipated level and pattern of use. The current use is viewed as an effective and justifiable method of travel that allows the public to discover, experience, and enjoy priority public uses on the refuge. Monitoring will identify any actions needed to respond to new information (adaptive management) and correct problems that may arise in the future

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Bicycling will be restricted to McLaughlin Road and not allowed on hiking trails or off road.
- Compliance with regulations will be achieved through education, signage and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife.

- The refuge will be open to this use during regular refuge hours, sunrise to sunset.
- If significant impacts are found, corrective actions (for example, closing the road to this use during mud season) will be taken.

JUSTIFICATION:

While bicycling is not a priority public use of the National Wildlife Refuge System (The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997), it is an existing use at Sunkhaze Meadows NWR, with no history of significant negative impacts. The Service and the Refuge System maintain goals of providing opportunities to view wildlife. Allowing the use of McLaughlin Road for bicycling may facilitate wildlife observation. These users may take the time to learn more about the refuge and become, or already be, supporters of the Refuge System.

Allowing bicycling at Sunkhaze NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, bicycling is an historic use of Sunkhaze Meadows NWR. Because this use is restricted to McLaughlin Road, away from sensitive wetland habitats and wildlife and the current and projected levels of the use are low, we anticipate that this use will have only negligible, minor, and temporary impacts on refuge resources. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Bicycling will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from dog walking are anticipated. This activity will not materially interfere with or detract from the mission of the Refuge System because of the limited impacts to refuge resources and the opportunity to reach other users as supporters of the Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Scott B. Kula 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Dog walking on trails

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel

Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graham Taylor

Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Dog walking on trails

Narrative:

Dog walking has been authorized on Sunkhaze Meadows National Wildlife Refuge (NWR, refuge) for many years. Many people who enjoy walking on refuge trails (including the Sandy Stream and Benton Unit trails) bring their canine companions along with them. Although dogs can increase disturbance to wildlife, the refuge enforces a leash restriction to keep the dog localized and under control at all times by the pedestrian. Limiting dog walking to trails will also keep potential disturbance to a minimum. No adverse impacts have been observed in the past and current levels of this use are low and are not expected to increase substantially. Continuing to allow this use will provide the public with additional options for enjoying the great outdoors and possibly introduce new people to Sunkhaze Meadows NWR and the priority use of wildlife observation. For these reasons, we have determined that allowing dog walking on the refuge is consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

COMPATIBILITY DETERMINATION

USE: Dog Walking on Trails

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is dog walking. Dog walking is not a priority public use of National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

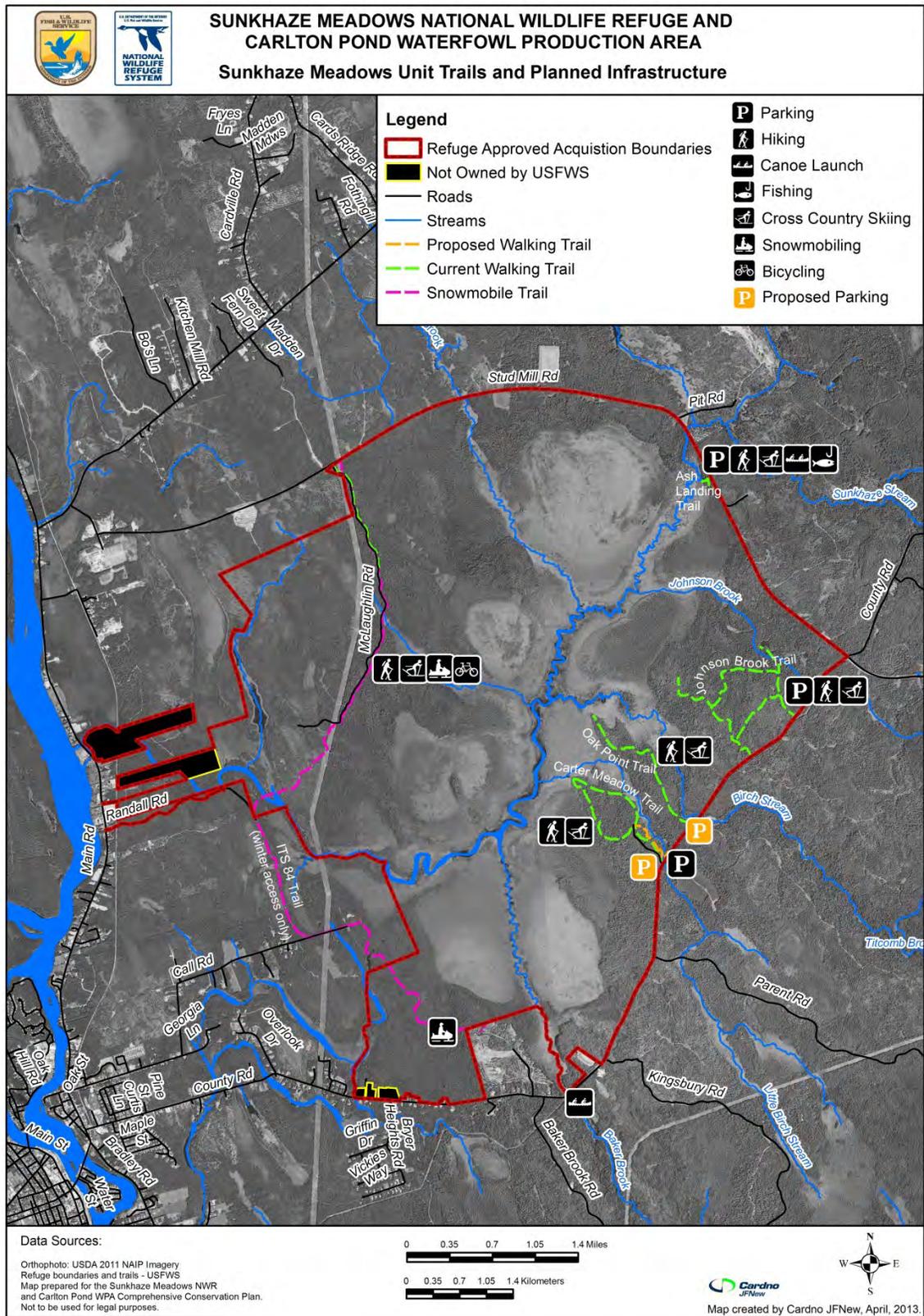
(b) Where will the use be conducted?

Dog walking will be permitted on refuge trails and McLaughlin Road at the Sunkhaze Meadows, Benton, and Sandy Stream Units.

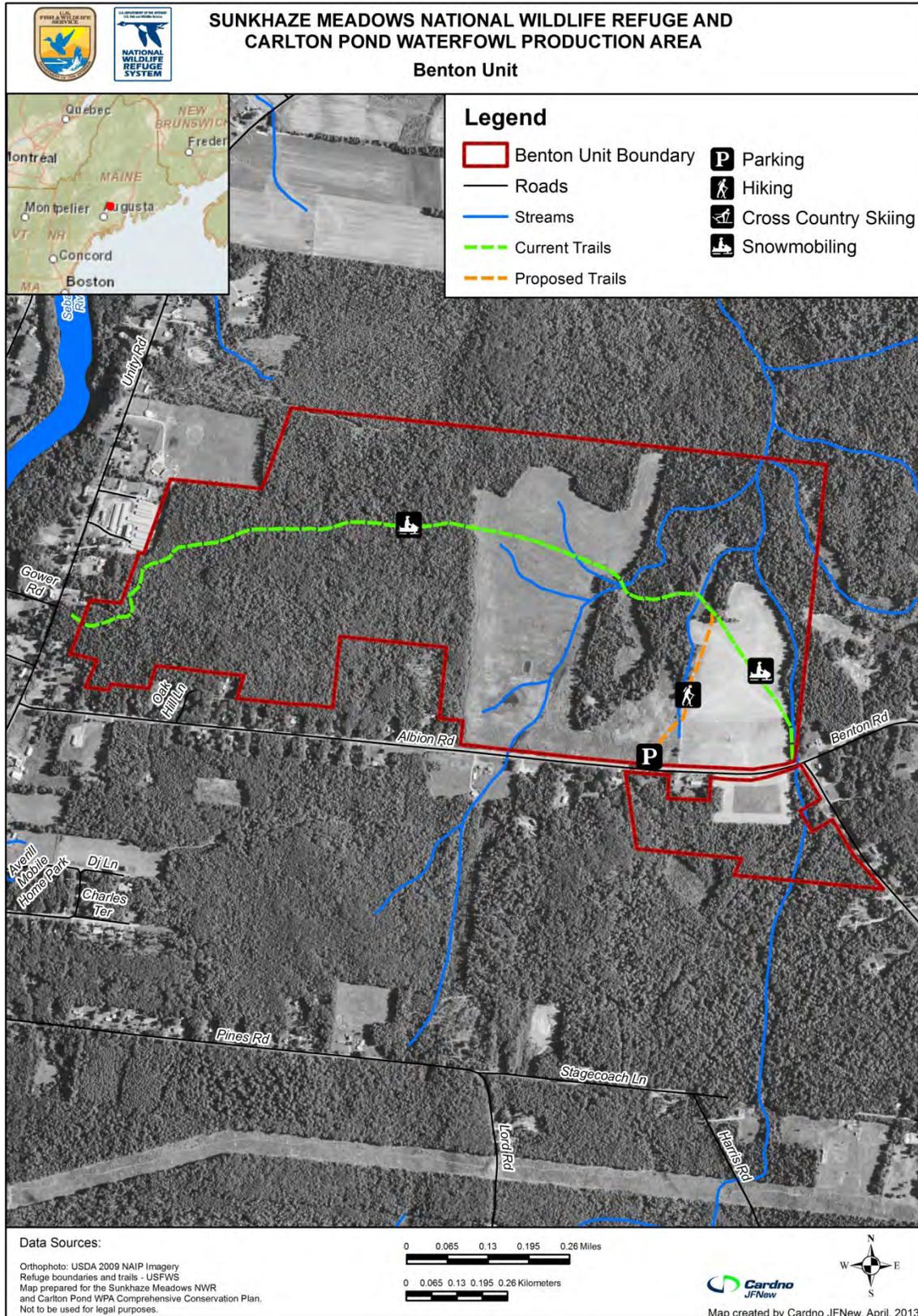
(c) When will the use be conducted?

Dog walking will be allowed throughout the entire year, during the refuge's normal open hours. The refuge is open daily sunrise to sunset.

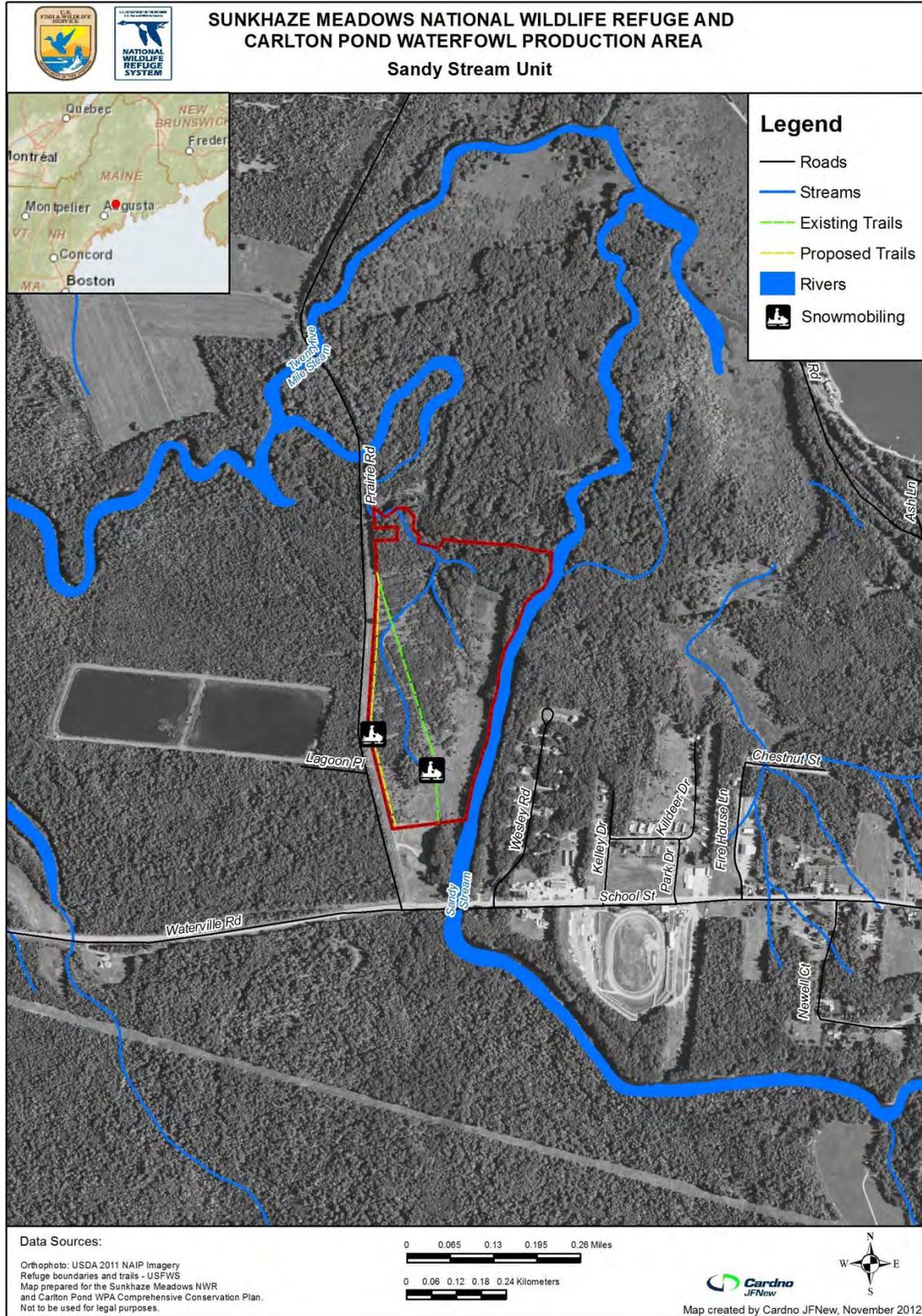
Map B.13. Roads and trails within the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR (dog walking is authorized on established roads and trails).



Map B.14. Trails within the Benton Unit of Sunkhaze Meadows NWR (dog walking is authorized on established trails).



Map B.15. Trail within the Sandy Stream Unit of Sunkhaze Meadows NWR (dog walking is authorized on the established trail).



(d) How will the use be conducted?

Dog walkers will be allowed to walk their dogs only when the dog is attached to a 6-foot (or shorter) leash and the dog walker is in control of the leash and dog at all times. This leash requirement will be enforced to minimize wildlife and visitor disturbance. All dog walkers with properly leashed dogs will be restricted to refuge trails and the McLaughlin Road.

(e) Why is the use being proposed?

This is an ongoing use of the refuge, and has been occurring without any evidence that it is disruptive or causing any damage. It has been a long time tradition for residents of the local community to use these portions of the refuge for this activity building strong local support and allowing an excellent opportunity to educate dog walkers about the refuge and the National Wildlife Refuge System.

AVAILABILITY OF RESOURCES:

Except for maintaining and periodically updating existing signs explaining the regulations, minimal costs will be involved. Monitoring of the site for compliance will continue, but will not require significantly more resources beyond those already necessary to patrol the area for compliance with current regulations. Compliance with the leash law is within the regular duties of the Refuge’s Law Enforcement Officer. The financial and staff resources necessary to provide and administer this use at its current level and at the level described in the final CCP are now available and we expect them to be available in the future. The annualized cost associated with the administration of pedestrian travel on the refuge is estimated below:

Providing information to the public and administration needs	\$1,000
Resource impacts and monitoring	\$1,000
Estimated Total:	\$2,000

Based on a review of the budget allocated for management of this activity, funding is adequate to ensure compatibility, and to administer and manage the use listed. Our existing staff and budget have provided sufficient resources to manage this use historically.

ANTICIPATED IMPACTS OF THE USE:

The presence of dogs may flush incubating birds from nests (Yalden and Yalden 1990), disrupt breeding displays (Baydack 1986), disrupt foraging activity in shorebirds (Hoopes 1993), and disturb roosting activity in ducks (Keller 1991). Many of these authors indicated that people with dogs on a leash provoked more disturbance than people walking without a dog, and loose dogs provoked the most pronounced disturbance reactions from their study animals. The greatest stress reaction results from unanticipated disturbance. Animals show greater flight response to humans moving unpredictably than to humans following a distinct path (Gabrielsen and Smith 1995). Despite thousands of years of domestication, dogs still maintain instincts to hunt and chase. The appropriate stimulus can trigger those instincts. Dogs that are unleashed or not under the control of their owners may disturb or threaten the lives of some wildlife. In effect, off-leash dogs increase the radius of human recreational influence or disturbance beyond what it will be in the absence of a dog.

The role of dogs in wildlife diseases is poorly understood. However, dogs can host endo- and ecto-parasites, and can contract diseases from or transmit diseases to wild animals. In addition, dog waste is known to transmit diseases that may threaten the health of some wildlife and other domesticated animals. Domestic dogs potentially can introduce various diseases and transport parasites into wildlife habitats (Sime 1999).

Because the use of the trail system is relatively light, and dog walking will be restricted to public trails where disturbance may already occur due to other public use activities, the potential impacts to wildlife and their habitats are expected to be minimal. In addition, the requirement for dogs to be kept on a 6-foot leash will minimize the impacts to other users and wildlife.

We do not anticipate any impacts to water quality, soils, or vegetation other than those impacts from normal trail use as described in our wildlife observation compatibility determination. The use will be confined to existing trails and no new construction or vegetation clearing is required. Impacts on wildlife will be minimal since the trails are not close to wildlife concentration areas and the dogs will be leashed. Short-term disturbance may occur to wildlife directly adjacent to the trail.

User conflicts are unlikely to occur since trails are lightly used and dogs will be on-leash and so prevented from annoying others. Dog waste is unsightly and may carry pathogens, but these impacts may be minimized by encouraging people to pick-up their dog's waste.

Since no federally listed species occur at any of the units of Sunkhaze Meadows NWR, leashed dog walking on the trails will not cause any direct or indirect impacts to federally listed, threatened or endangered species.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Only leashed dogs will be allowed on the refuge. The leash must be no more than 6 feet long. Dog walkers will be required to maintain control of their animal while on the refuge, thereby reducing the potential and severity of impacts to wildlife and must refrain from entering closed areas.

- Dog walkers must pick up after their dog(s) and remove or properly dispose of pet waste.
- Agency and public awareness will be increased through interpretive or educational materials about responsible pet ownership in the context of wildlife disturbance during all outdoor recreational pursuits.
- If a high number of reports of negative dog-wildlife or dog-people interactions on the refuge trails are reported, the refuge will reassess the use.
- If a high number of off-leash incidents are documented, we may consider eliminating dog walking from the refuge altogether.
- Restricting dog walking to the trails will reduce the potential disturbance of wildlife.

JUSTIFICATION:

Although dogs can increase disturbance to wildlife, the refuge will strictly enforce a leash law to keep dogs and disturbances localized with the pedestrian. This is an existing use at Sunkhaze Meadows NWR, with no history of significant negative impacts. There are no documented incidents of domestic dog-wildlife disturbances, nor of dog-human conflicts. The majority of dog walkers are likely local residents who regularly visit the refuge for wildlife dependent recreation and who understand our policy. The Service and the Refuge System maintain goals of providing opportunities to view wildlife. Allowing the use of the trail system by persons engaging in dog walking may facilitate wildlife observation. These users may take the time to learn more about the refuge and become, or already be, supporters of the Refuge System.

Allowing dog walking at Sunkhaze NWR will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, dog walking is an historic use of Sunkhaze Meadows NWR. Because this use is restricted to McLaughlin Road and refuge trails, away from sensitive wetland habitats and wildlife, and the current levels of the use are low, we anticipate that this use will have only negligible, minor, and temporary impacts on refuge resources. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Dog walking will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from dog walking are anticipated. This activity will not materially interfere with or detract from the mission of the Refuge System, because of the limited impacts to refuge resources, because it facilitates priority public uses, and because of the stipulations specified above.

Finding of Appropriateness of a Refuge Use

Refuge Name: Sunhaze Meadows National Wildlife Refuge

Use: Geocaching

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel

Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graham W. Taylor

Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Geocaching

Narrative:

Traditional geocaching (by burying, placing, or removing a physical cache) is not allowed on national wildlife refuges (NWR), as digging is considered a threat to possible cultural resources and leaving items above ground is considered abandoning property. However, the Friends of Sunkhaze Meadows National Wildlife Refuge have had a non-buried cache on the refuge since 2004 and found it to be an effective tool for attracting a non-traditional audience and introducing them to the refuge. Because of the potential for this use to facilitate priority public uses, such as interpretation and environmental education, we will continue to allow caches on Sunkhaze Meadows NWR through the special use permit process. We will enhance the ability of geocaching to facilitate priority public uses by requiring caches on the refuge to offer outreach and interpretation value; the contents of caches will need to be related to the refuge or the refuge's resources in some approved way. In addition, knowing the exact location and responsible party for each cache will enable us to know it is not abandoned property and keep track of it. It is anticipated that, given the current demand, and with these additional restrictions in place, very few additional caches will be requested. We will limit the number of geocaches if needed.

Allowed in a carefully controlled manner, geocaching is a tool to facilitate priority public uses, and to introduce a different audience to the assets of their National Wildlife Refuge System, and to encourage them to be active in the outdoors. For these reasons, we have determined that geocaching is consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

COMPATIBILITY DETERMINATION

USE: Geocaching

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." (16 U.S.C. 460k-1 (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is the placement and finding of non-buried geocaches by interested participants. This use is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

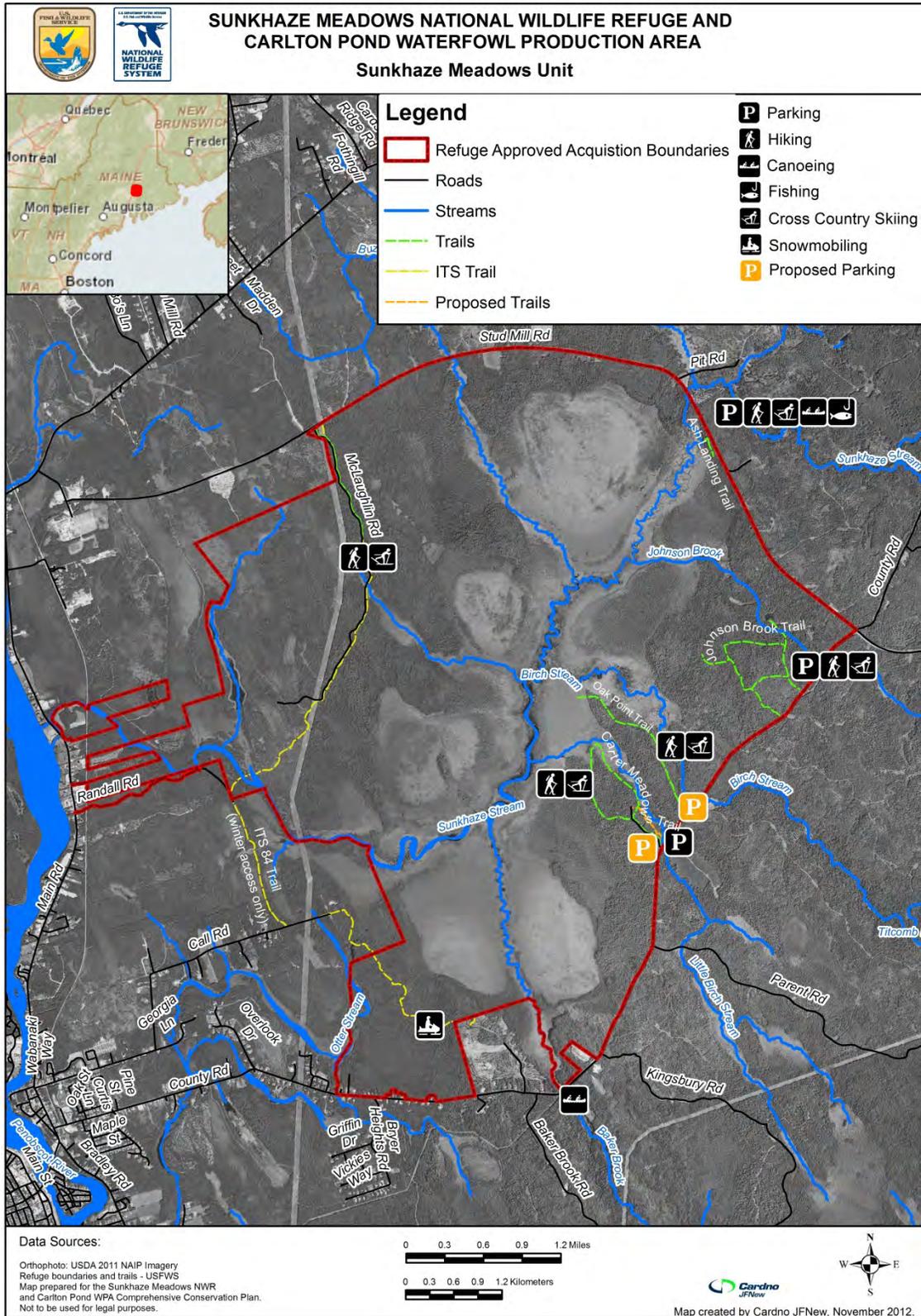
(b) Where will the use be conducted?

The location of any geocaches allowed will be at the discretion of the refuge manager on any of the refuge's units, considering factors such as ease of finding, sensitivity of surrounding flora, resilience of path to foot traffic, safety, etc.

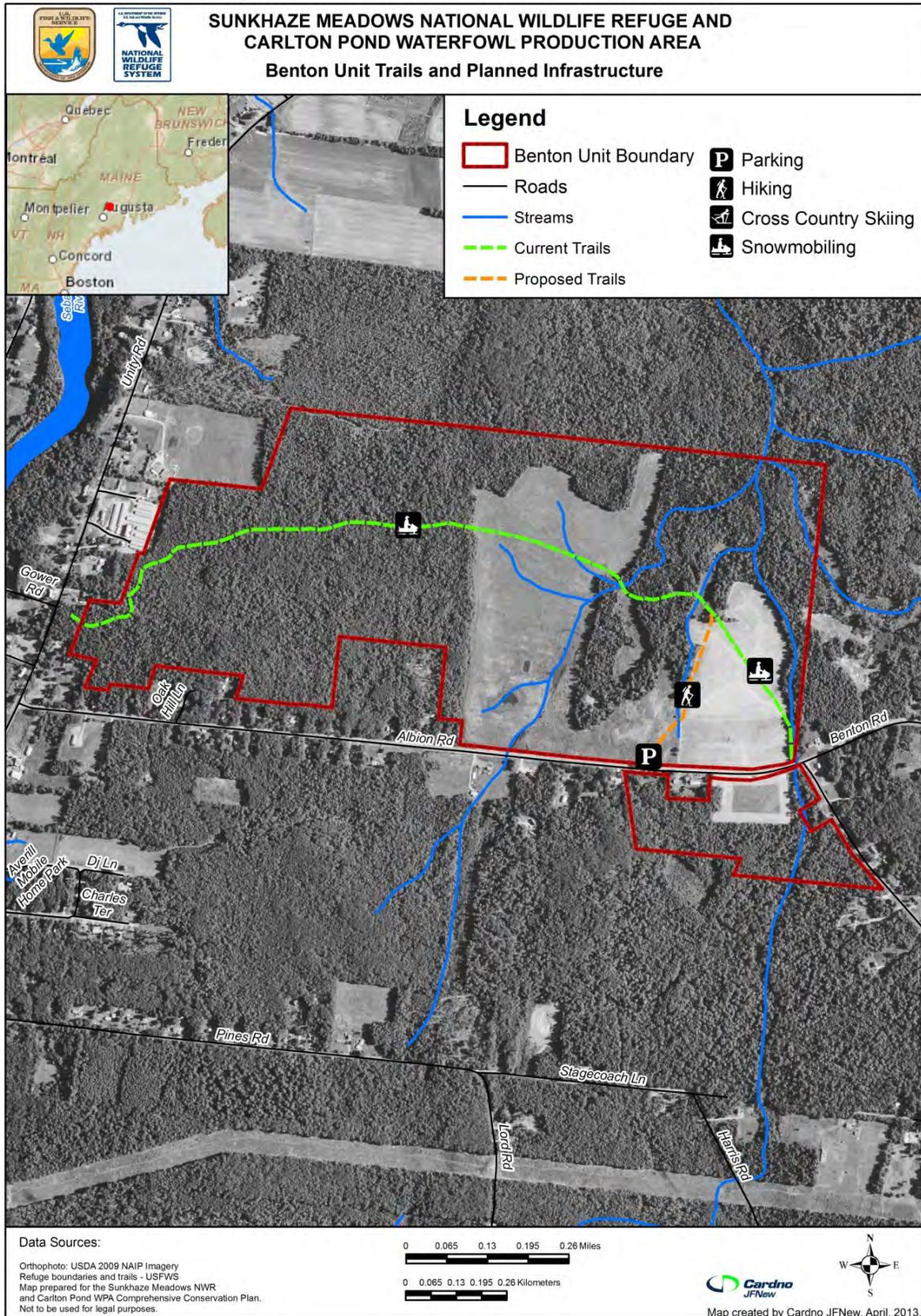
(c) When will the use be conducted?

The use will be conducted during daylight hours when the refuge is open to other public uses.

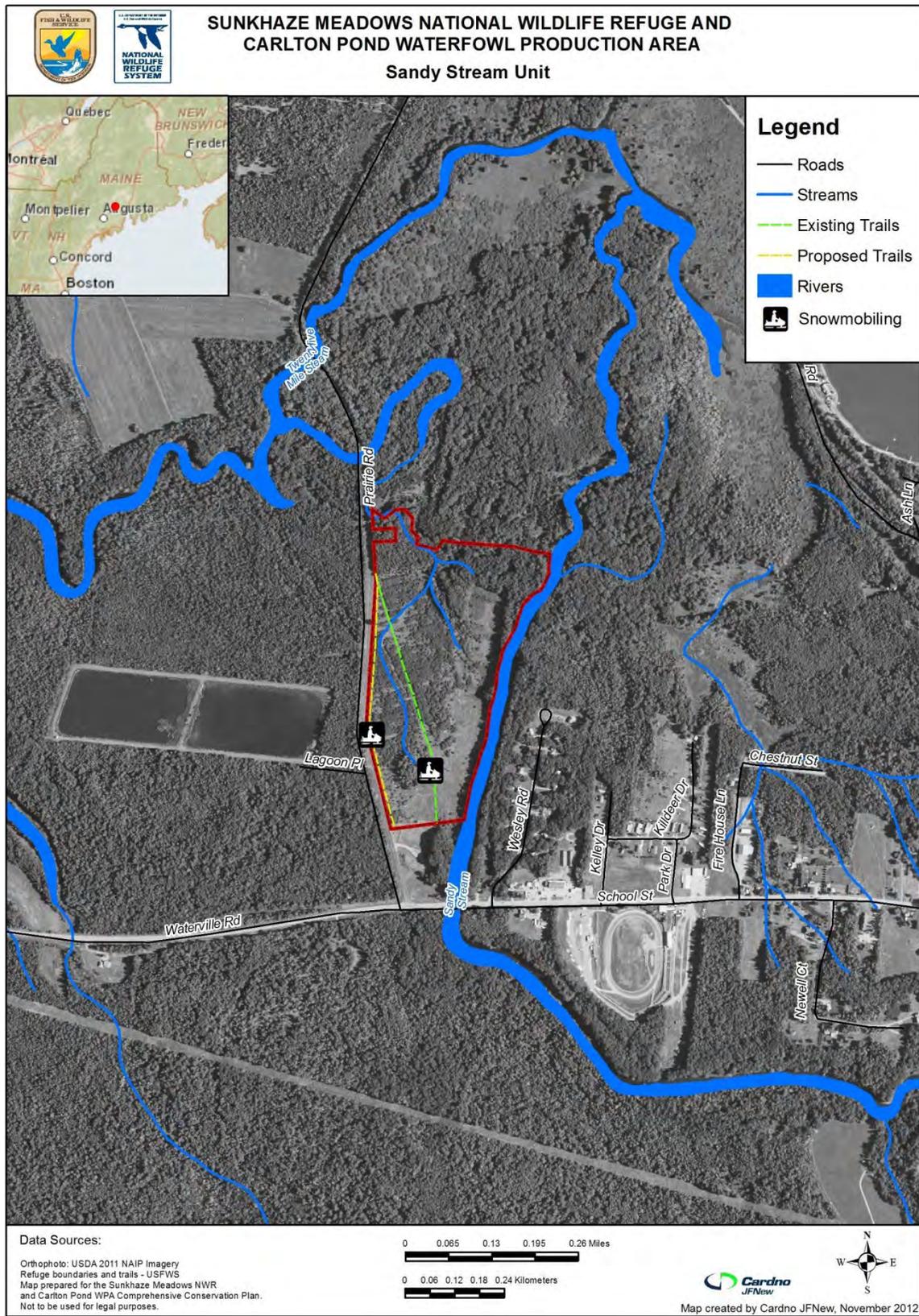
Map B.16. Current and planned facilities at the Sunk haze Meadows Unit of Sunk haze Meadows NWR.



Map B.17. Current and planned facilities at the Benton Unit of Sunkhaze Meadows NWR.



Map B.18. Current and planned facilities at the Sandy Stream Unit of Sunkhaze Meadows NWR.



(d) How will the use be conducted?

Traditional geocaching (by burying, placing, or removing of a physical cache) is not allowed on national wildlife refuges, as digging is considered a threat to possible cultural resources and leaving items unknown to the refuge manager above ground is considered abandoning property. In order to remove these objections, burying a geocache will not be allowed, and a special use permit (SUP) will be required for the placement and maintenance of all caches. Knowing the exact location and “ownership” of each cache will allow the refuge manager to know that the cache is not abandoned property and enable us to keep track of it. In addition, caches on the refuge need to offer outreach and interpretation value, so their contents need to be related to the refuge or the refuge’s resources in some approved way. It is anticipated that, given the current demand, and with these additional restrictions in place, very few additional caches will be requested. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

(e) Why is this use being proposed?

There is one geocache currently located on the Sunhaze Meadows NWR. Identified as “For the Love of Peat” on the Web site (www.geocaching.com), this cache was placed by a member of the Friends of Sunhaze Meadows organization, with permission from a former refuge manager, as a method to encourage visitation to and exploration of the refuge. The Web site shows that 130 visitors have found the cache since it was placed in 2004.

This cache serves the purpose of introducing many geocache enthusiasts, potentially a new audience, to the refuge. Although alternatives to a traditional geocache have been discussed, apparently virtual geocaches do not have the same appeal to enthusiasts as the real thing. In addition, virtual geocaching and other related activities will require the input and oversight of an onsite outreach specialist; we have none as Sunhaze NWR is currently unstaffed.

AVAILABILITY OF RESOURCES:

Annual costs associated with the administration of geocache SUPs on the refuge are estimated below:

Refuge Biologist (GS11) (review SUP applications, coordinate), 1/2 days/yr:	\$168
Administrative Assistant (GS7) (SUP preparation and administration), 1 hr/yr:	\$21
Total:	\$189

The refuge now has, and is anticipated to have into the future, adequate staff and funding to manage this minor use. Staff are currently located offsite at Maine Coastal Island NWR Complex headquarters.

ANTICIPATED IMPACTS OF THE USE:

It is anticipated that any caches that are placed on the refuge will only be allowed to be placed near a parking area or trail. Since hiking, skiing, and snowshoeing are not restricted to trails, geocachers are not being allowed any special privileges. Similar to visitors participating in priority public uses, visitors searching for the cache may create damage to soft surfaces, muddy areas, and thick shrubs or other vegetation, but proper placement of the cache will mitigate these impacts in advance. Disturbance to wildlife near the trail or the off-trail routes to the cache may

increase minimally; however, history of the existing geocache at the Sunkhaze Meadows Unit suggests that just over one additional person per month visited the site over the last 8 years. The disturbance of an occasional additional visitor passing through the woods is not significant.

On the positive side, people engaged in geocaching are learning about global positioning systems, getting outdoor exercise, and observing new places. In the case of visiting a geocache at Sunkhaze Meadows NWR, they may be encountering a national wildlife refuge for the first time, and may learn about the Service and the refuge through this encounter, as well as feel more comfortable in the outdoors and see some wildlife as part of their search for the cache.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- All people wishing to place a cache must apply for a SUP, and work with refuge staff to find a good location that works from a caching perspective and also has very low impact to refuge resources. Caches may not be buried. The container used must be durable, waterproof, and unobtrusive.
- The cache must contain information about the refuge or its resources. The contents must be approved by the refuge staff.

JUSTIFICATION:

Traditional geocaching (by burying, placing, or removing a physical cache) is not allowed on national wildlife refuges, as digging is considered a threat to possible cultural resources and leaving items above ground is considered abandoning property. However, the Friends of Sunkhaze Meadows NWR have had a non-buried cache on the refuge since 2004 and found it to be an effective tool for attracting a non-traditional audience and introducing them to the refuge. Because of the potential for this use to facilitate priority public uses, such as interpretation and environmental education, we will allow non-buried caches on the refuge through the SUP process. We will enhance the ability of geocaching to facilitate priority public uses by requiring caches on the refuge to offer outreach and interpretation value; the contents of caches will need to be related to the refuge or the refuge’s resources in some approved way. In addition, knowing the exact location and “ownership” of each cache will enable us to know it is not abandoned property and keep track of it.

Allowed in a carefully controlled manner (as stipulated above), we expect that the impacts of this use will not materially interfere with, or detract from, the mission of the National Wildlife

Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Commercial guiding for compatible, wildlife-dependent public uses

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Boettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graham Taylor Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Commercial guiding for compatible, wildlife-dependent public uses

Narrative:

Sunkhaze Meadows National Wildlife Refuge (refuge) visitors enjoy participating in wildlife-dependent priority public uses, but many may not have the knowledge, skills, or equipment to come to the refuge and engage in these activities. Commercial guides will help facilitate a safe and high-quality priority public use experience, and facilitate observation and appreciation by participants and observers of the refuge’s wildlife, habitats, and conservation programs.

By allowing this activity, refuge staff hope more visitors will be exposed to the refuge and the National Wildlife Refuge System (Refuge System), and this exposure may lead to a better understanding of the importance of the Refuge System to wildlife conservation and to the American people.

For these reasons, we have determined that commercial guiding is consistent with the U.S. Fish and Wildlife Service’s policy on the appropriateness of refuge uses (603 FW 1).

COMPATIBILITY DETERMINATION

USE: Commercial Guiding for Compatible, Wildlife-dependent Public Uses

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)), "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." (16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

“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.” (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is commercially guided priority public use activities (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) and select activities that have been found compatible and facilitate priority public uses (boating, skiing and snowshoeing, and orienteering). Commercial guiding is the act of accompanying or assisting any person engaged in a wildlife- or nature-dependent public use, in exchange for remuneration for those services.

To date, only a few hunting guides have inquired about obtaining special use permits (SUP), and citizens at comprehensive conservation planning scoping meetings requested that commercial guiding be allowed on Sunkhaze Meadows National Wildlife Refuge (NWR, refuge). Only wildlife- or nature-dependent activities, or those activities already found compatible are covered by this determination. Requests for any additional activities will be considered in the future on a case-by-case basis.

Commercial guiding is not a priority public use of the National Wildlife Refuge System (Refuge System) under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997. Commercial guiding can contribute to the fulfillment of refuge purposes and to the National Wildlife Refuge System Mission by facilitating priority and/or compatible public uses.

(b) Where will the use be conducted?

These activities take place on all units of the refuge that are open to individual public use. The same areas currently used by non-guided visitors for wildlife observation, wildlife photography, hunting, fishing, and environmental education will likely be used for commercially guided activities. Although the entire refuge is currently open for most activities, and overall use levels are fairly low, if user conflicts arise in the future, commercial activities could be restricted to certain areas or times to minimize such conflicts.

(c) When will the use be conducted?

These activities will take place year-round, subject to the regulations or laws governing the individual public use. Activities will take place during daylight hours only, or specified hunting hours, unless special provision is made with the refuge manager.

(d) How will the use be conducted?

Commercial guides will be allowed to operate on refuge lands through a formal process. The refuge manages commercial guiding activities at a level that is compatible with refuge purposes and that ensures high-quality guiding services are available for the public. SUP applications will be reviewed only when the complete application package has been received. If approved, permits will be mailed within 2 weeks of the request. If not approved, the entire application package (including the check) will be returned via mail. Application packages containing false statements or fraudulent or misleading information will be denied and the application fee will be forfeited.

All SUP activities are regulated by provisions listed in 50 CFR, subpart D - Permits, 15.41 - 45. The permittee will be required to comply with all Department of the Interior, U.S. Fish and Wildlife Service, and Federal, State, and local laws in the conduct of their business. Because this is an economic use of the refuge, it is also subject to other applicable laws and regulations (see 50 CFR 29.1).

The number of permittees for a particular activity is not presently limited by the refuge; however, restrictions may be placed on the quantity, time, and location of activities as deemed appropriate to sustain the resource and the quality of experience for other refuge visitors. If we determine that limits on the number of permittees is necessary, we will follow the procedures outlined in the Service's Refuge Manual (5 RM 17.11) and other applicable laws and regulations (see also 50 CFR 29.1). Whenever possible, these restrictions will be clearly explained on the permit; however, the refuge reserves the right to enforce further restrictions or to change the restrictions by amending the permit at any time during the permit period when deemed appropriate for the protection of the resource and the quality of experience for the general public. Visitors participating in approved

public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

The permittee must comply with the refuge regulations and SUP conditions listed under “Stipulations Necessary to Ensure Compatibility,” unless an exception is allowed in the SUP.

(e) Why is the use being proposed?

Because commercial guiding is considered an economic use, per Federal law (see 16 U.S.C. 715s) and Service regulations (50 CFR 29.1), we may only allow economic uses of a refuge natural resource where the use contributes to achieving refuge or WPA purposes or the Refuge System mission. We will allow commercial guiding to: (1) better protect refuge lands and waters; and, (2) to facilitate public participation in wildlife-dependent priority public uses, because many visitors may not have the knowledge, skills, confidence, or equipment to come to Sunkhaze Meadows NWR and engage in these activities on their own. Commercial guides will help facilitate a safe and high-quality priority public use experience, and facilitate observation and appreciation by participants and observers of the refuge’s wildlife and habitats.

AVAILABILITY OF RESOURCES:

Adequate refuge personnel and base operational funds are available to manage guided experiences at existing and projected levels. Administrative staff time will primarily involve issuing and renewing SUPs each year, ensuring licenses and certifications are current, collecting client use-day fees, and reporting data on an annual basis. Fieldwork associated with administering the program primarily involves monitoring the permittees’ compliance with permit terms.

Annual costs associated with the administration of commercial guiding on the refuge are estimated below:

Refuge Biologist (GS11) (review applications, coordinate with guides), 2 days/yr:	\$ 672
Administrative Assistant (GS7) (SUP preparation and administration), 1 day/yr:	\$ 168
Law Enforcement Officer (GS9) (checking activities for permit compliance), 5 days/yr:	\$1,200
Estimated Total Cost:	\$ 2,040

Fees will be assessed with each permit, and shall be set, when possible, to recover the costs of administering specialized uses including guiding (Refuge Manual 17.8, 17.9).

ANTICIPATED IMPACTS OF THE USE:

Commercial guiding of priority public uses and other uses that facilitate priority public uses can have positive or negative impacts to the refuge’s wildlife and habitats.

The positive impacts of these uses include providing visitors with a better appreciation and more complete understanding of the wildlife and habitats associated with the refuge. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service, as well as wildlife conservation in general.

The negative effects of these uses include impacts to plants, soils, hydrology, and wildlife from both visitors participating in the six priority public uses, boating, and skiing and snowshoeing on the refuge. The impacts associated with these activities are discussed in detail under the respective CDs. Below is a summary of potential impacts associated with pedestrian and boating and a discussion of additional impacts that could be associated with commercial guiding.

Vegetation Impacts:

Pedestrian travel can have indirect impacts to plants by compacting soils and diminishing soil porosity, aeration, and nutrient availability that affect plant growth and survival (Kuss 1986). Peatlands are particularly vulnerable to damage by visitors who may walk through them or collect plants. At Sunkhaze Meadows NWR, the peatlands are difficult to access due to the large area of wetlands that exist between the streams and the peat domes; there are no designated trails to access these sensitive areas. Plant collecting is also prohibited. Designated routes for pedestrian travel consist of existing trails, many with hardened surfaces or are existing trails that have been used for many years. Designated routes do not have any known occurrences of rare plant species on their surface that will be impacted by this use. Continuing pedestrian travel on these routes is not likely to cause any significant impacts to plants or plant communities.

People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. Staff will work to educate the visiting public to reduce introductions and will also monitor and control invasive species.

Similar to the impacts to vegetation from foot travel, effects on vegetation from skiing and snowshoeing are expected to be minimal. Skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. Vegetation is largely dormant during the winter and will largely be protected by a surface layer of snow. In addition, skis and snowshoes are designed to distribute weight, decreasing the potential for compacting or eroding soils and trampling vegetation.

Boating is not expected to have adverse impacts on refuge vegetation boat access sites and trails are located away from sensitive wetlands, peatlands, and rare plants. The majority of boat use that occurs on the refuge is non-motorized through the use of canoes and kayaks. When motors are used they are either low horsepower or electric trolling motors, therefore we do not anticipate any significant effects on refuge vegetation from boaters.

Soils Impacts:

Soils can be compacted and eroded as a result of continued use of pedestrian routes (Cole and Landres 1995). It is anticipated that some soil erosion will occur as a result of continuing pedestrian access on designated routes. Under current levels of use, impacts to soils (erosion, compaction) are not likely to be significant.

Effects on soils from skiing and snowshoeing are expected to be minimal. Skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. When these activities are occurring, soils also will largely be protected by a surface layer of snow. In addition, skis and snowshoes are designed to distribute weight, decreasing potential for

compacting or eroding soils. However, given the time of year, locations, and methods used, skiing and snowshoeing are not expected to significantly affect soils on the refuge at current or projected levels of use.

The majority of boat use that occurs on the refuge is non-motorized through the use of canoes and kayaks. When motors are used they are either low horsepower or electric trolling motors, therefore we do not anticipate any significant bank erosion due to boat wakes.

Hydrologic Impacts:

Roads and trails can affect the hydrology of an area, primarily through alteration of drainage patterns. It is anticipated that existing roads and trails will continue to influence hydrology regardless of pedestrian travel. Maintenance will be required to create adequate and proper drainage to avoid hydrologic impacts. Trail construction may also cause erosion and run-off of sediment into nearby waterways from exposed soils.

Since all the units of the refuge are fairly flat, erosion is not a large problem, but impacts to wet areas can occur when bridging is inadequate and visitors widen or go off the trail to avoid wet spots. Properly sited, designed, and maintained trails minimize this impact. Based on the current level of use, pedestrian travel is not likely to significantly increase erosion, incision, or stream alteration. Therefore, no significant hydrologic impacts are anticipated from this use.

Negative impacts on water quality from motorboat and other pollutants, human waste, and litter: Extensive water quality testing on Sunhaze Stream and its tributaries has not been carried out. The levels of pollutants from boat fuel and impacts on local aquatic systems are unknown. Hydrocarbon contamination can be harmful to fish. Currently most boating is non-motorized so we feel there is little contamination coming from this source.

Wildlife Impacts:

Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. The responses of wildlife to human activities includes: avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). 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.” These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat. Seasonal sensitivities can compound the effect of disturbance on wildlife. Both bird and mammal species which are present and active during the winter have the added environmental stressors of severe weather and food shortages, and can be more negatively affected than they will from the same level of disturbance during the warmer seasons (Hammit and Cole 1998). However, many

migratory birds are not present in the winter, and most resident species are not breeding or raising young during the time of year when cross-country skiing and snowshoeing occur. Additionally, many mammal species are less active during winter months. The most commonly observed wildlife in the winter is deer, snowshoe hare, chickadees, nuthatches, and ravens.

Summary of Impacts:

Opening the refuge to commercial guiding could increase the number of visitors to the refuge and increase the number of larger groups (4 or more people) visiting the refuge. Based on observations, few known requests to commercially guide on the refuge, and knowledge of the areas involved, there is no evidence that cumulatively, commercial guiding will have a noticeable increase in adverse effects on the refuge resources. Commercial guides and their clients will be required to comply with all of the existing stipulations for authorized public uses. In addition, commercial guides will be required to comply with additional stipulations below and will be routinely checked by the refuge law enforcement officer for compliance with regulations and permit conditions. Permit conditions and stipulations noted below are designed to minimize potential impacts. Although a substantial increase in the cumulative impacts from public use is not expected in the near term, refuge staff will monitor impacts of this use and respond, if necessary, to conserve the existing high quality of refuge resources.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The following stipulations apply to SUPs issued for commercially guided recreational tours. Continuing law enforcement and administrative monitoring of permittees will be carried out to ensure compliance with the following conditions that are incorporated into all permits in order to minimize impacts on refuge lands and resources.

