U.S. Fish & Wildlife Service

Shawangunk Grasslands National Wildlife Refuge

Comprehensive Conservation Plan

May 2006

Cover Photos: *Grassland management on the refuge,* USFWS photo
Short-eared owl, USFWS photo
Shawangunk Grasslands National Wildlife Refuge, USFWS photo
Bobolink, Scott A. Vincent©

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

The *U.S. Fish and Wildlife 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 95-million acre National Wildlife Refuge System comprised of more than 545 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological services field stations. The agency 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 Federal Assistance 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

Shawangunk Grasslands National Wildlife Refuge

Comprehensive Conservation Plan

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Regional Director, Region 5 — Date
U.S. Fish and Wildlife Service

Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
May 2006

Abstract

Type of action:	Administrative
Lead agency:	U.S. Department of the Interior, Fish and Wildlife Service
Responsible official:	Marvin Moriarty, Regional Director, Region 5
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This Comprehensive Conservation Plan (CCP) for the Shawangunk Grasslands National Wildlife Refuge (refuge) is the culmination of a planning effort involving state fish and wildlife agency, local partners, refuge neighbors, private landowners, and the local community. The CCP establishes 15-year management goals and objectives for wildlife and habitat, and public use and access. Under this plan, staff from the Wallkill River refuge headquarters office in Sussex, New Jersey, will continue to administer the Shawangunk Grasslands refuge. A small, seasonally staffed visitor contact facility and improved parking area and kiosk will increase opportunities for visitor outreach and improve the visibility of the Service. Other highlights of the CCP include: 1) managing 430 acres of grassland habitat using a diversity of tools and techniques to sustain high quality habitat for wintering raptors and nesting, foraging, and migrating grassland-dependent birds; 2) opening the refuge to fishing in the small pond; 3) initiating an archery hunt for white-tailed deer in the fall; 4) constructing an interpretive trail with observation platforms and photography blinds; 5) redesigning the scope of the original proposed restoration of the runways and taxiways to grassland to account for areas being used effectively by nesting grassland birds, and to look for opportunities to recycle waste materials onsite or nearby; and, 6) restoring the natural hydrology of the area to the extent it does not impede our grasslands habitat work. In addition, the plan identifies a 3,486-acre Shawangunk Grasslands Focus Area, including the refuge and contiguous, ecologically important land, where land use changes could directly affect refuge resources. The CCP does not propose Service acquisition of additional land at this time.

U.S. Fish & Wildlife Service

Shawangunk Grasslands National Wildlife Refuge

Comprehensive Conservation Plan

Refuge Vision Statement

The Shawangunk Grasslands National Wildlife Refuge, located in Ulster County, New York, provides exceptional grassland habitat within the Wallkill River watershed, a major tributary to the Hudson River. We will enhance and sustain this high quality habitat for the full complement of grassland-dependent birds that breed, winter and migrate through, the watershed. Other native grassland-dependent animals and regionally rare plants benefit from our management as well. With easy public access to the refuge's managed grasslands, and because of the open vistas the grasslands afford, it is an ideal setting for wildlife observation, nature photography, and environmental interpretation. All visitors will feel welcomed and encouraged to enjoy and appreciate the contribution of this refuge to the National Wildlife Refuge System.

U.S. Fish and Wildlife Service
Refuge Headquarters
1547 County Route 565
Sussex, NJ 07461

May 2006

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E-Mail: wallkillriver@fws.gov
Phone: 973/702 7266

http://www.fws.gov/northeast/shawangunk/

Federal Relay Service
for the deaf or hard of hearing
1800/877 8339

U.S. Fish and Wildlife Service Website
http://www.fws.gov

For National Wildlife Refuge System Information:
1800/344 WILD

May 2006

Chapter 1

Shawangunk Grasslands National Wildlife Refuge
USFWS photo

Purpose of and Need for Action

- Introduction and Background
- The Service, its Policies and Legal Mandates
- Conservation Plans and Initiatives Guiding the Project
- Refuge Establishment History and Purpose
- Existing Refuge Operational Plans
- Refuge Vision and Goals

Introduction and Background

This Comprehensive Conservation Plan (CCP) for the Shawangunk National Wildlife Refuge (Refuge) was prepared pursuant to the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 6688dd, et seq.; Refuge Improvement Act). An Environmental Assessment (EA), as required by the National Environmental Policy Act of 1969 (NEPA)[1], was prepared concurrent with the draft CCP.

This final CCP presents the combination of management goals, objectives, and strategies that we believe will best: achieve our vision for the refuge; contribute to the National Wildlife Refuge System (Refuge System) mission; achieve refuge purposes; fulfill legal mandates; address key issues; and incorporate sound principles of fish and wildlife management, and serve the American public. The CCP will guide management decisions and actions on the refuge over the next 15 years. It will also be used as a tool to help the State of New York natural resource agencies, our conservation partners, local communities, and the public understand our priorities.

This document has 5 chapters and 10 appendices. Chapter 1 is the "Purpose of and Need for Action" and it sets the stage for Chapters 2 through 5. It...

- describes the purpose of and need for a CCP;
- identifies national and regional mandates and plans that influenced this plan;
- highlights the purposes for which this refuge was established and presents its land acquisition history; and,
- presents the vision and goals for the refuge;

Chapter 2, "Planning Process", describes the planning process we followed, including public and partner involvement, in the course of developing this final plan.

Chapter 3, "Refuge and Resource Descriptions", describes the existing physical, biological, and human environment.

Chapter 4, "Management Direction and Implementation", presents the general refuge management actions, and the goals, objectives and strategies that will guide decision-making and land management. It also outlines our staffing and funding needs to accomplish the management direction.

[1] P.L. 91–190; 42 U.S.C. 4321–4347, January 1, 1970; 83 Stat. 852, as amended

The Purpose of and Need for Action

Developing a CCP with partner and public involvement is vital for successfully managing every national wildlife refuge. The *purpose* of a CCP is to provide strategic management direction for the next 15 years, by:

- stating clearly the desired future conditions of refuge habitat, wildlife, visitor services, staffing, and facilities;
- providing a clear understanding of the reasons for refuge management actions to state agencies, refuge neighbors, visitors, and partners;
- conforming refuge management to the policies and goals of the Refuge System and its legal mandates;
- providing long-term continuity in refuge management;
- ensuring the compatibility of current and future public use; and,
- justifying our staffing, operating and maintenance, and annual budget requests.