- Per Maine State law, any person who receives any form of remuneration for his/her services in accompanying or assisting any person in the fields, forests, or on the waters or ice within the boundaries of the State of Maine while hunting, fishing, trapping, boating, snowmobiling, or camping at a primitive camping area must be in possession of the appropriate, valid Guide's license issued by the State. Camping is not an authorized public use of the refuge, and is not allowed.
- The permittee will not advertise on refuge property; leaflets may not be distributed via the Refuge Visitor Center, Headquarters, etc. Leaflets may be distributed only

during approved programs covered by the SUP and only to those participants registered for that program.

- Permittee agrees to hold the U.S. Government harmless from liability for any accident/injury to their clients or employees resulting from their activities being authorized by this permit. The permittee must provide adequate and appropriate liability insurance (a Certificate of Insurance with adequate Comprehensive General Liability coverage, the minimum limit of liability being \$300,000 per occurrence). The insurance certificate must name the U.S. Fish and Wildlife Service as additional insured, as well as specify that the service/activity authorized by the permit is covered by the policy and must also provide a telephone number for verification purposes.
- The permittee must provide a copy of the appropriate documentation of current Red Cross First Aid and CPR certification for all guides.
- The refuge needs public use figures for end-of-year reports (both fiscal year and calendar year); therefore, SUP use figures must be turned in to the refuge by August 1st with estimates through September 30th, and the following information must be reported: total number of trips, total number participants, and total fees.
- We reserve the right to limit the number of commercial guides and clients as needed.
- A copy of a valid SUP must be available for inspection by any law enforcement officer or refuge staff member, on request, whenever an activity authorized by the permit is occurring. Storing in the glove box of the vehicle may be acceptable; however, all guides must be knowledgeable about the permit and its conditions.
- Violation of (1) any special conditions of the SUP, (2) any stipulations in the compatibility determinations for applicable authorized public uses, or (3) any Federal, State, local, or refuge regulations may result in a Notice of Violation (NOV) being issued or revocation/cancellation of the permit without written or verbal warning. In that case, the permittee will receive immediate notification via phone with follow-up notification via mail. Permittees are responsible for the actions of their employees, agents, others working under their SUP, and their clients.
- No refund will be made to the permittee, regardless of the reason for revocation/cancellation of a permit.
- Canoe/kayak tour permits: Guides will be required to be knowledgeable in the identification and threats of aquatic invasive plant species. They will be required to inspect boats, trailers, and all associated boating equipment for the presence of plant material. All plant material must be removed and securely placed in zip lock bags prior to launching the boat or using associated equipment in refuge waters.

- For those businesses having had a previous year SUP, a current year SUP will not be issued until an accounting of tours/activities conducted under the old SUP has been received by the refuge office.
- SUPs are issued on a year-to-year basis and are not automatically re-issued on consecutive years.
- Permittee will provide all participants with relevant refuge information, including regulations and conditions of permit. The U.S. Fish and Wildlife Service will supply information to permittee, on request.
- Vehicle(s) will be used only on designated roadways and in parking areas.
- Tours must begin and end during daylight hours only unless commercially guiding for hunting where refuge hunting hours apply.
- Groups will police their clients for litter, vandalism, etc. and report any problems to the refuge office.
- Individuals guiding bird watching clients or tours may not use electronic calls without the express written permission of the refuge manager.

JUSTIFICATION:

We have determined that allowing commercial guiding at Sunkhaze Meadows NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. In fact, based on the analysis presented above, we have determined that allowing this use will contribute to the mission of the National Wildlife Refuge System or the purposes for which the refuge was established as follows. First, refuge visitors enjoy participating in wildlife-dependent priority public uses, but many may not have the knowledge, skills, or equipment to come to Sunkhaze Meadows NWR and engage in these activities. Commercial guides may help facilitate a safe and high-quality priority public use experience, and facilitate observation and appreciation by participants and observers of the refuge's wildlife, habitats, and conservation programs. Second, by allowing this activity, refuge staff hope more visitors will be exposed to the refuge and the Refuge System, and this exposure may lead to a better understanding of the importance of the Refuge System to wildlife conservation and to the American people. These users may take the time to learn more about the refuge and become supporters of the National Wildlife Refuge System. In addition, this use also helps fulfill goal 4 of the CCP, "Promote enjoyment and environmental stewardship by engaging visitors, students, and nearby residents to experience the wetlands, woods, and wildlife at Sunkhaze Meadows Unit."

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sam B. Kim 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Commercial haying to manage grassland habitat

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel

Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Gregory J. Taylor

Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Commercial haying to manage grassland habitat

Narrative:

Commercial haying at Sunkhaze Meadows National Wildlife Refuge (Sunkhaze Meadows NWR, refuge) will be permitted in designated grassland management areas of the refuge. The configuration of the areas and the number of acres managed by haying may change from year to year. We will manage between 92 and 114 acres of the Benton Unit as grassland. We will maintain about 72 acres of these grasslands through our commercial haying program.

Commercial haying is considered to be an economic use under 50 CFR 29.1. Therefore, it must contribute to the purposes for which the refuge was established or the mission of the National Wildlife Refuge System. Haying removes vegetation from the field which is otherwise left by brush hog mowing equipment. This rank cut vegetation builds a duff layer in the “understory” of the grassland which, over time, can make the grassland less suitable for target grassland-nesting bird species. Periodic removal of the vegetation from the field helps reduce dense duff layer development, and can be beneficial for nesting grassland bird species such as bobolinks and grasshopper sparrows. Unlike nearby haying on commercial farmland, haying on the refuge is conducted under a special use permit, which requires hay not to be harvested until after July 15. This allows ground-nesting, grassland-dependent birds to raise their broods and not lose their chicks to the harvesting machines. In this way, haying contributes to goal 3 of the Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area comprehensive conservation plan (CCP), which states that the refuge will provide and promote through active management a diversity of successional habitats, including grasslands, to sustain early successional and shrubland species (USFWS 2013). Additionally, haying by a local farmer frees up staff equipment operators to conduct required management activities elsewhere on the refuge. This saves the refuge time and money which may be allocated to different projects. In that sense, this use also benefits the refuge’s other natural and cultural resources.

Haying facilitates the management of refuge grassland habitat and is not only a reasonable method, but sometimes is a preferred method of cutting grasslands for nesting bird species. For these reasons, we have found commercial haying contributes to the purposes for which the refuge was established and the mission of the National Wildlife Refuge System and, therefore, is an appropriate refuge use under the U.S. Fish and Wildlife Service’s policy on the appropriateness of refuge uses (603 FW 1).

Reference

U.S. Fish and Wildlife Service (USFWS). 2013. Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area Comprehensive Conservation Plan. September 2013.

COMPATIBILITY DETERMINATION

USE: Commercial Haying to Manage Grassland Habitat

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 (Refuge Recreation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

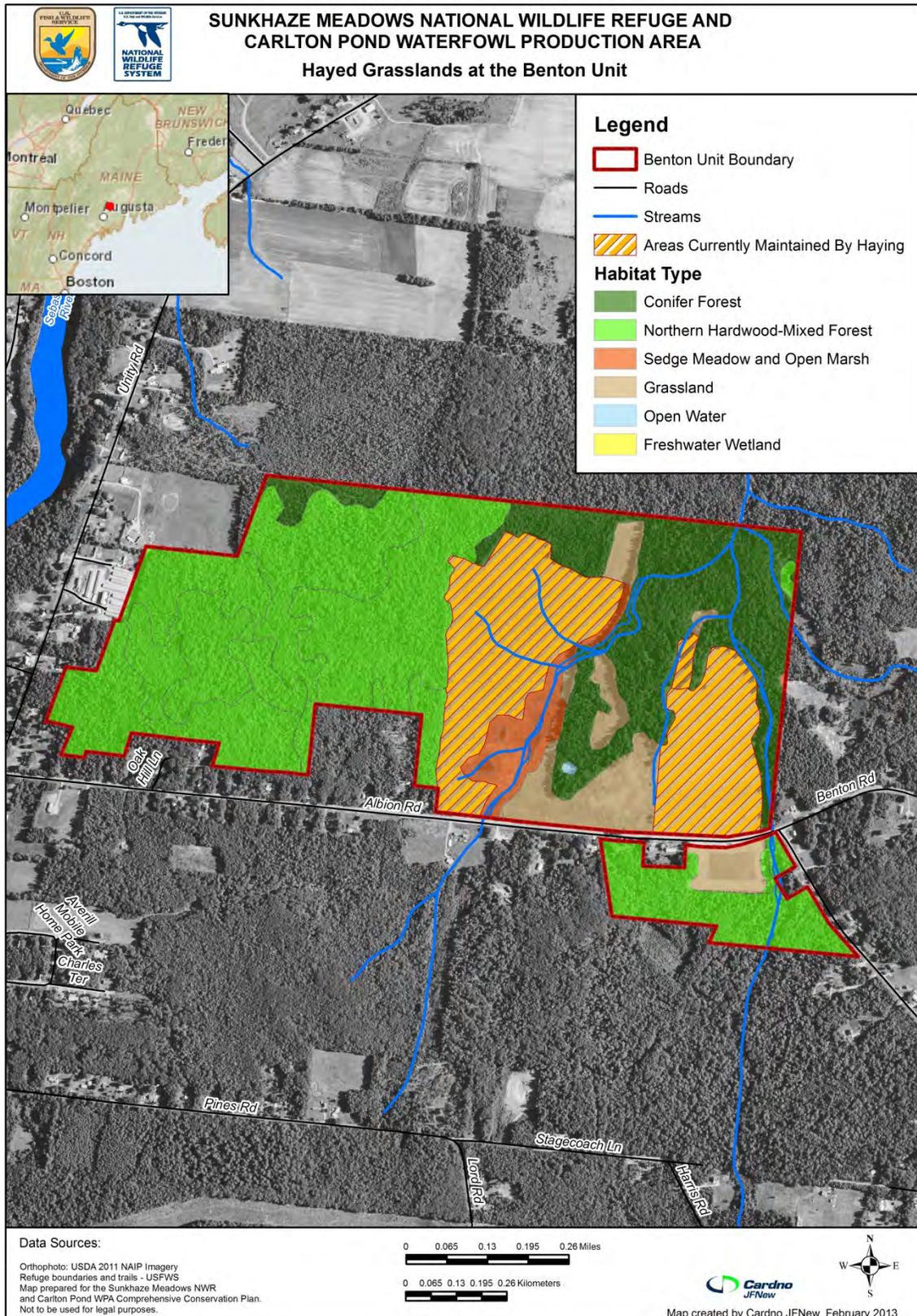
(a) What is the use? Is the use a priority public use?

The use is haying to manage grassland habitat. Haying is a refuge management economic activity, not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the use be conducted?

Haying will continue on 72 acres of grass fields within the 334-acre Benton Division of the Sunkhaze Meadows National Wildlife Refuge (NWR, refuge). This represents 21 percent of the Benton Division's acreage and 0.6 percent of the total refuge acreage. A map of the acreage to be hayed during a given year will be appended to the annual special use permit which is issued for this use.

Map B.19. Grasslands managed through commercial haying at the Benton Unit of Sunkhaze Meadows NWR.



(c) When will the use be conducted?

Refuge permittees will be able to access refuge hay fields from April through October, as needed for the haying operation. Access will be for the purposes of soil testing, application of soil amendments, planting, crop monitoring, and harvesting.

The use of a tractor to spread soil amendments and for hay harvest must occur after July 15th each year, to ensure that grassland bird species have completed nesting. Harvesting and equipment removal must be completed by October 31st, which is the ending date of the annual special use permit (SUP) issued for this refuge use.

(d) How will the use be conducted?

Individuals will be authorized to cut hay via a SUP issued by the refuge manager. Refuge grasslands and open fields are currently mowed or hayed every 1 to 3 years depending on weather and field conditions, desirability of the hay by local farmers, and refuge wildlife and habitat management goals. Haying frequency and intensity will be determined by what is needed to suppress broadleaf and woody plant invasion and to develop a mosaic of grassland vegetation in fields where open grassland is desired. Acres hayed will be adjusted as needed to ensure optimum maintenance of habitat for wildlife. Residual ground cover will be allowed to grow during the fall season to provide nesting habitat for waterfowl and neo-tropical migrants the next spring.

All activities under this SUP process are regulated by provisions listed in 50 CFR, subpart D - Permits, 15.41 - 45. The permittee will be required to comply with all Department of the Interior, U.S. Fish and Wildlife Service, and Federal, State, and local laws in the conduct of their business. Because this is an economic use of the refuge, it is also subject to other applicable laws and regulations (see 50 CFR 29.1). We will continue to follow the procedures outlined in the Service's Refuge Manual (5 RM 17.11) and other applicable laws and regulations (see also 50 CFR 29.1) when selecting permittees and administering this use. To reduce costs of administering this use and consistency from year to year, we may follow procedures specified in this section of the Refuge Manual which allow a previous permittee to have priority over other applicants for renewal of any privilege so long as there has been compliance with the provisions of the previous SUP.

When the refuge haying program was established, an initial fee of \$10 per acre was determined through a survey conducted by the local office of the Farm Services Agency. This survey revealed that the average farmer in the Benton, Maine area who leased land for haying paid \$10 per acre. The \$10 rate has been increased in subsequent years to match the annual cost-of-living increases given to the recipients of Social Security checks. Since 2007, the haying permittee has been required to pay an annual fee of \$12.66 per acre.

All equipment and materials for the haying operation will be supplied by the permittee. This consists of tractors, hay wagons, soil amendments, and equipment used for spreading soil amendments. No refuge-supplied facilities or improvements are required.

Grass seed to be used will consist of species native to central Maine and may not contain any genetically modified materials, as specified by Service policy. Soil amendments may include

some portion of Class A sludge (AD plus compost), but no Class B sludge may be used. Permittee may access hay fields for soil testing, application of soil amendments, planting, monitoring, and hay harvesting, although several of these activities may only be permitted after July 15.

Administration of the haying program will be conducted in accordance with the refuge Habitat Management Plan (USFWS 2007). Haying will be subject to the terms and conditions of an annual SUP issued by the refuge manager. The terms of this permit will ensure compatibility through application and implementation of Service policy and refuge-specific stipulations.

(e) Why is this use being proposed?

Sunkhaze Meadows NWR was established to benefit migratory birds. Goal 3 of the Sunkhaze Meadows NWR and Carlton Pond WPA Comprehensive Conservation Plan (CCP) states that the refuge will provide and promote through active management a diversity of successional habitats, including grasslands, to sustain early successional and shrubland species.

We will maintain between 92 and 114 acres of grassland at the Benton Division of grassland to provide nesting and migratory habitat for landbirds of high conservation priority in PIF Area 27 such as bobolinks, sedge wrens, and American woodcock. Seventy-two acres are maintained through the commercial haying program. The remaining acres are maintained through our prescribed burning program.

Haying and mowing are useful grassland management techniques (USFWS 1982). Mitchell et al. (2000) stated that mowing is an economical means of controlling invasion of grasslands by forbs and woody plants. Further, mowing is generally a more convenient technique to apply than prescribed fire or grazing. Herkert et al. (1993) recommend rotational haying or mowing as a grassland management alternative with subunits left idle. This strategy provides a complex of grassland successional stages to meet the respective nesting requirements of several grassland bird species. More specifically, haying and mowing are recommended techniques for managing grasslands used by nesting northern harrier (Berkey et al. 1993, Dechant et al. 2001b), upland sandpiper (Kirsch and Higgins 1976, Dechant et al. 2001a), grasshopper sparrow (Dechant et al. 2001c, Vickery 1996), savannah sparrow (Swanson 2001), bobolink (Bollinger and Gavin 1992, Dechant et al. 2001d), and eastern meadowlark (Lanyon 1995, Hull 2000). All of these species use the Benton Division of Sunkhaze Meadows NWR, at least during migration.

Historically most of New England was forested, except for a period following European settlement when much of the region was cleared for agriculture and subsequently grasslands and fields became abundant. In pre-settlement times, permanent, large openings were uncommon. Scattered openings occurred along large river floodplains, around beaver flowages, in coastal heathlands and in other areas of regular disturbance. Large grasslands are now in decline and the region has reforested, perhaps back to pre-settlement proportions.

Populations of grassland birds are declining as grassland habitats and other agricultural conditions diminish. Grassland birds have declined more consistently and over a wider geographic area than any other group of North American birds over the last 30 years (Robbins et al. 1986, Askins 1993, Knopf 1995, Askins 1997, Sauer et al. 1997). As a result, most grassland

birds appear on lists of rare and declining species (NYSDEC 1997, Pashley et al. 2000, U.S. NABCI Committee 2000, USFWS 2002). Norment (2002) notes that despite the relatively recent (last 200 years) rise and fall of grassland habitats and associated birds in New England, the region may still be important for these species given their continental decline and habitat loss in the core of their ranges in the Midwest.

Large grasslands are declining across the Northeast as a result of forest succession and development. Many remaining fields are mowed twice a year (late spring and mid-summer) for hay and hence, are less suitable for nesting birds. Although there is uncertainty about the extent of grassland habitat and associated wildlife prior to European settlement, grasslands provide a component of diversity that is desired (Jones and Vickery 1997).

American woodcock, which depend on old fields and clearings for courtship displays in the spring, are declining at a rate of 2 to 3 percent per year. The major causes for these declines are thought to be loss and degradation of habitat on the breeding and wintering grounds, resulting from forest succession and land use changes (Kelley 2003). Bobolinks also rely on open field habitat for nesting and foraging and are also declining (approximately 3 percent per year) in this region.

In addition to providing breeding habitat, the fields provide important foraging habitat for spring and fall migrating birds such as the bobolink. Most migratory birds rely on seeds, fruits, and insects to sustain them through migration. While difficult to quantify, the foraging habitat provided during migration is considered a vital component of the overall habitat quality.

Grassland management requires a combination of mowing and burning to prevent natural succession to shrubland and forest. Most of the grassland bird species (e.g., grasshopper, vesper, and savannah sparrows, upland sandpiper, and eastern meadowlark) that have declined in the region require 20 acres or more of contiguous grassland habitat (Jones and Vickery 1997). Only the bobolink occupies areas less than 10 acres, although a viable population will require a larger grassland area. Small grasslands surrounded by forest or shrubland and isolated from each other are unlikely to provide quality nesting and feeding habitat for these birds (Laura Mitchell, personal communication). Without active management, refuge grasslands could quickly become dominated by nonnative invasive species including purple loosestrife, multiflora rose, reed canary grass, and Japanese knotweed.

AVAILABILITY OF RESOURCES:

This activity is a refuge management economic activity conducted for the Service by a citizen through the use of a SUP, and therefore, is not subject to the Refuge Recreation Act.

For purposes of documentation, the costs associated with this use are minimal and include the cost of preparing a permit annually, communicating habitat management goals to the permittee annually, and monitoring the activity.

Estimated costs are as follows:

Law enforcement—patrol/visitor-resource protection/ public use monitoring/enforcement/outreach:	\$1,000 GS-9 Refuge Officer
Resource impacts/monitoring:	\$1,000 GS-11 Wildlife Biologist
Estimated Total Cost:	\$2,000

ANTICIPATED IMPACTS OF THE USE:

Effects on Wildlife:

Haying on the Benton Division of Sunkhaze Meadows NWR is used as an inexpensive management tool to maintain habitat for grassland-nesting birds, and for woodcock singing grounds and nocturnal roosting fields (Sepik et al. 1981) as well as providing habitat for other wildlife species such as geese, deer, and bears. At the time of refuge establishment, sedge wrens, which are a State-listed endangered species, nested on the property. Traditional habitat management activities, including haying, have been continued to ensure no significant habitat changes that could threaten use by sedge wrens. Haying has continued to make the habitat attractive to other species of importance such as bobolinks, American kestrels, and red-tailed hawks.

Haying by private parties will result in short-term disturbances and long-term benefits to both resident and migratory wildlife using the refuge. Short-term impacts will include disturbance and displacement of some wildlife by equipment operation. Haying activities will also result in short-term loss of habitat for species using those areas for nesting, feeding, or resting. This will be partially mitigated by limiting all cutting and haying until after July 15, when bobolinks, savannah sparrows and most other grassland-nesting birds have fledged at least one brood.

Other short-term impacts will be noise and exhaust fumes generated by the tractors and associated farm equipment, however this is not a significant impact. The resulting habitat will improve conditions for most of the species adversely affected by the short-term negative impacts (upland sandpiper, grasshopper sparrow, savannah sparrow and bobolink).

The American woodcock requires open areas for its spring courtship. Large fields, such as those at the Benton Division, are used by woodcock as nocturnal roosting areas during the summer months. The American woodcock is a high priority species under both the Partners in Flight and Bird Conservation Region 14 programs.

The lush re-growth that appears after a field is hayed provides green browse for Canada geese, white-tailed deer, and other wildlife.

Effects on Habitat:

Machinery and people can be vectors for invasive plants when seeds or other propagules are moved from one area to another. Once established, invasive plants can out compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. However, risks of introducing invasive plants via moving haying equipment from one hay field to another are thought to be minimal because there is usually no exposed mud in the

fields to get stuck in the tires and because the invasive plants that are most problematic in the area -primarily thistles- are spread via wind-blown seeds. Staff will work to eradicate any invasive species and educate the visiting public and permittee on ways to identify invasive species and methods to minimize the risk of spreading invasive species.

Overall, a controlled haying program will have long-term positive impacts to the refuge's grassland habitat. Haying suppresses invasion of grasslands by perennial forbs and shrubs. Consequently, grass-dominated plant communities are maintained. Furthermore, haying, in conjunction with a 5-year prescribed burn program for areas that are too wet or rocky for haying, will help to develop a mosaic of grassland vegetation. Diverse grasslands provide habitat for a greater diversity and abundance of grassland birds and other wildlife.

Effects on Water Quality:

The farmer is allowed to test the soil for fertility and add amendments. Over-fertilizing, fertilizing at the wrong time of year, or applying fertilizer too close to a water body can have negative impacts on water quality. Excess nitrogen and phosphorus, entering a body either overland or through the groundwater, can increase the nutrient levels in the water body. Fertilizer in a water body results in increased plant growth just as on the farm field, only in this case growth of phytoplankton, algae, and macrophytes. Dying plant material can take up a great deal of dissolved oxygen, leading to anoxic conditions and possibly to fish kills. To protect water quality on and around the refuge unit, we will impose the following stipulations as part of the SUP: 1) the permittee will be required to submit results of the soil test and plans for any amendment application to the refuge manager for approval prior to any application, and 2) permittee may not apply any soil amendments (fertilizers) on frozen ground or within a buffer zone of 100 feet of a water body.

Socioeconomic Effects:

The haying program will also have positive economic impacts for the permittees, and will result in hay being available to local farmers and construction contractors.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

On refuge lands:

- Refuge staff must continue to monitor the refuge for the presence of threatened or endangered species and ensure that haying continues to produce the desired habitat conditions which are beneficial to wildlife.

- Refuge permittees may access refuge hay fields from April through October, as needed for the haying operation for the purposes of soil testing, and crop monitoring. Tractor access for the application of soil amendments, planting, and harvesting, is restricted to after July 15.
- To minimize risk of spreading invasive species, haying equipment (e.g., harvesters or mowers) must be cleaned prior to entering Service lands. Cleaning entails removal of visible soil and plants or plant parts.
- The results of soil tests will be submitted to the refuge manager, along with planned rates of amendment (fertilizer) application, for review a week prior to planned application. The refuge manager reserves the right to approve or disapprove the planned application.
- No soil amendments (fertilizers) will be applied on frozen ground or within a buffer zone of 100 feet of a water body.
- Permittees must have written approval from the refuge manager before applying any pesticide (including herbicides). To provide enough time for us to complete the Service's pesticide approval process, permittees will need to submit the following to the refuge manager at least 3 months prior to the desired application date: 1) the pesticide label containing the common name of the pesticide and application rate, 2) recommended number of applications, 3) application methods and, 4) target pests. If the pesticide use is approved, the permittee is required to complete a pesticide spray record at the time of application. The pesticide spray record will be supplied by the refuge.
- Grass harvest must occur after July 15 each year, to ensure that grassland bird species have completed nesting. Harvesting and equipment removal must be completed by October 31, which is the ending date of the annual SUP issued for this refuge use.
- Haying locations may be adjusted annually or cancelled in any given year or series of years in the interest of optimizing habitat conditions for wildlife.
- Permittees must abide by the conditions stated in the annual SUP.

JUSTIFICATION:

We have determined that allowing commercial haying on Sunkhaze Meadows NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. In fact, based on the analysis presented above, we have determined that allowing this use will contribute to the mission of the National Wildlife Refuge System or the purposes for which the refuge was established as follows. Haying contributes to the refuge's wildlife purposes by maintaining habitat in a condition suitable for use by wildlife, primarily ground-nesting migratory birds. Raptors benefit from the area by using it extensively to hunt for small mammals. Small and large mammals use the fields for foraging and to raise their young. If equipment and staff were available, haying would be conducted by refuge

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Orienteeing

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettl Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graham W. Lyb Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Orienteering

Narrative:

On occasion, small groups (20 or less), like a Boy Scout troop, may wish to use Sunkhaze Meadows National Wildlife Refuge (refuge) as an outdoor classroom to teach participants how to navigate through the woods by map and compass. We will allow this use only for educational, and not competitive, purposes under carefully regulated conditions outlined in a special use permit. This use will introduce a different audience to the assets of the National Wildlife Refuge System, encourage them to be active in the outdoors, and contribute to their understanding and appreciation for the refuge's natural resources. For these reasons, we have found this use to be consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

We are limiting the use to non-competitive events for several reasons. First, in standard orienteering competitions, participants must run the course in the shortest possible time. This could disturb wildlife more than walking will, and has greater potential to conflict with other compatible, priority and non-priority public uses of the refuge. To ensure the health and safety of participants, organizers will likely bring in potable water to various locations along the route (Orienteering USA 2013). This will increase potential for habitat and wildlife disturbance, particularly if large quantities of water must be transported into several locations. In addition, these water containers will be a source of litter if not disposed of properly. There are other logistical considerations involved in competitions as well including the need for a registration area, awaiting area, a finish area, and setting up and taking down checkpoints. Competitions usually include spectators as well as participants, and can include large numbers of both. All of these factors will increase potential disturbance to wildlife and habitat and conflicts with other users; therefore, we will not allow competitive orienteering events on refuge lands.

Reference:

Orienteering USA. 2013. Rules for Orienteering USA Sanctioned Events. January 1, 2013.

Available online at <http://www.us.orienteering.org/sites/default/files/userfiles/u6/rules-2013-jan.pdf>.

COMPATIBILITY DETERMINATION

USE: Orienteering

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-406k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." ((16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

“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.” (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is the teaching of map and compass skills by having participants follow a preset course from station to station across a natural area. This use is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the use be conducted?

The location of any orienteering course allowed will be at the discretion of the refuge manager, considering factors such as ease of finding, sensitivity of surrounding flora, resilience of the selected path or general area designated for use to foot traffic, safety of participants, etc. The use could occur at any of the three units of Sunkhaze Meadows NWR. It will occur on roads, trails, off-trail, or some combination of these. Visitors participating in other approved public uses are already allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

(c) When will the use be conducted?

The use will be conducted during daylight hours when the refuge is open to other public uses.

(d) How will the use be conducted?

Traditional orienteering is a cross-country competition or “meet” run from point to point through natural terrain, where participants must navigate with map and compass. We are not contemplating allowing competitive meets; rather, we are intending to allow this use only to small groups of scouts or students whose leaders wish to set up a course as an educational exercise for teaching map and compass skills. We have received no requests for this activity to date, so we anticipate the number of visitors participating in this activity to be small and occasional. All aspects of the event will be controlled by a special use permit (SUP), which will only be given to competent adults who have adequate experience and safety and first aid training. Permittees will be required to remove any flags or other marking used to identify the control points promptly at the end of the event.

(e) Why is this use being proposed?

During public scoping for the refuge’s comprehensive conservation plan (CCP), the Friends of Sunhaze requested we open the refuge to this use. This use introduces individuals (including youth), potentially new audiences, to the refuge; it additionally introduces them to a healthy outdoor challenge, and map and compass skills important to budding naturalists in the State of Maine, where there are many wild lands to be explored. This use may support priority public uses at the refuge by educating visitors on skills (map and compass skills) they may find useful, particularly if they decide to explore off-trail. It also promotes safety in the outdoors by teaching skills that can prevent visitors from getting lost on the refuge and in other natural areas, particularly when going off-trail.

AVAILABILITY OF RESOURCES:

Annual costs associated with the administration of geocache SUPS on the refuge are estimated below:

Refuge biologist (GS11) (review SUP applications, coordinate) 1/2 days/yr:	\$168
Administrative Assistant (GS7) (SUP preparation and administration) 1 hr/yr:	\$ 21
Total:	\$189

The refuge now has, and is anticipated to have into the future, adequate staff and funding to manage this use.

ANTICIPATED IMPACTS OF THE USE:

At current and project levels of use, we expect only negligible adverse impacts to refuge wildlife and habitats from allowing occasional orienteering. Given that we have had no requests to date, we anticipate the numbers of visitors participating in this activity and frequency of occurrence will be low, and will not add appreciably to the impacts associated with other, existing public uses of the refuge. We only expect minimal and temporary disturbance caused by the mere presence of humans. Also, we do not anticipate any impacts to federally or State-listed threatened or endangered species.

Impacts to Wildlife Species:

Disturbances from recreational activities vary with the wildlife species involved and the activity's type, level, frequency, duration, and the time of year it occurs. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990).

Visitors to the refuge engaged in orienteering will generally be walking or running along refuge trails and roads, or in other designated areas that are also open for other public uses. The presence of people walking on refuge lands can lead to displacement of animals using these areas, although disturbance usually is a negligible influence on large mammal distributions and movements (Purdy et al. 1987; Boyle and Samson 1985). Some mammals may become habituated to humans, making them easier targets for hunters. Disturbance can have other effects including shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole 1991).

The effects of roads and trails on animals are complex. Trail use can disturb areas outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Bird communities in this study were apparently affected by the presence of recreational roads and trails, where common species (e.g., American robins) were found near trails and rare species (e.g., grasshopper sparrows) were found farther from trails. Songbird nest failure was also greater near trails. The effects on other forms of wildlife appear to be short-term with the exception of breeding bird communities.

A study by Miller, Knight, and Miller (1998) indicates that species composition and nest predation was altered adjacent to trails in both forested and grassland habitats. It appears that species composition changes are due to the presence of humans and not the trail or roadway itself. On the other hand, nest predation does appear to be a function of the trail that allows access to mammalian nest predators. Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Klein et al. 1995, Rodgers and Smith 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbances from recreation activities have at least temporary effects on the behavior and movement of birds within a habitat or localized area. Anticipated impacts of orienteering include temporary disturbances to species using habitats along trails or roads, as well as in the areas directly adjacent to trails or roads, as well as in any other area where the use is allowed. It is anticipated that any orienteering routes that are placed on the refuge will be placed near a parking area and trail, and will be temporary. Thus, disturbances are likely to be short-term and minimal due to the transient nature of the activity. It is possible, but not likely, that there may be nest abandonment of bird species nesting on, or next to, trails and other areas used for this activity if the use is too frequent during breeding season.

Long-term impacts may include certain wildlife species avoiding trail corridors and other areas should this use become too regular over time.

To reduce impacts to wildlife from this use, we will limit this use to designated trails, roads, and other areas already open to off-trail use by the public. We will limit this use to areas away from any sensitive habitats or rare natural communities and areas where rare, threatened, or endangered species are not known to occur.

Impacts to Soils and Vegetation:

The use of trails and gravel roads could lead to soil and leaf litter compaction, exposure of tree roots, direct trampling of plants, the introduction of invasive species, and changes in the plant communities up to 6 feet away from trails (Kuss 1986). Impacts of offtrail and offroad use tend to be greater than use on trails and roads. Offtrail and offroad impacts include a reduction in the density of plants near trails, soil compaction, increased erosion, and damage or killing of plants (Trails and Wildlife Taskforce 1998).

People running cross-country may create damage to soft surfaces, muddy areas, and thick shrubs or other vegetation, but this can be mitigated in advance by proper placement of the route. To limit impacts to plants and vegetation from this use, we will limit it to designated trails, roads, and other areas generally open to the public. The areas where this use will be are open to the public for other uses, not sensitive habitats or rare natural communities, or areas where rare, threatened, or endangered species occur.

The refuge will take all reasonable measures to prevent or minimize any potential negative effects to soils and plants, and will periodically evaluate the roads, trails, and other areas where visitors are allowed to orienteer to assess and prevent degradation. If evidence of unacceptable adverse impacts appears, the refuge will switch to other areas for this use, or curtail it, as deemed appropriate.

Based on the information provided above and the projected levels of use, the refuge anticipates that there will be minimal adverse impacts to soils and vegetation from occasional orienteering. With proper management, this use will not result in any greater than negligible short and will not result in any long-term impacts that will adversely affect the purposes of the refuge or the mission of the Refuge System.

On the positive side, the students engaged in orienteering are learning about maps, compasses and navigation in the outdoors, are getting outdoor exercise, and observing new places. They may be encountering a national wildlife refuge for the first time, and may learn about the Service and the refuge through this encounter, as well as feel more comfortable in the outdoors and see some wildlife as part of their experience.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- The orienteering event may not be competitive, and will be limited to 20 participants or less.
- All organizers wishing to set us a temporary route must apply for a SUP, and work with refuge staff to find a good location that works from an orienteering perspective, a safety perspective, and that also will not unduly impact refuge resources.
- Organizers must have suitable safety training (i.e., first aid and CPR) and a plan in place to adequately train and monitor participants so that they do not get lost or injured.
- Organizers may only use temporary flags or marks and must remove all flagging promptly after the exercise.

JUSTIFICATION:

While orienteering is not a priority public use of the National Wildlife Refuge System (The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997), it can support priority public uses, particularly at the Sunkhaze Meadows Unit of the refuge. Allowing orienteering, as specified above, at Sunkhaze NWR will not materially interfere with or detract from the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. Because this use is expected to be low and infrequent and the refuge manager will determine the location(s) where the activity will be allowed, we anticipate that this use will have only negligible, minor, and temporary impacts on refuge resources. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Orienteering will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from orienteering are anticipated. This activity will not materially interfere with or detract from the mission of the Refuge System because of the limited impacts to refuge resources and the opportunity to reach other users as supporters of the Refuge System. In fact, it contributes to the Refuge System mission by building skills that make participants safer and more comfortable in natural settings and introducing new audiences (particularly young people) to the refuge and the National Wildlife Refuge System. These users may take the time to learn more about the refuge and may build support for the Refuge System.

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunhaze Meadows National Wildlife Refuge

Use: Cross-country skiing and snowshoeing

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Richard W. Taylor Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Cross-country skiing and snowshoeing

Narrative:

Wildlife observation, photography, hunting, and interpretation are priority public uses as defined by the National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) and are to receive enhanced consideration over other general public uses. While cross-country skiing and snowshoeing are not priority public uses, these uses facilitate the six priority public uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) at Sunkhaze Meadows National Wildlife Refuge (refuge). The refuge is located in Maine where the ground can be covered with snow from November to April. In Maine, the traditional means of access to outdoor destinations during winter months is via skis and snowshoes. Due to the snow cover, visitor impact is minimized during winter months since the ground is not being compressed and fewer species and fewer numbers of wildlife are present. Trails are not cleared or groomed in winter, and snowshoes or skis are often necessary to access the refuge for priority public uses during the winter months. Cross-country skiing and snowshoeing are historic uses of the refuge, and are consistent with the environmental assessment prepared for the refuge's establishment (USFWS 1988, pg. 35). These uses have been allowed on the refuge since the refuge was established with no significant adverse effects observed. These uses also facilitate furbearer management by allowing trappers better access to their traps during the winter months. For these reasons, we have determined that cross-country skiing and snowshoeing are consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

Reference:

U.S. Fish and Wildlife Service (USFWS). 1988. Final environmental assessment: proposal to establish Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 5, Newton Corner, Massachusetts. 56p.

COMPATIBILITY DETERMINATION

USE: Cross-country skiing and snowshoeing

REFUGE NAME: Sunhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-406k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." ((16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

“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.” (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is allowing cross-country skiing and snowshoeing on Sunhaze Meadows National Wildlife Refuge (NWR, refuge). The use involves modified foot-travel over the surface of the snow or ice. These uses are not priority public uses; however, they facilitate wildlife observation, wildlife photography, hunting, and interpretation during winter months.

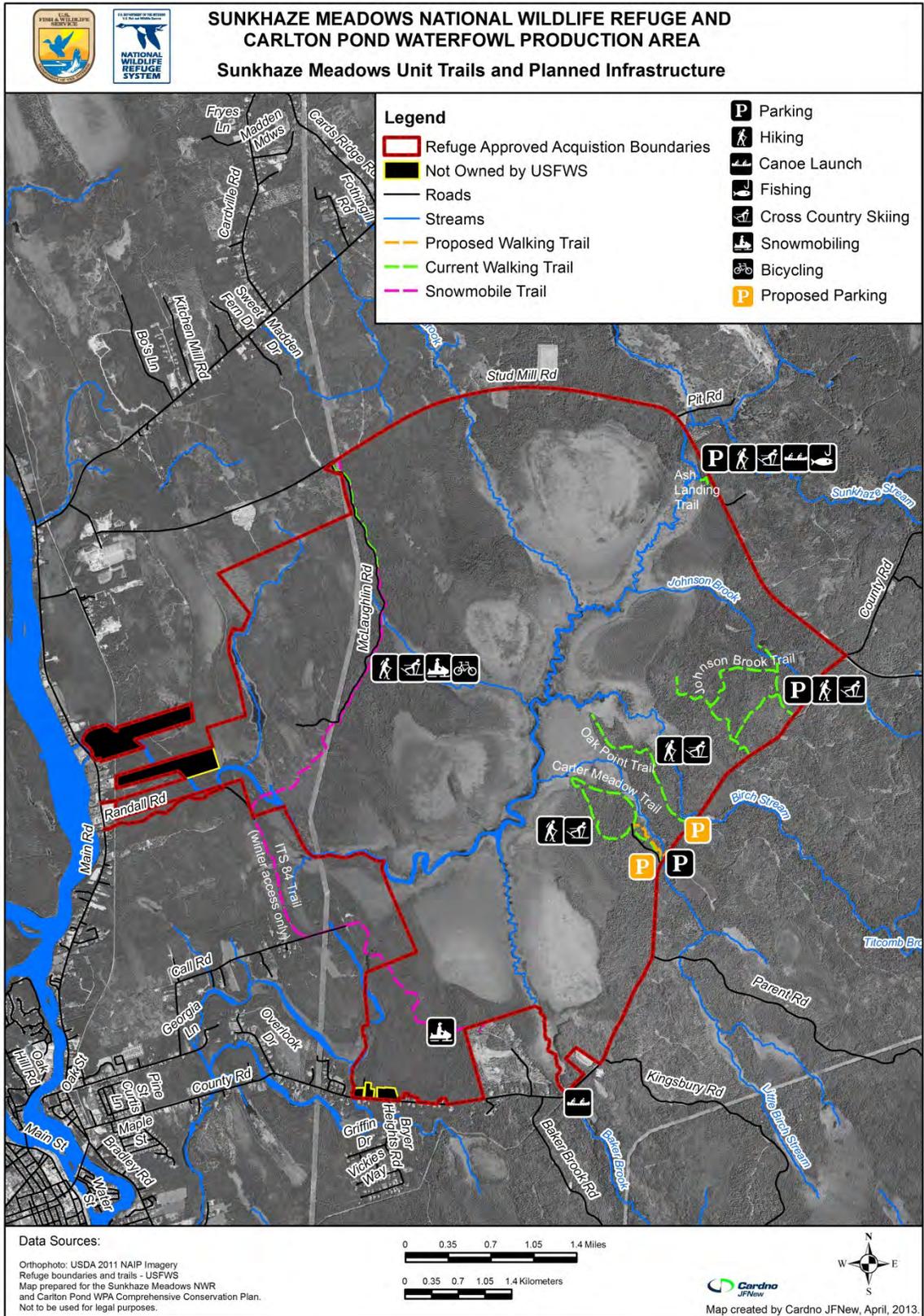
(b) Where will the use be conducted?

Most of the skiing and snowshoeing will occur along designated public use trails and access roads at the Sunhaze Meadows Unit of the refuge where underbrush is cleared and the going is marked and relatively easy. However, a small percentage of visitors may wish to explore off-trail at any of the three refuge units.

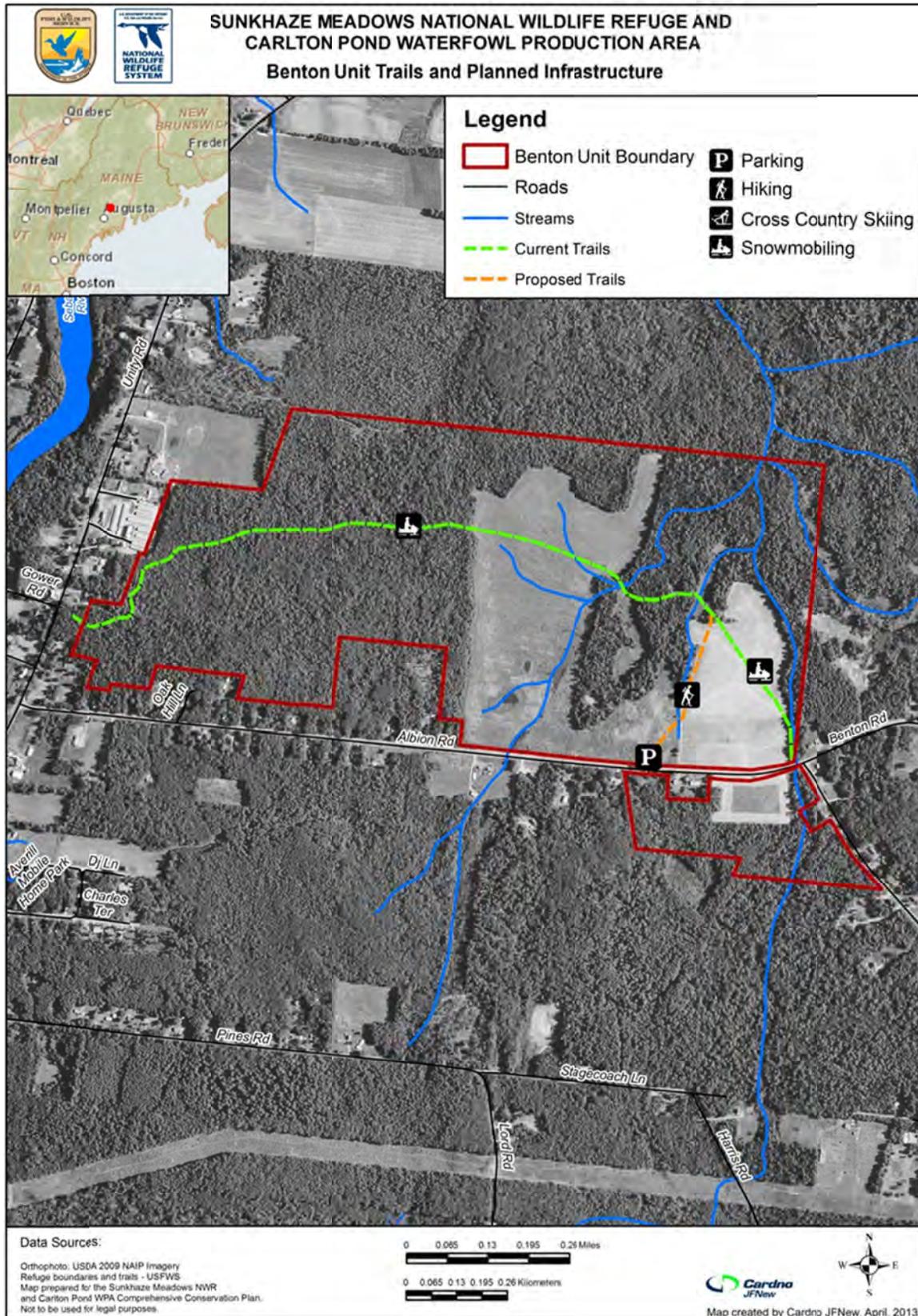
(c) When will the use be conducted?

Use will be determined by snow accumulation. Typically in central Maine, use will be limited to November through March but can vary considerably year to year. The refuge will be open to these uses from during normal refuge open hours, sunrise to sunset.

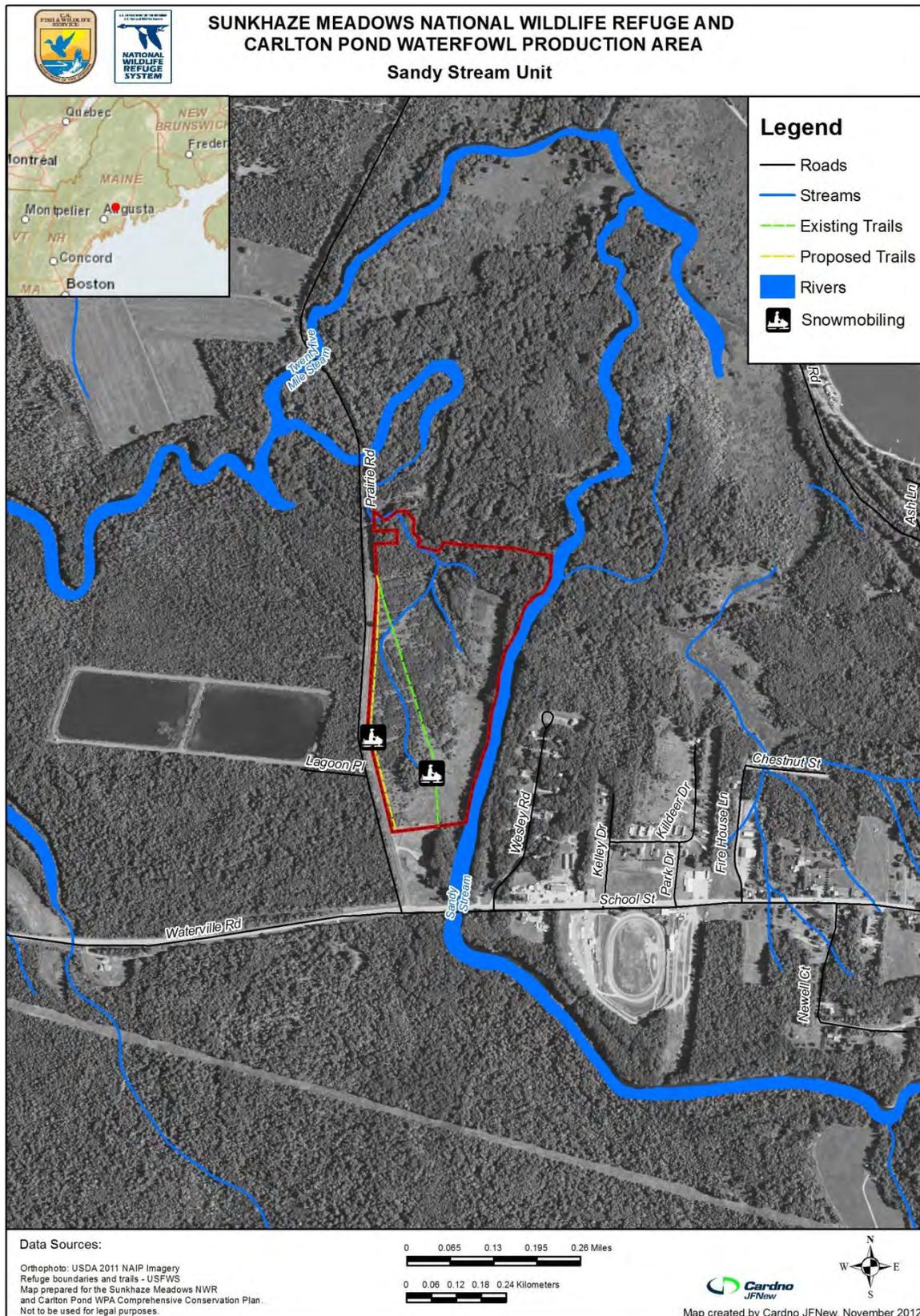
Map B.20. Current and planned facilities at the Sunkhaze Meadows Unit of Sunkhaze Meadows NWR.



Map B.21. Current and planned facilities at the Benton Unit of Sunkhaize Meadows NWR.



Map B.22. Current and planned facilities at the Sandy Stream Unit of Sunkhaze Meadows NWR.