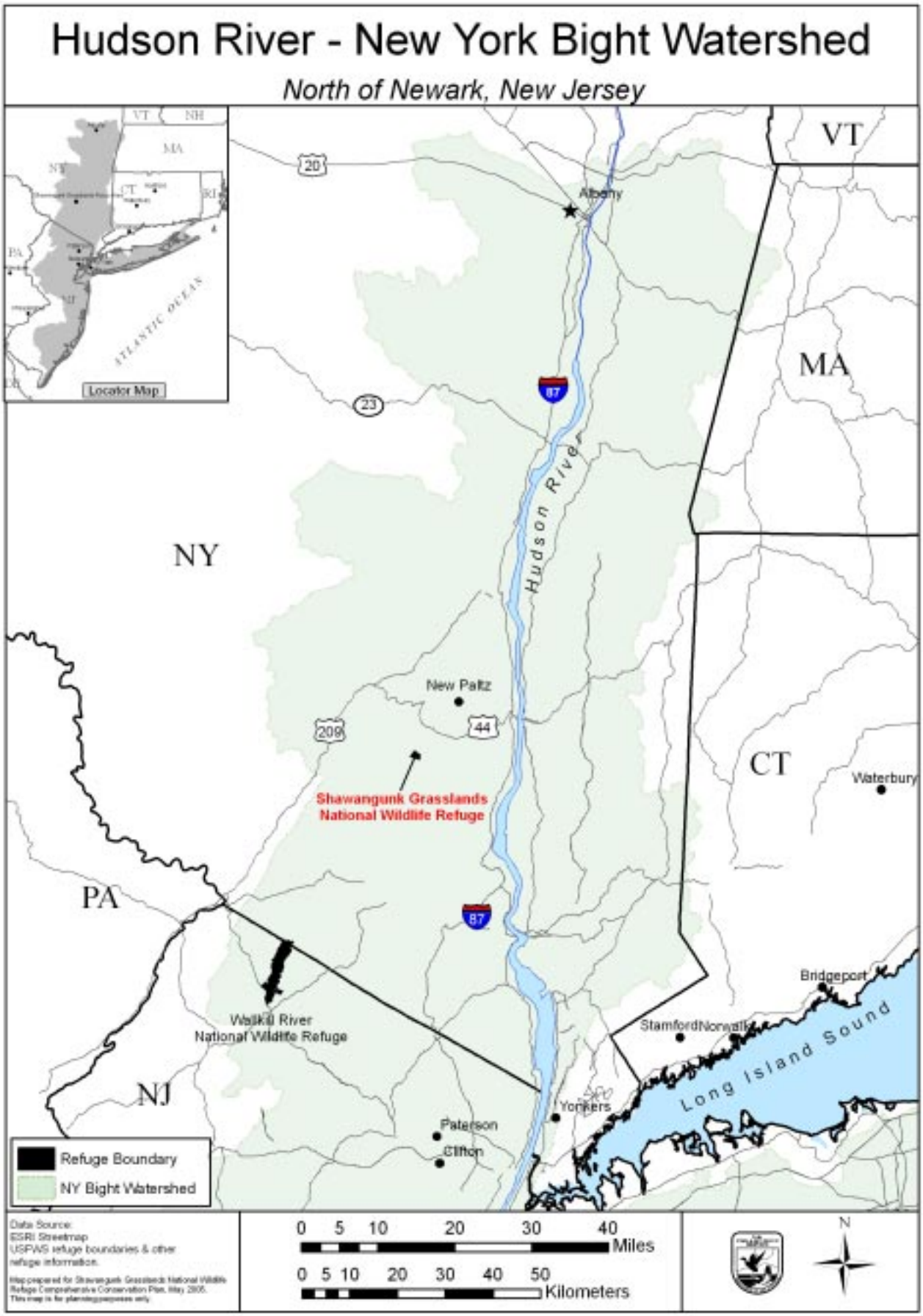
Savannah sparrow nest with young
Scott A. Vincent ©

The *need* to develop this CCP arose from the lack of a master plan to formally establish refuge management priorities, guide management actions, and measure their success. The refuge is relatively new and we have begun to establish relationships with neighboring communities, elected officials, and state natural resource agencies. We have opened the refuge to a few uses, but we wanted a public process to identify other potential compatible uses to evaluate. Raising awareness and gaining public support for our management actions will benefit the natural resources of the refuge, and the region.

This CCP will be reviewed and updated at least every 15 years in accordance with the Refuge Improvement Act and Service planning policy (602 FWS 1, 3 and 4).

Project Area

This 566-acre refuge lies in the Hudson River/New York Bight watershed, in the Town of Shawangunk, Ulster County, New York (map 1–1). The 3,486 acre Shawangunk Grasslands Refuge Focus Area (focus area) defines our project analysis area, and includes the refuge and contiguous lands with important wildlife habitats that also influence the quality of the refuge's natural resources (map 1–2).


Hudson River - New York Bight Watershed
North of Newark, New Jersey
Locator Map
VT
MA
NY
CT
PA
NJ
Albany
New Paltz
Shawangunk Grasslands
National Wildlife Refuge
Hudson River
Waterbury
Bridgeport
Stamford
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87
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Refuge Boundary
NY Bight Watershed
Data Source:
ESRI Streetmap
USFWS refuge boundaries & other
refuge information.
0 5 10 20 30 40 Miles
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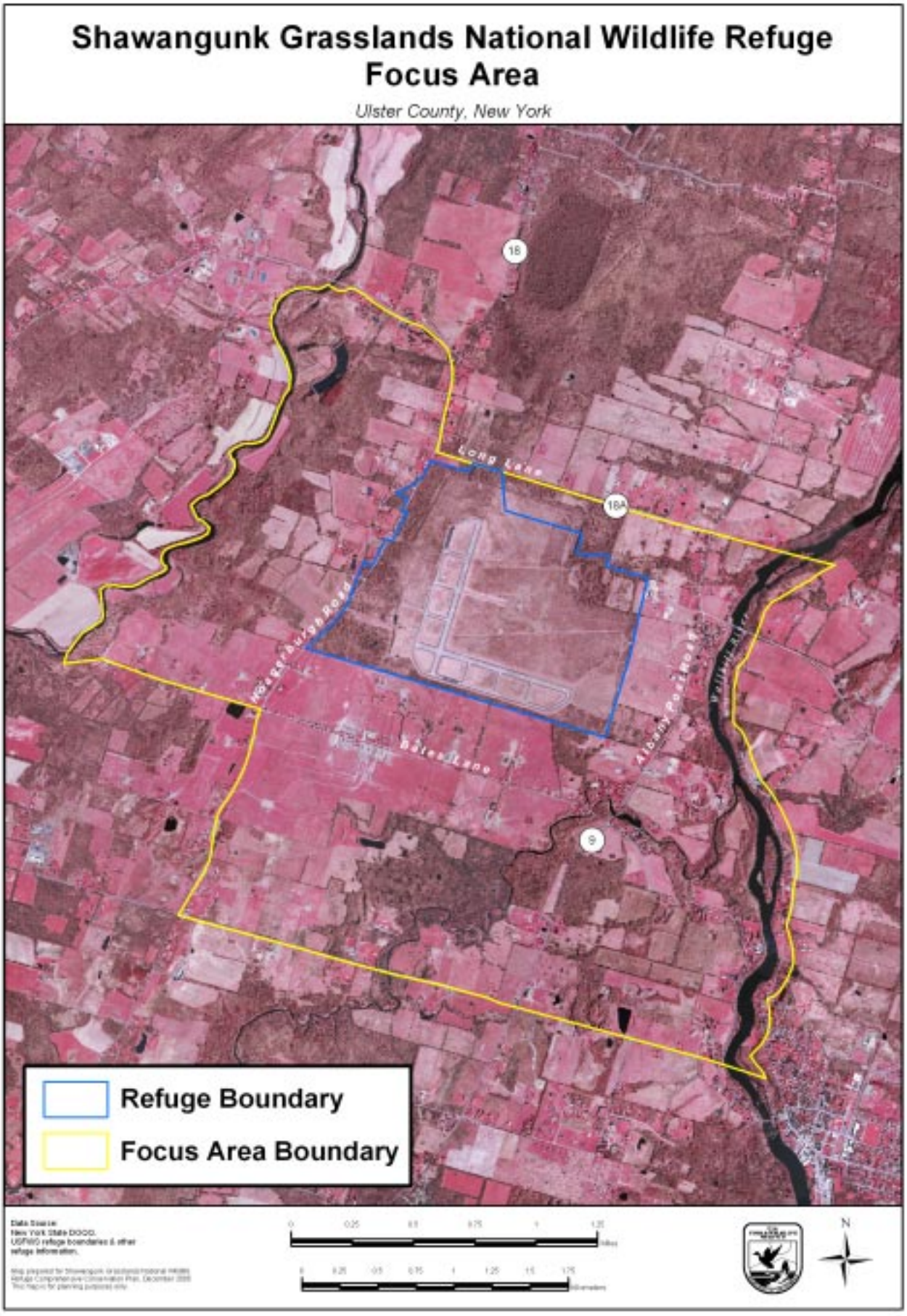

Shawangunk Grasslands National Wildlife Refuge
Focus Area
Ulster County, New York
18
18A
9
Long Lane
Refuge Boundary
Focus Area Boundary
N

The Service, its Policies and Legal Mandates

This section highlights the Service, the Refuge System, Service policy, laws, regulations, and mandates that directly influenced the development of this CCP.

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

The Service, part of the Department of the Interior, 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 to the Service the conservation and protection of certain national resources: migratory birds and fish, Federal-listed endangered or threatened species, inter-jurisdictional fish, wetlands, certain marine mammals, and national wildlife refuges. We also enforce federal wildlife laws and international treaties on importing and exporting wildlife, assist States with their fish and wildlife programs, and help other countries develop conservation programs.