(d) How will the use be conducted?

The uses are self-regulating with trail signs indicating appropriate routes of travel. The trails are not groomed. Provided staff resources are available, refuge staff will remove fallen trees and limbs. Visitors participating in these activities are allowed off-trail.

(e) Why is the use being proposed?

While skiing and snowshoeing are not priority public uses, they facilitate visitor participation in priority public uses on refuge lands during winter months. In Maine, the ground can be covered with snow from November to April. Traditional means of access to outdoor destinations during winter months is via skis and snowshoes. Due to the snow cover, visitor impact is minimized during winter months since the ground is not being compressed and fewer species and fewer numbers of wildlife are present. Trails are not cleared or groomed in winter, and snowshoes or skis are often necessary to access the refuge for priority public uses during the winter months. Cross-country skiing and snowshoeing are historic uses of the refuge, and are consistent with the environmental assessment prepared for the refuge’s establishment (USFWS 1988, pg. 35). These uses have been allowed on the refuge since the refuge was established with no significant adverse effects observed. These uses also facilitate furbearer management by allowing trappers better access to their traps during the winter months.

AVAILABILITY OF RESOURCES:

The refuge has a trail system in place to support priority public uses, and these trails are already being maintained for these purposes. Allowing cross-country skiing and snowshoeing on these trails will not increase the maintenance or operational needs. Refuge staff and volunteers maintain signs designating the location of trails, but this time is minimal and can be completed with current refuge funding.

Trail maintenance:	\$450
Signage and publications:	\$200
Law enforcement patrol:	\$800
Total:	\$1,450

Based on a review of the budget allocated for management of this activity, funding is adequate to ensure compatibility, and to administer and manage the use listed. Our existing staff and budget have provided sufficient resources to manage this use historically.

ANTICIPATED IMPACTS OF THE USE:

No impacts are expected on any threatened or endangered species, whether federally or State listed. No critical habitat has been identified in the vicinity of any refuge trails or roads, where this use is concentrated. Allowing these areas to be used for recreational use provides users with a quality wildlife-oriented recreational experience, which is a refuge objective and is related to a goal of the National Wildlife Refuge System. There have been no indications that skiing or snowshoeing on Sunhaze Meadows NWR causes problems for wildlife other than minimal and temporary disturbance caused by the mere presence of humans. Some impacts such as free-roaming pets, littering, and wildlife disturbance can be expected, but this is not anticipated to be significant.

In general, negative effects on habitat and wildlife associated with cross-country skiing and snowshoeing are considered minimal. Cross-country skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. Most wildlife species are less active during winter months, sensitive migratory birds have largely left the refuge. With the exception of bald eagles which start nesting in early spring (February or March), it is not breeding season for any of the wildlife that may be present. Surface water and soil may be frozen for at least a portion of this time, most vegetation is dormant, and sensitive habitat will largely be protected by a surface layer of snow. In addition, skis and snowshoes are designed to distribute weight, decreasing potential for eroding soils near waterways or soil compaction. Most visitors limit skiing and snowshoeing to established roads and trails. The following are more specific descriptions of potential impacts associated with cross-country skiing and snowshoeing.

Effects on Vegetation:

Short-term effects of trampling consist of the deterioration of plant material, whereas long-term effects of trampling include direct and indirect effects on vegetation and soils like diminishing soil porosity, aeration, and nutrient availability through soil compaction (Kuss 1986, Roovers et al. 2004). Compaction of soils limits the ability of plants, particularly rare and sensitive species, to revegetate affected areas (Hammit and Cole 1998). Kuss (1986) found plant species adapted to wet or moist habitats are the most sensitive and increased moisture content reduces the ability of the soil to support recreational traffic.

However, overall, effects on vegetation from skiing and snowshoeing are expected to be minimal. As mentioned previously, skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. Vegetation is largely dormant during the winter and will largely be protected by a surface layer of snow. In addition, skis and snowshoes are designed to distribute weight, decreasing the potential for compacting or eroding soils and trampling vegetation. Because of difficult access, visitors that ski or snowshoe usually remain on designated roads and trails. Designated roads and trails do not have any known occurrences of rare plant species on their surface that will be impacted by these uses.

Effects on Soils:

Soils can be compacted and eroded as a result of continued use of roads and trails. Overall, effects on soils are expected to be minimal. Skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. The soil surface will likely be frozen for some of the season, making it much less vulnerable to compaction or erosion. When these activities are occurring, soils also will largely be protected by a surface layer of snow. In addition, skis and snowshoes are designed to distribute weight, decreasing potential for compacting or eroding soils. Over the long term, the risk of erosion and sedimentation problems that might affect soils in these habitats will increase with increased visitor use and trail use. However, given the time of year, locations, methods used, and minor increases expected, increased levels of skiing and snowshoeing are not expected to significantly affect soils on the refuge.

Effects on Wildlife:

Short-term and long-term adverse impacts are not expected for wildlife populations in relation to the expected low use of snowshoeing and cross country skiing. Disturbances vary by wildlife species involved and the type, level, frequency, duration and the time of year activities occur.

Beale and Monaghan (2004) found that adverse effects to wildlife increase as number of users increase. The study found that an animal's response to one visitor walking down a trail is entirely different than its response to a group of users walking down a trail. The use of trails in the winter for cross-country skiing and snowshoeing have similar wildlife disturbance effects as those which occur through pedestrian travel on these trails during the other seasons. One of the primary differences is that many migratory birds are not present, and most resident species are not breeding or raising young during the time of year when cross-country skiing and snowshoeing occur. Additionally, many mammal species are less active during winter months. The most commonly observed wildlife in the winter is deer, snowshoe hare, chickadees, nuthatches, and ravens. Both bird and mammal species which are present and active this time of year have the added environmental stressors of severe weather and food shortages and can be more negatively affected than they will from the same level of disturbance during the warmer seasons (Hammit and Cole 1998).

We will take all necessary measures to mitigate any negative effects on wildlife associated with skiing and snowshoeing. We will evaluate roads, trails, and activities periodically to assess potential negative effects. If evidence of unacceptable adverse effects is observed, we will curtail or discontinue activities as needed. We will post and enforce refuge regulations, and establish, post, and enforce closed areas as needed. However, negative effects on wildlife are expected to be minimal. As discussed previously, cross-country skiing and snowshoeing are limited to winter months and require sufficient snow levels to allow access. Additionally, many refuge trails become difficult to access during winter conditions as access to main trail heads are only minimally maintained. This greatly reduces the numbers of users accessing refuge trails for these uses and thereby, minimizes impacts.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Compliance with regulations will be achieved through education, signage, and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife.
- The refuge will be open to these uses during regular refuge hours (sunrise to sunset for most uses, hours for hunting differ) and access to any restricted areas will be enforced.

JUSTIFICATION:

While cross-country skiing and snowshoeing are not a priority public uses of the National Wildlife Refuge System (The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997), they do facilitate priority public uses at Sunkhaze Meadows NWR.

Allowing cross-country skiing and snowshoeing at Sunkhaze NWR will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, cross-country skiing and snowshoeing are uses that support wildlife-dependent priority public uses with minimal adverse impacts on refuge resources. Negative effects on habitat and wildlife associated with cross-country skiing and snowshoeing are considered minimal because cross-country skiing and snowshoeing are limited to winter and require sufficient snow cover to allow access. Most wildlife species are less active during winter months, sensitive migratory birds have largely left the refuge, and it is not breeding season for any of the wildlife that may be present. Surface water and soil may be frozen for at least a portion of this time, most vegetation is dormant, and sensitive habitat will largely be protected by a surface layer of snow. This is an ongoing use of the refuge and there have been no indications that skiing or snowshoeing on Sunkhaze Meadows NWR causes problems for wildlife other than minimal and temporary disturbance caused by the mere presence of humans. Because of this, it is consistent with the wildlife and habitat aspects of the refuge's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

Cross-country skiing and snowshoeing will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species known to occur on the refuge. Therefore, no significant adverse effects from these uses are anticipated. By supporting priority public uses, allowing this use supports CCP goals and objectives as described in the refuge's CCP (USFWS 2013) and the refuge's purpose associated with allowing wildlife-oriented recreational opportunities. This activity will not materially interfere with or detract from the mission of the Refuge System, because of the limited impacts to refuge resources, it facilitates priority public uses, and the opportunity to attract visitors to the refuge and build support for the Refuge System.

Finding of Appropriateness of a Refuge Use

Refuge Name: Sunhaze Meadows National Wildlife Refuge

Use: Snowmobiling

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: John W Taylor Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge

Use: Snowmobiling

Narrative:

The State of Maine Interstate Trail System (ITS) is an extensive snowmobile trail network that connects Maine to neighboring states and Canada. All three of the refuge's units include a portion of a snowmobile trail. Snowmobile recreation is a critical part of the local economy during winter months and that of central Maine. The refuge is located in Maine where the ground can be covered with snow from November to April. The snowmobile trail provides a means of controlled access to the refuge in the winter months, and can provide an opportunity for visitors to engage in wildlife-dependent recreation, particularly hunting and fishing. This use may contribute to public understanding of and appreciation for the refuge's natural resources by providing opportunities for participants to experience the refuge, see refuge habitats, and support wildlife-dependent recreation during winter when visitation is usually more limited.

The original ITS-84 snowmobile trail at the Sunkhaze Meadows Unit was established before the refuge was created in 1988. The old trail traversed a portion of the refuge which included sensitive wetland habitats. After the refuge was created, the refuge manager worked with the local snowmobile club to reroute the trail, moving it away from the sensitive wetland habitats. The current 4.6-mile portion of the trail that crosses the refuge passes through forested upland. Relocation of the trail to off-refuge lands will require substantial effort and expense, and will undoubtedly result in greater impacts on wetlands than the existing trail, which impacts no wetlands in the vicinity of the refuge. Due to the snow cover, visitor impact is minimized during winter months since the ground is often frozen and fewer species and fewer numbers of wildlife are present. This is an historic use of the refuge, and is consistent with the environmental assessment prepared for the refuge's establishment (USFWS 1988, pg. 5). This use has been allowed on the refuge since the refuge was established with no significant adverse effects observed.

For these reasons, we have determined that continuing to allow this use is consistent with the U.S. Fish and Wildlife Service's policy on the appropriateness of refuge uses (603 FW 1).

Reference:

U.S. Fish and Wildlife Service (USFWS). 1988. Final Environmental Assessment: Proposal to Establish Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. August 1988. U.S. Department of the Interior Fish and Wildlife Service Region 5. Newton Corner, Massachusetts. 56 pp.

COMPATIBILITY DETERMINATION

USE: Snowmobiling

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge

DATE ESTABLISHED: November 22, 1988

ESTABLISHING AUTHORITIES:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-406k-4; 76 Stat. 653)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "... for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." ((16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

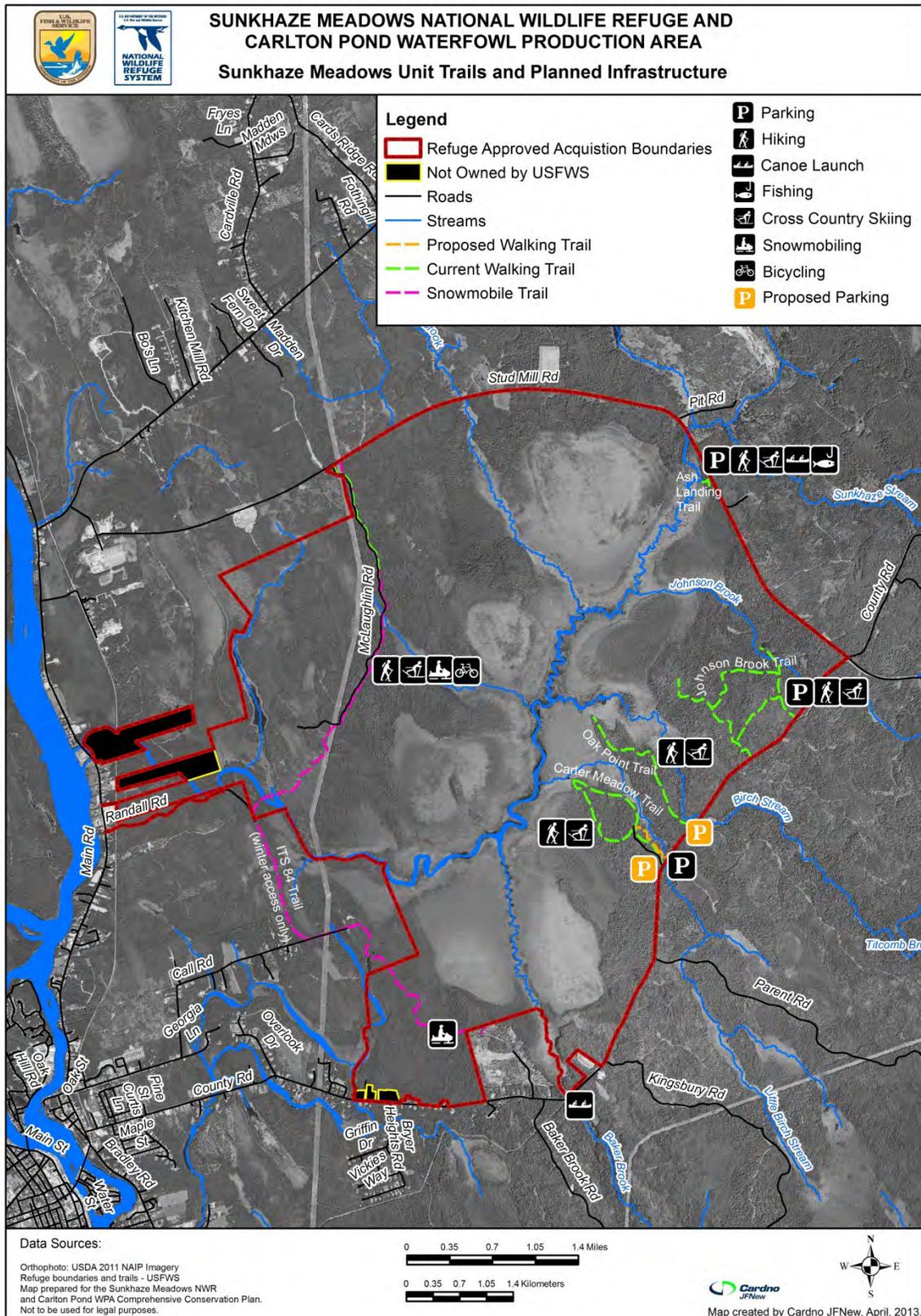
(a) What is the use? Is the use a priority public use?

The use is snowmobiling. It is not a priority public use of the National Wildlife Refuge System (Refuge System), under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

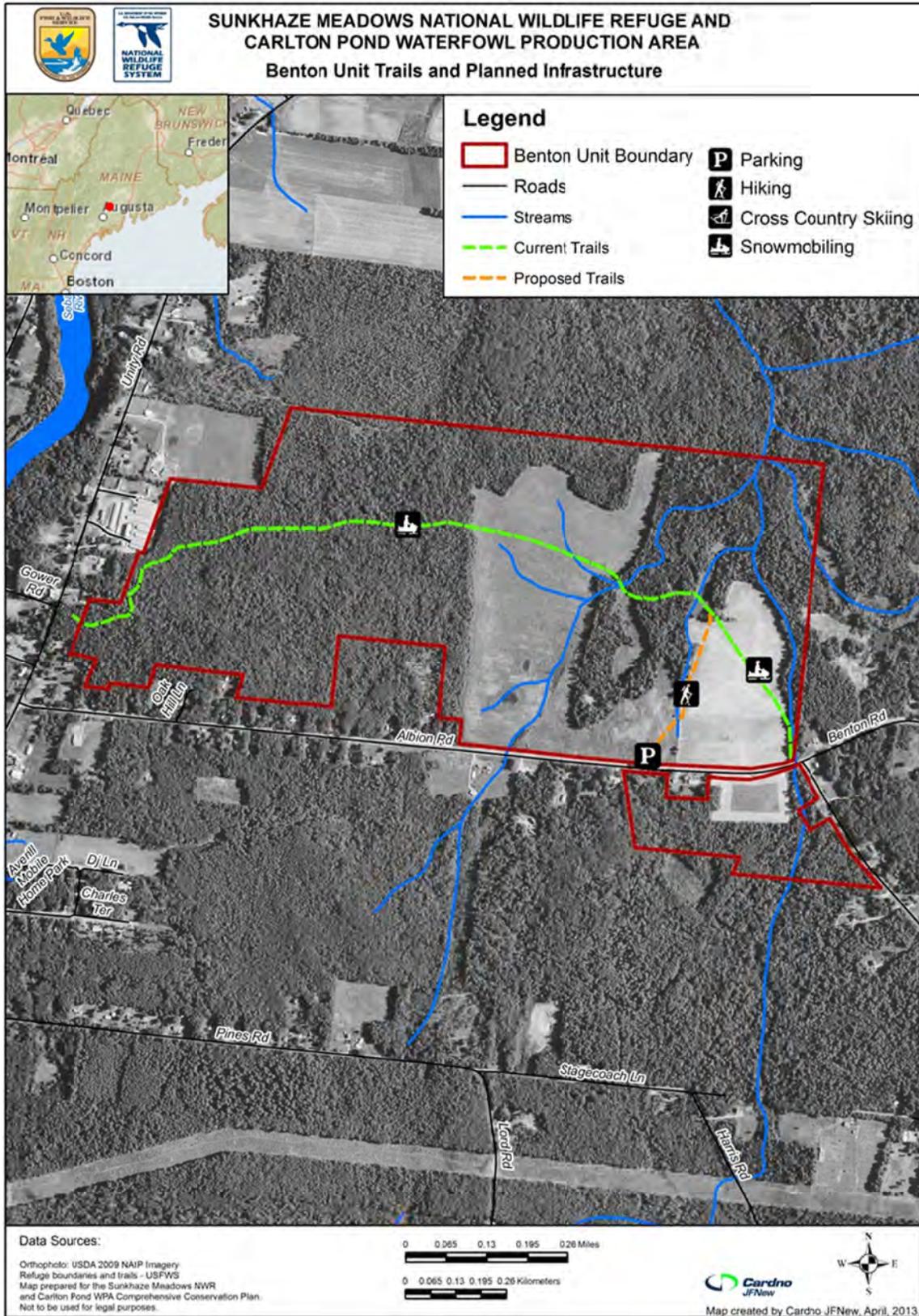
(b) Where will the use be conducted?

Snowmobile use is currently permitted on a limited portion of the Sunkhaze Meadows Unit of Sunkhaze Meadows National Wildlife Refuge (NWR, refuge) as part of the State of Maine Interstate Trail System (ITS) and on two other designated trails, one each on the Benton Unit and Sandy Stream Unit (see maps B.23, B.24, and B.25). The portion of the ITS-84 trail on Sunkhaze Meadows Unit is approximately 4.6 miles long. Trails on the Benton Unit and Sandy Stream Unit are 1.0 mile and 0.5 miles respectively.

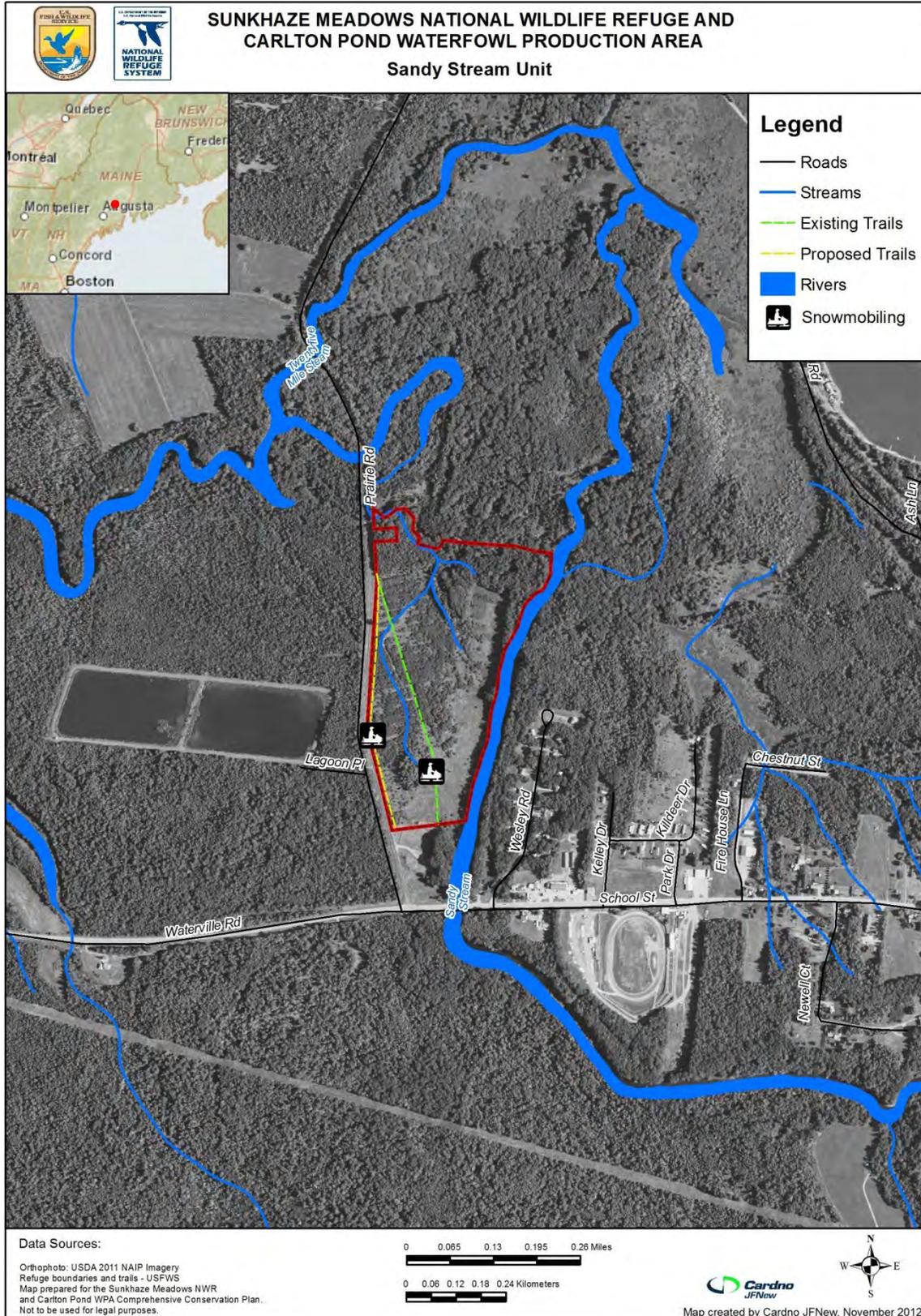
Map B.23. Snowmobile trail, and other facilities, at the Sunhaze Meadows Unit of Sunhaze Meadows NWR.



Map B.24. Snowmobile trail, and other facilities, at the Benton Unit of Sunkhaze Meadows NWR.



Map B.25. Snowmobile trail, and other facilities, at the Sandy Stream Unit of Sunkhaze Meadows NWR.



(c) When will the use be conducted?

Use usually occurs from January through March depending on ice and snow conditions, which vary yearly. Snowmobiling occurs when snow conditions are suitable, but no earlier than December 1 and no later than April 15.

(d) How will the use be conducted?

In Maine, snowmobile operators are required to secure landowner permission prior to traveling across lands other than their own, and snowmobile travel is permitted only on designated trails within the Statewide (ITS) trail system (unless written landowner permission is otherwise secured for off-trail operation). Throughout the ITS trail system, local snowmobile clubs are responsible for maintaining the trails within the clubs' designated areas of operation.

Snowmobile access and use on the refuge will be conducted according to applicable provisions of 50 CFR 27.31 ("General Provisions Regarding Vehicles"), applicable sections of the Maine Statutes, and Executive Orders 11644 (Use of Off-Road Vehicles on the Public Lands, February 8, 1972) and 11989 (Off-Road Vehicles on Public Lands, May 24, 1977).

The Sunkhaze Meadows Unit snowmobile trails and trail corridors are currently maintained by members of the Pine Tree Snowmobile Club of Milford, Maine and by the G and G Trailblazers Snowmobile Club of Greenbush, Maine. The Benton Unit Trail is maintained by the Country Cousins Snowmobile Club of Benton, Maine. The Sandy Stream Unit Trail is maintained by the Unity Snow Dusters Snowmobile Club of Troy, Maine.

Snowmobile clubs will continue to be required to obtain special use permits (SUP) for trail maintenance activities, including placement of appropriate signs. Members of the local clubs are responsible for placing trail junction, trail number, safety, and speed limit signs along the trails prior to December 1, maintaining them through the period of snowmobile use, and collecting signs and picking up any litter prior to the reopening of refuge roads after the mud season closure (typically prior to Memorial Day weekend). The local clubs also are responsible for grooming trails. Groomed trails typically are groomed to a width of approximately 10 to 15 feet depending on the underlying road width and snow conditions. Individual trails are groomed by permittees one to three times per week, depending on snow and trail conditions. Grooming generally occurs at night. Not all trails are regularly groomed. In late summer or fall, the clubs also maintain trails, as necessary, by cutting back woody brush that restricts trail width and removing trees that may have fallen across trails. New trail construction is not permitted.

Maximum allowed speed for snowmobiles on the refuge currently is 35 mph and is consistent with the speed limit on adjacent land ownerships. Travel is not permitted off designated trails. During the period when snowmobiles are permitted on the refuge, use occurs daily, but varies greatly in intensity. Snowmobilers typically travel in groups of two or more.

The operation of snowmobile on the refuge shall comply with all applicable State rules and regulations. We will not permit competitive snowmobiling events. No parking areas will be provided on the refuge. No all-terrain vehicles are permitted on the refuge.

Snowmobile access and use of the refuge are monitored by refuge staff and by members of the local snowmobile clubs. Additional monitoring is conducted by the local State game warden. We intend to monitor snowmobile use at the refuge via winter surveys and/or traffic counters in the future. We will also monitor the condition of culverts, bridges, pond and streams in spring and summer, and identify and close undesignated trails on the refuge.

(e) Why is this use being proposed?

Snowmobile recreation is a critical part of the local economy during winter months. The refuge is located in Maine where the ground can be covered with snow from November to April. The snowmobile trail provides a means of controlled access to the refuge in the winter months, and can provide an opportunity for visitors to engage in wildlife-dependent recreation. Relocation of the trail to off-refuge lands will require substantial effort and expense, and will undoubtedly result in greater impacts on wetlands than the existing trail, which impacts no wetlands in the vicinity of the refuge. Due to the snow cover, visitor impact is minimized during winter months since the ground is often frozen and fewer species and fewer numbers of wildlife are present. This is an historic use of the refuge, and is consistent with the environmental assessment prepared for the refuge’s establishment (USFWS 1988, pg. 5). This use has been allowed on the refuge since the refuge was established with no significant adverse effects observed.

AVAILABILITY OF RESOURCES:

With the hiring of a refuge officer, and a zone officer for Maine, Vermont, and New Hampshire, the resources necessary to provide and administer this use, at its present levels, are available within current and anticipated refuge budgets. Staff time associated with administration of this use relates to overseeing trail maintenance, issuing SUPs, and monitoring compliance with their conditions, enforcing laws, monitoring public use, and monitoring impacts on natural resources.

The refuge manager will administer the program. A wildlife biologist will monitor its effects on refuge resources. The refuge officer will monitor visitor use and conduct law enforcement for visitor safety and resource protection.

We estimate below the annual costs associated with the administration of snowmobiling on the refuge.

Overall oversight of program and Coordinate with State of Maine:	\$1,000 GS-13 Refuge Manager
Administer SUPs/Coordinate with snowmobile clubs/ Oversight of trail maintenance:	\$2,000 GS-12 Deputy Refuge Manager
Law enforcement patrol/Visitor-resource protection/ Public use monitoring/Enforcement/Outreach:	\$3,000 GS-9 Refuge Officer
Resource impacts/Monitoring:	\$3,000 GS-11 Wildlife Biologist
Snowmobile gas/Maintenance:	\$1,000
Estimated Total Cost:	\$11,000

All maintenance of snowmobile trails will be the responsibility of other parties (snowmobile clubs, volunteers, etc.). The refuge owns and operates snowmobiles for carrying out law

enforcement, refuge operations, and monitoring public use. Officers from Maine Department of Inland Fisheries and Wildlife occasionally supplement law enforcement coverage on the refuge, at no cost to us.

ANTICIPATED IMPACTS OF THE USE:

The original ITS-84 snowmobile trail at the Sunhaze Meadows Unit was established before the refuge was created in 1988. The old trail traversed a portion of the refuge which included sensitive wetland habitats. After the refuge was created, the refuge manager worked with the local snowmobile club to reroute the trail, moving it away from the sensitive wetland habitats. The current 4.6-mile portion of the trail that crosses the refuge passes through forested upland. Relocation of the trail to off-refuge lands will require extensive effort and expense, and will undoubtedly result in greater impacts on wetlands than the existing trail, which impacts no wetlands in the vicinity of the refuge.

Currently, the snowmobile trail at the Sandy Stream Unit bisects the refuge. To minimize habitat fragmentation and potential disturbance to wildlife associated with trail use and maintenance activities, we propose relocating the trail to the unit's western edge, near the existing road (see map B 24). Effects of relocating the trail are discussed in the refuge's comprehensive conservation plan (CCP)(USFWS 2013).

Wildlife Impacts:

The area on the refuge encompassed by snowmobile trails totals approximately 12.4 acres, or about 0.1 percent of the refuge's total area. This includes lengths of snowmobile trails on all three units multiplied by an expected width of 15 feet. Snowmobile trails traverse the spruce-fir, northern hardwood, and mixed conifer-hardwood habitats that are typical on the refuge. Wildlife species occurring in the habitats traversed by trails include: various migratory birds, resident birds (including spruce and ruffed grouse), snowshoe hare, moose, white-tailed deer, and various furbearers. Black bears, reptiles and amphibians, beaver, and brook trout also occur in habitats traversed by snowmobile trails, but normally are within hibernacula or under ice when snowmobiling occurs. Deer wintering areas located in the northeast corner of the Sunhaze Meadows Unit and the Benton Unit are outside the snowmobile trails areas. Also, many of the bird species present during the summer and fall have migrated to southern wintering grounds.

Winter is a particularly stressful time for many species of resident wildlife, because of the reduced availability and quality of food and the higher energetic costs of snow travel and thermoregulation. Late winter is a particularly vulnerable time for many species (especially ungulates), because snow depths are often greatest, the animals are in their poorest condition, and food resources have been exhausted.

Snowmobiles are capable of covering large areas and thus have the potential for disturbing wildlife and compacting snow over a large area, if they are not confined to designated trails (Hammit and Cole 1998). Some potential negative impacts of snowmobiling (and other forms of human disturbance) on wildlife include:

- Increased energy expenditure. Disturbance may result in increased heart rate, activity, or actual flight, all of which have an energetic cost. During severe winters or for animals in poor or marginal condition, the additional stress of disturbance may result in exhaustion

of an individual's food reserves, and lowered resistance to disease or predation. That may affect survival or reproduction. Animals may be in poorer condition going into the spring breeding season.

- Displacement to suboptimal habitat. Animals may be forced into habitats where foraging or cover is of lower quality. This may increase energetic costs, increase vulnerability to predation, or increase crowding and disease transmission. It may alter the distribution of animals on the landscape.
- Alteration of behavior. Disturbed animals may change their foraging times to periods when energy losses or exposure to predators is higher.
- Changes in community composition and inter-species interactions.
- Improved predator access to prey wintering areas (a benefit to predators, but a negative impact to prey).
- Direct mortality from snowmobile-wildlife collisions.

Some potential, positive impacts of snowmobiling and other forms of human disturbance on wildlife follow:

- Reduced energy expenditure. Snow compaction and trail creation by snowmobiles may reduce energy expenditure in deep snow for animals that follow snowmobile trails.
- Improved access to resources. Snow compaction and trail creation by snowmobiles may expand access to foraging areas, for animals using trails.

Although a moderately extensive body of literature treats the impacts of snowmobile activity on wildlife, particularly ungulates, the site-specific nature of much of the research and the complex interactions among the factors affecting wildlife make interpreting results and extrapolating them for Sunkhaze Meadows NWR difficult. The differences in methodology among studies make it difficult to compare them, and have compounded the problem. As a result, different studies have found apparently contradictory results that seem to be applicable only locally.

A few of the variables that may affect the type and degree of wildlife response to snowmobiles include the:

- Severity of winter snow conditions
- Type of vegetation or habitat
- Topography
- Time of day and month of year
- Level of habituation to disturbance
- Animal age and condition
- Species type
- Animal density and group size
- Animal activity type (standing versus bedded down)
- Intensity of hunting
- Intensity of snowmobile activity
- Duration of disturbance
- Behavior of snowmobile users

Mammals may show less of an overt response to human disturbance when winter conditions are particularly severe and energy conservation is at its most critical (Knight and Cole 1995). Impacts may be at the individual or population scale and may be either short- or long-term. Despite the apparent contradictions in the literature, many studies seem to indicate that snowmobiling may affect wildlife under certain conditions. Although population level impacts may exist, only impacts at the individual and local level have been demonstrated. Appropriate management can mitigate many of the negative effects.

Ungulates (white-tailed deer; moose)

White-tailed deer expend more energy in winter than at other times of the year. To compensate, deer usually conserve energy by restricting their movements, particularly in late winter, when they lack fat reserves and snow is deeper, rather than increasing their food intake by foraging more widely (Moen 1976). Energy conservation measures include walking slowly, on level ground. Thus, they are particularly vulnerable to disturbances that counter that energy conservation strategy.

Most ungulates react more strongly (are more likely to flee, travel a greater distance) to a person on foot than a person on a snowmobile. Stopping or getting off a vehicle creates more disturbance than a person on a continuously moving snowmobile (Oliff et al. 1999). Response to snowmobiles is greater in areas open to hunting than in areas closed to hunting.

No active flight responses were seen at distances greater than 650 feet. Response intensity increased with increasing size of a snowmobile group. The disturbance of wildlife tends to be less when human activities are fairly predictable both in location and behavior. Animals may habituate to predictable disturbance, and show less of a behavioral or physiological response. Snowmobile activities on fixed designated trails create fewer disturbances than activity that occurs randomly across the landscape (Oliff et al. 1999).

Wildlife seem to demonstrate a less intense response to disturbance when there is some sort of visual barrier between them and the source of disturbance created by vegetation and/or topography (Oliff et al. 1999).

Deer and moose are more likely to forage in the early morning or evening, therefore, these are the times they are most likely to encounter, and possibly be disturbed by, snowmobiles (Oliff et al. 1999).

Severinghaus and Tullar (1975) suggested that snowmobile disturbance might be energetically costly to deer. Although deer sometimes use snowmobile trails, those trails may not lead to the best foraging areas, or may help to concentrate foraging in a restricted area and contribute to over-browsing. They recommended keeping snowmobile trails at least 0.5 miles from deer wintering areas. In a controlled experiment, Freddy et al. (1986) found that snowmobiles invoked flight responses in mule deer at distances less than 440 feet. Distances traveled by fleeing deer averaged 330 feet. Deer demonstrated low levels of response (alerting) up to distances of about 1,540 feet. Freddy et al. (1986) suggest that keeping snowmobile trails greater than 1,500 feet from deer will minimize any disturbance. The study found no evidence of increased mortality or

impairment of reproduction, but deer may not have been disturbed often enough to show an effect.

Eckstein et al. (1979) experimentally exposed white-tailed deer to snowmobile activity, and found no differences in home range size, habitat use, or activity by white-tailed deer in areas with snowmobile activity versus areas without it. However, deer were displaced from an area within 200 feet of snowmobile trails. The study found that deer were less disturbed by snowmobile activity at night than during the day. Deer were found to use snowmobile trails occasionally, but did not seem to use snowmobile trails in preference to their own trails, or follow snowmobile trails beyond their normal wintering area. They concluded that, although there might be some energy savings for the deer from using snowmobile trails, the effects of snowmobiles forcing deer off of trails will counter balance those savings. They also recommended that snowmobile trails avoid deer wintering areas by rerouting through upland deciduous forest wherever possible.

Richens and Lavigne (1978) also found that white-tailed deer in Maine sometimes used snowmobile trails for short distances (less than 660 feet), especially when they were near bedding areas. Deer were more likely to use snowmobile trails under more severe winter conditions, when snow depths were greater. Deer were less likely to use snowmobile trails on wide logging roads that were less sheltered. Unlike the Eckstein et al. (1979) study, Richens and Lavigne found that deer could be persuaded to follow snowmobile trails over a mile beyond their own trail system when improved forage was provided at the new location. The study suggests that snowmobile trails could be laid out in deer wintering areas in a way that could benefit deer, by improving their mobility, reducing energy costs, and providing access to better foraging areas. Deer continued to use bedding areas close to snowmobile trails and did not appear to alter their activity patterns in response to snowmobiles, but snowmobile traffic in their study area was relatively light. The flight responses of deer to snowmobiles varied, depending on severity of winter, snow depth, type of cover, and time of day. Deer were more likely to flee from snowmobiles in early winter than in late winter. The poor condition of deer towards the end of winter may have contributed to this reduction in flight tendency. Richens and Lavigne also found deer were more likely to flee from snowmobiles traveling at high speeds than at low speeds (less than 10 mph).

In contrast to some other studies, Dorrance et al. (1975) found increases in white-tailed deer home range size, movement, and distance to snowmobile trails with increased snowmobile activity for an area previously closed to snowmobile use (but open to hunting). Deer failed to show these changes in movement patterns with increased snowmobile activity at a second study site that was open to snowmobile traffic but closed to hunting. At the second site, deer were displaced from the immediate vicinity of active snowmobile trails, but usually returned shortly after snowmobile activity stopped. That effect was seen even at very low levels of snowmobile activity. The habituation of deer to snowmobile activity may have been facilitated at this second site, where hunting was not permitted. However, in this study, displacement of deer from snowmobile trails probably did not result in a significant impact on deer except during particularly severe winters and/or on poor winter ranges.

Huff and Savage (1972) found that white-tailed deer in Minnesota utilized conifer (jack pine) areas with dense canopy cover during the middle of the week when snowmobile traffic was light, but shifted to a more open canopy aspen-birch stand during weekend heavy-use periods. They reported that radiant heat loss was higher in the aspen-birch stand than in the jack pine.

Moen (1982) found that heart rates of captive white-tailed deer increased when they were approached by snowmobiles, even when no change in their behavior was discernible. Deer also failed to habituate to snowmobiles (as measured by elevated heart-rates) over the course of the experiment. Moen (1982) suggested that there might be an energy cost to elevated heart-rate.

Although moose are considerably better adapted to deep snow and winter conditions than deer, severe winters can still stress them if food supplies are exhausted or if they are in poor condition. Like deer, moose tend to reduce their activity levels in winter as an energy conservation measure, and disturbances that cause them to increase their activity come at an energetic cost.

Collescott and Gillingham (1998) found that moose that bedded down within approximately 1,000 feet of an active snowmobile trail, or fed within 500 feet of snowmobile traffic, were likely to change their behavior in response to snowmobile disturbance. Moose within 1,000 feet of snowmobile traffic were sometimes temporarily displaced into less favorable foraging habitat. However, they did not find a significant impact on moose activity patterns within their study area associated with snowmobile traffic. Moose, in general, appear to habituate fairly readily to vehicle activity and will flee at shorter distances if they have become habituated.

The existing snowmobile trails are, at their closest point, approximately 2 miles west of the deer wintering area mapped within the Sunkhaze Meadows Unit. This 2-mile buffer consists of northern hardwood-mixed forest and peatland-wetland complex. This exceeds the recommended 0.5-mile buffer recommended by Freddy et al. (1986). At Benton Unit, the existing snowmobile trail passes through the edge of a mapped deer overwintering area. However, the vegetation in this portion of the site has changed from forest to grassland since it was originally mapped. Therefore, this area does not currently contain suitable habitat for deer overwintering. Instead, the edge of the northern hardwood-mixed forest (where suitable overwintering may occur) is located approximately 500 feet to the north, although most deer likely overwinter further within the mapped deer wintering area, away from the forest edge.

We expect adverse impacts on these species to remain low for the following reasons: 1) this use is a traditional use of refuge lands and has been occurring for many years, 2) refuge staff have not observed adverse impacts to these species in all of these years, 3) snowmobile trails avoid deer wintering areas, and 4) this use is expected to remain low and is therefore not expected to be intense or frequent. Under this plan, we will continue to monitor the refuge for potential impacts and will limit access or close areas as needed to protect resources. We will also continue to vary from State regulations in that we will not allow baiting on any refuge unit or at Carlton Pond WPA.

Black Bears

Black bears will abandon den sites if humans on foot disturb them sufficiently, and may abandon cubs (Goodrich and Berger 1994). Bears that abandon or change dens may remain active longer and experience more weight loss than undisturbed animals. Bears are particularly vulnerable to

disturbance just before denning (generally November through December), and just after they emerge from dens in the spring (March through April) (Oliff et al. 1999).

Other Carnivores (fisher, marten, weasels, red fox, coyote)

Little research has been done on disturbance effects on any of these species. However, fishers do not appear to alter their activity significantly in response to moderate levels of human disturbance. When disturbed, female fishers may move their den sites (Oliff et al. 1999). Weasels and pine marten frequently tunnel under the snow when foraging. Snow compaction caused by snowmobile trails may affect their foraging ability locally, as well as negatively impact prey populations (small mammals).

Neumann and Merriam (1972) found that red foxes exhibited greater levels of activity near snowmobile trails and were using trails as travel corridors. Coyotes increase their use of snowmobile trails during severe winters as well (Crete and Lariviere, 2003).

Other Mammals (snowshoe hare, small mammals)

Neumann and Merriam (1972) found that hare activity was reduced within 250 feet of snowmobile trails. They also found that a single passage of a snowmobile could significantly alter the insulating properties and temperature gradient of snow to a depth of 2 feet. Those changes in temperature regime were potentially great enough to increase energy costs to small mammals burrowing under the snow.

Jarvinen and Schmid (1971) found a significant increase in mortality of small mammals in an area where snow had been compacted experimentally by snowmobiles. Small mammals did not appear to migrate off-site in response to snowmobile activity. They suggested that causes of mortality might have been related to the reduced insulating capacity and increased thermal conductivity of the compacted snow which may have increased thermal stress on animals. Snow compaction may also have limited movement of animals and reduced the permeability of the snow to a point that inhibited gas exchange and increased levels of carbon dioxide above normal. If extensive, off-trail snowmobile activity compacts large areas of snow, the impacts on small mammal populations may be significant (Oliff et al. 1999).

Anticipated impacts of snowmobile activity on refuge wildlife include displacement of wildlife immediately adjacent to trails and some potential for contamination of streams with sediment or exhaust. The current route of Maine ITS-84 trail and associated connector trail traverse mixed and hardwood forest. We are not aware of any nesting bald eagle pairs at the Benton or Sandy Stream Units. While we are not sure of exact locations of current eagle nests on the Sunkhaze Meadows Unit, it is unlikely current snowmobile use is adversely affecting this species on the refuge. This use is an ongoing use of the refuge and appears to have been occurring at relatively consistent rates over the past nearly two decades. Because snowmobiling begins before eagle nesting season begins, at the Sunkhaze Meadows Unit any nesting eagle pairs that may be disturbed by this activity will be able to nest in suitable habitat on the refuge away from the snowmobile trails.

We will assess these trails and may re-route or close some of them if significant resource impacts seem likely. The use of well-constructed and maintained culverts and bridges over stream

crossings helps to minimize the contamination of streams and impacts to stream amphibians. Much of the disturbances to wildlife noted in literature are from snowmobiles that are not on designated trails and are traveling all over the landscape in unpredictable ways. Restricting snowmobile traffic to designated trails helps to increase predictability. The existing trails have been in place for decades and predate the establishment of the refuge. The snowmobile use at Sunhaze Meadows NWR is currently at very low levels based on weekly law enforcement patrols the last 2 years which supports our assessment of that adverse impacts associated with this activity are expected to be and remain low.

Habitat Impacts:

Vegetation

Several studies have found that snowmobiles damage vegetation. This may involve direct, mechanical damage as well as the alteration of soil and substrate conditions important for plant growth. The extent of impacts depends on the plant species, their sensitivity to cold and mechanical damage, snow depth, winter severity, and soil type and slope, among others.

Neumann and Merriam (1972) found that after a single passage by a snowmobile, over 25 percent of all tree saplings at or above the snow surface were damaged severely enough to cause mortality. Seventy-eight percent of saplings showed some signs of damage. Species with rigid woody stems were the most vulnerable. All vegetation above the snow surface was eliminated mechanically in heavily traveled areas.

Wanek (1974, 1971) found that soil temperatures were significantly colder and more variable under snowmobile trails than under un-compacted snow. That change occurred after the first snow compaction event. Soil froze sooner, deeper, and remained frozen for a longer time than under un-compacted snow. Soils under snowmobile tracks thawed out as much as three weeks later than under control areas. Temperature regimes varied, depending on the soil type. Sandy soils remained colder in the winter than did organic soils. Soil temperatures under hardwood forests remained colder than under softwoods. Some species of spring plants under snowmobile trails experienced up to 20 percent winter mortality, or no growth, delayed growth, or delayed or reduced flowering. Underground root structures were frozen and damaged in some instances. Species with large underground storage structures experienced the greatest damage due to freezing. Wanek (1974) also found that in an alfalfa field subjected to snow compaction by snowmobiles, productivity decreased by 24 to 33 percent. Weedy species also showed an accompanying increase. The decline in productivity was steeper during a more severe winter than during a milder winter. Wanek (1974, 1971) also found conifer sapling damage and mortality from snowmobile trails, particularly under low snow conditions. The damage to white spruce was highest. Some species, including trembling aspen and raspberry, increased in areas of snowmobile activity.

Bogs appear to be particularly sensitive to snowmobile activity. Wanek (1974) found a decline in some bog plants, with increasing snowmobile activity. Although sphagnum appeared to be unaffected, declines were observed in bog laurel, leather leaf, small cranberry, and pitcher plant. Impacts appeared to be due to mechanical damage, cold penetration, and desiccation.

Pesant et al. (1985) tested the effects of snowmobiling on agricultural fields. They found that in certain forage types, snowmobile trails resulted in reduced or delayed spring growth, changes in species composition, and reduced forage yield. Impacts were attributed to reduced soil temperatures under compacted snow, and deeper frost penetration into the soil, with accompanying damage to plants. Foresman et al. (1976) also found an early spring reduction in the growth of bluegrass under snowmobile trails, but found that vegetation had recovered by early summer. Matted vegetation under snowmobile tracks may have kept soil temperatures lower in the spring, and made it physically more difficult for new growth to penetrate the matted layer.

Keddy et al. (1979) found that snow compaction was greatest when snowmobiles traversed an area on several different days (increased frequency) than if they traversed the same area multiple times on the same day (increased intensity). Increased frequency of snowmobile use resulted in a decrease in standing crop on an old field, but no significant decrease occurred with greater intensity. Some shift in plant community structure also was noted. No significant impacts on vegetation were observed on an ice-covered marsh. Negative impacts of snowmobiling on vegetation may result from lower temperatures affecting buds and food storage structures, and longer snow retention in the spring may affect early germination and growth. Matting of vegetation may affect seed dispersal from previous year's seedpods.

Boucher and Tattar (1975) found that damage to vegetation and soils was greatest where snowmobile trails were located on steep (greater than 30 degrees) south-facing slopes. Damage primarily resulted from decreased snow depths (due to greater solar radiation), together with increased pressure of snowmobile treads on steeper slopes. On steep slopes, the surface organic layer, and in some instances the upper soil layer, were lost. Damage to plants included not only above-surface parts, but also damage to shallow root systems. Although vegetation recovered on flatter areas receiving moderate use, highly disturbed steep slopes did not.

Snowmobile use is limited to specific designated trails. Based on weekly law enforcement patrols, the current snowmobile use is at low levels and little unauthorized off-trail use occurs. We predict this use will remain low; therefore, it is not intense or frequent and is not expected to have noticeable adverse impacts to refuge habitats outside of the footprint of the trail itself.

Soil and Litter

The compaction of snow under snowmobile trails results in changes in thermal conduction and snow structure that cause snowmobile trails to melt more slowly in the spring and can create partially anaerobic conditions. The rates of litter decomposition may slow as a result. Neumann and Merriam (1972) found that the water holding capacity of snowmobile trails was significantly reduced. That could reduce the ability of the snow to hold water during spring runoff.

In contrast to this, Aasheim (1980) suggested that the delayed melting of compacted snowmobile trails might actually contribute to a reduction in peak runoff amounts.

Boucher and Tattar (1975) found that snowmobile activity on steep, south-facing slopes could disrupt or remove the surface layer of soil and increase erosion during spring rains. Some reports (Aasheim, 1980), indicate that soil erosion may be reduced on flatter areas under some

circumstances because the compacted snow on snowmobile trails may protect against erosion from spring runoff.

There appears to be general agreement that snowmobile activity on steeper slopes can increase erosion, particularly with shallow snow depths and vegetation disturbance.

The impacts of snowmobiles on soils and vegetation under shallow snow conditions may be as significant as when snowmobiles travel on bare ground (Hammit and Cole, 1998).

Foresman et al. (1976) found no evidence of soil compaction under snowmobile trails. The anticipated impacts from snowmobiling include damage to vegetation from snowmobile activity during the winter and from brush clearing during the fall, and some potential for soil erosion. There are no known rare plants or plant communities along the present route. Snowmobile trails at Sunkhaze have been rerouted in the past to address concerns over soil and wetland impacts. There are no designated trails that occur on steep, south facing slopes. Refuge personnel will continue to monitor the trails for signs of impacts and will either close the trail or re-route the trail to a more suitable location.

Pollution:

Water Quality

Adams (1975) found high levels of hydrocarbons after ice-out in the water of a small (2.5 acres), shallow pond that had been experimentally exposed to snowmobile exhaust. Brook trout exposed to the pond water were shown to have incorporated exhaust components (hydrocarbons). Hydrocarbons increased from undetectable levels in the water, pre-treatment to 10 ppm, post-treatment. Exposed fish exhibited hydrocarbon levels of up to 1 ppm. Petroleum hydrocarbons can have pathological effects on fish at very low levels (less than 10 ppb) and may negatively impact reproduction and foraging (Adams 1975). Hydrocarbon concentrations were highest near the water surface after ice-out. Fish may be particularly vulnerable to hydrocarbon contamination in the early spring because they may be in poorer condition, and are more likely to be active near the water surface. The concentration of hydrocarbons in snow is likely to be particularly high on trails where regular grooming constantly packs exposed snow (Oliff et al. 1999). Spring snowmelt may release those hydrocarbons into streams and other bodies of water (Oliff et al. 1999). To what extent the bodies of water on the refuge are at risk of hydrocarbon pollution is unclear. Maine ITS-84 crosses over Sunkhaze Stream at the end of McLaughlin Road and the snowmobile trail at Benton crosses Fowler Brook over a wooden bridge. Snowmobiles can only cross Sunkhaze Stream when the water is frozen. The waterway is protected by a wooden bridge at Benton Unit. Based on the small numbers of snowmobiles using the refuge units, we expect that water pollution impacts will not be significant. Given current low levels of snowmobile use, recent improvements in snowmobile technologies, and large water volumes the impacts are expected to be minimal.

Air Quality

Bishop et al. (2001) found that snowmobiles accounted for 27 percent of the annual emissions of carbon monoxide in Yellowstone National Park, as well as 77 percent of the annual hydrocarbon emissions. Carbon monoxide production was reduced by 13 percent for vehicles using

oxygenated fuels, but hydrocarbon emissions were unaffected. Fan-cooled snowmobiles had lower hydrocarbon emissions than liquid cooled machines.

Although automobiles substantially outnumber snowmobiles 16 to 1 in Yellowstone during the winter, snowmobiles are responsible for up to 90 percent of hydrocarbon and up to 69 percent of carbon monoxide emissions in the park (US GAO 2000). Additionally, 25 percent to 30 percent of snowmobile fuel is released unburned into the atmosphere (US GAO 2000).

The anticipated impacts from snowmobiles include some exhaust emissions to the air and possibly refuge streams. The refuge currently has no data on stream or air quality.

Noise

Snowmobile noise is readily detectable by wildlife at distances up to several kilometers. The effects of disturbance on wildlife are quite variable, and many species seem to be capable of habituating to it (Bowles 1995). There is no clear evidence for noise having an impact at the population level (Bowles 1995). Noise may have an impact on the experience of other human users on the refuge. We have not measured noise levels on the refuge, but they are probably noticeable near trails and on Sunkhaze Meadows NWR during busy winter weekends. Because of the ability of snowmobile noise to travel over great distances, much of the noise on the refuge probably comes from off-refuge snowmobile activity, over which the refuge has no control, as well as from on-refuge activity. We will minimize conflicts among users by restricting snowmobile use to designated trails, thus leaving the remainder of the refuge open to other users.

Summary of Anticipated Impacts:

Although the information available about the effects of snowmobiling on designated trails is incomplete, at its current and anticipated levels and patterns of use, we do not expect it to constitute significant short-term or long-term impacts separately or cumulatively. We will evaluate all trails every annually to ensure there are not site-specific impacts. We will reroute or close any trails if we determine that they have a significant, negative impact on wildlife or habitat.

Snowmobile trails are located on existing utility powerlines and trails.. The location for the trails has effectively mitigated impacts of snowmobiling relating to soil and vegetation on those surfaces. The bridges and culverts crossing the water courses are designed to support trucks and other heavy equipment. Therefore, additional impacts from snowmobiling are unlikely. Snowmobile trails throughout the area have been established for many years and pre-date refuge ownership. Because the wildlife potentially affected are accustomed to that use, we consider impacts on wildlife minimal. Increases in emission regulations by the U.S. Environmental Protection Agency, along with the increase in the number of 4-stroke and new cleaner 2-stroke engines in modern snowmobiles has and will continue to reduce the potential impacts on the environment described in the literature review. The increased presence of a law enforcement officer and zone officer will ensure stipulations that support the compatibility of this use. Therefore, snowmobiling on Sunkhaze Meadows NWR poses only a minimal threat to goals 3 (“Promote the biological integrity, diversity, and environmental health of the Sunkhaze Meadows Unit’s wetland, forest, and aquatic habitats to protect water quality and sustain native plant communities, rare plants, and wildlife, including species of conservation concern,” and

“Provide grassland, shrubland and aquatic habitats at Benton and Sandy Stream Units to sustain a diversity of wildlife, including species of conservation concern”) as written in the comprehensive conservation plan (CCP). Our continued monitoring of the effects of snowmobiling is necessary to understand better their impacts on refuge habitats, plant and wildlife communities, and human visitors. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future.

Snowmobile trails on the refuge provide an important link in the State trail system and enhance opportunities for the public to experience the winter landscape. Snowmobiling may also benefit goals 4 and 6 (“Promote enjoyment and environmental stewardship by engaging visitors, students, and nearby residents to experience the wetlands, woods, and wildlife at Sunkhaze Meadows Unit,” and “Promote enjoyment and environmental stewardship by engaging visitors, students, and nearby residents to experience the wetlands, woods, and wildlife at the Benton and Sandy Stream Units”) of the CCP by providing opportunities during winter months for wildlife observation and photography and access for hunting.

PUBLIC REVIEW AND COMMENT:

As part of the CCP process for Sunkhaze Meadows NWR and Carlton Pond Waterfowl Production Area, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Snowmobile clubs must continue to operate within the terms of the SUP issued to them every year.
- Snowmobiles will only be permitted on designated trails (maps B.22, B.23, and B.25)
- Snowmobile trails will only be open for use when all areas of the trail have generally contiguous snow cover.
- All trails will be located on existing roadbeds, wherever possible, to minimize vegetation damage. Trails will also be kept away from streams to avoid erosion. Where stream crossings are unavoidable, sighting and construction of bridges or culverts will follow best management practices, and crossing structures will be maintained in good repair.
- Trails will be located away from areas of unique or sensitive vegetation, such as bogs or wetlands.
- Snowmobile trails will be located so that they are away from deer wintering areas and do not run between deer bedding and feeding areas. Trails are also located in upland

deciduous forest, and will be kept out of drainage bottoms and coniferous riparian areas important for wildlife such as fisher, marten, and moose, wherever possible.

- All trails will be surveyed for signs of wildlife activity, sensitive vegetation, or erosion potential, and trail locations will be entered into a geographic information system. We will use that information to guide routing, re-routing, or closure of trails. Biological inventories will continue to provide baseline information for measuring change. Should the monitoring and evaluation of the use indicate that the compatibility criteria have or will be exceeded, appropriate action will be taken to ensure continued compatibility, including modifying or discontinuing the use.
- The refuge will institute a public outreach program (brochures, signs) when funding is available to help educate the public about refuge regulations, safety, and how to minimize disturbance of wildlife.
- Routine law enforcement patrols will be conducted throughout the year to promote compliance with refuge regulations and provide educational outreach, help monitor public use patterns, public safety, and document visitor interactions. Refuge officers may record visitor numbers, vehicle numbers, visitor activities, and locations of the activities to document current and future levels of refuge use. Conditions that are a risk to public safety will be identified, and appropriate action will be promptly taken to correct such conditions.

JUSTIFICATION:

This is an existing use of the refuge. This use is consistent with the Service's environmental assessment prepared for the refuge's establishment where we stated that we will continue to allow this use if compatible (USFWS 1988, pg. 5). Allowing snowmobiling at Sunkhaze NWR, as stipulated in this document, will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the refuge was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes. As discussed under the section on anticipated impacts above, the short portion of the trail that crosses the Sunkhaze Meadows Unit passes through a forested upland type habitat. Relocation of the trail to off-refuge lands will require substantial effort and expense, and will undoubtedly result in greater impacts on wetlands than the existing trail, which impacts no wetlands in the vicinity of the refuge. Adverse impacts to soils and vegetation from this use are minimized during winter months since snowmobiling is limited to established trails and the ground is often frozen. Adverse impacts on wildlife are minimized because fewer species and fewer numbers of wildlife are present during winter months when most of this use occurs. In addition, snowmobile trails throughout these areas have been established for many years and pre-date Service ownership. Because the wildlife potentially affected are accustomed to that use, we consider impacts on wildlife minimal. This use has been allowed on the refuge since the refuge was established with no significant adverse effects observed.

Snowmobiling will not materially interfere with or detract from the endangered species aspect of the refuge's purposes, because there are no federally listed threatened or endangered species

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Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

Use: Research conducted by non-Service personnel

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Goettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Grada W. Taylor Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

Use: Research conducted by non-Service personnel

Narrative:

Research by non-U.S. Fish and Wildlife Service (Service) personnel is conducted by colleges, universities, Federal, State, and local agencies, non-governmental organizations, and qualified members of the general public to further the understanding of the natural environment and to improve the management of Sunkhaze Meadows National Wildlife Refuge (Sunkhaze Meadows NWR, refuge) and Carlton Pond Waterfowl Production Area's (WPA) natural resources. Much of the information generated by the research is applicable to management on and near the refuge. In many cases, research by non-Service personnel ensures the perception of unbiased and objective information gathering, which can be important when using the research to develop management recommendations for politically sensitive issues. Additionally, universities and other federal partners can access equipment and facilities unavailable to refuge staff for analysis of data or biological samples. This use is therefore beneficial to the refuge and WPA's natural and cultural resources.

Research conducted by non-Service personnel will also enable the Service to better achieve three goals in the refuge and WPA's comprehensive conservation plan (USFWS 2013) because these data will help refuge staff make informed decisions. In addition, because this use could aid in the protection of fish and wildlife resources, it promotes the fulfillment of the refuge purpose of protecting fish and wildlife resources (Fish and Wildlife Act of 1956; 16 U.S.C. 742f (a) (4)). Research purposes fits into the description of 603 FW1 1.10(D), Specialized Uses. Specifically, research with partners is actively encouraged under 1.10 (D)(4).

The Service will encourage and support research and management studies on refuge and WPA lands that will improve and strengthen natural resource management decisions. The refuge manager will encourage and seek research relative to approved refuge objectives that clearly improves land management and promotes adaptive management. Priority research addresses information that will better manage the Nation's biological resources; is generally considered important to agencies of the Department of the Interior, the Service, the National Wildlife Refuge System, and State fish and game agencies; and that addresses important management issues or demonstrates techniques for management of species or habitats.

Refuge staff will also consider research for other purposes that may not be directly related to refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation, and management of native populations of fish, wildlife, and plants, and their natural diversity within the region or flyway. These proposals must comply with the Service's compatibility policy.

Evaluating and accepting or rejecting study proposals, as well as conditioning the special use permits (SUP) appropriately will minimize the impacts of and maximize the value of such research. If a research project occurs during the refuge's hunting season, special precautions will be required and enforced to ensure the researchers' health and safety. If conducted according to refuge- or WPA-specific stipulations set forth in the required SUP, this use will not affect the Service's ability to protect, conserve and manage wildlife and their habitats, nor will it impair existing wildlife-dependent recreational uses or reduce the potential to provide quality, compatible, wildlife-dependent recreation uses into the future.

Research therefore has been found appropriate because it is beneficial to the refuge and WPA's natural and cultural resources and it is consistent with the goals and objectives of the CCP (USFWS 2013).

Reference:

U.S. Fish and Wildlife Service (USFWS). 2013. Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area Comprehensive Conservation Plan. September 2013.

COMPATIBILITY DETERMINATION

USE: Research Conducted by Non-Service Personnel

REFUGE NAME: Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

DATE ESTABLISHED:

Sunkhaze Meadows National Wildlife Refuge: November 22, 1988

Carlton Pond Waterfowl Production Area: November 24, 1965

ESTABLISHING AUTHORITIES:

Sunkhaze Meadows National Wildlife Refuge:

1. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
2. Refuge Recreation Act of 1962 (16 U.S.C. 460k-406k-4; 76 Stat. 653)

Carlton Pond Waterfowl Production Area:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

Sunkhaze Meadows National Wildlife Refuge:

1. "... or the development, advancement, management, conservation, and protection of fish and wildlife resources ..." (16 U.S.C. 742f(a)(4)) "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." ((16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956))
2. "... suitable for -- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." ((16 U.S.C. 460k-1) (Refuge Recreation Act))

Carlton Pond Waterfowl Production Area:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." (16 U.S.C. 718c (Migratory Bird Hunting and Conservation Stamp Act))
2. "...for any other management purpose, for migratory birds." (16 U.S.C. 715d (Migratory Bird Conservation Act))

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is research conducted by non-Service personnel. Research conducted by non-Service personnel is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the use be conducted?

The location of the research will vary depending on the individual research project that is being conducted. The entire refuge is open and available for scientific research. An individual research project is usually limited to a particular habitat type, plant or wildlife species. On occasion research projects will encompass an assemblage of habitat types, plants or wildlife. The research location will be limited to those areas of the refuge and Waterfowl Production Area (WPA) that are absolutely necessary to conduct the research project.

(c) When will the use be conducted?

The timing of the research will depend entirely on the individual research project that is being conducted. Scientific research will be allowed to occur on the refuge throughout the year. An individual research project could be short term in design, requiring one or two visits over the course of a few days. Other research projects could be multiple year studies that require daily visits to the study site. The timing of each individual research project will be limited to the minimum required to complete the project. If a research project occurs during the refuge hunting season, special precautions will be required and enforced to ensure public health and safety.

(d) How will the use be conducted?

The mechanics of the research will depend entirely on the individual research project that is conducted. The objectives, methods, and approach of each research project will be carefully scrutinized before it will be allowed to occur on the refuge or the WPA. No research project will be allowed to occur if it does not have an approved study plan and protocol or if it compromises public health and safety, or if it is not found appropriate (see below).

In general, we will allow observational research projects (bird banding, bird counts, fur collection from scratching posts, etc.) that do not cause mortality to birds and animals, or involve major manipulations of the ecosystem. Where collecting will be allowed, it will be a critical part of the research, will not involve the collection of threatened or endangered species, and will be carefully restricted to levels not expected to impair populations. For example, over the past 2 years, the students of several local high schools, in conjunction with the Schoodic Education and Research Center, have been doing research on the movement of mercury through the aquatic food chain. Under a special use permit (SUP), they have been allowed to collect a limited number of dragonfly larvae for analysis from specific areas. Part of the study also compared the mercury loads of dragonfly larvae collected at the refuge with levels of those collected elsewhere. This was useful information of interest to the refuge and other Service staff.

Researchers participating in approved studies are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing). Carlton Pond WPA does

not currently have any walking trails, so access to the water is allowed via walking off-trail or through the use of motorized and non-motorized boats.

(e) Why is this use being proposed?

Research by non-Service personnel is conducted by colleges, universities, Federal, State, and local agencies, non-governmental organizations, and qualified members of the general public to further the understanding of the natural environment and to improve the management of the refuge's natural resources. Much of the information generated by the research is applicable to management on and near the refuge and WPA. The Service encourages and supports research and management studies on refuge lands that will improve and strengthen natural resource management decisions.

The refuge manager encourages and seeks research relative to approved refuge objectives that clearly improves habitat management and promotes adaptive management. Priority research addresses information that will better manage the Nation's biological resources and are generally considered important to: Agencies of the Department of the Interior; the U.S. Fish and Wildlife Service; the National Wildlife Refuge System; and state fish and wildlife agencies, and that address important management issues or demonstrate techniques for management of species or habitats. The refuge also considers research for other purposes which may not be directly related to refuge specific objectives, but contributes to the broader enhancement, protection, use, preservation and management of native populations of fish, wildlife and plants, and their natural diversity within the region or flyway. These proposals must comply with the Service's compatibility policy. Refuge support of research directly related to refuge objectives may take the form of funding, in-kind services such as housing or use of other facilities, vehicles, boats, or equipment, direct staff assistance with the project in the form of data collection, provision of historical records, conducting of management treatments, or other assistance as appropriate.

Both the Refuge Manual and the Service Manual provide guidance on allowing research on refuges. The Refuge Manual (4 RM 6.2) lists three objectives that can be met by permitting research on refuges:

- 1) Promoting new information which will improve the quality of the refuge and other Service management decisions.
- 2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management and the environment in general.
- 3) To provide the opportunity for students and others to learn the principles of field research.

The Service Manual (603 FW 1.10D (4)) provides supplemental guidance in terms of the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

The rationale for this conclusion is clearly stated in the preamble to that policy (71 Federal Regulation 36415):

Not all research may be appropriate. Some research may affect fish, wildlife, and plants in a manner neither consistent with refuge management plans nor compatible with refuge purposes or the Refuge System mission. Some research may interfere with or preclude refuge management activities, appropriate off the refuge, appropriate and compatible public uses, or other research. Some research may be appropriate off the refuge, but not on the refuge. For example, some natural and physical research may not be wildlife-dependent and may be accomplished successfully at locations off the refuge. Because not all research support establishing purposes of refuges or the Refuge System mission, we cannot define research as a refuge management activity.

AVAILABILITY OF RESOURCES:

The bulk of the cost for research is incurred in staff time to review research proposals, coordinate with researchers and write SUPs. In some cases, a research project may only require one day of staff time to write a SUP. In other cases, a research project may take many weeks, as the refuge staff must coordinate with students and advisors and accompany researchers on site visits.

Annual costs associated with the administration of outside research on the refuge and WPA are estimated below:

Refuge biologist (GS11) (review proposals, coordinate with researchers) 2 days/yr:	\$672
Administrative Assistant (GS7) (SUP preparation and administration) 1 day/yr:	\$168
Estimated Total Cost:	\$840

ANTICIPATED IMPACTS OF THE USE:

The Service encourages approved research to further the understanding of the natural resources. Research by other than Service personnel adds greatly to the information base for refuge managers to make proper decisions. Disturbance to wildlife and vegetation by researchers could occur through observation, banding, collecting blood, and accessing the study area by foot, boat, or vehicle. These impacts could be exacerbated by multiple concurrent research projects. It is possible that direct mortality could result as a by-product of research activities. Overall, however, allowing research to be conducted by non-Service personnel should have little impact on Service interests. If the research project is conducted with professionalism and integrity, the knowledge gained far outweighs potential adverse impacts.

Research conducted by non-Service personnel on Sunkhaze Meadows NWR and Carlton Pond WPA poses only a minimal threat to refuge resources because the refuge manager can control the potential for adverse impacts through SUPs, prohibiting multiple research projects from affecting any given area or species at one time. Refuge managers retain the option to prohibit research on the refuge or WPA which does not contribute to the mission of the refuge system or causes undue disturbance or harm. Managers retain the right to revoke or deny renewal for any SUP if unanticipated short-term, long-term, or cumulative impacts are noted.

Ideally, any research project conducted on the refuge will positively contribute to one or more of the refuge goals and/or objectives and may assist in achieving goals 1, 2, and 3 of the refuge’s and WPA’s comprehensive conservation plan (USFWS 2013). There may be short-term disturbance to plants and wildlife during field investigations—this is unavoidable in most cases. Any threats will be mitigated by the stipulations required under this compatibility determination and any additional conditions specified under each SUP.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows NWR and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- All researchers will be required to submit a detailed research proposal per Service Policy (FWS Refuge Manual Chapter 4 Section 6).
- The refuge must be given at least 45 days to review proposals before initiation of research. If collection of wildlife is involved, the refuge must be given 60 days to review the proposal.
- The regional refuge biologists, other Service Divisions, State agencies, academic experts, may be asked to review and comment on proposals.
- Proposals will be prioritized and approved based on need, benefit to refuge resources and the Refuge System, compatibility, and funding required.
- Researchers will be expected to submit a final report to the refuge, on completion of their work. For long-term studies, interim progress reports may also be required. The refuge also expects that research will be published in peer-reviewed publications.
- The contribution of the refuge and the Service will need to be acknowledged in any publications.
- SUPs will be required for all research conducted by non-Service personnel. The SUP will list all conditions that are necessary to ensure compatibility. These permits will also identify a schedule for annual progress reports and the submittal of a final report or scientific paper.

COMPATIBILITY DETERMINATION

USE: Wildlife Observation and Photography, Environmental Education and Interpretation

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C.718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resource and their habitats within the United States for the benefit of present and future generations of Americans." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

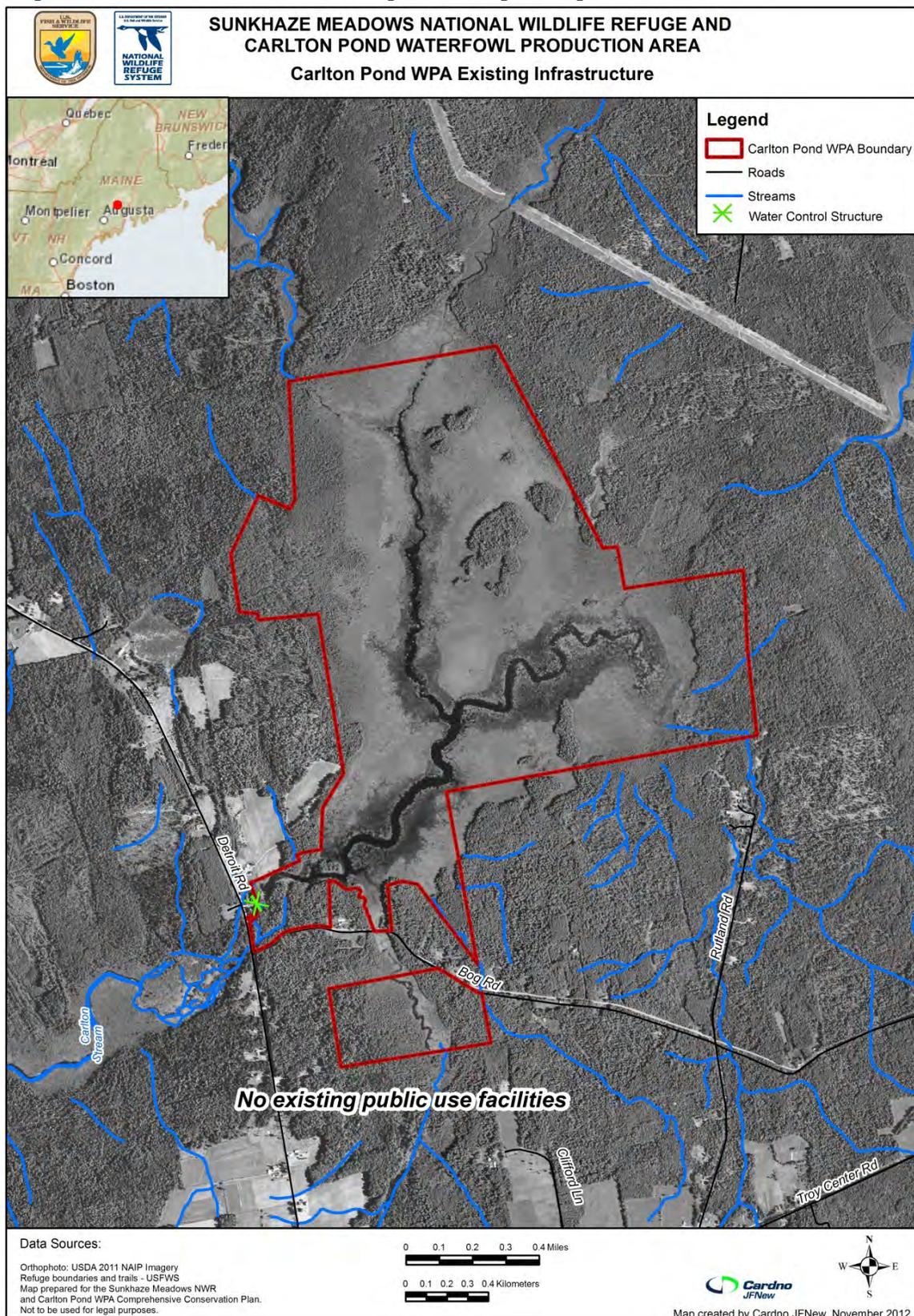
(a) What are the uses? Are they priority public uses?

The uses are wildlife observation, photography, environmental education, and interpretation. These uses are four of the six priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where will the uses be conducted?

Wildlife observation, photography, environmental education and interpretation will be allowed to occur throughout the Carlton Pond WPA during open hours (map B.26). No designated trails or photo blinds exist or are planned on the area; most visitors use canoes or kayaks to access the WPA, and opportunities for observation and photography occur on the adjacent road and access point as well as from a canoe, kayak or other boat on the water. The exact locations of environmental education and interpretation activities will be at the discretion of the refuge manager and specified through a required special use permit (SUP).

Map B.26. Service lands and waters open to compatible public uses within Carlton Pond WPA.



(c) When will the uses be conducted?

Wildlife observation, photography, environmental education, and interpretation will be allowed on the WPA daily, year-round, from sunrise to sunset, unless a conflict with a management activity or an extenuating circumstance necessitates deviating from this. Closures for snow or ice storms, or other events affecting human safety, or for nesting season and other sensitive times of the year are examples that might require these uses be temporarily suspended or require temporary spatial closures of certain areas.

(d) How will the uses be conducted?

Refuge staff will be responsible to provide law enforcement; maintain boundaries and signs; meet with and/or respond to inquiries by adjacent landowners and interested public; recruit and supervise volunteers; prepare information on these uses to be delivered via websites, brochures, and other means; develop necessary signage; monitor and evaluate impacts; regulate the use of the area by groups larger than 10 through SUPs (for example, limiting an environmental education canoe program to one class of 30 on a given day) ; and, if sufficient staff exists, prepare and deliver environmental education and/or interpretation programs. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (i.e., walking).

(e) Why are these use(s) being proposed?

Wildlife observation, wildlife photography, environmental education, and interpretation are Priority Public Uses as defined by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). If compatible, they are to be facilitated on refuges. These uses will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resources and to gain understanding and appreciation for fish and wildlife and habitats, ecology and wildlife management. These uses provide opportunities for visitors to relax and enjoy wildlife in a wholesome, safe, unstructured outdoor environment at their own pace, and to provide the psychological and health benefits attendant to that type of outdoor enjoyment. As visitors enjoy the recreational aspects of these activities, they may be drawn to engage in the more structured educational opportunities offered, and thereby enhance their understanding of natural resource management programs and ecological concepts. This, in turn, will enable them to better understand ecological issues and problems affecting refuge resources and become better advocates and stewards for those resources. Photographs that are taken on refuges are sometimes shared with others by the photographer or shared with the refuge staff and donated for use in U.S. Fish and Wildlife Service (Service) outreach materials and can provide the public increased exposure to refuge assets.

AVAILABILITY OF RESOURCES:

Sufficient refuge resources in terms of personnel and budget are available to administer these uses.

Cost Breakdown:

The following are estimated costs to the refuge to administer and manage the refuge programs for wildlife observation, wildlife photography, environmental education, and interpretation.

Maintenance:	\$500	annually to maintain water levels and dike
Install kiosk and signs:	\$1,500	one-time expense
Monitoring:	\$600	annually
Law Enforcement:	\$1,000	annually
Total	\$3,600	

ANTICIPATED IMPACTS OF THE USE:

Wildlife observation and photography, environmental education, and interpretation can have positive or negative impacts on the WPA's wildlife and habitats.

In general, visitors engaged in these uses will be traveling by foot, either by walking or hiking, in designated areas and along designated trails and roads. The positive impacts of these uses include providing visitors with a better appreciation and more complete understanding of the wildlife and habitats associated with the refuge. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service, as well as wildlife conservation in general.

The negative effects of these uses include impacts to plants, soils, hydrology, and wildlife from both visitors walking and hiking on the WPA and from building and maintaining public use facilities.

Vegetation Impacts:

Pedestrian travel can have indirect impacts to plants by compacting soils and diminishing soil porosity, aeration, and nutrient availability that affect plant growth and survival (Kuss 1986). Hammitt and Cole (1998) note that compaction limits the ability of plants to re-vegetate affected areas. Repeated foot travel can directly impact plants by crushing the plants themselves. Rare plants with limited site occurrence are particularly susceptible to such impacts. Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss 1986). Moist and wet soil conditions are present at the refuge, particularly during spring and early summer. It is anticipated that allowing these uses could cause vegetation damage at boat put-in areas. However, these uses have been allowed at Carlton Pond WPA in the past and no significant damage has been observed.

People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. Once established, invasives can out-compete native plants, thereby altering habitats and indirectly impacting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring, and when necessary, treatment. Staff will work to educate the visiting public to reduce introductions and will also monitor and control invasive species.

Soils Impacts:

Soils can be compacted and eroded as a result of continued use of pedestrian routes (Cole and Landres 1995). It is anticipated that some minor soil erosion will occur as a result of continuing pedestrian access on designated routes. Under current and anticipated levels of use, impacts to

soils (erosion, compaction) are not likely to be significant, because this will be an ongoing use of the refuge, and refuge staff have not observed problems with soil erosion or compaction to date.

Hydrologic Impacts:

Roads and trails can affect the hydrology of an area, primarily through alteration of drainage patterns. It is anticipated that existing roads and trails will continue to influence hydrology regardless of pedestrian travel. Maintenance will be required to create adequate and proper drainage to avoid hydrologic impacts. Trail construction may also cause erosion and run-off of sediment into nearby waterways from exposed soils.

Impacts to wet areas can occur when bridging is inadequate and visitors widen or go off the trail to avoid wet spots. Properly sited, designed, and maintained trails minimize this impact. Based on the current and projected levels of use, pedestrian travel is not likely to significantly increase erosion, incision, or stream alteration. This will be an ongoing use of the refuge, and refuge staff have not observed problems with erosion, incision, or stream alteration to date. Therefore, no significant hydrologic impacts are anticipated from this use.

Wildlife Impacts:

Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year such activities occur. The responses of wildlife to human activities includes: avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). 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.” These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat.

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples 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) noted that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during the breeding season and winter months.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). McNeil et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Flight in response to disturbance can lower nesting productivity and cause disease and death.

Studying the effects of human visitation on waterbirds at J.N. “Ding” Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Herons and bitterns were quite tolerant of people; however, the presence of people did disturb these birds when hunting, terrestrial prey. Great blue herons (*Ardea herodias*), tricolored herons (*Egretta tricolor*), great egrets (*Casmerodius albus*), and little blue herons (*E. caerulea*) were disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the Northeastern United States.

Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske et al. (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, could make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads in the Eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981, Klein et al. 1995, Burger and Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger and Gochfeld 1981, Burger et al. 1995, Knight and Cole 1995, Rodgers and Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986, Burger et al. 1995, Knight and Cole 1995). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slows birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998), though noise was not correlated with visitor group size (Burger and Gochfeld 1998).

Specifically, at Carlton Pond WPA, spring or summer boating activity undertaken to observe or photograph wildlife may cause some disturbance to nesting waterfowl and shorebirds. The black tern, a State-listed endangered species, nests in the wetland vegetation near the water, so their nesting locations are monitored and water levels controlled for their benefit. In previous years, refuge staff have observed that most visitors avoid the areas where these and other waterfowl nest because of the emergent vegetation, mucky soils, and relatively shallow waters. These conditions make foot access and boat access somewhat difficult. Photographers and others will be notified with signs not to disturb these birds if needed. If disturbance becomes a productivity issue, the area close to their nests will be temporarily closed. Black ducks and other ground nesting birds are usually secreted away from areas traveled by boaters. In addition, wildlife observers and photographers generally seek to minimize disturbance as it interferes with their activity. Overall, effects should not be significant since the WPA experiences minimal public use and use is concentrated only at the launch site; there are no trails or buildings.

Summary of Impacts:

Based on observations and knowledge of the areas involved, there is no evidence that cumulatively, the proposed wildlife-dependent uses will have an unacceptable effect on the wildlife resource. Even before the establishment of the WPA, the landowners allowed the public to engage in these uses without discernible negative effects. Although a substantial increase in the cumulative impacts from public use is not expected in the near term, it will be important for refuge staff to monitor use and respond, if necessary, to conserve the existing high quality wildlife resources.

No additional effects from wildlife observation, wildlife photography, environmental education, and interpretation are anticipated. Therefore allowing these uses poses only minimal threats to goal 2 of the CCP: “Provide open water and emergent wetland habitat at the Carlton Pond WPA to sustain a diversity of wildlife, including waterfowl and species of conservation concern.” These uses help fulfill goal 5, to “Promote enjoyment and environmental stewardship by

engaging visitors, students, and nearby residents to experience the wetlands, woods, and wildlife at the Carlton Pond WPA.”

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Refuge staff will continue to monitor the WPA for the presence of threatened or endangered species, including the state-listed black terns, and ensure that unusual or critical conditions relative to habitat or disturbance are not present. If conditions dictate, uses of all or any part of the area may be temporarily suspended by posting appropriate signs.
- Periodic law enforcement will ensure compliance with regulations and area closures and discourage prohibited activities and vandalism.
- Outside individuals, groups or organizations wishing to visit the refuge to provide environmental education or interpretation activities will be required to obtain a SUP. This will allow the refuge staff to provide important information about access, resources, and specific stipulations to reduce disturbances that may be caused by groups compared to individuals. It will also help the refuge quantify and monitor these uses on the WPA.

JUSTIFICATION:

Wildlife observation, wildlife photography, environmental education, and interpretation are priority public uses for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife resources (Executive Order 12996, March 25, 1996, and The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997). The Service’s policy is to provide opportunities for these uses when compatible and consistent with sound fish and wildlife management.

Allowing wildlife observation and photography, environmental education, and interpretation on Carlton Pond WPA will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the WPA was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes centered around migratory birds, focusing on waterfowl. These uses do not materially interfere with or detract from these purposes because: (1) these uses occur and are expected to remain at relatively low levels, and (2) at current and

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COMPATIBILITY DETERMINATION

USE: Fishing

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C. 718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is access to recreational fishing at Carlton Pond WPA. Public fishing is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

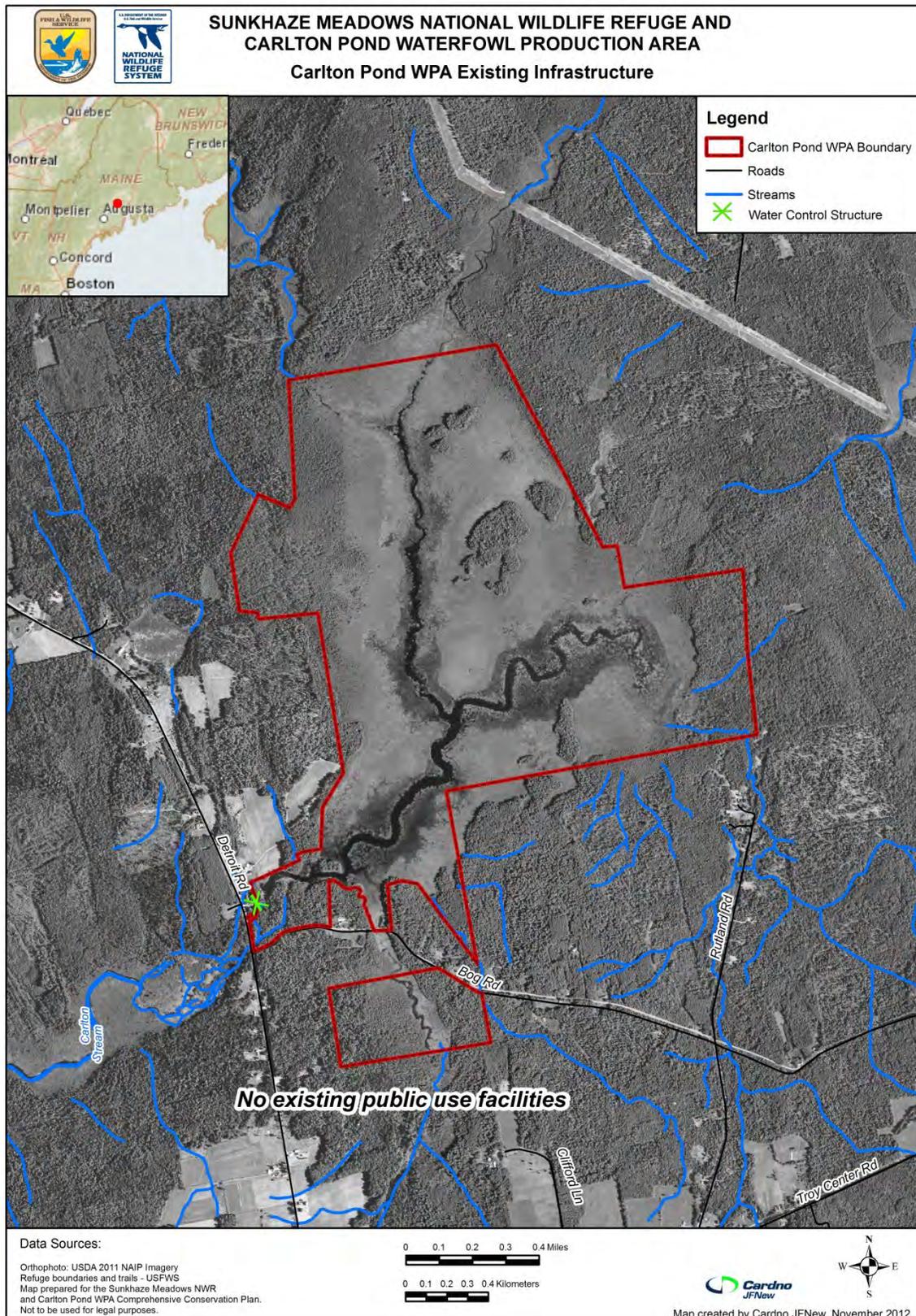
(b) Where will the use be conducted?

Fishing will be allowed throughout the waterways within Carlton Pond WPA during regular open hours (see map B.27).

(c) When will the use be conducted?

The use will be conducted during the seasons specified in the fishing regulations of the State of Maine. Visitors will be allowed to access to Carlton Pond on foot through the refuge between sunrise and sunset, normal refuge open hours.

Map B.27. U.S. Fish and Wildlife Service lands and waters open to compatible public uses within Carlton Pond WPA (see text for details).



(d) How will the use be conducted?

Carlton Pond WPA is open to fishing in accordance with 50 CFR 32.4. Visitors participating in this approved public use are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking). Fishing may be conducted by boat or from the bank. Bank fishing may occur around the culvert on the Bog Road and near the dam. Fish species usually sought are pickerel, yellow perch, bullheads, and smallmouth and largemouth bass.

Refuge staff will continue to monitor the WPA for the presence of threatened or endangered species and ensure that unusual or critical conditions relative to habitat or wildlife are not present. If such conditions so dictate, uses of all or any part of the area may be temporarily suspended by posting in accordance with 50 CFR 31.16, 32.1, and 32.4. The refuge manager may, upon annual review of the fishing program, impose further restrictions on fishing or recommend that some or all fishing on the WPA be closed. We will restrict fishing if it becomes inconsistent with other, higher priority refuge programs or endangers WPA resources or public safety.

Fishing will be conducted under Maine State fishing regulations for open water and ice fishing, with some additional restrictions discussed below, to protect fish, wildlife, and habitat, and to reduce potential public use conflicts. A valid State of Maine fishing license will be required to fish on Carlton Pond WPA. Visitors fishing from boats will be required to comply with all conditions and stipulations in the WPA's compatibility determination for boating.

No fish of any species may be introduced into WPA waters without appropriate State and refuge permits. This includes unused bait fish and eggs. Bait fish may be trapped by State regulation from Carlton Pond's waters for personal use, but not for commercial purposes.

At the discretion of the refuge manager, some Service lands may be seasonally, temporarily, or permanently closed to fishing access, if wildlife or habitat impacts or user conflicts become an issue. In cooperation with State fisheries biologists, we may manipulate the fisheries and habitat to promote or improve the fishery resource, if warranted. That may include changing fishing regulations (season dates, creel limits, methods of take), introducing or removing fish barriers, and designating riparian buffers.

Additional specifics on how fishing will be implemented on the refuge are included in the refuge's public fishing plan. Staff are currently revising the plan, and intend to complete revisions within 5 years of CCP approval.

(e) Why is the use being proposed?

Carlton Pond WPA has been opened to fishing since its establishment in 1965. As stated previously, WPAs are open to fishing in accordance with 50 CFR 32.4. Fishing is also one of the priority uses of the Refuge System. The Service supports and encourages priority public uses on Service lands where appropriate and compatible. Fishing is also a traditional form of wildlife-oriented recreation. The 2011 national survey of fishing, hunting, and wildlife-associated recreation reveals that 341,000 Maine residents and nonresidents 16 years old and older participated in fishing (USFWS 2011).

AVAILABILITY OF RESOURCES:

Additional fiscal resources to conduct this activity will be minimal since Carlton Pond WPA has been opened to public fishing since its establishment in 1965, and will occur under State regulations and not as a refuge-regulated fishing program. Costs associated with administration of this use include:

Public Informational Signage:	\$300
GS-9 Refuge Officer	
Law Enforcement/Outreach:	\$1,000
Total:	\$1,300

Based on a review of the budget allocated for public fishing management, we have determined that sufficient resources are available to continue the existing fishing program. Our existing staff and budget should provide sufficient resources to continue managing this activity.

ANTICIPATED IMPACTS OF THIS USE:

Fishing is consistent with the purposes of Carlton Pond WPA when it is carried out within established regulations and is a priority use of the Refuge System.

Impacts on Fish Species:

Recreational fishing can have negative impacts on fish populations if it occurs at high levels or is not managed properly. Potential impacts from fishing include direct mortality from harvest and catch and release; injury to fish caught and released, changes in age and size class distribution, changes in reproductive capacity and success, loss of genetic diversity, altered behavior, and changes in ecosystems and food webs (Lewin et al. 2006, Cline et al. 2007).

These impacts are often disproportionate among fish species, sizes, ages, sexes, and based on other behavioral traits because anglers selectively catch fish based on these factors (Lewin et al. 2006). In general, anglers tend to target larger and older fish. The selective removal of larger and older fish can have a variety of impacts of fish population dynamics. First, it can decrease the age and size class distribution in fish populations. Second, larger and older fish tend to have greater reproductive capacity because they are better able to compete for spawning areas and generally have higher egg outputs. Because of this, their selective removal may reduce the populations overall reproductive success. Depending upon the species, anglers may also be more likely to catch males (e.g., some male largemouth bass are more aggressive towards lures) or females (e.g., in some species females grow faster). Also, fish that are more active during the day are often more vulnerable to being caught (Lewin et al. 2006).

Catch-and-release fishing can also have impacts on individual fish, including immediate or delayed mortality. The likelihood of mortality is related to the type of fishing gear used, where the fish is hooked, how the fish is handled, angler experience, and environmental conditions. In general, circle hooks tend to cause less damage than barbed hooks. Also, fish hooked in the lips or jaws tend to have minimal mortality as compared to fish hooked in the gills, esophagus, intestine, or eyes. Fish caught and released with nonlethal injuries may also be exposed to parasites, or bacterial or fungal infections. Individuals that are caught and then handled may also

experience stress, which can lead to changes in physiology and behavior which can in turn impact their growth, reproduction, and immune system (Lewin et al. 2006).

Since fishing generally removes individuals from a population, at high levels it can lead to reduced population sizes and loss of genetic diversity. The loss of genetic diversity can ultimately reduce a population's fitness, resilience, and ability to adapt to environmental changes and stressors, such as climate change. The higher the fishing mortality, the greater these types of impacts will be (Lewin et al. 2006).

While fishing does remove individuals from the population, we do not anticipate that current or projected fishing pressure will affect the WPA's fish populations as a whole. The State sets catch limits, designated waters, and fishing seasons to protect the State's fish populations. As a shallow water impoundment, Carlton Pond is dominated by common, warm water species. In addition, there are no known federally listed or State-listed fish species in WPA waters. As stated previously, fish species usually sought are chain pickerel, yellow perch, bullheads, and smallmouth and largemouth bass. While popular with anglers, smallmouth and largemouth bass are not native to Maine (MDIFW 2001). According to Maine Department of Inland Fisheries and Wildlife (MDIFW), there has been an increase of 47 percent in the number of lakes with one or more species of bass between 1980 and 2000 (MDIFW 2001). Chain pickerel are thought to be native only to southern Maine, and are therefore not considered native to Carlton Pond WPA (MDIFW 2008). Based on the MDIFW (2008) assessment, abundance of chain pickerel is increasing; and, despite State efforts to limit the distribution of pickerel, the species distribution is also increasing (MDIFW 2008). Bullhead and yellow perch are also considered to be nonnative to Carlton Pond WPA (MDIFW 2002). Both species are widely distributed throughout the State, and fishery managers have made efforts to reduce their range to reduce competition with native species such as brook trout (MDIFW 2002). We do not have abundance estimates specifically for Carlton Pond WPA waters; however, given the distribution of these species and the State's estimates of abundance, we do not expect fishing pressure at Carlton Pond WPA to have adverse effects on these species.

Illegal take can also impact fish populations. Periodic patrol by our refuge officer in cooperation with Maine State game wardens will help reduce illegal take.

Impacts on Other Wildlife:

Fishing has the greatest potential to impact aquatic and semi-aquatic species in WPA fishing areas. In particular, fishing has the potential to disturb waterfowl and waterbird species. Fishing seasons in Maine coincide in part with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Anglers can also affect the number, behavior, and temporal distribution of some species of birds, including bald eagles, common ravens, and American crows (Knight et al. 1991). Human activity, including both walking and boat use, has the potential to affect the distribution, abundance, and species richness of water birds by disturbing birds that are overwinter, resting, foraging, reproducing, and nesting.

Disturbances from recreational activities vary with the wildlife species involved and the activity's type, level, frequency, duration, and the time of year it occurs. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger

1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Anglers may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting in egg mortality. This is unlikely as birds nesting and rearing areas are difficult to access on land because of marsh conditions. If disturbance from anglers becomes a problem we will close refuge areas seasonally to fishing around sensitive nest sites, in conjunction with the State of Maine, if necessary.

Visitors to the refuge engaged in fishing will generally be walking across refuge lands to reach the pond. Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the Eastern United States (Burger 1981, Burger 1986, Klein 1993, Klein et al. 1995, Rodgers and Smith 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbances from recreation activities have at least temporary effects on the behavior and movement of birds within a habitat or localized area.

Lost fishing tackle may harm waterfowl, eagles, and other birds externally by catching and tearing skin. Fishing line may also become wrapped around body parts and hinder movement (legs, wings), impair feeding (bill), or cause constriction with subsequent reduction of blood flow and tissue damage. An object above or below the water surface may snag entangled animals, from which they are unable to escape. Nineteen percent of loon mortalities in Minnesota were attributed to entanglement in fishing line (Ensor et al. 1992). Entanglement in fishing line has also caused mortality in bald eagles. Birds may also ingest sinkers, hooks, floats, lures, and fishing line. Ingested tackle may cause damage or penetration of the mouth or other parts of the digestive tract, resulting in impaired function or death. Lead tackle is particularly toxic to wildlife. An investigation into causes of mortality in loons in New England found 52 percent of loon carcasses submitted to Tufts University Wildlife Clinic had died of lead poisoning from ingestion of lead sinkers (Pokras and Chafel. 1992). Maine law prohibits the sale of lead sinkers that weigh less than 0.5 ounces (Maine Title 12, part 13, subpart 4, chapter 923, subchapter 5, 12663-A). Because of the threat of lead poisoning to waterbirds from ingestion of lead sinkers, we prohibit the use of any lead fishing sinkers or jigs on the WPA. There have not been many cases of wildlife loss due to lost fishing gear on the WPA; however, the refuge and the State will continue to provide education and outreach on the hazards of lead sinkers and discarded fishing tackle. Our refuge officer will help in that public outreach.

Water Quality Impacts:

Pollutants from human waste and litter have the potential to have negative impacts on water quality. Extensive water quality testing on Carlton Pond and its tributaries has not been carried out. As such, impacts on local aquatic systems are unknown. We will initiate public outreach and education on littering, pollutants, and proper waste disposal if the use increases substantially above current use levels to help mitigate water quality impacts. Water quality testing will be carried out as funding levels permit.

Bank erosion from human activity (foot traffic) may increase aquatic sediment loads of ponds, or alter riparian vegetation in ways harmful to fish or other wildlife. We do not intend to construct any new trails or boardwalks to provide shore-based fishing access. Therefore, there may be minor impacts associated with the transportation of fishing equipment to the shoreline, especially the heavy equipment used for ice fishing. However, we believe effects of this use on soil erosion and vegetation will be minor for the following reasons. First, effects on soil erosion and vegetation trampling associated with current and projected levels of ice fishing are expected to be minimal since this activity occurs in winter months, when the ground is frozen and vegetation is generally dormant. During other times of year, most anglers appear to access the pond using non-motorized boats, which also minimizes potential impacts of soil erosion and vegetation trampling. Lastly, fishing has been an authorized public use at the WPA for many years, and Service staff are unaware of any bank erosion or vegetation trampling issues associated with fishing at Carlton Pond WPA. Therefore, at current and projected levels of use we expect only minor adverse impacts to soil or vegetation from foot traffic related to fishing.

Other Impacts:

Accidental or deliberate introductions of nonnative fish that may negatively impact native fish, wildlife, or vegetation. The refuge will continue to work cooperatively with the State in providing educational outreach and signs on preventing introductions of nonnative fish and try to contain introductions if they occur.

Accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to fishing boats may also impact native vegetation, wildlife, and habitats. With the exception of a few isolated occurrences of purple loosestrife, WPA waters appear to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys of aquatic invasives. We can mitigate the potential for introductions by having boaters clean their boats before launching and after retrieving. We will also post launch sites with educational materials and have law enforcement officers make spot checks of vessels for compliance and to educate boaters on proper methods for checking for aquatic hitchhikers.

There may be some conflicts between anglers and birders. If other conflicts should arise, the refuge may need to place additional constraints on public uses to minimize conflicts.

Management actions may include, but are not limited to: education and outreach, zoning (in space and/or time), and separating user groups.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- We will manage the public fishing program in accordance with Federal and State regulations and review it annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high-quality outdoor experience for participants. Therefore, adherence to the regulations stated herein will ensure compatibility with the purpose for which the refuge was established.
- All boats, trailers, motors, and fishing gear will be encouraged to be inspected by the owner for plant material and cleaned prior to launching and after retrieval.
- Compliance with regulations will be achieved through education, posted signs, and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife. Individuals fishing in Carlton Pond WPA are subject to the inspection of licenses, fishing equipment, fish creels and containers, vehicles, and their contents by Federal or State officers.
- No commercial fishing or collecting bait for commercial purposes will be allowed.
- Maine law prohibits the sale of lead sinkers weighing less than 0.5 ounces (Maine Title 12, part 13, subpart 4, chapter 923, subchapter 5, 12663-A). Use of any lead fishing sinkers or jigs is prohibited on the WPA.
- The WPA will be open to fishing during regular WPA open hours, sunrise to sunset.

JUSTIFICATION:

Fishing is a priority public use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife resources (The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997). The Service's policy is to provide opportunities for this use when compatible and consistent with sound fish and wildlife management. Fishing is also a popular, traditional recreation activity in Maine that is strongly supported by the Maine Department of Inland Fisheries and Wildlife.

Allowing fishing on Carlton Pond WPA will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the WPA was established. As listed in the purposes section of this compatibility determination, the refuge was established and subsequently land was acquired for two main purposes centered around migratory birds, with a focus on migratory waterfowl. This use does not adversely impact these purposes because: (1) these uses occur and are expected to remain at relatively low levels, and (2) at current and projected levels of use wildlife and habitats, including migratory birds, do not appear to be appreciably negatively affected by this use. We have made this determination based on lack of observed habitat degradation, because disturbance to wildlife is expected to be short term, and these uses are concentrated in areas away from the sensitive nesting and feeding areas. Therefore, no significant adverse effects from fishing are anticipated. In addition, allowing these

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COMPATIBILITY DETERMINATION

USE: Hunting

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C. 718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resource and their habitats within the United States for the benefit of present and future generations of Americans." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

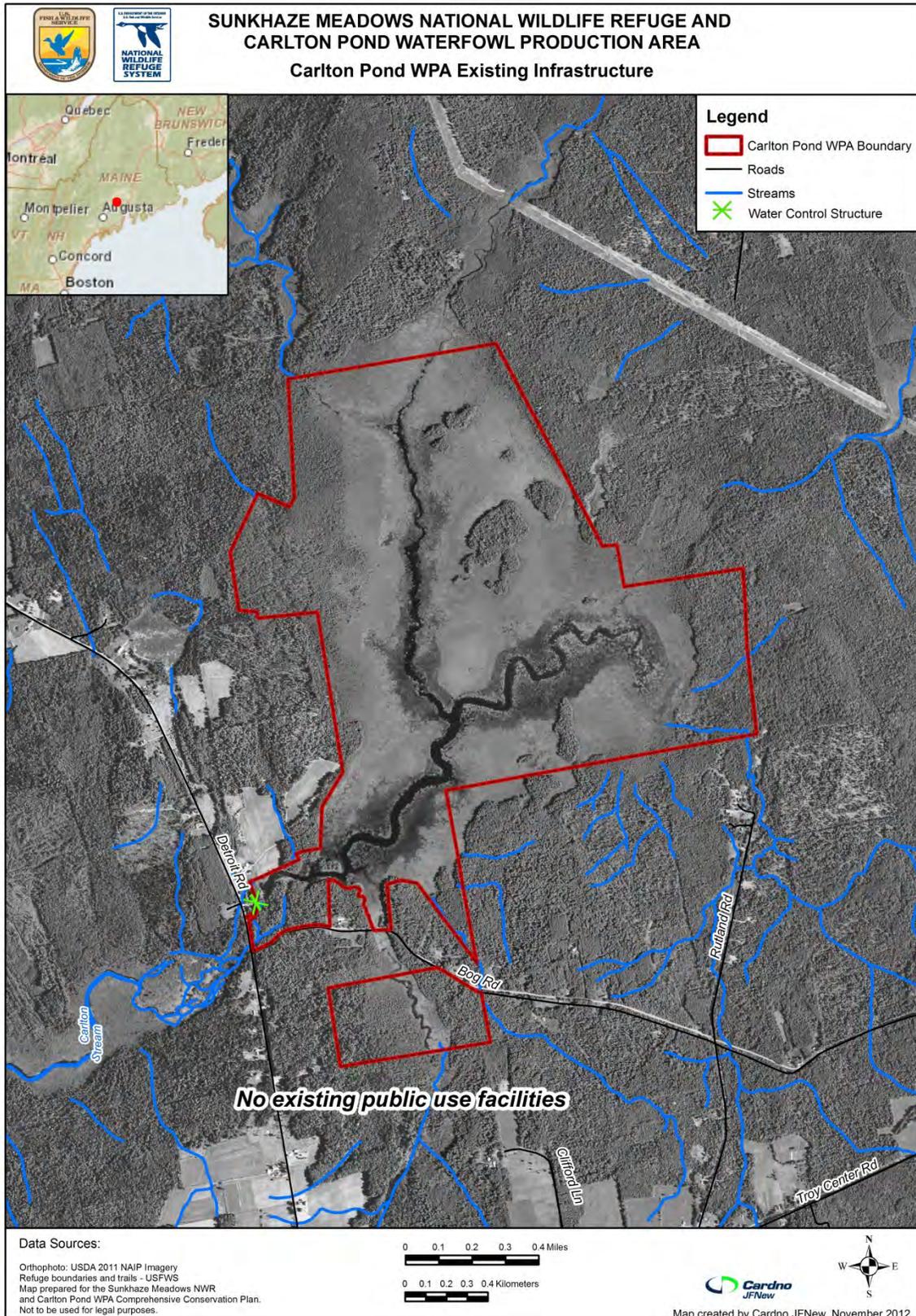
(a) What is the use? Is the use a priority public use?

The use is hunting by the public. Hunting is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act; Public Law 105-57). Per 50 CFR 32.1, "Lands acquired as 'waterfowl production areas' shall annually be open to the hunting of migratory game birds, upland game, and big game subject to the provisions of State law and regulations and the pertinent provisions of 50 CFR parts 25 through 31 of this subchapter: *Provided*, That all forms of hunting or entry on all or any part of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions of, or affecting land, water, vegetation, or wildlife populations."

(b) Where will the use be conducted?

Hunting will be allowed on Carlton Pond WPA which is located in the town of Troy, Waldo County, Maine (map B.28).

Map B.28. Service lands and waters open to compatible public uses within Carlton Pond WPA (see text for details).



(c) When will the use be conducted?

Hunting will be conducted during State of Maine seasons for big game, upland game, and migratory bird hunting seasons, and will be in accordance with Federal and State regulations. In cooperation with the State, hunt season dates and bag limits may be adjusted in the future as needed to achieve balanced wildlife population levels and to limit conflicts with other user groups.

(d) How will the use be conducted?

The refuge permits hunting in accordance with State and Federal guidelines. Per 50 CFR 32.1, all forms of hunting on all or any part of Carlton Pond WPA may be temporarily suspended by posting upon occasions of unusual or critical conditions of, or affecting land, water, vegetation, or wildlife populations. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (i.e., walking).

(e) Why is the use being proposed?

Hunting is one of the priority uses outlined by Congress in the Refuge Improvement Act of 1997. The Service supports and encourages priority uses on national wildlife refuge lands where appropriate and compatible. According to Federal regulations, waterfowl production areas “shall annually be open to the hunting of migratory game birds, upland game, and big game...” subject to the provisions of State and Federal laws and regulations...” (50 CFR 32.1)

AVAILABILITY OF RESOURCES:

Additional fiscal resources to conduct this activity will be minimal as Carlton Pond WPA has been open to hunting since 1965 and since hunting will continue to occur under State regulations and not as a refuge regulated hunting program. Costs associated with administration of this use include:

Preparation of Annual Hunt Plan:	\$500	GS-11 Wildlife Biologist GS-12 Deputy Refuge Manager
Preparation and Updating of Refuge Hunting Brochure:	\$300	GS-12 Deputy Refuge Manager GS-9 Refuge Officer
Dispensing Information during year:	\$200	GS-6 Administrative Assistant
Law Enforcement/Outreach:	\$3,000	GS-9 Refuge Officer
Total:	\$4,000	

Based on a review of the budget allocated for hunting management, funding is adequate to ensure compatibility, administer, and manage the recreational use listed. Sufficient resources are available to continue the existing hunting program. Our existing staff and budget have provided sufficient resources to continue current management.

ANTICIPATED IMPACTS OF THE USE:

Wildlife Impacts – Migratory Game Bird Species:

While individual birds are harvested as part of the WPA’s hunt program, because of the Service’s and the State’s efforts to monitor and regulate harvest of these species, we do not

expect adverse impacts at the population level from harvesting these species. Additional information on harvests and efforts to manage these species follows.

Waterfowl

Adverse effects on waterfowl populations are not expected because of the hunting regulations and bag limits that have been set in place by the Federal and State agencies (USFWS Migratory Bird Office and the Maine Department of Inland Fisheries and Wildlife (MDIFW)) that manage the harvest of waterfowl populations. Significant conservation measures and extensive pre- and post-season population monitoring and the institution of Adaptive Harvest Management are safeguards inherent in waterfowl management. Adverse effects on other game species are not expected, because hunting will occur under state regulations. The MDIFW sets harvest limits that take into account game species population data collected by State biologists and wildlife species assessments.

Woodcock

Restrictive hunting regulations have been in effect for American woodcock since 1985 when surveys indicated a decline in numbers since the 1960's. The Service and State agencies monitor the population closely through a Migratory Bird Harvest Information Program (HIP) and also spring singing male counts (SGS) throughout the birds range.

Based on data from the HIP, 7,100 woodcock hunters harvested 31,700 woodcock in Maine last year. The long-term trend (1968 to 2011) indicates a decline in woodcock numbers across their range; however, 2011 is the 8th year in a row that the population appears stable. In 2011, the number of males heard on SGS routes (3.58) was slightly higher than last year (3.41) and was above the 10-year average of 3.42. (MDIFW 2011a)

Effects on Wildlife - Resident Mammals:

The MDIFW is responsible for the management of resident wildlife including game mammal species. They use a variety of methods to assess population levels and develop harvest strategies. While individual mammals are harvested as part of the refuge's hunt program, because of the State's efforts to monitor and regulate harvest of resident mammal species, we do not expect adverse impacts at the population level from harvesting these species. Additional information on harvests and State efforts to manage game species follows.

White-tailed Deer

During 2011, 198,107 deer hunting licenses were sold in Maine with hunter densities averaging about seven per square mile. Statewide these hunters spent an estimated 1.08 million hunter days effort pursuing deer during Maine's 79 day deer hunting season. Deer hunting success was estimated at 11 percent in 2011 with 18,784 deer harvested. Wildlife Management District (WMD) 23, which includes Carlton Pond WPA, had 1,657 deer harvested.

Moose

The annual allocation of moose permits is a function of specific management goals for each WMD. Permits were awarded to applicants by a computerized lottery with 49,889 applying for 3,903 permits. In 2011, 2,582 moose were checked into station with 2 moose harvested in the

WMD which includes Carlton Pond WPA. Statewide the success rate for last year's hunt was 79 percent which is equal to the average success rate for the last 9 years. Aerial surveys are conducted in nine WMDs to count the number of bulls, cows, and calves. Based on these surveys the State estimates the statewide moose population to be 76,000. These surveys combined with data collected on female moose reproduction, survival rates obtained by aging teeth and hunter sight-rate data, MDIFW ensures harvest is in keeping with a healthy moose population.

Black Bear

The forests of Maine support the largest black bear population in the Eastern United States. For more than 35 years, MDIFW has closely monitored bears to ensure their management decisions are based on current and sound information. Harvest levels are determined based on harvest data and samples of teeth collected which help to show population trends and the number of bears present in the population.

The State regulates harvest by setting season length, bag limit, and legal methods of hunting. Most bears are harvested by hunting over bait (75 percent), 12 percent using dogs, 6 percent by deer hunters, 4 percent by still hunting², and 3 percent in traps. The total harvest in 2011 was 2,400 with 8 taken in the WMD that includes Carlton Pond WPA. No baiting is allowed on the WPA which reduces harvest as compared to surrounding areas.

Furbearers and Small Mammals

In Maine many mammals are harvested for their pelt value. Many of the species are harvested by trapping but the following are also hunted: coyote, bobcat, raccoon, skunk, snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel.

Currently the State's coyote population is between 10,000 to 12,000 in the winter and increases to 19,000 in spring. This number decreases due to the low number of pups that survive after birth. The coyote population will likely remain relatively constant unless wolves reestablish themselves in the State and then it is believed the coyote population will drastically decline (Jakubas 1999). The coyote population in Maine has been the center of controversy in recent years because of its potential role in affecting deer populations. There is a desire by some public to control or eliminate coyote populations. However, hunting and trapping has been shown to have little effect in determining Statewide population levels. There will need to be mortality rates greater than 70 percent for there to be a reduction in the population (Jakubas 1999). In 2011, 1,623 coyotes were taken in Maine through hunting and trapping.

The red fox population is distributed Statewide (Caron 1986) and is currently considered to be abundant and stable (Jakubas 2004). Red fox are hunted but most of the take for this species is through trapping. Harvests across the State in 2011 through trapping and hunting totaled 922.

The bobcat is a trapped and hunted species that is distributed over most of the State (Morris 1986). The Bobcat Management System is used to manage bobcat populations in the State (McLaughlin 1995). The number of bobcat harvested in 2011 through trapping and hunting was 305.

² Rather than being completely 'still,' still hunters move slowly, deliberately, and quietly through the habitat looking for tracks, movement, fur, or other signs of the animal.

Population trends for the striped skunk, porcupine, and woodchuck are unknown according to the state of Maine since harvests are not recorded. However, these species are commonly seen on the refuge, the WPA, and throughout the State.

Human Disturbance Effects:

Hunting can have direct and indirect impacts on both target and non-target species. These impacts include direct mortality of individuals; changes in wildlife behavior; changes in wildlife population structure, dynamics, and distribution patterns; and disturbance from noise and hunters walking on- and off-trail (Cole and Knight 1990, Cole 1995, Bell and Austin 1985). In many cases, hunting removes a portion of the wildlife population that will otherwise naturally succumb to predation, disease, or competition (Bartmann et al. 1992). Typical changes in deer behavior in response to hunting include avoidance of certain areas, becoming more wary, staying closer to cover, and shifting feeding times (e.g., feeding more at night) (King and Workman 1986). For waterfowl species, hunting may also make them more skittish and prone to disturbance, reduce the amount of time they spend foraging and resting, alter their habitat usage patterns, and disrupt their pair and family bonds (Raveling 1979, Owen 1977, White-Robinson 1982, Madsen 1985, Bartelt 1987).

In general, visitors to the WPA engaged in hunting will be walking off-trail in designated areas open to hunting. General disturbances from recreational activities, including hunting, vary with the wildlife species involved and the activity's type, level, frequency, duration, and the time of year it occurs. The responses of wildlife to human activities, such as hunting, include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). The amount of disturbance tends to increase with decreased distance between visitors and birds (Burger 1986).

Some bird species flee from human disturbance, which can lower their nesting productivity and cause disease and death (Knight and Cole 1991). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased 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 common species (i.e., American robins) were found near trails and more specialized species (i.e., grasshopper sparrows) were found farther from trails. Nest predation also was found to be greater near trails (Miller et al. 1998). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction and other reproductive functions of song (Arcese 1987). Disturbance, which leads to reduced singing activity, makes males rely more heavily on physical deterrents in defending territories, which are time- and energy-consuming (Ewald and Carpenter 1978).

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples 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.

The hunt at Carlton Pond has been conducted since 1990 with no significant disturbance noted due to this use. This is largely due to the small numbers of hunters participating in the hunt dispersed over a large area. The hunting takes place outside of the migratory bird nesting period further minimizing the potential effects.

Effects on Vegetation:

The physical effects on vegetation from hunting various game species on the WPA are expected to be minimal. All-terrain vehicles will not be allowed on the WPA. Other vehicles are restricted to designated roadways. Hunter use is generally dispersed over large areas. Hunters will have little to no impact on the vegetation.

Positive, indirect effects on the vegetation could result from a reduction in the white-tailed deer population. The impacts of dense deer populations on forest regeneration and the composition and diversity of the herbaceous understory have been well documented (Tierson et al. 1966, Behrend et al. 1970, Tilghman 1989). Well-managed hunting can effectively control deer and produce dramatic changes in the forest vegetation (Behrend et al. 1970). The impact of deer hunting on the vegetation could be positive and result in better regeneration of forest canopy species and an increase in the diversity of the herbaceous understory. In summary, there will be few if any negative impacts from this use on the WPA's vegetation, but there could be beneficial impacts from the decrease of deer browse on the WPA's vegetation due to the decrease in the number of deer on Service lands.

Possible negative cumulative impacts of the proposed activity include temporary trampling of vegetation and light soil erosion. Most hunting occurs during the fall and winter when the ground is either frozen, covered in snow, or when plants are dormant. For these reasons, cumulative impacts to plant communities and soils are not likely to be significant.

Effects on Soils:

It is anticipated that minor impacts to soils will occur as a result of allowing hunting access on Carlton Pond. Erosion potential will likely vary during the season based on soil moisture and temperatures. During much of the hunting season, soils may be frozen or covered in snow, thereby reducing the impacts greatly. At current and projected levels of use, we expect only minimal impacts to soils (erosion, compaction) because of the time of year, expected low numbers of hunters, and because hunters are spread out around the WPA. This will be an ongoing use of the WPA, and Service staff have observed only minor negative effects, if any, on soils associated with this use to date.

Effects on Air Quality:

Air quality and water quality impacts will be minimal and only due to WPA visitors' automobile emissions and run-off on roads and trails. These effects will not only come from hunters but from a majority of users of wildlife-dependent recreation on the WPA. Given the traditional low number of hunters the effects on overall air and water quality in the region will be negligible, compared to the effects from non-WPA sources.

Economic Effects:

The 2011 national survey of fishing, hunting, and wildlife-associated recreation reveals that 1,117,000 Maine residents and nonresidents 16 years old and older fished, hunted, or watched wildlife in Maine. Of that total, 341,000 fished, 181,000 hunted, and 838,000 participated in wildlife watching activities, including observing, feeding, and photographing wildlife (USFWS 2011). While we do not have exact numbers of hunters on the WPA, visitors participating in this use provided some economic benefit to the local economy by purchasing goods and services (e.g., food, lodging, gas) in and around the area.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The hunt program will continue to be managed in accordance with Federal and State regulations. The program will be reviewed annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants.

- Shotgun hunters may possess only approved nontoxic shot while in the field (see 50 CFR 32.2(k)).
- All forms of hunting on all or any part of Carlton Pond WPA may be temporarily suspended by posting upon occasions of unusual or critical conditions of, or affecting land, water, vegetation, or wildlife populations (50 CFR 32.1).
- We allow eastern coyote hunting from October 1 to March 31.
- We allow bear hunting from October 1 to the end of the State-prescribed season. Per 50 CFR 32.2(h), the use of bait is prohibited during the hunting of bears or other wildlife.
- All applicable State and Federal regulations will apply.

JUSTIFICATION:

Per Federal regulations, waterfowl production areas are to be open to hunting unless temporarily closed because of “unusual or critical conditions...affecting land, water, vegetation, or wildlife populations” (50 CFR 32.1). Public hunting is also a priority public use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife resources (The National Wildlife Refuge System Administration Act of 1966, as amended by the

National Wildlife Refuge System Improvement Act of 1997). The Service's policy is to provide enhanced opportunities for this use when compatible and consistent with sound fish and wildlife management. In addition, hunting is an historic use of the WPA. It is a popular, traditional recreation activity on public lands in Maine that is strongly supported by the Maine Department of Inland Fisheries and Wildlife.

Allowing hunting at the WPA will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the WPA was established. As listed in the purposes section of this compatibility determination, the WPA was established and subsequently land was acquired for two main purposes related to migratory birds. As discussed under the section on anticipated impacts above, hunting is a wildlife-dependent priority public use with minimal adverse impacts on WPA resources; therefore, no significant adverse effects from public hunting are anticipated. Because of this, it is consistent with the WPA's migratory bird purposes. In fact in contrast to refuges, WPAs are open to hunting unless closed, so continuing to allow hunting supports Service regulations, the Service policy on hunting, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System. Allowing this use supports CCP goals and objectives as described in the WPA's CCP (USFWS 2013). This activity will not materially interfere with or detract from the mission of the Service, because providing this wildlife-dependent recreational opportunity is a focus of the National Wildlife Refuge System.

SIGNATURE:

Refuge Manager: Beth Gattel 8/30/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sam B. Kuer 9/17/2013
(Signature) (Date)

MANDATORY 15 YEAR RE-EVALUATION DATE: 9/17/2028

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COMPATIBILITY DETERMINATION

USE: Furbearer Management (Trapping)

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C. 718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

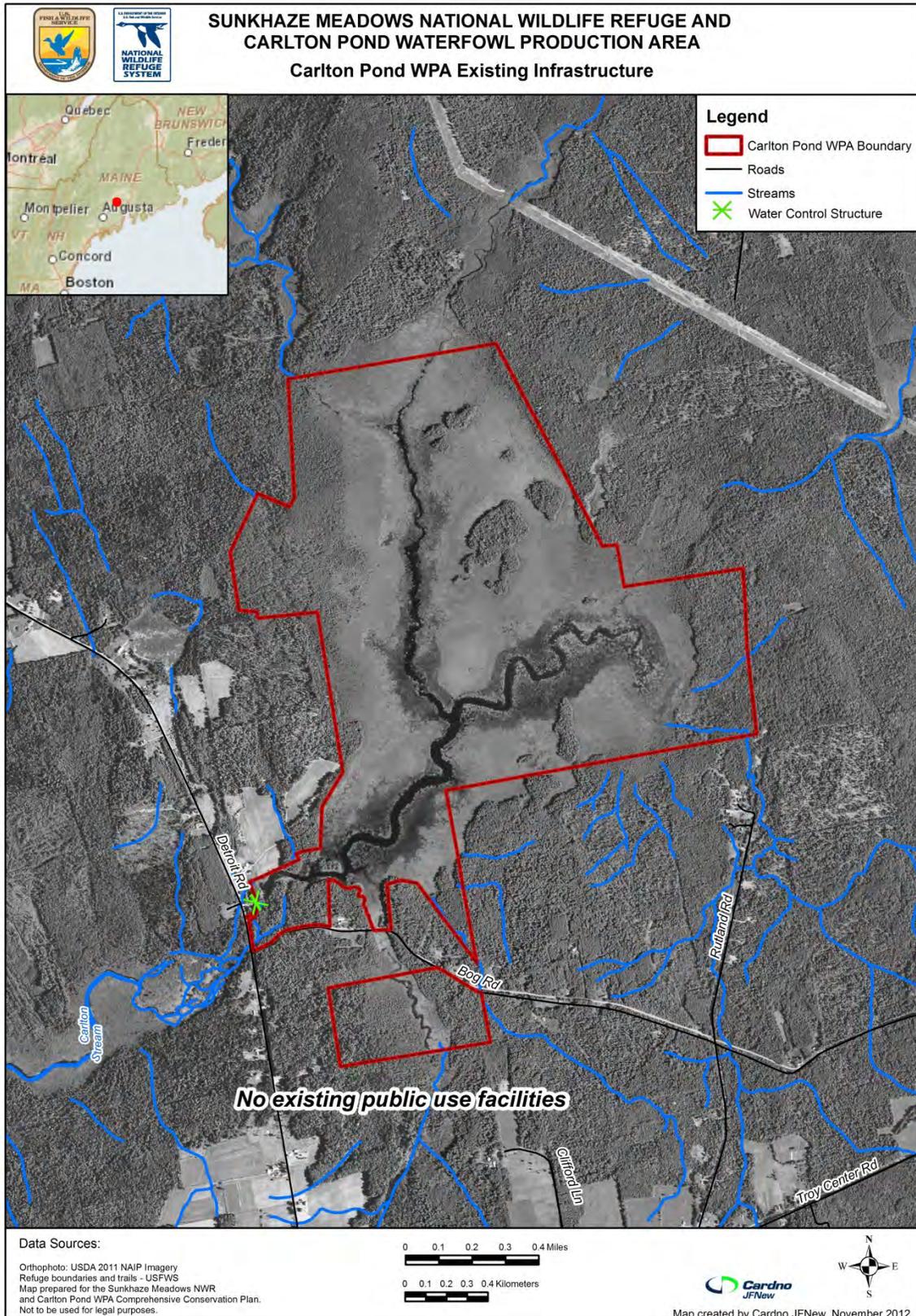
The use is furbearer management. We consider furbearer management to be a Service management economic activity. It is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where will the use be conducted?

Furbearer management through trapping is an allowable practice in Maine. Currently, there are no restricted locations within the Carlton Pond WPA. Zones have not been established nor limits set. However, if necessary, such controls could be implemented to meet our goals for protecting WPA resources.

Service law enforcement will ensure that trappers on the WPA comply with State regulations.

Map B.29. Service lands and waters open to furbearer management within Carlton Pond WPA (see text for details).



(c) When will the use be conducted?

Furbearer management will be conducted in accordance with the State of Maine seasons. Maine furbearer management seasons usually run from mid-October to the end of December, with beaver trapping in Wildlife Management District 23, where the Carlton Pond WPA is located, allowed until the end of March.

(d) How will the use be conducted?

The WPA will be open to furbearer management for the following species: beaver, bobcat, mink, fisher, marten, coyote, fox, muskrat, opossum, otter, raccoon, red squirrel, skunk, and weasel. Although bear trapping is allowed in Maine, bears are not considered a furbearer. Bear trapping is not allowed.

We will continue to allow furbearer management following Maine State regulations during State seasons and under State limits for the targeted species. Visitors participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (i.e., walking and snowshoeing). To facilitate checking traps and retrieval of game, trappers will be allowed to use snowshoes.

Special use permits will not be required per 50 CFR 31.16, “Land acquired as ‘waterfowl production areas’ shall be open to public trapping without a Federal permit provided that...all or part of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, or wildlife populations.”

To gather information about trapping effort and furbearer populations, we will encourage persons who inquire about trapping at Carlton Pond WPA to communicate with us at the end of the season to let us know how much time they spent and what they caught.

(e) Why is this use being proposed?

As discussed above, per 50 CFR 31.16, “Land acquired as ‘waterfowl production areas’ shall be open to public trapping...” Because trapping is considered an economic use, per Federal law (see 16 U.S.C. 715s) and Service regulations (50 CFR 29.1), we may only allow economic uses of a refuge or WPA natural resource where the use contributes to achieving refuge or WPA purposes or the Refuge System mission. We will conduct furbearer management: (1) as a tool to manage habitat and maintain the predator-to-prey balance, (2) as a mechanism to collect survey and monitoring information that otherwise will be expensive and difficult to obtain using Service resources, and (3) as a way to collect initial data that may lead to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained, experienced group of trappers, the Service can use their skills and local knowledge to perform or assist in valuable management or research functions. Trappers could potentially provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications. Trappers on the WPA typically have a stake in proper habitat and wildlife conservation and protection of the ecological integrity of the refuge so they can continue trapping. Accordingly, they are valuable assets for the refuge manager in providing onsite reports concerning the fundamental status of habitat, wildlife, and WPA conditions.

improves the welfare of animals in trapping through trap testing and the development of “Best Management Practices (BMPs) for Trapping Furbearers in the United States.” The WPA will cooperate with and contribute to the development and implementation of those BMPs by practicing an integrated, comprehensive approach to furbearer management, wherever and whenever possible.

Impacts to Other Wildlife:

Non-target species could be taken incidentally through this trapping program. Traps will be set specifically around areas of targeted species activity to reduce the risk of taking species other than targeted species. The experience of the trappers and the selection of the appropriate trap size will reduce non-target captures (Northeast Furbearer Resources Technical Committee 1996, Boggess et al. 1990). State regulations require that bait be covered, so birds of prey are not able to see the bait from above. Lynx (federally listed as endangered) have not been documented on the WPA. Therefore, potential impacts to lynx are negligible or nonexistent. If lynx are someday identified on the WPA, the refuge manager will work with the State of Maine to implement measures to prevent accidental take of lynx. The refuge manager will ensure that measures are utilized to avoid take of waterfowl and endangered species.

Trappers may temporarily disturb wildlife while walking or snowshoeing around the WPA. Disturbances vary by wildlife species involved and the type, level, frequency, duration, and the time of year activities occur. Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole 1991). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. In this study, common species (e.g., American robins) were found near trails and rare species (e.g., Blackburnian warblers) were found farther from trails. In some cases there is a clear link between the extent of disturbance and either the survival or reproductive success of individuals (e.g., Schulz and Stock 1993), but in many cases disturbance acts in a more subtle way, by reducing access to resources such as food supplies or nesting sites (Gill et al. 1996). Bird flight in response to disturbance can lower reproductive success by exposing individuals and nests to predators. For recreation activities that occur simultaneously (e.g., hiking, biking) there will likely be compounding negative impacts to wildlife (Knight and Cole 1991). However, because of the temporal separation of trapping activities and breeding wildlife using the WPA, disturbance of migratory birds by trappers will be negligible, and can be further reduced by regulating trapping activity in certain areas at times when such birds are likely to be present.

Conflicts with Other Public Uses:

A program of regulated furbearer management on the WPA as described under this compatibility determination is not expected to conflict with other public uses. With respect to possible negative reaction to trapping on the WPA by some members of the visiting public, conflicts are not expected because trapping is generally an inconspicuous activity, traps are usually hidden from view, typically are not set near roads, and are checked in the early morning. These characteristics serve to limit the potential for encounters between traps or captured animals and those engaged in other public use activities.

Other Beneficial Impacts:

Regulated trapping has been documented to provide a variety of ecological benefits including prevention and alleviation of habitat degradation, facilitation of habitat and wildlife restoration, reduction of predation on key species of management concern, protection of rare and endangered species, dampening of disease transmission and severity of disease outbreaks among wildlife and between wildlife and humans, and the conservation and enhancement of biological and genetic diversity (Boggess et al. 1990, Organ et al. 1996).

Implementation of a regulated trapping program on the WPA provides a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. The ecological and monitoring benefits are management services that will be accomplished through minimal or even no cost to the government, compared to costs associated with using salaried staff or contractual arrangements with private individuals or organizations, other agencies, or refuge staff. By maintaining a trained and experienced cadre of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions (Mason 1990). Trappers who participate in the WPA program will provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications. Trappers typically have a stake in proper habitat and wildlife conservation and protection of the ecological integrity of the WPA so they can continue trapping. Accordingly, they are valuable assets for the refuge manager in providing on-site reports concerning the fundamental status of habitat, wildlife, and WPA conditions.

Furbearers are considered a renewable natural resource with cultural and economic values (Andelt et al. 1999, Boggess et al. 1990, Northeast Furbearer Resources Technical Committee 1996, Payne 1980). Several human dimensions studies have documented trapper profiles, cultural aspects of trapping, and the socioeconomic role of trapping in the United States (Andelt et al. 1999, Boggess et al. 1990, Daigle et al. 1998, Gentile 1987). A regulated trapping program on the WPA also fosters the appreciation of wildlife and nature, wildlife observation, environmental education, a greater understanding of ecological relationships, stewardship of natural resources, and inter-generational passage of the methodologies of renewable resource use. Trapping is an activity in which family members and friends often participate together and share joint experiences that broaden the sense of appreciation for natural resources and ecological awareness, and indeed even a sense of community (Glass et al. 1991, Daigle et al. 1998).

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible _____

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Trappers must have a State license and comply with all State regulations relating to trapping.
- Trappers, when requested by refuge staff or Federal or State enforcement officers, must display for inspection their State trapping license, trapping equipment, and all animals in their possession.
- Traps shall be set only where traps or trapped furbearers are not readily visible from public highways, overlooks, or other visitor facilities (if established). No land sets may be set within 100 feet of any road or trail (if established) open to the public.
- Use of all-terrain vehicles is prohibited anywhere on the WPA. Trappers must not interfere with or cause hazards to vehicular travel, or the activities of other WPA visitors.
- The use of exposed bait and setting traps adjacent to naturally occurring carcasses are prohibited.
- Non-target animals that are uninjured should be released immediately. Injured or killed animals must be reported as specified by the Maine Department of Inland Fisheries and Wildlife trapping regulations.
- Trappers are encouraged to communicate with us at the end of the season to let us know how much time they spent and what they caught

JUSTIFICATION:

We have determined that allowing trapping on the WPA will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the WPA was established for the following reasons. First, furbearer populations, with local exceptions, are stable or increasing in Maine and the furbearer management program on the WPA does not have any known negative impacts on furbearer populations. Second, at current and projected levels of use, adverse impacts to wildlife and habitat are expected to be minimal because of the temporal separation of trapping activities (usually fall and winter) and breeding wildlife (usually in spring) using the WPA.

In fact, based on the analysis presented above, we have determined that it will contribute to the mission of the National Wildlife Refuge System and the purposes for which the WPA was established. Furbearer management through trapping on the WPA is a useful tool in maintaining balance between furbearers and habitat. High populations of predators can decrease the survival and nesting success of migratory birds, thus compromising the central purpose of the WPA. Trapping may provide survey and monitoring information that otherwise will be expensive and

difficult to obtain using Service resources; and potentially may contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained, experienced group of trappers, the Service can use their skills and local knowledge to perform or assist in valuable management or research functions. Trappers who participate could provide assistance with the implementation of structured management objectives, such as the alleviation or reduction of wildlife damage conflicts, negative interactions among species, and habitat modifications; maintenance of the vigor and health of furbearer populations; and safeguarding the WPA infrastructure critical to habitat management for focal fish and wildlife species. Trapping also helps build appreciation for natural resources, ecological awareness, and support for the Refuge System.

SIGNATURE:

Refuge Manager: Beth Goettel 8/19/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Scott B. Ken 9/17/2013
(Signature) (Date)

MANDATORY 10 YEAR RE-EVALUATION DATE: 9/17/2023

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Finding of Appropriateness of a Refuge Use

Refuge Name: Carlton Pond Waterfowl Production Area

Use: Retriever hunt test and field trial

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate: Appropriate: X

Refuge Manager: Beth Gbettel Date: 8/19/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Frederick W. Tyler Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Carlton Pond Waterfowl Production Area

Use: Retriever hunt test and field trial

Narrative:

Members of the Maine Retriever Club occasionally request to use Carlton Pond Waterfowl Production Area (WPA) briefly as one of the water trial sites in their annual retriever hunt test and an annual field trial. The events consist of dogs competing in a series of tests to assess their ability to retrieve downed game. The events adhere to standards as set by the American Kennel Club. This is not a priority public use; however, the use of dogs to retrieve downed game is related to the priority public use of hunting. The objective of permitting these hunt tests and field trials on Service lands is to encourage practices and techniques that enhance the tradition and quality of the hunting experience and reduce the incidence of downed but unretrieved game. We also believe allowing this use will facilitate observation, and appreciation by participants and observers of the event, of the WPA's wildlife, habitats, and conservation programs.

This use is conducted where a finger of Carlton Pond crosses Bog Road; it is estimated that activities will involve less than 10 percent of the water area and less than 7 acres of WPA lands. Previous requests for the retriever hunt test have been for late August, not before August 14 and not after August 31; the field trial has been scheduled during the third weekend in September, so waterfowl breeding is over and the hunting season has generally not begun. A special use permit (SUP) is issued annually, requiring compliance with the specific requirements outlined in Service Manual Chapter 631 FW 5, Field Trials. Because we require organizers of these events to obtain a SUP prior to holding the events, this use is also consistent with 50 CFR 27.91 which prohibits field trials for dogs on national wildlife refuge except where authorized by a SUP.

COMPATIBILITY DETERMINATION

USE: Retriever Hunt Test and Field Trial

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C. 718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resource and their habitats within the United States for the benefit of present and future generations of Americans." (16 U.S.C. 668dd-668ee) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

The use is an annual retriever hunt test and an annual field trial. The events consist of dogs competing in a series of tests against other dogs to test their ability to retrieve downed game. The events adhere to standards as set by the American Kennel Club and are coordinated by a local group, the Maine Retriever Trial Club, Inc. This is not a priority public use, however, the use of dogs to retrieve downed game is related to the priority public use of hunting.

(b) Where will the use be conducted?

During the hunt test and the field trial, many sites in the area are used to accommodate all the different tests or age classes of dogs. The use of Carleton Pond has been requested because several water bodies in the area are required, and the availability of Carlton Pond is very helpful in making these events logistically possible. When the club uses Carlton Pond, they will access

the pond where a finger of it crosses Bog Road (see map); it is estimated that activities will involve less than 10 percent of the water area.

Parking and placement of the portable toilet is in a lot on private land nearby and additional parking is available off WPA lands, along Bog Road.

(c) When will the use be conducted?

The hunt test is scheduled in late August, not before August 14 and not after August 31, and the field trial is held the third weekend in September each year. Hunt tests and field trials held by the club earlier in the season will not be allowed to use Carlton Pond due to the conflict with the waterfowl breeding season. Dog training is not allowed at Carlton Pond at any time.

(d) How will the use be conducted?

Typically, field trials have four levels in which dogs can compete, with between 10 to 60 dogs in a given level. Each level requires that dogs are tested in both land and water.

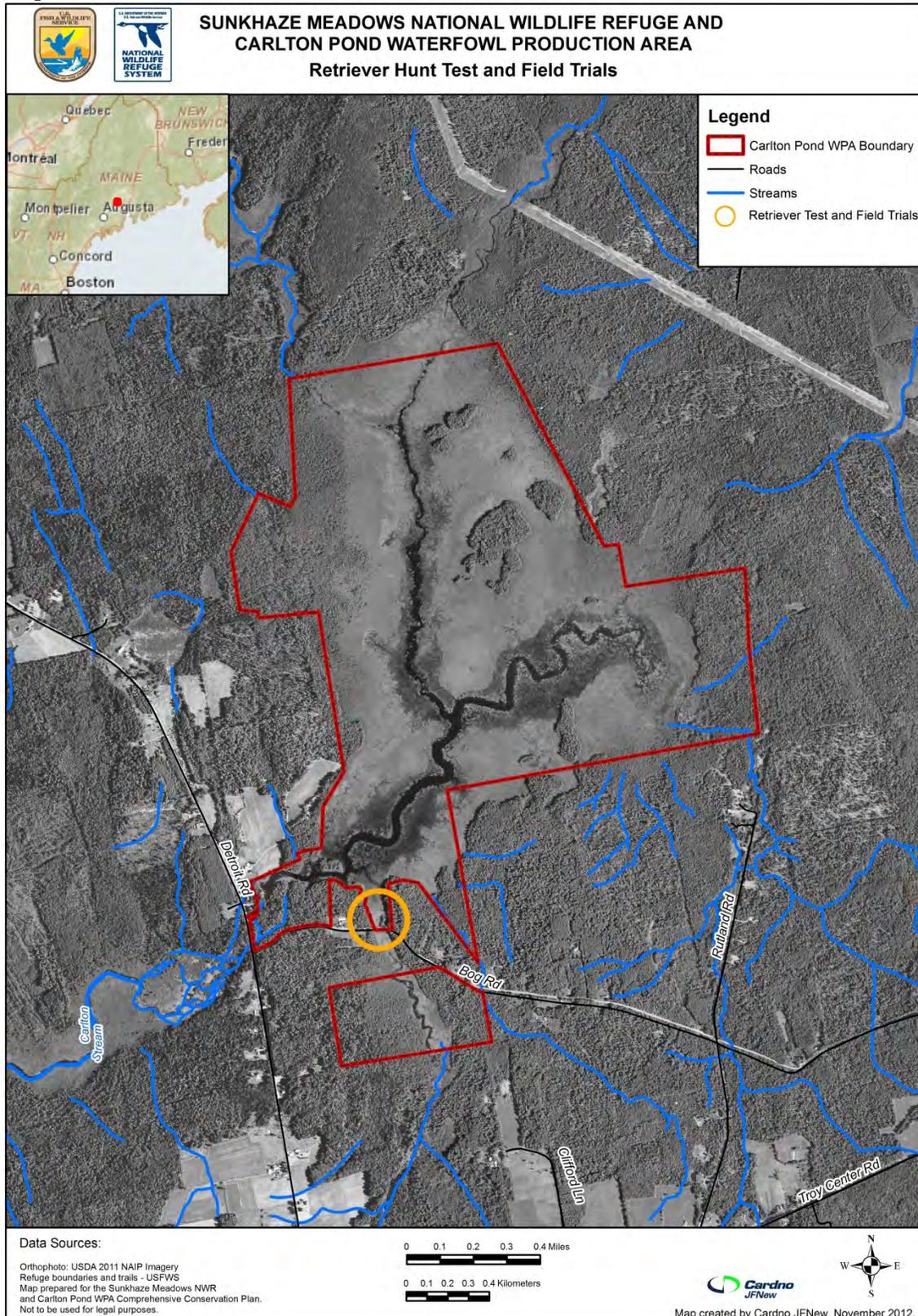
The trials are set up to progressively eliminate dogs that fail to meet the standards of each series of the tests. Land tests are almost always run first, which usually eliminates over half of the dogs running in a given level. The water series usually starts the second day of the competition and begins with what are called blind retrieves. The blind retrieves require a handler to get the dog to a point between 100 and 400 yards away using whistles and hand signals, simulating picking up a downed bird that the dog did not see shot or fall. The final series of the competition at each level tests the ability of the dogs to retrieve ducks that are simulated to have been shot and fallen in or around the water. The simulation usually involves a series of two to four fired shots with a duck thrown to a specific location for each shot. Sometimes, one of those shots within the series includes shooting a live farm-raised duck. Except for the live duck being shot, each of the other retrieves are required to occur in the same location, making it more fair to judge the quality of the retrieve. The water series usually occurs on the last day of the competition and tests only the dogs which have not been eliminated in the first three series.

In their entirety, tests and field trial to be held in this area will serve an estimated 150 to 225 dogs and 20 to 60 handlers per event. The land tests will be run on Saturday at other locations and the any water tests using Carlton Pond will begin either very late Saturday afternoon, or more likely on Sunday. There will be an estimated 70 dogs involved in the water trials at Carlton Pond and an estimated 210 to 280 shotgun rounds fired. Non-toxic shot will be used. Birds must be certified disease free. Like other visitors, dog handlers participating in approved public uses are allowed off-trail; however, off-trail use is limited to pedestrian access only (e.g., walking, snowshoeing, skiing).

(e) Why is the use being proposed?

This is an historic use of the refuge and the Maine Retriever Trial Club was not aware of the need to apply for a special use permit (SUP). Refuge staff were not aware that this activity was ongoing until the fall of 2008; no complaints have ever been received. Upon finding out about the requirement to obtain a permit, the club officers promptly applied for one. An interim compatibility determination was issued, with the intent of re-examining the use during the Sunkhaze Meadows National Wildlife Refuge Comprehensive Conservation Plan.

Map B.29. Authorized location for retriever hunt test and field trials at Carlton Pond WPA.



The activity is wildlife oriented, facilitates a priority public use (hunting) by improving the retrieval of downed waterfowl through the use of well trained dogs, minimizing crippling losses and facilitates observation, and appreciation by participants and observers of the event of the WPA's wildlife, habitats, and conservation programs.

AVAILABILITY OF RESOURCES:

This event does not require any special permanent facilities. The retriever club arranges for the delivery and removal of temporary portable toilets on adjacent private land, and directs and controls parking along one side of Bog Road. The refuge staff issues the SUP and monitors the activity to insure compliance with the requirements of the SUP. This activity is within the budget and staffing capabilities of the refuge to manage.

The following is the list of the approximate costs to the refuge required to administer and monitor the SUP including coordinating with the permittee:

Administrative time:	\$ 30
Monitoring: (12 hours of Law Enforcement Officer and/or biologist)	\$ 504
Total Cost:	\$ 534

ANTICIPATED IMPACTS OF THE USE:

Direct Impacts:

Field trials have the potential to adversely impact wildlife resources through direct disturbance. The presence of dogs may displace foraging birds (Lafferty 2001), disrupt their nesting behavior (Langston et al. 2007, Lord et al. 2001, Taylor et al. 2007), or destroy nests (Nol and Brooks 1982). These effects appear to be most pronounced for species that nest or feed on the ground. The presence of dogs may also reduce both bird diversity and abundance (Banks and Bryant 2007). The visual presence of dogs may alter the physiology and behavior of mammals (Miller et al. 2001) and their persistent scent may displace mammalian predators (George and Crooks 2006, Lenth et al. 2008, Reed and Merenlender 2008).

Miller et al. (2001) showed that the presence of a pedestrian is the additive factor in disturbing wildlife when comparing wildlife response to dog-alone, pedestrian-alone, and dog-on-leash treatments. Flush distance and distance moved were almost always greater when activities occurred off-trail versus when the same activities occurred on-trail, suggesting that where recreational activities occurring on-trail are frequent and spatially predictable, animals will likely habituate to activity in these locations.

The role of dogs in wildlife diseases is poorly understood. However, dogs host endo- and ectoparasites, and can contract diseases from or transmit diseases to wild animals. In addition, dog waste is known to transmit diseases that may threaten the health of some wildlife and other domesticated animals. Domestic dogs potentially can introduce various diseases and transport parasites into wildlife habitats (Sime 1999). To minimize this risk, it will be required that handlers collect and properly dispose of any dog feces deposited during the events.

To minimize disturbance to wildlife, the trials will not be held during the waterfowl breeding season. The period of time during which these events are allowed to use Carlton Pond are after the waterfowl breeding season and before the regular waterfowl hunting season begins. Since only a small portion of the water area is being used, any waterfowl that may be using the pond can move to other areas for the small number of days involved. No wild animals will be killed as part of this event, and only non-toxic shot will be allowed to be used on the captive-bred ducks. Captive-reared ducks must be of indigenous species or established exotic species only and must be certified disease-free.

Direct impacts associated with this use also include vegetation disturbance. The access area has a large stand of wild rice. Although the intent is to use the open water areas, at times dogs will be running through emergent vegetation to get to the water or swimming through vegetation to reach a dummy or duck.

Because the activity takes place in August and September, the wild rice growing in the area is already mature. If plants are bent over or broken off at this point, rice kernels will be dislodged, but the plant itself will not be killed. Rice kernels knocked into the water will either be eaten by waterfowl or sink to the bottom to overwinter in the mud and serve as a seed source for spring germination. No long-term impacts to vegetation are anticipated.

The activity may create a conflict with other potential visitors to the WPA. The September weekend date occasionally overlaps with the state's Youth Waterfowl Hunt day on Saturday of that weekend. The club cannot reschedule the event, as dates are assigned by the American Kennel Club to be part of a traveling circuit, so the change to another date will conflict with another event elsewhere. Since the water trials, the only portion that may occur at the pond, begin late on Saturday and more likely only on Sunday, few youth hunters should be inconvenienced. Even if they plan to hunt late on Saturday and arrive to find the field trial ongoing, they could still access the other parts of the pond or hunt in other nearby wetlands. In the 4 years that the use has been allowed by SUP, it only occurred on the same weekend as the Youth Waterfowl Hunt once.

We currently have no data on the number of youth hunters that may use Carlton Pond. In the 4 years of interim compatibility, refuge staff have never actually observed the event. This will be corrected during the coming 5 year compatibility period, as mandatory prior notification and staff attendance will be required. The refuge personnel who will monitor the event will count the number of youth hunters they finds using the pond on this day as well as the number of dogs and handlers, and will document any user conflicts or other impacts observed.

Indirect Impacts:

Indirect impacts will include effects from pollution, litter, introduction of lead shot or non-indigenous birds, or diseased birds, or erosion caused by the activity. The stipulations of the SUP make these impacts unlikely to occur.

Cumulative Impacts:

Since this activity occurs but twice a year, in a relatively small area and the direct impacts to vegetation and wildlife are not large, we do not anticipate any significant cumulative impacts.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- The group sponsoring a field trial is required to obtain a SUP from the refuge (per 50 CFR 27.91) which must be re-issued annually. There will be a nominal fee to cover the cost of processing the SUP, currently around \$50.00
- Notification of the date and time Carlton Pond will be used as part of a test or trial is required to be given to the refuge staff one week prior to the use and a staff member of the refuge is required to be present to enforce the stipulations of the permit and evaluate the impacts of the activity each time Carlton Pond WPA is used.
- All birds utilized in the trial must be pen-reared game farm stock.
- Only indigenous species or established exotic species of birds may be used as target animals for the field trials.
- Target animals used must have a health certificate, issued by a veterinarian, that provides reasonable assurance of the absence of Type C botulism, avian cholera, duck plague (duck viral enteritis), and aspergillosis.
- A written certification from the game farm operator that he has not had any disease diagnosed or any undiagnosed die-off occurring on his premises within the previous 6-month period must be provided to the refuge manager prior to the trial.
- Target animals should be brought to the site in disposable crates (e.g. cardboard boxes) that have not been used before. Such crates must be properly disposed of after use.
- Only federally approved non-toxic shot may be used in taking the birds.
- Dog feces deposited during the event must be immediately picked up and properly disposed of.

- The trial must be conducted in an orderly manner.
- No alcoholic beverages are allowed at the event.
- The permittee is responsible for collecting and clearing debris and litter during and following the trial.
- Necessary State permits must be obtained prior to the start of the trial.
- An adequate number of portable toilets must be placed nearby and promptly removed after the event.
- Parking must be managed so as not to impede access by emergency vehicles and normal traffic on the road, and so as not to annoy neighbors or impede access to their driveways.
- The number of dogs involved in activities at Carlton Pond WPA must not exceed 70 and the number of handlers must not exceed 50.
- There is no room for concessions at this site; therefore, no concessions will be allowed.

At the refuge manager's discretion, applicants that receive a SUP for this use that fail to comply with one or more of these stipulations may not receive a permit in future years.

JUSTIFICATION:

The objective of permitting these hunt tests and field trials on Service lands is to encourage practices and techniques that enhance the tradition and quality of the hunting experience and reduce the incidence of downed but unretrieved game. These particular retriever tests and field trials, due to their seasonal timing and limited duration, can be managed within existing refuge resources. The refuge SUP conditions limit the scope of the field trial activities to specific dates and areas and assure that the activity is carried out in a manner that minimizes impacts on wildlife and habitat.

At this time, we believe that the retriever hunt tests and retriever trials as proposed do not materially interfere with or detract from purposes for which the WPA was established or the mission of the National Wildlife Refuge System. We will carefully monitor potential impacts to refuge resources and potential conflicts with other visitors over the next 5 years. We will reevaluate this activity in 5 years, or sooner if deemed necessary. Should conflicts or impacts be observed, stipulations in the SUP may be modified or added to minimize these conflicts, or the activity may be terminated.

SIGNATURE:

Refuge Manager: Beth Goettel 8/30/2013
(Signature) (Date)

CONCURRENCE:

Regional Chief: Sean B. Ke 9/17/2013
(Signature) (Date)

SERVICE REQUESTED 5 YEAR RE-EVALUATION DATE: 9/17/2018

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Taylor, E.C., R.E. Green, and J. Perrins. 2007. Stone curlews (*Burhinus oedicanus*) and recreational disturbance: developing a management tool for access. *Ibis* 149(Supplement):37-44.

U.S. Fish and Wildlife Service (USFWS). Service Manual Chapter 631 FW 5, Field Trials.

Finding of Appropriateness of a Refuge Use

Refuge Name: Carlton Pond Waterfowl Production Area

Use: Boating

This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate:

Appropriate: X

Refuge Manager: Beth Goettel

Date: 8/30/2013

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: Graham W. Tapp

Date: 9/11/13

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Carlton Pond Waterfowl Production Area

Use: Boating

Narrative:

Boating is an historic use of Carlton Pond Waterfowl Production Area (WPA) that occurred before the WPA was created. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the National Wildlife Refuge System (Refuge System). The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Motorized and non-motorized boating is an appropriate means of facilitating these priority public uses on the WPA since much of the WPA is only accessible by water. Jet skis will not be permitted on WPA waters due to their environmental impact, noise, speed, and excessive wildlife disturbance. There are currently no motor or speed limitations since boats access is limited to hand-carry sites. The use has been allowed on the WPA since it was established with no significant adverse effects observed. U.S. Fish and Wildlife Service staff will continue to monitor the use and could implement both motor and speed limitations if wake or speeds become harmful to wildlife or habitat, or in the interest of public safety.

By allowing this use, we are providing opportunities and facilitating WPA programs in a manner and location that offer wildlife-dependent recreation and maintains the level of current fish and wildlife values. For these reasons, we have determined that allowing this use is consistent with the U.S. Fish and Wildlife Service policy on the appropriateness of refuge uses.

COMPATIBILITY DETERMINATION

USE: Boating

REFUGE NAME: Carlton Pond Waterfowl Production Area

DATE ESTABLISHED: November 24, 1965

ESTABLISHING AUTHORITIES:

Carlton Pond Waterfowl Production Area (WPA) was authorized by administrative action on July 15, 1964. The WPA was officially established when the first parcel was acquired on November 24, 1965. It was established under the following legislative authorities:

1. Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718c)
2. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

1. "...as Waterfowl Production Areas" subject to "...all the provisions of such Act [Migratory Bird Conservation Act] ...except the inviolate sanctuary provisions..." ((16 U.S.C. 718c) (Migratory Bird Hunting and Conservation Stamp Act)).
2. "...for any other management purpose, for migratory birds." ((16 U.S.C. 715d) (Migratory Bird Conservation Act)).

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

"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." (16 U.S.C. 668(dd) and (ee)) (National Wildlife Refuge System Administration Act of 1966)

DESCRIPTION OF USE:

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

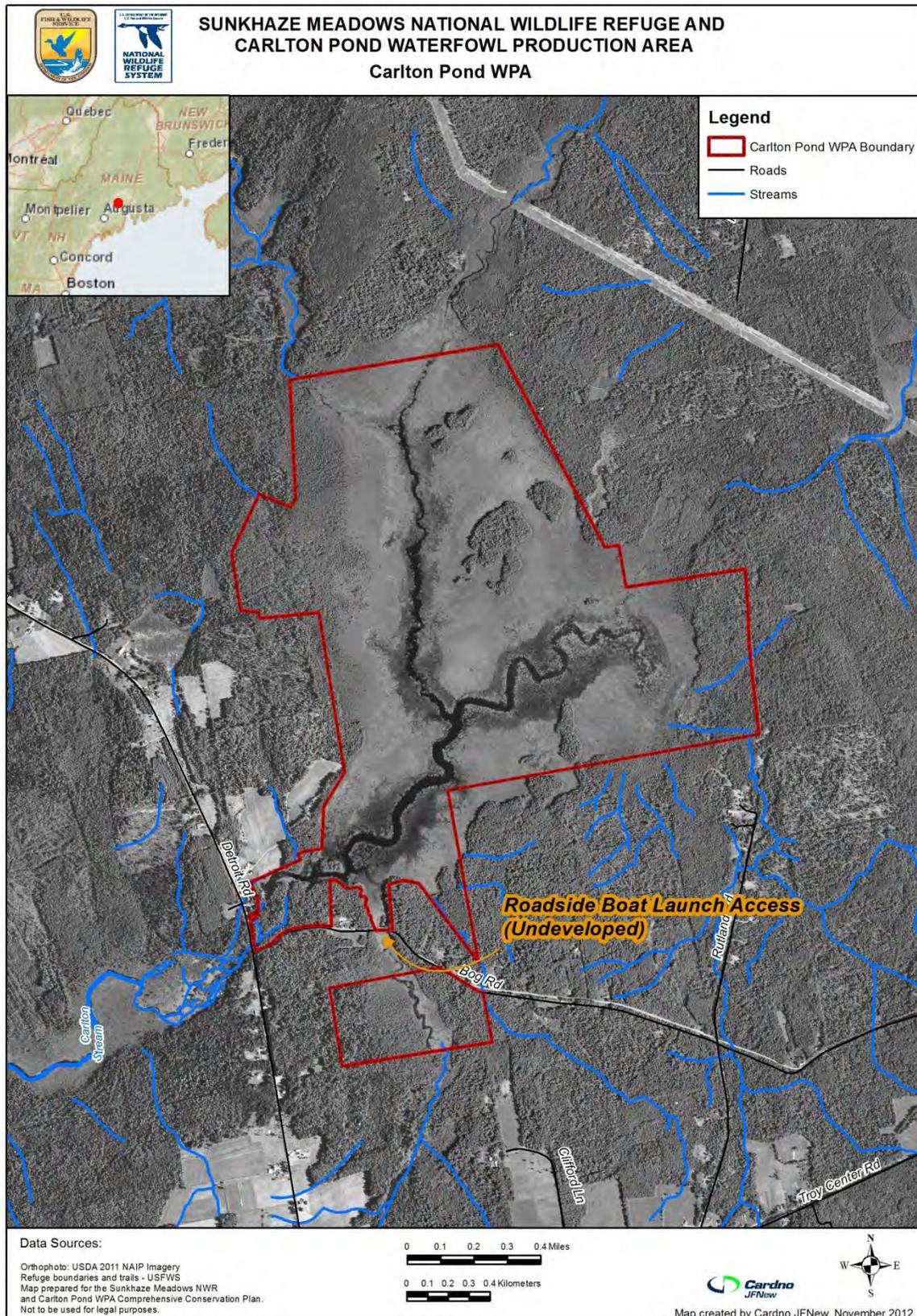
The use is motorized and non-motorized boating. Motorized and non-motorized boating are not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended by the National Wildlife Refuge System Improvement Act of 1997, however, they facilitate priority public uses.

Refuge visitors use non-motorized canoes, motorized canoes, and other small boats on Carlton Pond WPA waterways to access otherwise inaccessible portions of the waterfowl management area. Some visitors use these activities to support participation in fishing, hunting, environmental education, wildlife photography, and wildlife observation.

(b) Where will the use be conducted?

Motorized and non-motorized boating will be allowed on all open waters of Carlton Pond WPA (map B.31).

Map B.31. Location of undeveloped boat launch at Carlton Pond WPA (see text for details).



(c) When will the use be conducted?

Motorized and non-motorized boating will be allowed year round, when waters are ice-free, from sunrise to sunset, and one hour before and after sunset in support of hunting.

(d) How will the use be conducted?

Motorized and non-motorized boating will be conducted consistent with refuge and State regulations, with some additional restrictions to protect fish, wildlife, and habitat, and to reduce potential conflicts among public uses.

Hand-carry boat access is available at a number of locations both on and off Service-owned lands around Carlton Pond WPA. A car-top boat launch is located on Bog Road where it crosses a finger of Carlton Pond (see map B.30). All boats launched or landed on refuge lands must follow State boating regulations and, if applicable, show registration.

Maine Statute Title 38: 419B-420 prohibits the transport of any aquatic plant or parts of any aquatic plant, including roots, rhizomes, stems, leaves or seeds, on the outside of a vehicle, boat, personal watercraft, boat trailer or other equipment on a public road. Boaters should inspect all watercraft and clean off any aquatic invasive species before and after launching at WPA sites. That cleaning should take place on dry ground well away from the water. Nonnative, invasive plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively affect native fish and plant species. Carlton Pond and its associated brooks and streams appear to be relatively free of aquatic invasive plants, and cleaning boats, trailers, and other equipment will help to keep them that way. Small areas of purple loosestrife have been found on Carlton Pond WPA and cleaning of boats will help reduce the chance of spreading loosestrife to new wetlands. Signs, public outreach, and periodic enforcement will help educate and remind the public of the importance of inspecting and cleaning watercraft and Maine State laws prohibiting transport of aquatic plants.

(e) Why is the use being proposed?

Motorized and non-motorized boating are existing uses at Carlton Pond WPA. These uses have been ongoing for many years with little or no observed adverse impacts to refuge habitats or wildlife. In addition, these uses also help facilitate the six priority public uses of the Refuge System: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. By allowing this use, we are providing opportunities and facilitating Service programs in a manner and location that offer wildlife-dependent recreation and maintain the level of current fish and wildlife values. Most of Carlton Pond will be inaccessible to the public without using a boat.

AVAILABILITY OF RESOURCES:

Facilities or materials needed to support boating include periodic law enforcement patrol, biological monitoring, and educational outreach signage.

Estimated costs are as follows:

Law Enforcement Patrol	\$3,000.00
Biological Monitoring/resource impact monitoring	\$2,000.00
Educational Signage	\$ 600.00
Total Estimated Program Cost:	\$5,600.00

ANTICIPATED IMPACTS OF THE USE:

Because Carlton Pond and its tributaries have limited access for motorized and non-motorized boats, we do not expect a dramatic change from existing conditions. Currently boat and motor size is limited because no launch ramp is available for larger boats; therefore, all boats must be hand-carried to the water. The use is further restricted by seasonal low water levels and dense emergent vegetation around the edges of the pond and bank of its tributaries. In the past 2 years, Service law enforcement patrols have observed consistent low levels of use. Potential impacts of motorized and non-motorized boating include the following:

Accidental introduction of invasive plants, pathogens, or nonnative invertebrates, attached to fishing boats: With the exception of a few isolated occurrences of purple loosestrife, Carlton Pond appears to be relatively free of invasive aquatic plants and mollusks. However, we have not carried out extensive surveys for aquatic invasives. We can mitigate the potential for introductions by educating and encouraging boaters to clean their boats before launching and after retrieving. We will also post launch sites with educational materials and have law enforcement officers make courtesy spot checks of vessels and to educate boaters on proper methods for checking for aquatic hitchhikers.

Disturbance of wildlife (particularly breeding and brood-rearing black terns, waterfowl, and wading birds): Boating seasons in Maine coincide in part with spring and early summer nesting and brood-rearing periods for many species of aquatic birds. Anglers and other boaters may disturb nesting birds by approaching too closely to nests, causing nesting birds to flush. Flushing may expose eggs to predation or cooling, resulting in egg mortality. If this becomes a problem we will close refuge areas seasonally to boating around sensitive nest sites, in conjunction with the State of Maine if necessary. Though motorized boats generally have a greater impact on wildlife, even non-motorized boats can alter distribution, reduce use of particular habitats by waterfowl and other birds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). However, compared to motorboats, canoes and kayaks appear to cause fewer disturbances to most wildlife species (DeLong 2002). Most boating at Carlton Pond WPA is non-motorized, and based on 2 years of weekly law enforcement patrols, this use occurs at very low numbers which minimizes potential impacts.

Negative impacts on water quality from motorboat and other pollutants, human waste, and litter: Extensive water quality testing at Carlton Pond and its tributaries has not been carried out. The actual levels of pollutants from boat fuel and impacts on local aquatic systems are unknown. Hydrocarbon contamination can be harmful to fish. Currently most boating is non-motorized so we believe there is little contamination coming from this source. We will initiate public outreach and education on littering, pollutants, and proper waste disposal if the use increases substantially above current use levels to help mitigate potential adverse impacts to water quality. Water quality testing will be carried out, dependent on staff and funding.

Bank erosion from human activity (boat landings, boat wakes) may increase aquatic sediment loads of streams and rivers, or alter riparian or streamside habitat and vegetation in ways harmful to fish or other wildlife. Boat access will be restricted to designated areas only. Access sites will be located near existing roads and access points, away from sensitive areas. The majority of boat use that occurs on Carlton Pond is non-motorized, primarily canoes and kayaks. When motorboats are used, they are either low horsepower or electric trolling motors; therefore, we do not anticipate any bank erosion due to boat wakes.

Negative impacts from fishing boats and foot traffic to sensitive wetlands and rare wetland plants. Boat access sites will be located away from sensitive wetlands and rare plants.

Conflicts between boaters and other user groups: We know that a small number of conflicts among boaters and other users have arisen at Carlton Pond in the past. In addition, local land owners have expressed concerns about trespass and vehicles parking in inappropriate places and the disposal of human waste by boaters. We will continue to monitor for conflicts among users. If we determine conflicts among users are sufficient to cause safety concerns or affect the overall quality of visitor experiences, we will reevaluate the relevant compatibility determinations and may modify them to reduce conflicts or ensure public safety. Actions we may take to minimize conflicts among user include: 1) providing additional education and outreach, or 2) separating user groups spatially (i.e., different parts of the WPA are open to different activities) or temporally (the WPA would be closed to certain activities at certain times of day or during certain seasons).

To summarize, our continued monitoring of invasive species and outreach at launching sites is necessary to minimize impacts on refuge habitats, plant, and wildlife communities. Monitoring will identify any actions needed to respond to new information and correct problems that may arise in the future. Boating will support the mission of the Refuge System by facilitating participation in the six priority public uses.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation plan (CCP) process for Sunhaze Meadows National Wildlife Refuge and Carlton Pond WPA, this compatibility determination was available for public review and comment for 39 days concurrent with the release of our draft CCP and environmental assessment.

DETERMINATION (check one below):

This use is compatible X

This use is not compatible

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Boating access areas will be designated and signed.

- Service staff will continue to monitor the refuge for the presence of threatened or endangered species and ensure that boat use has no significant impact on these species. If needed in the future, closure of areas will be coordinated with the State of Maine.
- Motor or speed limitations could be implemented if wake or speeds become harmful to wildlife or habitat, or in the interest of public safety.
- Jet Skis will not be permitted on WPA waters due to their environmental impact, noise, speed, and excessive wildlife disturbance.
- All users will be encouraged to inspect and clean boats, trailers, motors, and fishing gear for plant material prior to launching and after retrieval.
- Compliance with regulations and these stipulations will be achieved through education, signage, and law enforcement which will result in minimizing negative impacts to refuge habitat and wildlife.
- The WPA will be open to boating sunrise to sunset and access to any restricted areas will be enforced.

JUSTIFICATION:

Allowing boating at the WPA will not materially interfere with, or detract from, the mission of the National Wildlife Refuge System of the purposes for which the WPA was established. As listed in the purposes section of this compatibility determination, the WPA was established and subsequently land was acquired for two main purposes. Boating will not materially interfere with or detract from the WPA's purposes for several reasons. First, as discussed under the section on anticipated impacts above, boating is a use that supports wildlife-dependent priority public uses with minimal adverse impacts on refuge resources. Use by boaters, based on 2 years of weekly law enforcement patrols, is low and is expected to remain low. This is due largely to numerous other opportunities in the area. Second, waterfowl tend to congregate in emergent vegetation on the wetland edges away from the main waterway used by boaters, so minimal and temporary disturbance of waterfowl is anticipated from boating activity. Third, erosion of stream banks by wakes from motorized boats has not been observed since most boating is non-motorized and dense vegetation and thickly matted roots protect the wetland banks. Therefore, boating is consistent with the wildlife and habitat aspects of the WPA's purposes, the Service policy on compatible uses, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

By supporting priority public uses, allowing this use supports CCP goals and objectives as described in the refuge's and WPA's CCP (USFWS 2013). This activity will not materially interfere with or detract from the mission of the Refuge System because of the limited impacts to WPA resources, it facilitates priority public uses, and the opportunity to attract visitors to the WPA and build support for the Refuge System.

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- U.S. Fish and Wildlife Service (USFWS). 1988. Final Environmental Assessment, Proposal to Establish Sunhaze Meadows National Wildlife Refuge.
- 1992. Sunhaze Meadows National Wildlife Refuge Preliminary Station Management Plan.
- 1993. Sunhaze Meadows National Wildlife Refuge Annual Narratives 1989-1993. Unpublished reports in refuge files.

Appendix C

Bill Thompson, USFWS



Northern parula warbler

Wilderness Review

Introduction

As part of the Comprehensive Conservation Plan (CCP) process, the U.S. Fish and Wildlife Service (Service, we, our) conducted this wilderness review of Sunhaze Meadows National Wildlife Refuge (NWR) and Carlton Pond Waterfowl Production Area (WPA). The purpose of a wilderness review is to identify and recommend to Congress lands and waters of the National Wildlife Refuge System (Refuge System) that merit inclusion in the National Wilderness Preservation System (NWPS). Wilderness areas are untrammeled, roadless, undeveloped, and natural. They also offer outstanding opportunities for solitude and primitive recreation. Only Federal lands can be considered for wilderness designation. Wilderness reviews are required elements of CCPs, are conducted in accordance with the refuge planning process outlined in the U.S. Fish and Wildlife Service (Service) Manual (602 FW 1 and 3), and comply with the National Environmental Policy Act (NEPA) of 1969, including offering opportunities for public involvement.

Wilderness Review Process

The wilderness review process has three phases:

1. Inventory phase
2. Study phase
3. Recommendation phase

During the inventory phase, the wilderness review team identifies lands and waters that meet the minimum criteria for wilderness. These areas are called wilderness study areas. During the study phase, the team further evaluates each wilderness study area to determine whether or not to recommend it for wilderness designation. In particular, team members analyze the quality of the area's values (e.g., ecological, cultural, and spiritual), resources (e.g., wildlife, water, vegetation, minerals, and soils), and uses (e.g., habitat management and public use). They also evaluate the manageability of the area as wilderness and conduct a minimum requirements/tools analysis. During the final phase, the team decides whether or not to recommend any wilderness study areas to Congress for wilderness designation. If the team decides that any wilderness study areas merit wilderness designation, they report their recommendations to Congress in a wilderness study report. The wilderness study report is prepared after the final CCP has been signed. Any areas that are recommended for wilderness designation would be managed to maintain wilderness character, in accordance with management goals, objectives, and strategies outlined in the CCP, until Congress makes a decision or the CCP is amended to modify or remove the wilderness proposal.

Phase I. Wilderness Inventory

Introduction

The wilderness inventory takes a broad look at the planning area to identify wilderness study areas. A wilderness study area is an area of undeveloped Federal land that retains its primeval character and influence, is without permanent improvements or human habitation, and also meets the minimum criteria for wilderness as identified in section 2(c) of the Wilderness Act of 1964 (16 U.S.C. 1131-1136, 78 Stat. 890; Public Law 88-577).

We began this phase by considering all of the lands and waters on Sunkhaze Meadows NWR and Carlton Pond WPA owned in fee by the Federal government. We identified five, separate contiguous blocks on Sunkhaze Meadows NWR and Carlton Pond WPA. We subdivided one block on the refuge's Sunkhaze Meadows Unit into two separate areas along a section of McLaughlin Road (which is used by refuge staff and hunters) and a powerline right-of-way.

Based on this analysis, we identified the following six blocks (maps C.1, C.2, and C.3):

1. Sunkhaze Meadows NWR—Sunkhaze Meadows Unit, area A
2. Sunkhaze Meadows NWR—Sunkhaze Meadows Unit, area B
3. Sunkhaze Meadows NWR—Sunkhaze Meadows Unit, area C
4. Sunkhaze Meadows NWR— Benton Unit
5. Sunkhaze Meadows NWR—Sandy Stream Unit
6. Carlton Pond WPA

Minimum Wilderness Criteria

Our next step was to identify wilderness study areas by evaluating each of the six blocks to see if they meet the following minimum wilderness criteria:

- Appear *natural*.
- Provide for *solitude or primitive recreation*.
- Are either a *roadless* area that meets the *size* criteria or a roadless island of any size.

Below we provide more detailed descriptions of each these criteria and table C.1 presents our evaluation of each of the six blocks against the minimum wilderness criteria based on the Wilderness Act and Service policy (610 FW 4).

Naturalness—The Wilderness Act, section 2(c), defines wilderness as an area that “generally appears to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable.” The area must appear natural to the average visitor, rather than “pristine.” The presence of historic landscape conditions is not required.

An area may include some human impacts provided they are substantially unnoticeable in the unit as a whole. Significant hazards caused by humans, such as the presence of unexploded ordnance from military activity and the physical impacts of refuge management facilities and activities are also considered in evaluating the naturalness criteria.

An area may not be considered unnatural in appearance solely on the basis of the sights and sounds of human impacts and activities outside the boundary of the unit. The cumulative effects of these factors in conjunction with land base size, and physiographic and vegetative characteristics were considered in the evaluation of naturalness.

The following factors were the primary considerations in evaluating naturalness:

- A. Does the area appear to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable?
- B. If present, are human impacts substantially unnoticeable in the unit as a whole?

- C. Does the area contain significant hazards caused by humans, such as the presence of unexploded ordnance from military activity?
- D. What are the physical impacts of refuge management facilities and activities?

Solitude or Primitive and Unconfined Recreation—A wilderness study area must provide outstanding opportunities for solitude or primitive and unconfined recreation. The area does not have to possess outstanding opportunities for both solitude and primitive and unconfined recreation, and does not need to have outstanding opportunities on every acre. Further, an area does not have to be open to public use and access to qualify under this criteria; Congress has designated a number of wilderness areas in the Refuge System that are closed to public access to protect resource values.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. These primitive recreation activities may provide opportunities to experience challenge and risk, self reliance, and adventure. Solitude and primitive unconfined recreation are not well defined by the Wilderness Act, but can be expected to occur together in most cases. However, an outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreation use that experiencing solitude is not an option.

The following factors were the primary considerations in evaluating outstanding opportunities for solitude or primitive, unconfined recreation:

- A. The area offers the opportunity to avoid sights, sounds, and evidence of other people. A visitor to the area should be able to feel alone or isolated.
- B. The area offers non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport.

Roadless—Roadless refers to the absence of improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use. A route maintained solely by the passage of vehicles does not constitute a road.

The following factors were the primary considerations in evaluating the roadless criteria:

- A. The area does not contain improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
- B. The area is an island, or contains an island, that does not have improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
- C. The area is in Federal fee title ownership.

Size—The size criteria can be satisfied if an area has at least 5,000 acres of contiguous roadless public land, or is sufficiently large that its preservation and use in an unimpaired condition is practicable.

The following factors were the primary considerations in evaluating the size criteria:

- A. An area of more than 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- B. A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features.
- C. An area of less than 5,000 contiguous Federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- D. An area of less than 5,000 contiguous acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the U.S. Department of Agriculture - Forest Service, National Park Service, or Bureau of Land Management.

Supplemental Value—The Wilderness Act states that an area of wilderness may contain ecological, geological, or other features of scientific, educational, scenic, or historical value. Supplemental values of the area are optional, but the degree to which their presence enhances the area’s suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features.

Summary of Wilderness Inventory Findings

Out of the six blocks we evaluated, only the Sunkhaze Meadows Unit, area A met all of the minimum wilderness criteria and qualified as a wilderness study area. The remaining five areas did not meet one or more of the minimum wilderness criteria and, therefore, did not qualify as wilderness study areas. We eliminated these blocks from further consideration for wilderness designation in this CCP. Please see chapter 3 of the Sunkhaze Meadows NWR and Carlton Pond WPA Comprehensive Conservation Plan (CCP) for detailed descriptions of habitats and facilities at Sunkhaze Meadows NWR and Carlton Pond WPA (USFWS 2012).

Phase II. Wilderness Study

In this phase, we further evaluated the Sunkhaze Meadows Unit, area A wilderness study area to determine its suitability for designation, management, and preservation as wilderness. This evaluation considered the following:

- The area’s quality of wilderness values
- The refuge’s capability for managing the refuge as wilderness (“manageability”)

Table C.1. Wilderness inventory for Sunkhaze Meadows NWR and Carlton Pond WPA.

	Size in acres	Minimum Wilderness Criteria				Qualifies as a Wilderness Study Area by meeting all minimum wilderness criteria?
		(1) Has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unconfined condition, or is a roadless island?	(2) Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticed?	(3) Has outstanding opportunities for solitude or for a primitive and unconfined type of recreation?	(4) Contains ecological, geological or other features of scientific, scenic, or historical value?	
SunKhaze Meadows Unit, Area A	9,897 acres	Yes	Yes	Yes	Yes Has exemplary natural communities (domed bog, northern white cedar woodland fen, unpatterned fen, and silver maple floodplain forest) and is in an area with a high likelihood for containing cultural resources.	Yes
SunKhaze Meadows Unit, Area B	1,566 acres	No	Yes	No	Yes - in an area with a high likelihood for containing cultural resources.	No
SunKhaze Meadows Unit, Area C	20 acres	No	No	No	Yes - in an area with a high likelihood for containing cultural resources.	No
Benton Unit	334 acres	No	No	No	No	No
Sandy Stream Unit	58 acres	No	No	No	No	No
Carlton Pond WPA	1,068 acres	No	No	Yes	No	No

Quality of Wilderness Values

Size

The 9,897-acre Sunkhaze Meadows Unit, area A wilderness study area exceeds the size criteria of 5,000 contiguous acres.

Roadless

The wilderness study area meets the roadless criteria as it does not contain any improved roads. However, the study area is bounded by improved roads along all sides. It is bounded to the west by McLaughlin Road and a powerline right-of-way, to the south and east by County Road, and to the north by Stud Mill Road. McLaughlin Road is a one-lane, dirt road that is only used by refuge staff and hunters. County Road is a two-lane, public road that is partially paved and partially dirt. Stud Mill Road is a wide, two-lane, gravel road that is well maintained. Stud Mill Road is privately owned, but open to the public except for some storm events and during mud season (usually March through May).

Naturalness

The wilderness study area generally appears natural, is mostly free of human impacts, and does not contain any significant hazards caused by humans. Nearly all of the wilderness study area is covered by natural vegetation. The Sunkhaze Stream runs through the middle of the study area and is surrounded by wet grassland habitat. The rest of the study area is mostly forested wetlands, forested uplands, and peat bog habitat. There are also some scattered smaller ponds, bogs, and beaver marshes.

However, the study area does have some human impacts which may somewhat detract from the study area's "naturalness." These include the following:

1. There are a variety of public use facilities located in the study area, including several refuge trails, informational kiosks, and signs. The Johnson Brook Trail includes sections of boardwalk. There is also a raised wildlife viewing platform located on the Carter Meadows Trail which is visible from the bog and Sunkhaze Stream. Currently, all of the trails allow hiking, snowshoeing, and cross-country skiing.
2. The refuge currently allows two forms of motorized recreational uses in the study area, which are generally prohibited in wilderness areas:
 - Motorized boating on Sunkhaze Stream
 - Snowmobiling along the ITS 84 Trail (a portion of this trail runs along the western border and through the southwest corner of the study area).
3. There are several buildings in the study area that are used by refuge staff and the refuge Friends Group to store equipment and supplies. There is also one private cabin, which predates refuge establishment, on leased refuge land. These buildings currently use electricity.
4. There are a few sites in the wilderness study area that were previously actively managed as early successional habitat. Although these few areas have clear and obvious signs of human impact, they are scattered and small. Additionally, we do not anticipate management for early successional habitat in these areas and over time they are expected to naturally convert to forest.

Outstanding Opportunities for Solitude and Primitive Recreation

The wilderness study area has outstanding opportunities for primitive recreation. The refuge currently offers a variety of non-motorized, dispersed outdoor recreation activities that do not require developed facilities or mechanical transport in the wilderness study area. These activities include nature photography, walking and hiking, snowshoeing, cross-country skiing, non-motorized boating (canoeing and kayaking), hunting, trapping, and fishing. In particular, the wilderness study area offers excellent opportunities for unconfined non-motorized boating, fishing, hunting, and snowshoeing.

Although the wilderness study area does offer some opportunity for solitude, these opportunities are relatively limited and not outstanding. It is generally difficult to avoid sights, sounds, and evidence of other people in the wilderness area for several reasons. First, much of the wilderness area's interior is forested wetlands, stream habitat, and peat bog. Because these habitats are difficult to hike through, the majority of hiking opportunities are located along the periphery of the wilderness area. Since the wilderness area is bounded by roads and adjacent to residential developments, it would be difficult for hikers to avoid the sights and sounds of humans. Second, snowmobiling and motorized boating are currently allowed in designated areas of the wilderness study and may be seen or heard by other users. Lastly, the refuge is located less than 20 miles from Bangor International Airport and there is some discussion of turning the Stud Mill Road (along the northern boundary of the refuge) into a major State highway. While not within the wilderness study area, these sights and sounds would be apparent from the wilderness study area, and could affect the sense of solitude and wilderness characteristics.

The only potentially outstanding opportunity for solitude in the wilderness study area is non-motorized boating (including fishing from non-motorized boats). Since Sunkhaze Stream runs through the center of the wilderness area, non-motorized boaters on the stream have a greater chance of feeling alone and isolated. However, along the edges of the wilderness area, non-motorized boaters would be close to roads and human development. Also, motorized boating currently occurs on Sunkhaze Stream. For non-motorized boaters to experience outstanding solitude, motorized boating would need to be eliminated.

Supplemental Values

The wilderness study area has several important ecological and cultural values. It contains four exemplary natural communities: domed bogs, northern white cedar woodland fen, unpatterned fen, and silver maple floodplain forest. It also contains portions of a deer overwintering area, as mapped by the Maine Department of Inland Fisheries and Wildlife. According to the Maine Historic Preservation Commission, the region around the refuge has a high potential for pre-European Native American archaeological sites (pers. comm., Arthur Speiss, MHPC, 2011). Archaeological excavations near the refuge have found evidence of human occupation from 8,500 to 5,000 years ago (Robinson 2012). Although there have been no systematic cultural resource surveys of Sunkhaze Meadows NWR, it is likely that the study area contains archaeological and historical sites.

Manageability Analysis

Being able to manage an area as wilderness is one of the criteria we evaluate when determining whether all or part of a wilderness study area is suitable for wilderness designation. We must be

reasonably certain that we can manage the study area to maintain wilderness character over the long term before designating it as wilderness. In order to analyze the manageability of the Sunkhaze Meadows Unit, area A wilderness study area, we considered the following:

- Existing private rights, including the type, extent, and validity of private rights in the wilderness study area.
- Land status and Service jurisdiction, including whether or not the Service has adequate jurisdiction over the wilderness study area to ensure maintenance of its wilderness character.
- Current and planned refuge management activities and refuge uses, including:
 - ♦ If these activities and uses involve or require the use of generally prohibited uses;
 - ♦ How the continuation or implementation of these activities and uses affect our ability to manage the area as wilderness; and
 - ♦ If we could modify or eliminate these activities and uses to improve our ability to manage the area as wilderness while still accomplishing refuge purposes.

Existing Private Rights

According to our records, the Service owns all existing rights in the study area, there should be no conflicts with third part rights.

Land Status and Service Jurisdiction

The refuge owns all of the wilderness study area in fee title.

Current and Planned Refuge Management Activities and Refuge Uses

Some of our current and proposed management activities and recreational opportunities are prohibited in wilderness areas or may require the use of mechanized tools. If the wilderness study area were designated as wilderness, we would need to eliminate these activities and uses or redraw the boundary for the wilderness area to exclude the areas where these activities and uses take place.

Motorized Boating and Snowmobiling

We currently permit motorized boating and snowmobiling on designated portions of the refuge. Both of these uses are usually prohibited in wilderness areas because they involve motorized transport. Snowmobiling is specifically mentioned as being permitted on the refuge at appropriate times or in places where no conflict would occur with the objectives of the Refuge System in the 1988 Environmental Assessment establishing the refuge (USFWS 1988). Because of this, we do not believe it should be eliminated from the entire wilderness study area. Since snowmobiling only occurs on a small portion of the wilderness study area, the boundary of the wilderness study area could be adjusted to eliminate the snowmobile trail.

It would be difficult to completely eliminate motorized boating. There are no natural landmarks that could be used to denote the boundary of the proposed wilderness study area. The stream cannot be used as the boundary marker because it floods extensively, particularly in the spring. Based on comments from refuge visitors, spring is also the time when most motorized boating occurs on the refuge. In spring, the stream floods sections of peat bog and forested wetlands which create a large lake. During flooding, the stream channel is not visible. It is difficult to

place and maintain boundary signs within these flooded areas for a variety of reasons. First, the peatland consists of poorly drained organic soils of peat and muck (Thompson and Born 1986). Each year the peat freezes and thaws; in just a few years, this would cause sign posts to lean and eventually fall over, causing them to be submerged when the stream is flooded. To avoid this, post holes would need to be more than 10 feet deep since the peat thickness ranges from 10 to 15 feet deep (USFWS 2001). We estimate that we would need to post and maintain signs along up to 4.5 miles within the peatland soils. This would be logistically difficult and would divert limited resources away from managing refuge habitat and priority public uses. Without posted signs, it would be difficult to enforce a ban on motorized boating in the wilderness study area because motorized boating would still occur on the portion of the stream outside of the refuge. Since the wilderness boundary and refuge boundary would be difficult to post, it would be nearly impossible for boaters to know when they are within or outside a wilderness area. Because boaters can legally access Sunkhaze Stream off the refuge, we do not believe that adjusting the wilderness boundary would address this issue.

Maintaining Refuge Trail System and Other Public Use Facilities

We currently use mechanized tools to maintain refuge trails, boardwalks, the observation platform, and other public use facilities in the wilderness study area. It would be difficult to manage these facilities using non-mechanized tools since Sunkhaze Meadows NWR is unstaffed and currently managed by staff from the Maine Coastal Islands NWR Complex, as time and resources permit. Boardwalks are important for providing access and protecting sensitive wetland habitats on the refuge. We do not believe we could completely eliminate the refuge trail system and other public use facilities in the entire wilderness study area because they are important to achieving refuge purposes and goals related to providing wildlife-oriented recreational opportunities. It is possible to adjust the wilderness study area boundary to exclude most of these areas.

Maintaining Storage Buildings

We currently maintain several buildings in the wilderness study area. The refuge's Friends Group and staff use these buildings for storage and they require the use of electricity. We believe these buildings are important to achieving refuge purposes because they store materials and equipment for our habitat management and public use programs, and help support activities (including interpretive programs) of the refuge's Friends group. There is also a privately owned cabin within the study area. The previous property owner authorized the use of the cabin, prior to Service acquisition. We have continued to allow the cabin owners to remain, for a fee, provided they meet certain stipulations. Given that Sunkhaze Meadows NWR is unstaffed, it would be difficult to maintain and operate these buildings without the use of mechanized tools and electricity. However, we could adjust the wilderness study area boundary to avoid the areas where these buildings are located.

Habitat Management

Designating wilderness would also reduce our flexibility to actively manage habitats in the study area. Although we currently conduct little active management in the study area, we are proposing to evaluate how to best manage several rare natural communities and a deer overwintering area in the study area. Our analysis may determine that these habitats require active management using mechanized tools in order to help achieve the refuge's purposes and goals. Additionally,

designating the study area as wilderness would reduce our flexibility to use mechanized tools to control invasive plant species. As mentioned above, since the refuge is managed by offsite staff from the Maine Coastal Islands NWR Complex, it would be difficult to actively manage large areas of habitat and control invasive species without the use of mechanized tools. Eliminating active habitat management in the entire wilderness study area may negatively impact our ability to achieve refuge purposes and goals related to habitat and wildlife management. Active habitat management could also conflict with the intent of the Wilderness Act to primarily allow natural processes to influence designated wilderness. At this time, we do not know which management actions might be best for maintaining or improving the rare natural communities within the study area. We may need to conduct experimental treatments and use adaptive management. Wilderness designation could impede or prevent us from implementing these treatments. However, it is possible to adjust the wilderness study area boundary to avoid most of the habitats that may require active management.

Overall, we believe it would be difficult to effectively manage the entire 9,897-acre Sunkhaze Meadows Unit, area A wilderness study area to maintain the wilderness character while achieving refuge purposes and the Refuge System mission.

Evaluation of Management Alternatives

Based on our manageability analysis, we developed three management alternatives: no wilderness, all wilderness, and partial wilderness. First we provide a brief description of the three alternatives. We then compare and contrast how the alternatives impact a variety of topics, including refuge purposes, the Refuge System mission, the purposes of the Wilderness Act (table C.2).

Description of the Management Alternatives

No Wilderness Alternative

Under this alternative, we would not recommend any portions of Sunkhaze Meadows NWR and Carlton Pond WPA for wilderness designation. We would manage both the refuge and waterfowl production area as described in chapter 3 of the CCP.

All Wilderness Alternative

Under this alternative, we would recommend the entire 9,897-acre Sunkhaze Meadows Unit, area A wilderness study area (map C.1) to Congress for wilderness designation and inclusion in the NWPS. We would manage this area to preserve its wilderness values.

Partial Wilderness Alternative

Under this alternative, we would recommend about 7,090 acres of Sunkhaze Meadows Unit, area A wilderness study area (map C.4) to Congress for wilderness designation and inclusion in the NWPS. We would manage this area to preserve its wilderness values. For reasons described above under “Current and Planned Refuge Management Activities and Refuge Uses,” this 7,090-acre section would exclude the following sections of the original Sunkhaze Meadows Unit, area A wilderness study area:

- The ITS 84 Snowmobile Trail and the area south of the trail in the southwest of the study area.

- The deer overwintering area, as mapped by the Maine Department of Inland Fisheries and Wildlife, in the northeast of the study area.
- The silver maple floodplain forest exemplary natural community, adjacent to the deer overwintering area.
- The Carter Meadows Trail (including observation platform), the Johnson Brook Trail, the Oak Point Trail, and the Ash Landing Trail.
- Several buildings, including storage buildings, located near the Carter Meadows Trail.

Summary of Wilderness Study Findings

After analyzing all three alternatives, we determined that the Sunkhaze Meadows Unit, area A wilderness study area is not currently suitable for wilderness designation under either the “All Wilderness” or “Partial Wilderness” alternatives. Our determination was based on the following major factors:

- 1. It would be difficult to denote the boundary of the wilderness area, and therefore hard for visitors to know where the wilderness area is, to enforce restricted uses, and manage the area as wilderness.** Because of seasonal flooding of Sunkhaze Stream and the lack of other natural landmarks, it would be difficult to denote the boundary under both the “All Wilderness Alternative” and the “Partial Wilderness Alternative.”
- 2. It would be difficult to manage and maintain the trails, boardwalks, and buildings in the wilderness study area without the use of mechanized tools.** The refuge is currently unstaffed and is administered by staff from the Maine Coastal Islands National Wildlife Refuge Complex, located about 2 hours away. It would be difficult for staff members to maintain all of the refuge trails, boardwalks, and buildings without the use of mechanized tools. Under the “Partial Wilderness Alternative,” this would be less of an issue because the potential wilderness area would exclude most of the buildings, trails, boardwalks, and other public use infrastructure.
- 3. It may be difficult to achieve management objectives for rare habitat types in the wilderness study area.** Botanical inventories and rare plant surveys conducted by refuge staff and the Maine Natural Heritage Program (MNHP) have documented several exemplary communities and rare plants within the wilderness study area. One of the exemplary natural communities is the northern white cedar seepage forest. The best management techniques to maintain or improve the biological diversity, integrity, and environmental health for this habitat are currently unknown. This habitat may require active management, including experimental methods and adaptive management. This would be difficult to implement under the “All Wilderness” alternative. Under the “Partial Wilderness Alternative,” this would be less of an issue because the potential wilderness area would exclude most of the northern white cedar seepage forest. It could become a problem if this habitat expanded into the partial wilderness area.

Table C.2. Comparison of the management alternatives.

<i>Impacts of Each Alternative on...</i>	No Wilderness Alternative	All Wilderness Alternative	Partial Wilderness Alternative
Wilderness values¹	Maintains existing wilderness values.	May enhance wilderness values on 9,897 acres by eliminating motorized boating and snowmobiling, and forgoing active management of habitats and recreational facilities.	May enhance wilderness values on 7,090 acres by eliminating motorized boating.
Refuge resources	Retains flexibility to actively manage.	Reduces flexibility to enhance habitats and public use facilities on 9,897 acres including the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.	Reduces flexibility to enhance habitats and public use facilities on 7,090 acres, but retains the flexibility for active management in the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.
Achieving the purposes of the Wilderness Act and National Wilderness Preservation System²	None of the refuge would be specifically managed to achieve the purposes of the Wilderness Act. However, we would manage the wilderness study area in a way that would likely maintain much, if not all, of the area's existing level of wilderness character.	Most likely to achieve the purposes of the Wilderness Act by managing 9,897 acres to protect, preserve, and enhance wilderness character.	Likely to achieve the purposes of the Wilderness Act by managing 7,090 acres to protect, preserve, and enhance wilderness character.
Achieving refuge or unit purposes	Most likely to achieve the purposes of the refuge by allowing the flexibility to actively manage habitats and maintain public use facilities and trails.	Reduces flexibility to enhance habitats and public use facilities on 9,897 acres including the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.	Reduces flexibility to enhance habitats and public use facilities on 7,090 acres, but retains the flexibility for active management in the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.
Contributing to the Refuge System Mission	Most likely to contribute to the Refuge System mission by allowing the flexibility to actively manage habitats and maintain public use facilities and trails.	Reduces flexibility to enhance habitats and public use facilities on 9,897 acres including the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.	Reduces flexibility to enhance habitats and public use facilities on 7,090 acres, but retains the flexibility for active management in the deer overwintering area, the silver maple floodplain forest exemplary natural community, and refuge trail system.

<i>Impacts of Each Alternative on...</i>	No Wilderness Alternative	All Wilderness Alternative	Partial Wilderness Alternative
Maintaining and, where appropriate, restoring biological integrity, diversity, and environmental health	Retains the flexibility to actively manage and restore biological integrity, diversity, and environmental health, if deemed necessary.	Reduces our flexibility to actively manage and restore biological integrity, diversity, and environmental health on 9,897 acres, if deemed necessary.	Reduces our flexibility to actively manage and restore biological integrity, diversity, and environmental health on 7,090 acres, if deemed necessary, especially for identified rare natural communities.
Meeting other legal and policy mandates and prior refuge NEPA documents	Continues to allow snowmobiling, which was specifically mentioned as being permitted on the refuge in the 1988 Environmental Assessment establishing the refuge.	Prohibit snowmobiling, which was specifically mentioned as being permitted on the refuge, where compatible, in the 1988 Environmental Assessment establishing the refuge.	Continues to allow snowmobiling, which was specifically mentioned as being permitted on the refuge in the 1988 Environmental Assessment establishing the refuge. Difficult to manage different public uses at the potential border because of seasonal flooding, lack of natural landmarks, and difficulty in posting boundary.

¹ Wilderness values include biophysical (e.g., ecosystems, scenery, and natural processes), psychological (e.g., opportunity for solitude or primitive and unconfined recreation), symbolic (e.g., national and natural remnants of American cultural and evolutionary heritage), and spiritual (e.g., sense of connection with nature and values beyond one's self) values (601 FW 1.5JJ).

² The purposes of the Wilderness Act are: secure an enduring resource of wilderness; protect and preserve the wilderness character of areas within the National Wilderness Preservation System; administer the National Wilderness Preservation System for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness; and gather and disseminate information regarding the use and enjoyment of wilderness areas (601 FW 1.8). Wilderness character is defined as: (1) maintaining the natural, scenic condition of the land; (2) providing environments for native plants and animals, including those threatened or endangered; (3) maintaining watersheds and airsheds in a healthy condition; (4) maintaining natural night skies and soundscapes; (5) retaining the primeval character of and influence on the land; (6) serving as a benchmark for ecological studies; and (7) providing opportunities for solitude, primitive and unconfined outdoor recreation, risk, adventure, education, personal growth experiences, a sense of connection with nature and values beyond one's self, a link to our American cultural heritage, and mental and spiritual restoration in the absence of urban pressures (601 FW 1.13).

4. **The 1988 Environmental Assessment establishing the refuge specifically mentions providing opportunities for snowmobiling, if compatible.** Snowmobiling is an existing use on the refuge and the 1988 Environmental Assessment explicitly states that snowmobiling would be permitted on the refuge at appropriate times or in places where it would not conflict with the objectives of the Refuge System. However, snowmobiling is usually prohibited in wilderness areas. We do not wish to discontinue offering snowmobiling along the ITS 84 Snowmobile Trail. Under the “Partial Wilderness Alternative,” this would not be an issue because the potential wilderness area would exclude the snowmobile trail, as well as areas south of the trail.

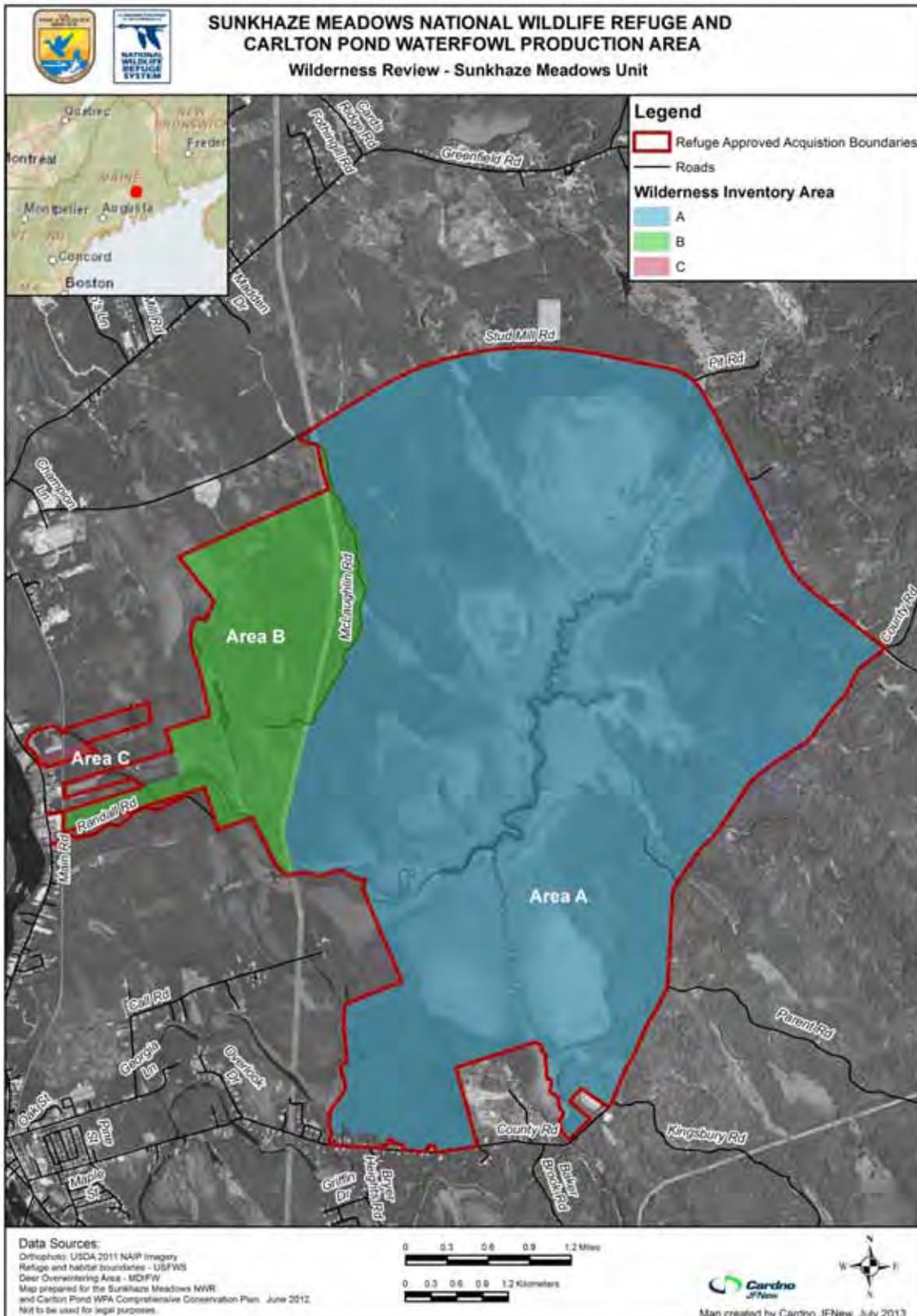
5. **The comments we received during the public comment period were not supportive of designating wilderness on Sunkhaze Meadows NWR.** On February 9, 2012, we held a public meeting about the wilderness review process for Sunkhaze Meadows NWR. At the meeting, we solicited comments on the 7,090-acre partial wilderness study area considered under the “Partial Wilderness Alternative.” The comments we received were generally unsupportive of proposing wilderness on the refuge.

We have finished the wilderness study process and will not recommend any refuge or waterfowl production area lands to Congress for inclusion in the NWPS at this time. We will reassess this determination during development of the next CCP in 15 years, or sooner if deemed appropriate.

Literature Cited

- Robinson, B. 2012. Cultural Resources of Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. Prepared for U.S. Fish and Wildlife Service, Region 5. Draft Report. March 2012. 114 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. Final Environmental Assessment, Proposal to Establish Sunkhaze Meadows National Wildlife Refuge, Penobscot County, Maine. U.S. Fish and Wildlife Service Region 5. 56 pp.
- . 2013. Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area Draft Comprehensive Conservation Plan and Environmental Assessment. U.S. Fish and Wildlife Service, Maine Coastal Islands National Wildlife Refuge Complex, Rockland, ME.

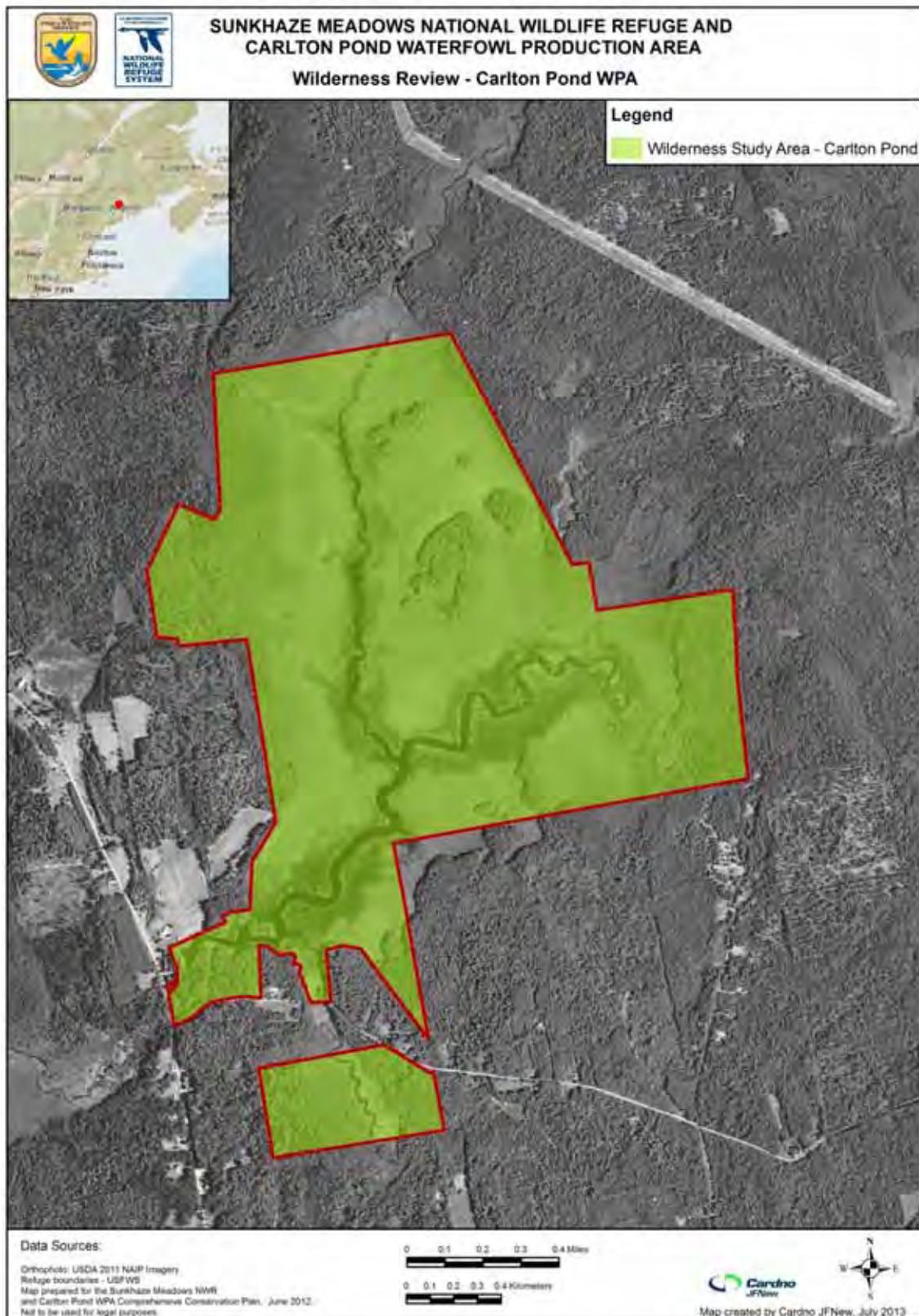
Map C.1. Areas analyzed during the Wilderness Review for the Sunhaze Meadows Unit of Sunhaze Meadows NWR.



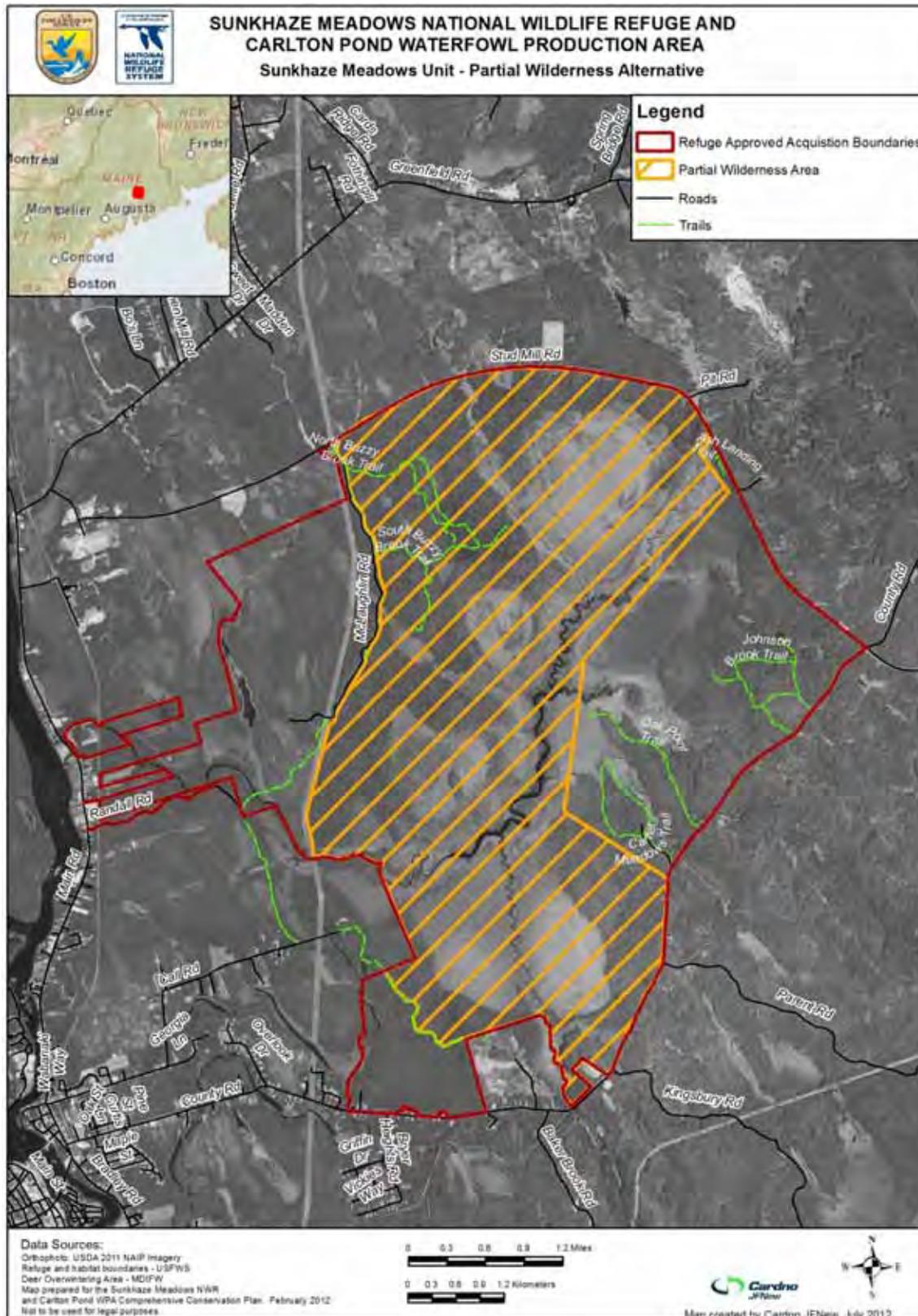
Map C.2. Areas analyzed during the Wilderness Review for the Benton and Sandy Stream Units of Sunhaze Meadows NWR.



Map C.3. Areas analyzed during the Wilderness Review for Carlton Pond WPA.



Map C.4. Partial wilderness alternative analyzed for the Sunkhaze Meadows NWR and Carlton Pond WPA Wilderness Review.



Appendix D

John and Karen Hollingsworth, USFWS



Service staff on Sunhaze Stream at Sunhaze Meadows National Wildlife Refuge.

Wild and Scenic Rivers Review

Introduction

The Wild and Scenic Rivers Act (Public Law 90-543 as amended: 16 U.S.C. 1271-1287) established the National Wild and Scenic Rivers System (NWSRS) to provide Federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations.

The act requires Federal agencies to identify and evaluate potential additions to the NWSRS through their land and resource management planning processes. Section 5(d) (1) of this act states in part: “In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potential.” Wild and scenic river considerations are a required element of comprehensive conservation plans (CCPs) for national wildlife refuges and are conducted in accordance with the refuge planning process outlined in 602 FW 1 and 3, including public involvement and National Environmental Policy Act (NEPA) compliance.

The scope of this wild and scenic rivers review is limited to inventory and tentative classification of the rivers, river segments, and their immediate environments within the Sunhaze Meadows National Wildlife Refuge (NWR, refuge) and Carlton Pond Waterfowl Production Area (WPA) boundaries to determine eligibility. Eligible rivers will be studied at a later date to determine suitability for inclusion in the NWSRS. Regardless, we do not expect the results of the review process, or designation if it occurs, to affect any of the existing public uses or proposed habitat management of Service lands or waters.

Wild and Scenic Rivers Review Process

As part of the Section 5(d) (1) review process, the U.S. Fish and Wildlife Service (Service, we, our) are required to evaluate all river segments that are within the planning area and listed in the Nationwide Rivers Inventory (NRI). The NRI is maintained by the National Park Service (NPS) and lists more than 3,400 free-flowing river segments in the United States that are believed to possess one or more “outstandingly remarkable” natural or cultural values judged to be of more than local or regional significance.

The Wild and Scenic Rivers Act defines a river as “a flowing body of water or estuary or section, portion or tributary thereof, including rivers, streams, crooks, runs, kills, and small lakes.” When a river or river segment is determined to be potentially eligible through the wild and scenic rivers inventory process, its eligibility status is forwarded to the NPS for inclusion into the NRI. The results of this inventory will be forwarded to NPS to update the NRI.

There are three steps in the wild and scenic rivers review process: eligibility, classification, and suitability. A river or stream is eligible if it is free-flowing and has at least one outstandingly remarkable value (ORV). The act identifies an ORV as recreational, geologic, fish and wildlife, historic, cultural, or other similar values. If we find a river or stream is eligible, we determine the appropriate classification. Classification is based on its condition at the time of study. Section 2(b) of the act provides guidance on classification. The act specifies three classification categories: wild river areas, scenic river areas, and recreational river areas (these are discussed in

more detail below under “Wild and Scenic Rivers Classification for Sunkhaze Meadows NWR and Carlton Pond WPA”).

During the third step, we conduct a suitability study to determine if the river or river segments that were found eligible are suitable for designation to the NWSRS. The act identifies the factors that will be considered and documented in determining the suitability of a river or river segment for inclusion in the NWSRS.

Section 4(a) of the act states that the study will include:

“ ... maps and illustrations, ...; the characteristics which do or do not make the area a worthy addition to the system; the current status of landownership and use in the area; the reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the national wild and scenic rivers system; the federal agency ... by which it is proposed the area, should it be added to the system, be administered; the extent to which it is proposed that such administration, including the costs thereof, be shared by state and local agencies; and the estimated cost to the United States of acquiring necessary lands and interests in land and of administering the area, should it be added to the system...”

The study area covers each river or river segment and their immediate environment. The immediate environment is an area extending the length of the river or river segment being studied and extending in width 0.25 miles from each bank of the river.

The recommendation phase consists of forwarding the wild and scenic rivers study report from the Service Director to the Secretary, then onto the President, and finally to Congress. If the study phase is completed in conjunction with a CCP, the study report is prepared after the decision document for the final CCP has been signed. The river or river segments recommended for NWSRS designation are managed to maintain their character in accordance with management goals, objectives, and strategies outlined in the final CCP until Congress makes a favorable legislative determination or the CCP is amended to modify or remove the wild and scenic river proposal.

To expedite the CCP process, we deferred the suitability study until after the CCP is completed. River eligibility and classifications assigned during this review are tentative, and are subject to further consideration during the suitability study. Once the study phase is completed, there will be one of two outcomes: a recommendation to designate suitable segments of stream under the Wild and Scenic Rivers Act, or a determination that there are no suitable stream segments and therefore we would not recommend designation at this time. If we determine that there are suitable segments, we would prepare a legislative environmental impact statement. This document, along with the results of the suitability study would be submitted to the Director of the Service, then to the Secretary of the Department of the Interior, then onto the President, and finally to Congress for potential designation. This is a long process and there are several opportunities for public involvement, including the comment period that occurred for the draft CCP and environmental assessment (EA). At this time, we do not know when we might be able to complete the suitability study. We expect it will be several years.

The Inventory Team

We established an inventory team to complete this review. The team was comprised of staff from the Service's Northeast Regional Office, Maine Coastal Islands NWR Complex, and a retired Service employee. The members include the following:

- Beth Goettel, Refuge Manager, Maine Coastal Islands NWR Complex
- Brian Benedict, Deputy Refuge Manager, Maine Coastal Islands NWR Complex
- Michael Langlois, Wildlife Biologist, Maine Coastal Islands NWR Complex
- Lia McLaughlin, Natural Resource Planner, Northeast Regional Office
- Nancy McGarigal, Lead Natural Resource Planner, Northeast Regional Office
- Margaret Engesser, Assistant Outreach Coordinator, Northeast Regional Office
- Barry Brady, (retired) Regional Wilderness Coordinator, Northeast Regional Office

We also shared drafts of this document for review and comment with members of the CCP planning team which includes representatives from Maine Department of Inland Fisheries and Wildlife, the Penobscot Indian Nation, and the Town of Milford.

Phase I. Wild and Scenic Rivers Inventory

Introduction

The wild and scenic rivers inventory identifies rivers or segments of rivers and their immediate environment within the planning area that meet the minimum criteria for wild and scenic river eligibility under the act.

Minimum Wild and Scenic Rivers Criteria

A river, stream, or segment must meet both of the following criteria to be eligible for designation as a wild and scenic river:

- The river or river segment must be free-flowing.
- The river or river segment and its immediate environment must possess at least one ORV associated with the river or stream.

Outstandingly Remarkable Values

ORVs include scenic, recreational, geologic, fish and wildlife, historic, cultural, or similar values. The following definitions were taken from the joint U.S. Department of Agriculture-Forest Service and NPS technical report "The Wild and Scenic River Study Process" (Diedrich and Thomas 1999). These definitions are intended to set minimum thresholds for each ORV to help foster consistency across Federal river-administering agencies. These definitions are only illustrative and not comprehensive. Agencies may modify these criteria or include additional criteria to make them more meaningful in the area of comparison.

- **Scenery:** The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.
- **Recreation:** Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region.

- Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the region of comparison.
- The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.
- **Geology:** The river, or the area within the river corridor, contains one or more examples of geologic features, processes, or phenomena that is unique or rare within the region of comparison.
- **Fish:** Fish values can be based on the merits of fish populations, fish habitat, or a combination of the two.
 - **Population:** The river is nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federally listed or State-listed (or candidate) threatened, endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”
 - **Habitat:** The river provides exceptionally high-quality habitat for fish species native to the region of comparison. Of particular significance is habitat for wild stocks and/or federally listed or state-listed (or candidate) threatened, endangered or sensitive species. Diversity of habitats is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”
- **Wildlife:** Wildlife values can be based on the merits of terrestrial or aquatic wildlife populations, habitat, or a combination of the two.
 - **Populations:** The river, or area within the river corridor, contains nationally or regionally important populations of native wildlife species. Of particular significance are species considered to be unique, and/or populations of federally listed or state-listed (or candidate) threatened endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”
 - **Habitat:** The river, or area within the river corridor, provides exceptionally high quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federally listed or state-listed (or candidate) threatened, endangered or sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”
- **Prehistory:** The river, or area within the river corridor, contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must have unique or rare

characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; and/or may have been used by cultural groups for rare sacred purposes. Many such sites are listed on the National Register of Historic Places, which is administered by the NPS.

- **History:** The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or one-of-a-kind in the region. Many such sites are listed on the National Register of Historic Places. A historic site(s) and/or features(s) is 50 years old or older in most cases.
- **Other Values:** While no specific national evaluation guidelines have been developed for the “other similar values” category, these may include, but are not limited to, hydrological, paleontological, or botanical resources.

Wild and Scenic Rivers Classification

Each river or river segment eligible for inclusion in the NWSRS must be classified as either a wild, scenic, or recreational river. The act provides the following definitions:

- **Wild river areas** – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- **Scenic river areas** – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- **Recreational river areas** – Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Wild and Scenic Rivers Inventory Findings

Below is a summary of the inventory findings for all of the streams and stream segments within the boundaries for Sunhaze Meadows NWR and Carlton Pond WPA.

River or Stream Segment: Fowler Brook and tributary (Benton Unit)

Length: 0.66 miles for Fowler Brook, 0.66 miles tributary

Outstandingly Remarkable Values: None

Tentative Classification: Not applicable

The Benton Unit is one of three units that comprise the Sunhaze Meadows National Wildlife Refuge, and is located near the town of Unity, in Waldo County, Maine. This unit is bordered by roads and agricultural lands on two sides and forested habitat on the other two sides. One stream segment on refuge lands goes through the center of the unit, primarily the grassland habitat. The

other stream segment follows the eastern edge of the unit and is bordered by forest. Both stream segments are small, and neither segment contains any ORVs as defined above. For this reason, we have determined that these segments are not eligible for designation as wild or scenic under the Wild and Scenic Rivers Act.

River or Stream Segment: Carlton Pond (Carlton Pond WPA)

Length: not applicable

Outstandingly Remarkable Values: None

Tentative Classification: Not applicable

Carlton Pond WPA is located near the town of Unity, in Waldo County, Maine. Carlton Pond is an impounded wetland, maintained by a water control structure placed at its outlet. Service jurisdiction is limited to lands surrounding the pond, and only includes a small segment of the stream at the pond’s inlet. There are no other known waterways on Service lands. Therefore, we do not consider any of the waters on refuge lands to be free-flowing. For this reason, we have determined that streams or stream segments within Carlton Pond WPA do not meet the minimum requirements for designation as wild or scenic under the Wild and Scenic Rivers Act.

River or Stream Segment: Sunkhaze Stream and its Tributaries

Length: 5 miles of stream, 16 miles of tributaries

Outstandingly Remarkable Values: Other Values (hydrologic quality, botanical)

Tentative Classification: Scenic

Sunkhaze Stream bisects the refuge along a northeast to southwest orientation and flows directly into the larger Penobscot River. The Sunkhaze Meadows Unit includes 5 miles of Sunkhaze Stream and another 16 miles of tributary streams that include Buzzy, Little Buzzy, Baker, Dudley and Johnson Brooks, and Birch and Little Birch Streams (see map D.1 and table D.1). Maine Department of Environmental Protection classifies Sunkhaze Stream and its tributaries as class AA waters. The State of Maine defines Class AA waters as “waters which have outstanding natural resources and which should be preserved because of their ecological, social, scenic or recreational importance. Sunkhaze Stream is a high order, relatively undeveloped stream, and this stream and its tributaries are currently listed in the NRI.

Table D.1. Lengths of stream and brook segments within the Sunkhaze Meadows Unit evaluated for eligibility under the Wild and Scenic Rivers Act.

Stream or Brook	Length (miles)
Sunkhaze Stream	5
Little Birch Stream	1.8
Birch Stream	2.6
Baker Brook	2.9
Buzzy Brook	2.4
Little Buzzy Brook	1.9
Johnson Brook	1.9
Dudley Brook	2.4
Total	20.9

Smithwood and McKeon (1999) divide Sunkhaze Stream into three types of riverine habitat. The lower section (treed river habitat) is characterized by a deep, wide, and heavily channelized part of the stream with a hardwood canopy that shades the stream. Submerged logs are abundant and emergent vegetation is moderate. The middle section, known as “bog meadow,” is a heavily channelized river surrounded by a tall grass meadow. This habitat comprises most of the unit from below the confluence of Baker Brook to an area above the confluence of Buzzy Brook. Farther upstream the river becomes increasingly narrow and shallow. The upper section (“upper Sunkhaze”) begins near the Buzzy Brook confluence and extends upstream to the unit’s boundary at Stud Mill Road. The lower part of this habitat has a series of beaver dams that create pools and slow runs. Upstream of the confluence with Johnson Brook the canopy closes in again, dominated by alders. The grade increases just below Stud Mill Road, creating shallow fast-moving water in a series of riffles, runs, and pools (Smithwood and McKeon 1999).

Along with its six tributaries, Sunkhaze Stream supports a diversity of wetland communities. The wetland complex consists primarily of wet meadows, shrub thickets, cedar swamps, extensive red and silver maple floodplain forests and open freshwater stream habitats, along with plant communities associated with peatlands, such as shrub heaths and cedar and spruce bogs. The complex contains several large raised bogs or domes, separated by extensive areas of streamside freshwater meadows. Davis et al. (1983) ranked the peat bogs of the Sunkhaze Meadows Unit high quality among 31 other peatlands in Maine based on its developmental-morphological diversity, pristine character, and exemplary quality of peatland type or feature. It is the second largest peatland in the State, with peat thickness ranging from 5 to 20 feet.

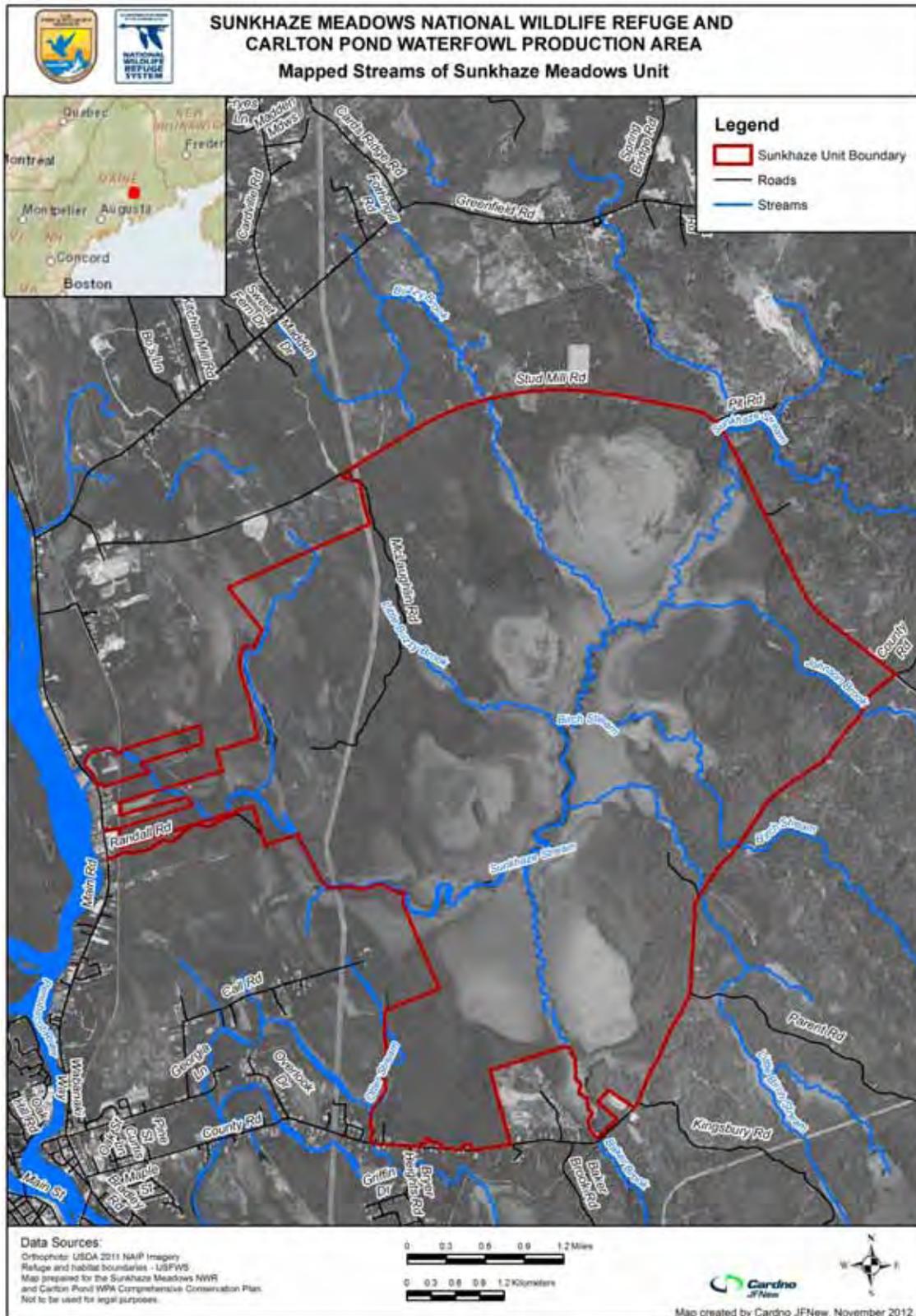
The bogs and stream wetlands, adjacent uplands and associated transition zones, also provide habitat for many wildlife species. Brook trout and American eel are native to the Sunkhaze Stream system. Beaver are especially abundant along Sunkhaze Stream and its tributaries, as evidenced by their lodges, dams, caches, and scent mounds. The wood turtle, a species of special concern in Maine, has been observed in the Sunkhaze Stream system.

While the unit is bordered by roads, the interior is largely undeveloped. There are relatively few trails and fewer roads because of the prevalence of bog and other wetland habitats. This, combined with seasonal flooding, has discouraged development of infrastructure along the stream and tributary shorelines both before the refuge was established and after acquisition. Therefore, the shorelines of these streams and creeks remain difficult to access by land and are largely undeveloped.

Conclusion

Because of the unique botanical resources associated with this stream system, its free-flowing nature, and its outstanding water quality, we have determined that Sunkhaze Stream and its tributaries within the refuge boundary are eligible for designation under the Wild and Scenic Rivers Act. Because of the relatively undeveloped nature of their banks and existing road access, we have tentatively classified these waters as scenic, based on the definitions established in the act. We will complete the suitability study and submit a recommendation, if applicable, after the CCP process is completed. The suitability study will be subject to additional public review under NEPA.

Map D.1. Streams within Sunkhaze Meadows National Wildlife Refuge determined to be eligible for designation under the Wild and Scenic Rivers Act.



Protective Management

Once a river or river segment is found eligible by an agency, the agency must evaluate any subsequent actions within its jurisdiction to ensure the actions do not affect potential wild and scenic river designation. Management activities and authorized uses must not adversely affect either the eligibility, or the tentative classification from a wild area to a scenic area or a scenic area to a recreational river area. In other words, for Sunkhaze Stream and its tributaries, we need to ensure that activities conducted under our jurisdiction do not affect the characteristics of the stream that make it eligible for designation. Under the conditions and restrictions specified in Sections 7(b), 8(b), 9(b) and 12(a) of the act, the river is protected for the duration of the study plus up to 3 years after the required report is submitted (along with the President's recommendation) to Congress. Should Congress not act within the 3-year timeframe, the river is no longer afforded protection by the act.

Protective management for eligible river segments should provide protection in the following ways:

1. **Free-flowing Values:** The free-flowing characteristics of the eligible river segments cannot be modified to allow stream impoundments, diversions, channelization, and/or rip-rapping to the extent the Service is authorized under law.
2. **River-related Values:** Each segment must be managed to protect identified ORVs and, to the extent practicable, these values must be enhanced.
3. **Classification Impacts:** Management and development of the eligible river and its corridor cannot be modified, subject to valid existing rights, to the degree that its eligibility or tentative classification would be affected.

At this time, we do not believe it is necessary to establish any additional protective measures to protect the eligibility or ORVs of these waterways. None of the strategies presented in the CCP include management that will impede the free-flowing nature of these systems, their ORVs, or the tentative classification. As stated previously, we do not expect the results of the review process, or designation if it occurs, to affect any of the existing public uses or proposed habitat management of Service lands or waters. If, in the future, we determine that additional protective measures are necessary that would affect existing public uses, we will notify the public at least 30 days in advance of implementing the measures. At that time, we will provide opportunities for public comment on any proposed changes.

Literature Cited

- Diedrich, J. and C. Thomas. 1999. The Wild and Scenic River Study Process. Technical report prepared for the Interagency Wild and Scenic Rivers Coordinating Council. Prepared by the U.S. Forest Service Portland, Oregon and the National Park Service, Anchorage, Alaska. 54 pp. accessed November 2012 online at <http://www.gehwa.org/Wild%20&%20Scenic%20River%20Files/W&S%20study-process.pdf>
- Davis, R.B., G.L. Jacobson, Jr., L.S. Widoff, and A. Zlotsky. 1983. Evaluation of Maine peatlands for their unique and exemplary qualities. A report to the Maine Department of Conservation. Institute for Quaternary Studies and Department of Botany and Plant Pathology, University of Maine, Orono, Maine.

Smithwood, D.A. and J.F. McKeon. 1999. Sunkhaze Meadows National Wildlife Refuge fisheries management plan. U.S. Fish and Wildlife Service, Laconia, New Hampshire.

Appendix E



USFWS

American black duck

Staffing Charts

Figure E.1. Current Staffing for Maine Coastal Islands National Wildlife Refuge Complex (including Sunkhaze Meadows NWR and Carlton Pond WPA).

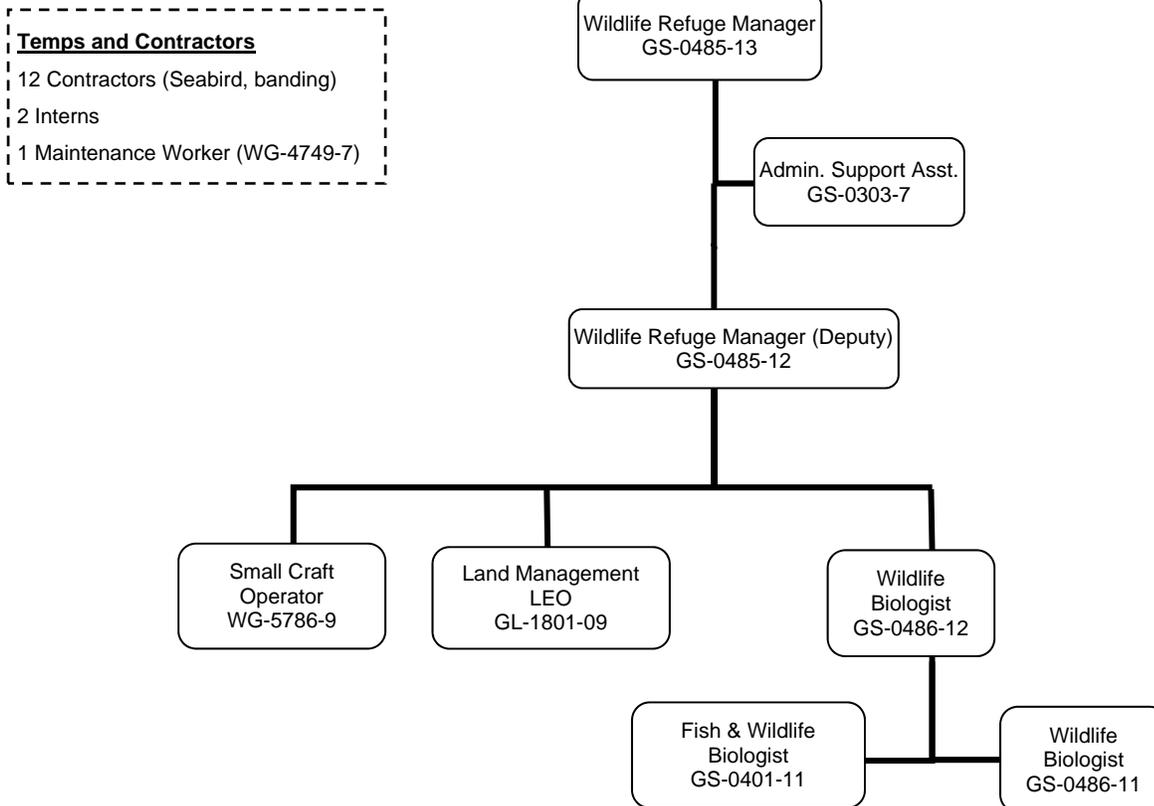
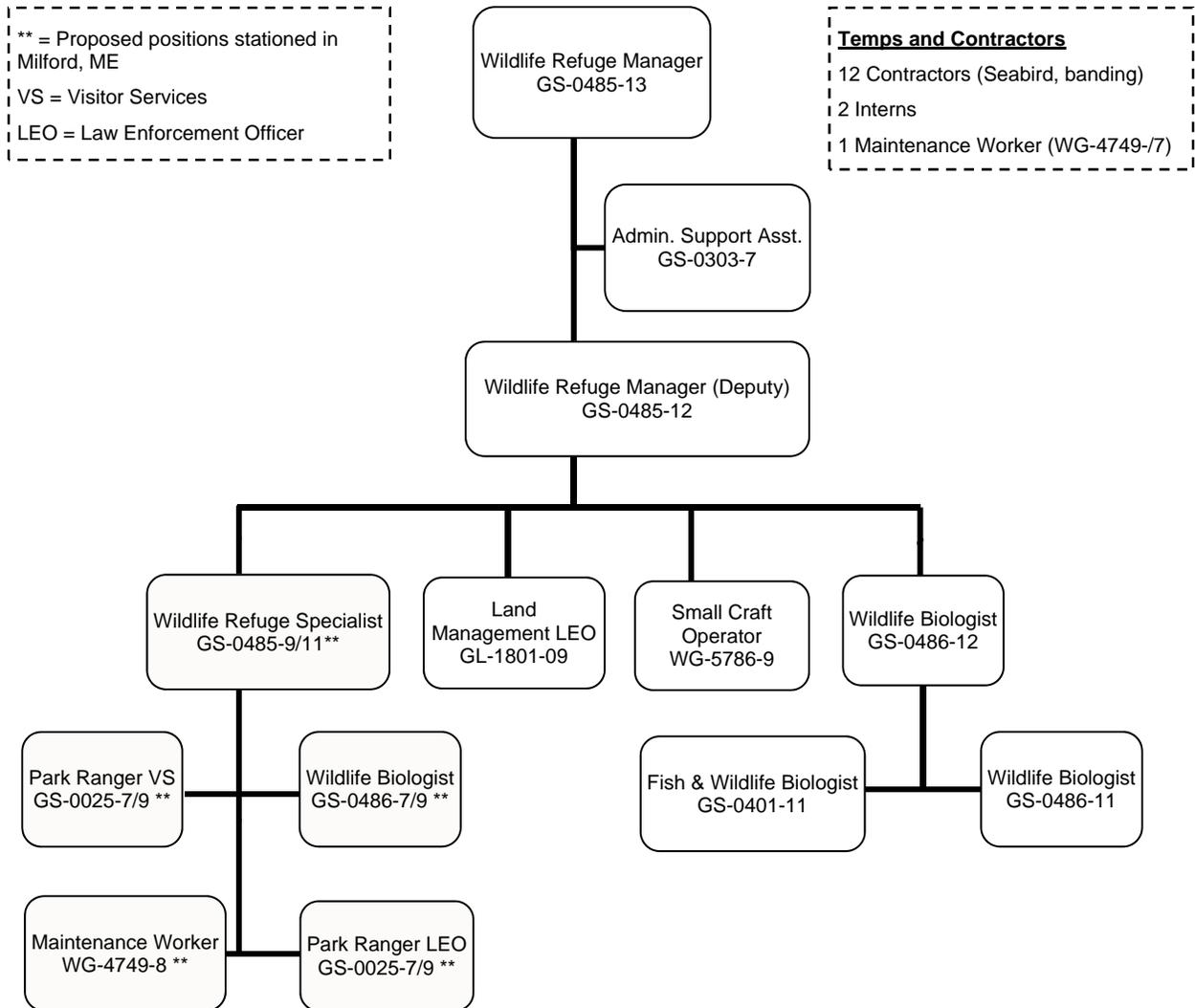


Figure E.2. Current and Proposed Staffing for Maine Coastal Islands National Wildlife Refuge Complex (including Sunhaze Meadows NWR and Carlton Pond WPA).



Appendix F

Mark Musselman, USFWS



Prothonotary warbler

Refuge and WPA Proposed Project and Staff Costs

Table F.1. Proposed dedicated staff for Sunhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area and estimated annual costs (in 2012 dollars).

Position Title	Refuge Rank	Proposed Staffing (Estimated Annual Cost)
Wildlife Refuge Specialist (GS-0485-9/11)	1	\$110,507
Park Ranger – Visitor Services (GS-0025-7/9)	2	\$91,334
Wildlife Biologist (GS-0486-7/9)	3	\$91,334
Maintenance Worker (WG-4749-8)	4	\$84,011
Park Ranger – Law Enforcement (GS-0025-7/9)	5	\$102,405
TOTAL		\$479,591

Table F.2. Proposed projects for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area and estimated costs (in 2012 dollars).

Project Title	Location	Cost	Frequency
EXISTING FACILITIES			
Maintain Cabin 1	Sunkhaze Meadows Unit	\$1,000	annually
Maintain Cabin 2	Sunkhaze Meadows Unit	\$2,500	annually
Demolish Cabin 3	Sunkhaze Meadows Unit	\$12,000	one time
Demolish Cabin 4	Sunkhaze Meadows Unit	\$12,000	one time
Improve directional trail signs	Sunkhaze Meadows Unit	\$1,500	Every 10 years
Replace boardwalks along Johnson Brook Trail	Sunkhaze Meadows Unit	\$110,000	one time
Maintain Carter Meadow Trail, Johnson Brook Trail, Ash Landing Trail, and Oak Point Trail	Sunkhaze Meadows Unit	\$12,000	annually
NEW FACILITIES			
Construct or acquire new refuge headquarters	At or near Sunkhaze Meadows Unit	unknown	one time, then annual maintenance
Develop new trail head from the entrance of Carter Meadow Road to the existing Carter Meadow trailhead	Sunkhaze Meadows Unit	\$17,500	one time
Develop two gravel parking areas	Sunkhaze Meadows Unit	\$26,950 (for both)	one time
Design and construct kiosk	Benton Unit	\$10,000	one time
Develop interpretive display for grassland management	Benton Unit	\$5,000	one time
Create 0.25-mile long pedestrian connector trail between the parking lot and existing snowmobile trail	Benton Unit	\$8,750	one time

Appendix G



Dave Small

Red Fox

Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Sunhaze Meadows NWR and Carlton Pond WPA

Appendix G.

Summary of Public Comments and Service Responses on the Draft Comprehensive Conservation Plan and Environmental Assessment for Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area

September 2013

Introduction

In April 2013, the U.S. Fish and Wildlife Service (Service, we, our) completed the Sunkhaze Meadows National Wildlife Refuge (Sunkhaze Meadows NWR, the refuge) and Carlton Pond Waterfowl Production Area (Carlton Pond WPA, WPA) Draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA). That document outlines three alternatives for managing the refuge and WPA over the next 15 years and identifies alternative B as the “Service-preferred alternative.” We released the draft CCP and EA for public review and comment from April 23 to May 31, 2013.

We evaluated all the letters, email, and phone calls we received during that comment period, along with comments recorded during our two sets of public meetings (four meetings total). This document summarizes the substantive comments we received and provides our responses to them. Based on our analysis in the draft CCP and EA and our evaluation of comments, we made a few minor modifications to alternative B and are recommending this modified alternative B to the Northeast Regional Director for implementation. It is this modified alternative B which is detailed in the final CCP.

We recommended the following modifications to alternative B:

- 1) Under objective 4.1, we agreed to maintain the spur trail off of the Johnson Brook Trail.
- 2) We clarified that we will provide wood duck nesting boxes from existing supplies upon request, as long as volunteers continue to clean, maintain, and monitor use of the boxes. After the existing supply of boxes is depleted, we will phase out artificial wood duck nesting boxes as they deteriorate, or will remove the boxes if volunteers are no longer able to maintain them (see strategies under objective 2.1).
- 3) We added a strategy under objective 6.1 that we will explore the feasibility of and interest in including Benton Unit in a regional trail system upon request.
- 4) We modified a strategy under objective 7.2 to include specific reference to working with universities as well as other partners to identify research and monitoring projects and needs at each refuge unit to foster partnerships.
- 5) We modified language in the boating compatibility determination for Carlton Pond WPA to include monitoring for potential conflicts with other authorized public uses on the WPA (e.g., hunting), and will modify this and other compatibility determinations if warranted.

These changes are not substantive, and none of the changes affect the expected environmental impacts in any significant way. Therefore, we have determined that none of these modifications warrants publishing a revised or amended draft CCP and EA before publishing the CCP.

The Northeast Regional Director will either select the modified alternative B for the final CCP, or one of the other two alternatives analyzed in the draft CCP and EA, or a combination of actions from among the three alternatives. The Northeast Regional Director will also determine whether a Finding of No Significant Impact is justified prior to finalizing her decision. This decision will be made after:

- Reviewing all the comments received on the draft CCP and EA, and our responses to those comments.
- Affirming that the CCP actions support the purpose and need for the CCP, support the purposes for which the refuge and WPA were established, help fulfill the mission of the National Wildlife Refuge System (Refuge System), comply with all legal and policy mandates, and work best toward achieving the refuge's and WPA's vision and goals.

Concurrent with release of the approved final CCP, we will publish a notice of the availability in the *Federal Register*. This will complete the planning phase of the CCP process. Then, we will begin its implementation phase.

Summary of Comments Received

During the comment period, we received comments at three of the four public meetings, as well as written comments, including email and post, from eight individuals. We also received comments from the Maine Department of Inland Fisheries and Wildlife (MDIFW).

Below, we address the substantive comments we received. Comments were organized by subject. Directly beneath each subject heading, you will see a list of unique numbers that correspond to the person, agency, public meeting, or organization that submitted the comment. In some cases, one person may have submitted a comment more than once (public meeting, email, written letter, or telephone). The cross-referenced list appears as attachment 1 to this appendix.

In our responses, we may refer the reader to other places in this document or the draft CCP and EA where we address the same comment. In some instances, we refer to specific text in the draft CCP and EA and indicate how the CCP was changed in response to comments. The full versions of the draft CCP and EA or the final CCP are available online at:

<http://www.fws.gov/northeast/planning/Sunkhaze%20Meadows/ccphome.html>.

For a CD-ROM or a print copy, please contact:

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Rockland, ME 04841
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Service Responses to Comments by Subject

Habitat Management

(Letter ID#: 2, 3, 4, 5, 16)

Comment 1: One commenter believes that there should be no prescribed burning and no logging on the refuge because trees benefit the environment by preventing flooding and erosion, helping to stop climate change and heat islands, and making oxygen.

Response: We agree that maintaining forested habitat on refuge and WPA lands is important. Prescribed burning and tree harvesting are both management tools that are used on national wildlife refuges to create and maintain desired habitats. The Service's preferred alternative (alternative B) includes minimal tree harvesting, since the goal is to maintain mature (late-successional) forest (also, see our answer to the next comment). The purposes of this are to provide a balance of habitats in a landscape where the surrounding forests are being harvested and are therefore generally younger, and to protect the water quality of the wetland complexes at the Sunkhaze Meadows Unit and at Carlton Pond WPA. Alternative B recommends prescribed fire only to maintain grassland at the Benton Unit, in that portion of the field where mowing is impractical because of rocks. We discuss the importance of grassland habitat in the draft CCP and EA under alternative A, objective 3.1 (page 3-27)

Comment 2: One commenter would like us to clarify what we mean by "habitat enhancement" under alternative B, asking if we "seek to 'promote later successional species through no active management.'"

Response: We do expect to promote mature (late-successional) forest and its accompanying plants and animals largely through no active management; however, there may be instances where some active management would help maintain a healthier late-successional forest. Much of the refuge's forest, particularly in the Sunkhaze Meadows Unit, has been logged prior to Service acquisition. After Service acquisition, portions of these forests were managed to keep them in shrubland and young forest habitats as well. Because of this history, trees in portions of the forest are even-aged. Because the trees in these areas are nearly the same age, a large portion of these trees may stop growing and may even die off at the same time. This results in loss of the cover and other wildlife values previously provided by these blocks of trees. In contrast, trees in uneven-aged stands are expected to die at variable times. Select tree harvesting as a stand ages would provide an older-growth uneven-aged stand, which would be more resilient over time than an even-aged one.

Comment 3: One commenter was opposed to any trapping. One person asked if the trapping program was a management activity or if we were just allowing trapping.

Response: We recognize that there are differing opinions about the role of furbearer management (i.e., trapping) on national wildlife refuges. We consider trapping to be a refuge management economic activity as described in the Code of Federal Regulations (CFR; see 50 CFR 25.12). In chapter 3 of the draft CCP and EA (page 3-10), under "Actions Common to All Alternatives" we explain the role of furbearer management on the refuge and WPA. Maintaining a furbearer

management program provides a mechanism for collecting survey and monitoring information, or contributing to research on furbearer occurrence, activity, movement, population status, and ecology. The ecological and monitoring benefits are management services that are accomplished through minimal or even no cost to the government. In addition, as discussed in the compatibility determination for furbearer management at Carlton Pond WPA and as specified in 50 CFR 31.16, WPAs are open to public trapping unless temporarily closed. For these reasons, we intend to maintain the current furbearer management programs at the refuge and WPA. For additional information on the refuge and WPA furbearer management programs, please see the associated compatibility determinations in appendix B.

Comment 4: One commenter asked if the refuge was doing any habitat management to increase waterfowl habitat at the Sunkhaze Meadows Unit? Was increasing waterfowl production considered?

Response: The Sunkhaze Meadows Unit was acquired under the general authorities of the Fish and Wildlife Act of 1956 and the Refuge Recreation Act of 1962, with the primary purpose of protecting the peat bog domes and Sunkhaze Stream wetland complex. Waterfowl production has never been a primary purpose of the unit, and artificial means of increasing waterfowl production have not been considered.

Although many refuges in the past have used a variety of management techniques, like artificial impoundments, agricultural programs, and artificial nest structures to increase waterfowl production, these techniques are often expensive (e.g., building and maintaining impoundments) and can be counter-productive. The Service's policy on maintaining biological integrity, diversity and environmental health (601 FW3 3.7 E) states that we should "...favor management that restores or mimics natural ecosystem processes or functions to achieve refuge purpose(s)." In a free-flowing wetland complex that was acquired to protect the wetland complex rather than specifically acquired for waterfowl production, we believe that maintaining the natural character of the ecosystem best meets the purposes of the refuge and the mission of the Refuge System.

Comment 5: One individual stated that staff should monitor and inventory the extent of purple loosestrife which has been found in the middle of the Sunkhaze Meadows Unit.

Response: We agree that this is a high priority and have been monitoring and controlling this plant to the best of our ability. Over the past few years, we have worked with the Friends of Sunkhaze Meadows and other partners to control this species through hand pulling and herbicide applications. Monitoring and inventory for invasive species is included within the early detection and rapid response strategy presented under actions common to all of the alternatives (see pages 3-7 and 3-8 in the draft CCP and EA). Controlling this species is also included as strategies under objectives 1.1 and 1.2 (see pages 3-20 and 3-21 in the draft CCP and EA).

Comment 6: One commenter recommended the Service complete a "landscape scale analysis to promote biodiversity" and continue preserving the existing habitats at the Sunkhaze Meadows Unit.

Response: We agree in the importance of looking at the role of the refuge and WPA from a landscape perspective. This is evidenced by the Service's efforts in developing Landscape Conservation Cooperatives (LCCs). During the planning process we consulted a variety of Service and non-Service personnel, in addition to the planning team members and other refuge staff, to ensure we were considering the role of the refuge and WPA from a landscape perspective. For example, Service staff from the Migratory Bird Program assisted us by providing a landscape scale perspective on current and historic habitats in Maine and the North Atlantic LCC along with recommendations on what habitats Sunhaze Meadows NWR might be in the best position to provide specifically from this regional perspective. We also discussed landscape level issues in chapter 4 of the draft CCP and EA, under the cumulative impacts analysis.

We also agree it is important to preserve the habitats at the Sunhaze Meadows Unit. All three alternatives focus on protecting the unique domed bogs and peatlands of this unit. While all three alternatives also protect the forest and other habitats, we believe the final CCP best protects all of the refuge and WPA habitats and allows the refuge to best contribute to natural resource conservation at a landscape scale.

Comment 7: One individual asked how the Service would be able to meet the actions common to all alternatives or the objectives under goal 1 under any of the alternatives, given the absence of staff and any biological or ecological research.

Response: Strategies presented in the various alternatives are predicated on staff and funding levels associated with those alternatives. CCPs are for planning purposes and do not constitute a commitment of resources. Service staff will continue to work with volunteers and other partners to accomplish as many of the goals and objectives as possible using the available resources.

Comment 8: One individual asked if we could describe what protocols we are using to specifically accomplish the following actions: (a) monitoring and controlling invasive species, (b) furbearer management, (c) monitoring and abatement of diseases, (d) facilitating or conducting biological research and investigations; (e) protecting cultural resources; (f) providing wildlife-dependent recreational opportunities, and (g) completing findings of appropriate use and compatibility determinations.

Response: The Service is required by law and policy to meet several of these obligations. We do use or are developing standardized monitoring protocols for some of these categories. Other resources are monitored regularly but we have not necessarily developed protocols. For example, we are aware of the location of several archaeological sites within the refuge. Service staff, usually a law enforcement officer, routinely visit the refuge to look for unauthorized access and public uses, including disturbance of these locations. We would include any future sites in this effort, if discovered.

The Service has recently dedicated funding for a national inventory and monitoring program. Our regional inventory and monitoring staff are working with academic partners, Service staff, and others to identify standard inventory and monitoring protocols that can be implemented in refuges across the Service's Northeast Region and the nation, so that we can compare data

collected at different locations. This process is ongoing. We will incorporate the results of these efforts into our inventory and monitoring step-down plan (see page 3-16 of the draft CCP and EA) as they become available and as resources allow.

Of course, meeting all of these obligations is difficult given current limits on resources. The staff at Maine Coastal Islands NWR attempts to meet the highest priority obligations for Sunhaze Meadows NWR and Carlton Pond WPA as best it can, while also meeting obligations at the coastal refuge. We also recognize the need for additional resources to accomplish the increased activity proposed in alternatives B and C.

Comment 9: One individual asked how we know that the refuge and WPA are relatively free of invasive species, and what were we comparing them to.

Response: The refuge manager at Maine Coastal Islands NWR was one of the founding members of the Invasive Plant Atlas of New England (IPANE; <http://www.eddmaps.org/ipane/>), and has traveled extensively throughout New England and controlled invasive plants in several states. She was heavily involved in the development of the Connecticut River Watershed/Long Island Sound Invasive Control Initiative Strategic Plan (USFWS 1999), which looked at the distribution of invasive plants across the landscape and what various states were doing to control or encourage the control of them. This effort found that, in general, Rhode Island, Connecticut, and Massachusetts habitats had a much bigger problem (more species, more robust individual plants, more percent cover) than habitats in Vermont and New Hampshire. Maine is similar to Vermont and New Hampshire. This does not in any way diminish the seriousness of invasive plant infestations nor the need to eradicate or control them, wherever they occur.

Comment 10: One person asked if changing (raising) the water level in Unity Pond would affect Carlton Pond WPA.

Response: Since Carlton Pond WPA is upstream from Unity Pond, and water levels are kept above Carlton Stream by a dam, we do not believe Carlton Pond would be affected by raising water levels at Unity Pond.

Comment 11: One person commented that Carlton Pond is getting shallower because of sedimentation and low water at certain times of year and asked if there is a way for the Service to address this.

Response: All dams slow the water behind them, causing the sediment being transported in the water to settle out. Dredging the sediments is extremely difficult and expensive. Although shallow areas can be an impediment to recreation, shallow marshes can be very productive habitats. At Carlton Pond, much of the thick vegetation in the shallow water near the inlet on Bog Road is wild rice, a highly desirable waterfowl food. At this time, we do not believe there is a wildlife or habitat benefit to removing sediment from Carlton Pond, so we have no plans to do so.

Comment 12: One person asked what is the Service doing with duck boxes at Carlton Pond WPA and if they could get replacements.

Response: As an agency, the Service is moving away from the use of artificial nesting boxes for cavity-nesting ducks. Instead, we are focusing our efforts on improving available nesting habitat.

For over 13 years, Carton Pond WPA has had an active volunteer program (several groups or individuals) that have maintained, cleaned, and documented the use of the nesting boxes. These volunteers have used the wood duck boxes as a way to get people outside and interested in their neighborhood and the environment. While there is an active volunteer program to annually clean and maintain the boxes, the refuge staff will continue to provide the remaining wood duck boxes it has in its inventory upon request. Because of limited resources and the agency's movement away from artificial nesting boxes, we do not anticipate supplying additional nest boxes once our current inventory is exhausted. If wood duck boxes are not maintained and cleaned, the boxes would then be removed. We have clarified this by adding two strategies addressing artificial wood duck nest boxes under objective 2.1.

Refuge Administration and Infrastructure
(Letter ID#: 1, 2, 3, 4, 5, 10, 14, 16)

Comment 13: One commenter was opposed to exchanging any refuge or WPA lands for other, currently private, lands.

Response: The Service may exchange federally owned land for private lands. Per Service policy (342 FW 5), the land exchange must be of benefit to the United States, and the value of the lands or interests in lands must be approximately equal or values may be equalized by the payment of cash by the grantor or by the United States. As with other Service actions, land exchanges are subject to a variety of other requirements including compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347; NEPA). We do not foresee proposing any land exchanges for the refuge or WPA at this time. If this changes, we will conduct whatever level of additional NEPA review is warranted.

Comment 14: One commenter asked if private landowners still pay taxes on property that is under a conservation easement?

Response: Yes, after a conservation easement is established landowners are still required to pay property taxes on the remaining value of their land. They no longer pay property taxes on the value of the easement.

Comment 15: One commenter was opposed to allowing mining, private grazing of livestock, water diversion, or other commercial uses of the refuge and WPA.

Response: We consider these uses to be economic uses. As stipulated in 50 CFR 29.1, "We may only authorize public or private economic use of the natural resources of any national wildlife refuge...where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission." We have not proposed any of these specific activities mentioned by the commenter under any of the alternatives in the draft CCP and EA, so we do not anticipate authorizing these uses at this time. We have authorized the

following economic uses of the refuge and WPA: haying, trapping, and commercial guiding for hunting, fishing, wildlife observation, photography, environmental education, and interpretation. As specified in the compatibility determinations for these uses, we have found that these uses contribute to achieving the purposes of the refuge and WPA and the mission of the Refuge System.

If we determine that authorizing other economic uses of the refuge and WPA may be warranted, we would need to prepare a finding of appropriateness and compatibility determination for each use, and provide opportunities for additional public review and comment before opening the refuge or WPA to these uses. These documents would need to specify how the use would contribute to achieving refuge purposes or the Refuge System mission.

Comment 16: Several commenters were in favor of dedicated staff for the refuge and WPA.

Response: Thank you for your support. We have proposed additional staff under alternatives B and C; however, the CCP is developed for planning purposes only and does not constitute a commitment of resources. Additional staff and associated funding will depend on the Service's budget and Northeast Region budget allocations.

Comment 17: One commenter was opposed to any new trails or roads. Another commenter was opposed to any new development of refuge or WPA lands for human use.

Response: The purpose of the CCP is to develop a management direction that best achieves the refuge and WPA purposes; attains the vision and goals developed for the refuge and WPA; contributes to the Refuge System mission; addresses key problems, issues, and relevant mandates; and is consistent with sound principles of fish and wildlife management. Additions to the refuge's trails and parking areas proposed under alternatives B and C are relatively minor. We have proposed these additions to improve the quality of visitor experiences and in some cases improve visitor safety. No new roads are proposed under any alternative.

Comment 18: One commenter stated that, with the speed on the County Road and the deep ditches, additional parking areas are a good idea. Another commenter noted that the barrier logs around the parking lot boundaries are rotting – these don't look good to the public and need to be removed.

Response: Thank you for your support for our proposal to add additional parking areas to allow people to access hiking trails without walking on the County Road. We have already removed the barrier logs that were mentioned.

Comment 19: One commenter stated that the right side of the Carter Meadows Loop was a hazardous and difficult trail. Therefore, maintenance on this side of the trail should be discontinued.

Response: We agree that this area is wetter and is more difficult to maintain than the other side; however, visitors enjoy loop trails and this trail was identified as one of the more popular trails during public scoping for the CCP. For these reasons, we plan to maintain the existing trail.

Comment 20: One commenter was not sure if it was worth the money to make improvements at Ash Landing because this access to the stream is rarely used.

Response: We do not have exact quantitative data on the amount of use this trail and boat access gets; however, it is the only access to Sunkhaze Stream on refuge land and was one of the top three most popular trails identified during public scoping for the CCP. We use this area to access the stream for management purposes, including checking for invasive species like purple loosestrife. The improvements planned for Ash Landing will facilitate public access as well as refuge management access, and we intend to continue to maintain it for the use of boaters, anglers, and refuge staff.

Comment 21: One commenter would like the Service to maintain the Birch Grove spur off the Johnson Brook Trail as far as the boardwalk because the boardwalk is still in good condition, it provides a unique view of a swampy area, and it provides access to an interesting old farm site.

Response: The refuge manager revisited this spur with the commenter. We agree with the commenter's assessment that the spur trail is still in good condition and we have modified alternative B to include maintaining this spur trail off Johnson Brook Trail.

Comment 22: One commenter stated that the South Buzzy Brook Trail is not useful to visitors because it is wet and over-grown.

Response: We agree. This is one of the reasons we are recommending we stop maintaining this trail.

Comment 23: One commenter believes that we have inaccurately assessed the condition of the North Buzzy Brook Trail in the draft CCP and EA. The commenter states that there are a few wet areas, but these could be easily bypassed and most of the downed trees are cleared. He requested we contact him to discuss ideas for resolving problems with this area. Two other commenters requested we continue to maintain the Buzzy Brook Trails. One commenter asked if the issue was money, and suggested we use volunteers to maintain these trails.

Response: There are several issues with maintaining the Buzzy Brook Trails. There is a lack of guaranteed, year-round public access on the Stud Mill Road, which is a private road with gates that are closed in spring, when the road is wet and muddy. There is no safe parking for that trail; cars must park on the Stud Mill road (unsafe due to logging truck traffic), or block the McLaughlin Road gate (not allowed) except when the McLaughlin Road gate is open during hunting season. The only way to solve this would be to move the McLaughlin Road gate further down the road, beyond the small parking pull-off near the trail. If we did this, the parking area would not be visible from a frequently traveled road; which often leads to problems with illegal dumping and other unauthorized activities. Keeping these trails cleared of down trees and properly maintained is labor intensive and, as discussed in the draft CCP and EA (see page 3-64), these trails are already largely impassable and are among the least used. Even with proposed additional staff in alternative B, we believe maintaining these trails is not the best use of limited resources.

Comment 24: One commenter would like to have more trails at the Benton Unit, and asked if the Service would be willing to include the existing snowmobile trail at the Benton Unit in a regional trail system.

Response: We support the addition of a small connector trail as described under alternative B in the draft CCP and EA. We would be happy to work with a regional group to explore the feasibility of including the Benton Unit trails in a regional system, and have added this as a strategy under objective 6.1. We may need to revise one or more of the compatibility determinations and evaluate how best to patrol and maintain the trails if they start to get much more use.

Comment 25: One commenter asked if some money could be shifted from Maine Coastal Islands NWR to Sunkhaze Meadows NWR. Another commenter asked where our estimates of staff time (5 percent under alternative A) and maintenance budget originated, if there were accounted for formally, and if this could change. This individual supported a CCP that involved greater staff time from Maine Coastal Islands NWR Complex or preferably Moosehorn NWR, stating that an increase as small as 5 percent “would help implement much needed programs at Sunkhaze Meadows, and satellite units.”

Response: The budget for Maine Coastal Islands NWR includes the salaries of its eight employees, about 20 percent more for management capability (e.g., on-the-ground work), and funds to pay for rent of its facilities. Sunkhaze Meadows NWR and Carlton Pond WPA were complexed with Maine Coastal Islands NWR to save funding. At that time, all of the funding for Sunkhaze Meadows NWR and Carlton Pond WPA was reallocated such that \$5,800 was added to the Maine Coastal Islands NWR budget for maintenance costs and remaining funds were used to offset budget cuts. We have stretched our staff and resources to try to cover the additional responsibilities, but this is difficult. Maine Coastal Islands NWR is responsible for 59 islands from New Hampshire to Canada plus four mainland units, and run active seabird restoration projects on seven islands which are staffed 3 months of the year. Travel time also makes managing the refuge difficult since both of the Maine Coastal Islands NWR offices are about 2 hours away.

We based our estimate of 5 percent of the average time our staff spends at Sunkhaze Meadows NWR and Carlton Pond WPA on self-reporting of refuge staff. We do not formally keep track of how much time each employee spends on these areas, so actual time may be more or less. Some staff, including our law enforcement officer, our full-time and seasonal maintenance people, and the refuge manager spend much more than 5 percent of their time on projects related to Sunkhaze Meadows NWR and Carlton Pond WPA, while other staff spend less. Service staff struggle to complete the highest priority activities at both refuges. In the past few years, we have patrolled Sunkhaze Meadows NWR weekly, supervised large crews of volunteers to improve trails and to help us maintain boundaries, controlled purple loosestrife along the County and Stud Mill Roads, met with the Friends group regularly, and worked diligently on this plan. We are also planning to replace all the old signs with new ones. It is within the refuge manager’s purview to reallocate some resources, including staff time, within their existing budget. We agree that additional time and resources would benefit Sunkhaze Meadows NWR, but this would divert resources from

high priority projects at Maine Coastal Islands NWR. For this reason, we do not anticipate diverting additional resources from Maine Coastal Islands NWR to Sunkhaze Meadows NWR.

Public Use and Access

Public Use

(Letter ID #: 1, 2, 14, 16)

Comment 26: One commenter stated that the refuge and WPA should be closed to overland vehicles such as all terrain vehicles (ATVs), unless needed for research.

Response: The Refuge Improvement Act and Service policy require us to develop findings of appropriateness and compatibility determinations for public uses such as overland vehicles. We recognize that overland vehicles may adversely affect refuge and WPA resources. To date, the only public overland vehicles use allowed on refuge lands is snowmobiling. This use is authorized on only a few designated trails, and is limited to winter months when adequate snow is present and disturbance to habitats and wildlife is minimal. Use of other overland vehicles is limited (e.g., occasional refuge management activities, snowmobile trail maintenance through a special use permit). The refuge and WPA are currently closed to general ATV use and other similar uses, and we have not proposed opening the refuge to these uses under any of the alternatives. As discussed previously, if we determine that authorizing these types of public uses may be warranted, we would need to prepare a finding of appropriateness and compatibility determination for each use, and provide opportunities for additional public review and comment before opening the refuge or WPA to these uses. These documents would need to specify discuss the impacts of allowing a use and how the use would not materially interfere with or detract from the refuge or WPA purposes or the Refuge System mission.

Comment 27: One commenter asked if the small, square, refuge boundary signs (the ones that say “No Unauthorized Access”) along the road would be changed? They make people think they can’t go onto the refuge.

Response: We agree that the wording of these signs can be confusing, particularly for new visitors. These are standard refuge boundary signs used throughout the Refuge System, so any changes to these signs would need to be approved at the national level. To try to alleviate this confusion, we are developing new interpretive signs that include an explanation of the boundary sign language and lists of what uses are authorized and some uses that are prohibited.

Comment 28: One commenter asked if we could create another access point to the Sunkhaze Meadows Unit and Sunkhaze Stream, preferably along State Route 2.

Response: We agree that providing additional access points to Sunkhaze Stream would facilitate participation in authorized public uses at the Sunkhaze Meadows Unit. As stated under alternative B, objective 4.1 of the draft CCP and EA, we intend to work with willing landowners to establish boat access on lands and waters near or adjacent to the refuge, including exploring opportunities to develop boat access points along Sunkhaze Stream near its mouth as well as

upstream, and if feasible, on tributaries. State Route 2 is near the mouth of Sunkhaze Stream, and is one of the areas where we would like to establish access.

Comment 29: One commenter would like refuge staff to “train members of the Friends group to do the work that is not being done to maintain public access in places, in the absence of permanent staff.”

Response: We are grateful for the support of our volunteers. Currently, several volunteers pick up trash and re-stock brochures for us, and alert us to acts of vandalism that have taken place. Training volunteers to complete other maintenance tasks and having them operate unsupervised by Service staff is more complicated. Some tasks, such as trail maintenance, often involve the use of potentially dangerous equipment (e.g., chain saws, hand saws). To ensure any volunteers that may be accidentally injured are covered, we would need to implement a formal training program and enter into a formal agreement with a volunteer group or group leader. We are not aware of any group or group leader that is interested in taking on this responsibility at this time.

Comment 30: One commenter suggested that the Service could build some relationships with the University of Maine, Orono, to engage students and interns in helping. This commenter noted that years ago there was a summer internship program with the University of Maine and asked if there is a way to reestablish that? Another commenter suggested we get Milford School involved, perhaps a visit Sunkhaze Meadows day. They asked if refuge staff could help with such a day?

Response: We agree that building relationships with the University of Maine and other partners would be beneficial. We have modified the strategy related to identifying research and monitoring projects under objective 7.2, to include universities as a specific partner. Refuge staff would be willing to assist the Milford School, if the school requested it.

Hunting and Fishing **(Letter ID#: 4, 5, 11, 12, 13, 14, 15)**

Comment 31: One individual expressed opposition to allowing any hunting on the refuge and WPA.

Response: We understand there are differing opinions about the role of hunting on national wildlife refuges. Hunting is an historic use of refuge and WPA lands. As discussed in the draft CCP and EA, there are many laws, policies, establishment documents, and other mandates that we used to guide public use programs on the refuge and WPA. We considered these mandates and other factors, and determined that reducing or eliminated hunting would not meet the purposes of the CCP. Please see “Actions Considered but Eliminated from Further Study,” (page 3-5) in the draft CCP and EA for a more detailed explanation.

Comment 32: Several individuals expressed support for continuing to allow hunting on the refuge and WPA.

Response: Thank you for your support.

Comment 33: Several commenters expressed support for continuing to allow fishing on the refuge and WPA.

Response: Thank you for your support.

Comment 34: One commenter recommended we close portions of the refuge and WPA with the most plant and animal diversity to hunting, particularly areas with threatened or endangered species.

Response: We agree that it is important to protect the biological diversity of the refuge and WPA, particularly rare habitats and species. Most of the refuge's and WPA's sensitive plant and wildlife species are found in the bogs and wetland areas, which are generally difficult for visitors to access. Hunting is a wildlife-dependent public use of the Refuge System specified in the Refuge Improvement Act, and is to receive enhanced consideration. Federal law and Service policy require that we complete compatibility determinations for wildlife-dependent public uses. We have completed compatibility determinations for hunting for the refuge units and the WPA. Based on the analysis presented in those documents (see appendix B), we do not believe it is necessary to protect refuge and WPA resources by closing sections of the refuge or WPA to hunting at this time. We will continue to monitor for potential impacts to refuge resources, and will make revise our compatibility determinations as needed to protect refuge and WPA resources. This could include closing sensitive areas if needed.

Comment 35: One commenter believed that we had made a mistake and that the Sunkhaze Meadows Unit does lie within one of the State's priority target areas for deer management, where intensive coyote hunting is encouraged.

Response: MDIFW has encouraged coyote hunting in northern, eastern, and western parts of the State in an effort to increase the deer population in these areas. The Sunkhaze Meadows Unit is near, but outside of, the boundary of the northern area identified by MDIFW. We worked closely with the representative from MDIFW that is on our planning team to ensure we interpreted these boundaries correctly. He confirmed that the Sunkhaze Meadows Unit does not lie within any of the current State target areas for deer management.

Comment 36: One commenter noted that he had experienced conflicts with non-hunting boaters on the WPA. He recommended we limit recreation boating and fishing during waterfowl hunt seasons to avoid conflicts with waterfowl hunters. This commenter suggested fishing and recreational boating could be limited to between 11 a.m. and 3 p.m. to minimize potential conflicts and enjoy the pond. This commenter also recommended education of non-hunting visitors to help alleviate conflicts.

Response: We are aware that a small number of users have reported conflicts when participating in wildlife-oriented recreation at Carlton Pond WPA. To date, we have received few reports of conflicts between boaters and hunters and Service staff have not observed conflicts; therefore, we believe these conflicts currently occur infrequently. However, we recognize that this may

change over time. We have modified language in the boating compatibility determination for Carlton Pond to read as follows:

We will continue to monitor for conflicts among users. If we determine conflicts among users are sufficient to cause safety concerns or affect the overall quality of visitor experiences, we will reevaluate the relevant compatibility determinations and may modify them to reduce conflicts or ensure public safety. Actions we may take to minimize conflicts among user include: (1) providing additional education and outreach, or (2) separating user groups spatially (i.e., different parts of the WPA are open to different activities) or temporally (the WPA would be closed to certain activities at certain times of day or during certain seasons).

Alternatives

General Comments

(Letter ID#: 5, 14, 16)

Comment 37: One individual commented that none of the alternatives adequately protected wildlife and wildlands, and requested a reconsideration of alternatives or a recombination of alternatives that should be evaluated by an independent scientific panel.

Response: From the comment, it is unclear which aspects of the alternatives the commenter believes are not adequate for protecting natural resources of the refuge. The Refuge System mission, Service policies on appropriateness and compatibility of public uses, and Service policy on biological integrity, diversity, and environmental health are all intended to protect natural resources. Throughout the planning process, we have looked to these and consulted with a variety of experts to help develop the alternatives that ensure refuge and WPA resources are protected. We believe alternative B, as amended, adequately protects refuge and WPA natural resources.

Comment 38: One individual wrote, “I am concerned that there are no true alternatives here, as both Alternative B and C are contingent on staff, which is beyond the control of the USFWS currently.... I support an ADDITIONAL alternative that would include re-directing a portion of the staff time from Maine Coastal Islands NWR to conduct some very basic monitoring, inventory, and maintenance activities at Sunkhaze Meadows as described in Alternative B.”

Response: During the last round of staff reductions to adjust to flat budgets over a period of years, Service supervisors decided to de-staff Sunkhaze Meadows NWR. As already mentioned (see response to comment 25), the staff at Maine Coastal Islands NWR was required to pick up the additional responsibilities at Sunkhaze Meadows NWR, and have tried their best to prioritize and accomplish essential activities for Sunkhaze Meadows NWR. We agree that additional time and resources would benefit Sunkhaze Meadows NWR and that maintenance, inventory, and monitoring are important. Alternatives B and C in the draft CCP and EA reflect this, as does the final CCP. Service leadership could choose to add staff by reassigning existing staff (including staff from Maine Coastal Islands NWR) or by hiring new staff. At this time, Service leadership has determined that reallocating resources would divert resources from high priority projects at

other refuges. For this reason, we do not anticipate diverting additional resources from Maine Coastal Islands NWR or other refuges to Sunkhaze Meadows NWR. However, this may change.

Comment 39: One commenter expressed support for Wild and Scenic River designation.

Response: Thank you for your support.

Alternative A
(Letter ID#: 4, 5, 16)

Comment 40: One individual expressed support for alternative A.

Response: We appreciate your support for our current management.

Comment 41: Another individual commented that alternative A appeared to be the easiest alternative without current staff and hoped that if alternative A was selected, the Service would have a reason aside from it being the “easiest.”

Response: The National Environmental Policy Act requires that a range of alternatives be presented, including a “No Action” alternative. In this case, our “No Action” alternative is alternative A, representing “no change from the current management.”

As, stated in chapter 1 of the draft CCP and EA and the final CCP, our intent was to develop a CCP that best meets refuge and WPA purposes, the Refuge System mission, and the goals, that is based on sound science. Decisions about the final CCP will be based on these criteria.

Alternative B
(Letter ID#: 14, 17)

Comment 42: One commenter did not fully support any alternative, but preferred alternative B over the other alternatives presented. Another commenter supported alternative B.

Response: It is not clear from the first comment which aspects of the alternatives the commenter did not support. We appreciate the support for alternative B.

Alternative C
(Letter ID#: 2, 4, 5, 16)

Comment 43: Two commenters expressed opposition to alternative C because of the proposed early successional habitat management, in particular at the Sunkhaze Meadows Unit. However, one of these supported additional visitor services proposed under this alternative.

Response: We appreciate these comments. We agree that the most valuable contribution the Sunkhaze Meadows Unit can make to the landscape is providing mature (i.e., late successional) forest and protecting the peat bog. We agree that additional visitor services programs would be beneficial; however, we believe visitor services, habitat management, and monitoring and

inventory efforts proposed under alternative B, as amended, best meet the purposes of the refuge and the mission of the Refuge System.

Comment 44: One commenter complimented the planning team on the alternatives that were developed. This commenter preferred alternative C, but thought alternative B was good as well.

Response: Thank you for your support.

Planning Process and Policy

CCP Process

(Letter ID#: 1, 2, 16)

Comment 45: One individual disagreed with our proposed action to “develop a CCP...that guides refuge management...” This individual believes “this is inconsistent, as ‘management’ implies manipulation or directed manipulation for an intended purpose.” Instead, this person believes that “administration” would be more appropriate, given the lack of staff and lack of active habitat management. This individual stated that it appears that “...the Friends of Sunkhaze group...are the only folks doing anything for the refuge formally (outside of maintenance of fallen signs, etc.)”

Response: Given the context of this comment, we believe the commenter is primarily focused on the Sunkhaze Meadows Unit of the refuge. We agree that the Friends of Sunkhaze Meadows are instrumental in helping the refuge, and we are grateful for their support. We also recognize that the lack of staff has reduced our ability to manage the refuge and WPA. When we use the term “manage” we are referring both to habitat management, monitoring, and management of public uses and infrastructure. We do currently manage water levels at Carlton Pond WPA to benefit migratory waterfowl and the State-listed black tern, we also work with a cooperative farmer to maintain portions of the grasslands at the Benton Unit, we complete prescribed burns to maintain the remaining grasslands there, as well as treating portions of the Sandy Stream Unit to maintain it as shrubland habitat. The refuge law enforcement officer also works with other law enforcement personnel and other refuge staff to manage public use on the refuge and WPA. Under all alternatives, we would maintain some form of resource and public use management, even without additional staff.

Comment 46: One individual stated, that it “appears that there will be action items possibly associated with the CCP - but it was my understanding that these would be included in the CCP...There are many ‘action items’ described in the document, but no current plan to accomplish these.”

Response: The draft CCP and EA is intended to provide enough detail on all aspects of refuge and WPA management to inform refuge staff, other agencies, our partners, and the public what each alternative would entail as well as associated effects. Given the breadth of this document, it is not feasible for us to include day to day operational detail in this document. As discussed in chapter 1 of the draft CCP and EA, there are up to 25 step-down plans we may prepare to provide additional detail for day to day management of the refuge and WPA. In chapter 3 of the

draft CCP and EA (see page 3-15), we identified a subset of those plans that are a priority for us to complete as well as a timeline for when we hope to complete them.

Comment 47: On commenter asked, “Even if we like alternative C better, does the plan translate into additional resources?”

Response: CCPs do not constitute a commitment for staffing increases, or funding for operations, maintenance, or future land acquisition. Implementation is adjusted annually given the reality of budgets, staffing, and unforeseen critical priorities.

Comment 48: One individual asked if the Service could “propose an alternative that is essentially Alternative A, with some of the tasks involved in Alternative B, with a commitment of more staff time” from Maine Coastal Inlands NWR Complex or Moosehorn NWR?

Response: Our Regional Director may choose any of the alternatives, or some combination of alternatives, for the final CCP. While two of the alternatives specify additional staff and propose projects that would require additional funding, we have flexibility in how we implement these. Refuge managers do have authority to reallocate their existing resources, including staff time, and refuge supervisors could move oversight of Sunkhaze Meadows NWR and Carlton Pond WPA to another staffed refuge such as Moosehorn NWR.

Comment 49: One commenter was concerned that the lack of attendance at the public meetings meant there would not be many comments or much support for the refuge.

Response: We are grateful for the support and comments we have received at the refuge units and WPA and throughout the planning process.

Comment 50: A few people at one of the public meetings noted that they had not received an announcement about the public meetings. They asked how we notified the public and noted that we should have been sure to send information to all of the people who signed in at the Wilderness public meeting held in February 2012.

Response: We apologize for this oversight. Contact information for 17 new contacts was inadvertently left off our mailing list. We have rectified this error, and mailed copies of newsletters to each of these people on May 1, 2013, 30 days before the comment period ended.

Comment 51: One person asked about the status of the proposed East-West Highway and how it would affect the refuge.

Response: We are aware of the discussions around a proposed East-West Highway. We are working to stay informed of the process. However, it is not a Federal or Service activity; therefore, it is outside of the Refuge System’s jurisdiction provided it does not cross Service-owned lands.

Comment 52: A few people at one of the public meetings thanked the refuge manager and refuge staff for involving the town in the planning process and responding to public input at the public meetings.

Response: Thank you. We value our neighbors and partners and are committed to working together.

References

U.S. Fish and Wildlife Service (USFWS). 1999. The Connecticut River Watershed-Long Island Sound Invasive Plant Control Initiative: Strategic Plan. Silvio O. Conte National Fish and Wildlife Refuge.

Attachment 1. Comment Identification (ID) Numbers and Respondents

Comment ID Number	Name or Public Meeting Date and Time
1	April 25, 2013, 2:00 to 4:00 p.m. meeting, Milford, ME
2	April 25, 2013, 4:00 to 6:00 p.m. meeting, Milford, ME
3	April 26, 2013, 3:00 to 5:00 p.m. meeting, Unity, ME
4, 5, 6, 7, 8, 9	Jean Public
10	Rodric C. Johnson
11	Leo Cournoyer
12	John Benge, Sr.
13	Meghan Hassele
14	Stefan Kodet
15	Dr. Bill Cunningham
16	Lindsay Seward
17	Maine Department of Inland Fisheries and Wildlife

Appendix H



Danielle D'Auria

Lily Pads at Carlton Pond WPA

Finding of No Significant Impact

Finding of No Significant Impact

Sunkhaze Meadows National Wildlife Refuge and Carlton Pond Waterfowl Production Area Comprehensive Conservation Plan

In April 2013, the U.S. Fish and Wildlife Service (Service) published the Sunkhaze Meadows National Wildlife Refuge (NWR) and Carlton Pond Waterfowl Production Area (WPA) draft comprehensive conservation plan (CCP) and environmental assessment (EA). The refuge and WPA are both located in Maine.

Sunkhaze Meadows NWR was established in 1988 to preserve the Sunkhaze Meadows peat bog (now the Sunkhaze Meadows Unit) and to ensure public access to this unique environment. Sunkhaze Meadows NWR is currently comprised of three units and about 320 acres of conservation easements. The three units are the Sunkhaze Meadows Unit, the Benton Unit, and the Sandy Stream Unit. The Sunkhaze Meadows Unit is the largest of the three, at 11,484 acres. It is located in the town of Milford in Penobscot County. The Benton Unit is a 334-acre former dairy farm in the town of Benton in Kennebec County. The Sandy Stream Unit is a 58-acre parcel in the town of Unity in Waldo County. Sunkhaze Meadows NWR includes more than 3,450 acres of unique freshwater wetland-peatland habitat, which also provides breeding and migrating habitat for waterfowl and other wetland species.

Carlton Pond WPA was acquired by the Service in 1966 to protect waterfowl and other wildlife associated with this area in central Maine. The WPA is located in the town of Troy in Waldo County. It is 1,068 acres, including about 784 acres of managed emergent marsh and open water habitats. Carlton Pond WPA has historically provided good nesting habitat for waterfowl and other birds. It is also one of the few areas in Maine that provides nesting habitat for the black tern, which is State-listed as endangered. Many other bird species that use Carlton Pond WPA have been listed by the Partners in Flight organization as species that are declining.

The Sunkhaze Meadows NWR and Carlton Pond WPA draft CCP and EA outlines three alternatives for managing the refuge and WPA over the next 15 years. It considers their direct, indirect, and cumulative impacts on the environment and their potential contribution to the mission of the National Wildlife Refuge System (NWRS). The draft CCP and EA restates the purposes of the refuge and WPA, creates a vision for the next 15 years, and proposes seven goals to be achieved through plan implementation. Because portions of Sunkhaze Stream and its tributaries have been found eligible for listing under the Wild and Scenic Rivers Act, all of the alternatives include completing a Wild and Scenic River Study.

Alternative B is identified as the Service-preferred alternative. Chapter 3 in the draft CCP and EA details the respective goals, objectives, and strategies for each of the three alternatives. Chapter 4 of the draft CCP and EA describes the consequences of implementing those actions under each alternative. The draft plan's six appendixes provide additional information supporting the assessment and specific proposals in alternative B. A brief overview of each alternative in the CCP follows:

Alternative A (Current Management): The Council on Environmental Quality regulations on implementing the National Environmental Policy Act (NEPA) require a “No Action” alternative, which we define here as “continuing current management.” This alternative describes our existing management priorities and activities, and serves as a baseline for comparing and contrasting alternatives B and C. It would maintain our present levels of approved refuge and WPA staffing and the biological and visitor programs now in place. We would continue to focus on preserving the freshwater wetland-peatland complex on the Sunkhaze Meadows Unit, which provides habitat for breeding waterfowl. We would also continue to maintain the open water and emergent marsh habitat at Carlton Pond WPA, the grassland habitat at the Benton Unit, and the shrubland and riparian habitat at the Sandy Stream Unit. Public use activities, such as wildlife observation, photography, hiking, snowmobiling, and hunting, would continue to be allowed. We would continue to rely on volunteers to lead environmental education and interpretation programs.

Alternative B (Service-preferred Alternative): This alternative combines the actions we believe would most effectively achieve refuge and WPA purposes, vision, and goals; the NWRS mission; and respond to issues raised during public scoping. Under alternative B, we would focus on the preservation of the wetland-peatland complex and mature forest within the Sunkhaze Meadow Unit. In contrast to alternative A, this alternative includes more inventory and monitoring, as well as research and active management (if warranted) to benefit rare habitats on the refuge. We would continue shrubland habitat management at the Sandy Stream Unit and would expand grassland management at the Benton Unit if feasible. Management of Carlton Pond WPA would remain unchanged, focusing on providing habitat for breeding black terns and waterfowl. We would work to enhance public use activities, such as providing additional parking areas and improving maintenance of some existing public trails. Our environmental education and interpretation program would be improved by providing Service-led environmental education programs, in addition to programming conducted by partners and the Friends of Sunkhaze Meadows.

Alternative C (Increased Shrub and Young Forest Habitat and Increased Public Use): Under alternative C, we would continue to focus on the preservation of the wetland-peatland complex at the Sunkhaze Meadows Unit. However, in contrast to alternatives A and B, this alternative includes shifting management of some mature forest and grasslands to shrubland and young forest habitat within the Sunkhaze Meadow Unit and Benton Unit to benefit species of concern that rely on these habitats. Management of the Sandy Stream Unit and Carlton Pond WPA would be similar to alternative B. Under alternative C, we would also work closely with partners to increase and enhance public use activities, such as expanding the trails at the Benton Unit and providing more environmental education and interpretation programming.

We distributed the draft CCP and EA for a 39-day period of public review and comment from April 23 to May 31, 2013. We received comments from individuals at three of the four public meetings we held on the draft plan, as well as written comments from eight individuals during the comment period. We also received comments from the Maine Department of Inland

Fisheries and Wildlife (MDIFW). Appendix G in the final CCP includes a summary of the substantive comments we received and our responses to them.

After reviewing the proposed management actions and considering all substantive public comments and our responses to them, we have determined that the analyses in the draft CCP and EA are sufficient to support our findings. We are selecting alternative B, as presented in the draft CCP and EA, with the following modifications recommended by the planning team, to implement as the final CCP.

Recommended modifications, based on public comments, include:

1. Under objective 4.1, we agreed to maintain the spur trail off of the Johnson Brook Trail in the Sunhaze Meadows Unit.
2. We clarified that we will provide wood duck nesting boxes from existing supplies upon request, as long as volunteers continue to clean, maintain, and monitor use of the boxes. After the existing supply of boxes is depleted, we will phase out artificial wood duck nesting boxes as they deteriorate, or will remove the boxes if volunteers are no longer able to maintain them (see strategies under objective 2.1).
3. We added a strategy under objective 6.1 that we will explore the feasibility of, and interest in, including the Benton Unit in a regional trail system upon request.
4. We modified a strategy under objective 7.2 to include specific reference to working with universities, as well as other partners, to identify research and monitoring projects and needs at each refuge unit to foster partnerships.
5. We modified language in the boating compatibility determination for Carlton Pond WPA to include monitoring for potential conflicts with other authorized public uses on the WPA (e.g., hunting), and will modify this and other compatibility determinations if warranted.

We conclude that alternative B, with the above changes, in comparison to the other two alternatives, will: (1) best fulfill the mission of the NWRS; (2) best achieve the refuge's and WPA's purposes, vision, and goals; (3) best maintain the refuge's and WPA's ecological integrity; (4) best address the major issues identified during the planning process; and (5) be most consistent with the principles of sound fish and wildlife management. Specifically, in comparison to the other two alternatives, alternative B provides the biggest increase in health and quality of refuge and WPA habitats through enhanced habitat management. It also provides the most reasonable and effective improvements to existing public use programs that are in demand, with minimal impacts to wildlife and habitats. The plans to improve and expand parking areas, interpretive signs, and trails are reasonable, feasible, and will result in the most efficient management of the refuge and WPA and best serve the American public. This Finding of No Significant Impact (FONSI) includes the draft CCP and EA by reference.

We have reviewed the predicted beneficial and adverse impacts of alternative B that are presented in chapter 4 of the draft CCP and EA and compared them to the other alternatives. We specifically reviewed the context and intensity of those predicted impacts over the short and long term, and considered the cumulative effects. The review of each of the NEPA factors to assess whether there will be significant effect on the environment is summarized here (40 C.F.R. 1508.27).

(1) Beneficial and adverse effects - We expect the final CCP (alternative B) management actions to benefit both the wildlife and habitats at Sunkhaze Meadows NWR and Carlton Pond WPA. Important examples include measures to protect the unique peatland-wetland complex as well as mature forest within the Sunkhaze Meadow Unit, increase inventory and monitoring efforts so that we have a better understanding of refuge and WPA resources, and research and management to benefit other rare habitats on the refuge. Benefits will not result from any major change in management strategy; rather, they will be incremental to the effects of the current management. Therefore, we do not anticipate these incremental benefits to result in a significant impact on the human environment, nor do we expect a significant adverse impact on the human environment.

(2) Public health and safety - We expect the good safety record of the refuge and WPA to continue based on the protective actions provided in the stipulations of the compatibility determinations for each of the authorized public uses on the refuge and WPA. Habitat management proposed in alternative B is similar in method and quantity as current management. We have no reports of any adverse effects on public health and safety associated with these activities (e.g., brush hogging shrubland at the Sandy Stream Unit and haying at the Benton Unit), and do not anticipate any. The effects of prescribed burns have already been addressed under a previous EA. As stipulated by Service policy and that EA, each prescribed burn will first require a prescribed fire plan that will ensure public safety. Hunting will continue to follow Federal and State regulations. Benefits to public health associated with protecting habitat are expected to continue. Therefore, there should be no significant impact on public health and safety from the implementation of the CCP.

(3) Unique characteristics of the area - The primary, unique characteristics of Sunkhaze Meadows NWR are the exemplary natural communities identified in the Sunkhaze Meadows Unit. These include unpatterned fen, domed bogs, northern white cedar woodland fen, and silver maple floodplain forest. The primary, unique characteristic of Carlton Pond WPA is its value as resting, feeding, and nesting habitat for waterfowl and the State-listed black tern. As in (1), the benefits will be incremental to the effects of the ongoing management measures originally instituted to protect these resources. Thus, we do not expect these incremental benefits to result in a significant impact on the human environment.

(4) Highly controversial effects - The management actions in the final CCP such as grassland and shrubland management, inventory and monitoring, and authorized public uses are time-tested measures. Their effects on the refuge and WPA are widely known from past management and monitoring. There is no scientific controversy over what these effects will be. Thus, there is little risk of any unexpected significant effects on the environment.

(5) Highly uncertain effects or unknown risks - The management actions in the final CCP are evolutionary. They are mostly refinements of the existing management measures that we have used for many years. We will implement a monitoring program to reassess the effectiveness of each planned improvement. With the data available on the current management results and the system in place to adjust for any unplanned effect, we do not find a high degree of uncertainty or unknown risk that the CCP will cause any significant impact on the environment.

(6) Precedent for future actions with significant effects - The purpose of the CCP is to establish the precedent for managing the refuge and WPA for up to 15 years. The effects of that management are designed as gradual improvements over the existing conditions, not global changes. For example, strategies such as expanding visitation and managing for forest health will be completed over many years. Therefore, we do not expect this plan to set a precedent for any future actions to significantly impact the environment.

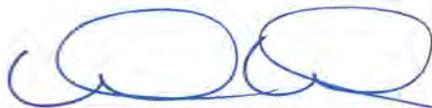
(7) Cumulatively significant impacts - The CCP provides the programmatic, long-term management plan for the refuge and WPA. We plan to coordinate with surrounding land managers to promote common goals such as managing wildlife, habitat, and public use to minimize potential conflicts. Our management jurisdiction is limited, however, to refuge and WPA lands and waters. We do not foresee any of the coordinated activities rising to the level of a significant effect on the environment. Within the term of the CCP, we intend to pursue smaller projects such as building additional trails and small parking areas. Cumulative impacts of these projects have been analyzed in the draft CCP and EA. If other, larger projects are developed, we will examine the cumulative effects of these projects before they are approved. We will conduct whatever level of additional NEPA review is warranted.

(8) Effects on scientific, cultural, or historical resources - Evaluation of archaeological resources presented in the draft CCP and EA showed no significant impacts on these resources from the planned management activities. Service archaeologists in the Northeast Regional Office keep an inventory of known sites and structures, and ensure that we consider them in planning new ground-disturbing or structure-altering changes to the refuge and WPA. Throughout the implementation of the CCP, we will continue to consult with the Maine Historic Preservation Commission and Tribes on any projects that might affect cultural resources.

(9) Effects on Endangered Species Act (ESA)-listed species and habitats - As detailed in the final CCP, we have contacted the Service's Maine Ecological Services office and the National Marine Fisheries Service (NMFS) to ensure compliance with Section 7 of the ESA. There are no known federally listed species on the refuge or WPA. All of the refuge units and the WPA are within designated critical habitat for the federally endangered Atlantic salmon. Our management actions are designed to continue preserving and improving the existing habitat conditions for this species, so we do not expect any significant impacts on designated critical habitat. The CCP also protects the delisted bald eagle. We will consult with appropriate Ecological Services and NMFS staff on additional species if warranted. Therefore, we do not anticipate any significant effects on ESA resources.

(10) Threat of violating any environmental law - Our habitat management actions are designed to benefit the environment. They will comply with all applicable protections such as the Clean Water Act and the Clean Air Act. Pursuant to the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd(e)(3), 668dd(m)), we have coordinated closely with MDIFW in developing the CCP and the fish and wildlife regulations for the refuge and WPA. Our hunting and fishing programs require all participants to comply with Federal and State regulations. We do not anticipate that the CCP will violate any environmental law or cause any significant impact on the environment.

Based on this review, we find that implementing alternative B will not have a significant impact on the quality of the human environment in accordance with Section 102(2)(c) of NEPA. Therefore, we have concluded that an Environmental Impact Statement is not required, and this FONSI is appropriate and warranted.



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Hadley, Massachusetts

SEP 27 2013

Date

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September 2013