The Service manual, *http://www.fws.gov.directives/direct.html*, contains the standing and continuing directives to implement its authorities, responsibilities, and activities. Special Service directives that affect the rights of citizens or the authorities of other agencies are published separately in the Code of Federal Regulations (CFR), and are not duplicated in the Service manual. Most of the current regulations that pertain to the Service are issued in 50 CFR parts 1–99, available at *http://www.access.gpo.gov/nara/cfr/index.html*.

The National Wildlife Refuge System, its Mission, and Policies

The Refuge System is the world's largest collection of lands and waters set aside specifically for the conservation of wildlife and the protection of ecosystems. More than 545 national wildlife refuges are part of that national system today. They encompass more than 96 million acres of lands and waters in all 50 states and several island territories. More than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretive activities on refuges across the nation each year.

In 1997, President William Jefferson Clinton signed into law the Refuge Improvement Act. That law established a unifying mission for the Refuge System, a new process for determining compatible public use activities on refuges, and the requirement to prepare CCPs for each refuge. The Refuge Improvement Act states that first and foremost, the Refuge System must focus on wildlife conservation. It further states 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 that 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."*
>
> -Refuge Improvement Act; Public Law 105-57

The Refuge System manual provides a central reference for current policy governing the operation and management of the Refuge System not covered by the Service manual, including technical information on implementing refuge polices and guidelines. That manual can be reviewed at the Wallkill River Refuge Headquarters. A few noteworthy policies instrumental in developing this CCP follow.

Refuge System Planning Policy

This policy establishes requirements and guidance for Refuge System planning, including CCPs and step-down management plans. It states that we will manage all refuges in accordance with an approved CCP which, when implemented, will achieve refuge purposes; help fulfill the Refuge System mission; maintain and, where appropriate, restore the ecological integrity of each refuge and the Refuge System; help achieve the goals of the National Wilderness Preservation System; and meet other mandates [Fish and Wildlife Service Manual (602 FW 1,2,3)].

Pond at Shawangunk Grasslands National Wildlife Refuge
USFWS photo

Maintaining Biological Integrity, Diversity, and Environmental Health Policy

This policy 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 found 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 environmental components. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem (601 FW 3).

Compatibility Policy

Federal law and Service policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities and ensure that Americans can enjoy Refuge System lands and waters. The Refuge Improvement Act is the key legislation regarding management of public uses and compatibility. The compatibility requirements of the Refuge Improvement Act were adopted in the Service's Final Compatibility Regulations and Final Compatibility Policy, published October 18, 2000 (Federal Register, Vol. 65, No. 202, pp. 62458–62496). This Compatibility Rule changed or modified Service regulations contained in chapter 50, parts 25, 26, and 29 of the Code of Federal Regulations (USFWS 2000c). To view the policy and regulations online, visit *http://policy.fws.gov/library/00fr62483.pdf*. Our summary follows.

The Refuge Improvement Act and its regulations require an affirmative finding by the refuge manager of the compatibility of an activity before it is allowed on a national wildlife refuge. This finding is documented in a report called a "compatibility determination." 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" (Refuge Improvement Act). The Act defines six priority, wildlife-dependent uses that are to be given enhanced consideration on refuges: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. These priority uses may be authorized on a refuge when they are compatible and not inconsistent with public safety. At the time the compatibility determination is made, the refuge manager will insert the required maximum 10-year re-evaluation date for uses other than wildlife-dependent recreational uses, or a 15-year maximum re-evaluation date for wildlife-dependent recreational uses. However, the refuge manager may re-evaluate the compatibility of a use at any time (602 FWS 2, Parts 2.11 and 2.12). For example, a decision may be revisited sooner than the mandatory date, or even before the CCP process is completed, if new information reveals unacceptable impacts or incompatibility with refuge purposes.

Moreover, not all uses that are determined compatible may be allowed. The refuge manager has the discretion to allow or deny any use based on other considerations such as public safety, policy, or available funding. Nevertheless, all uses that are allowed must be determined compatible. Except for consideration of consistency with State laws and regulations as provided for in subsec-

tion (m) of the Act, no other determinations or findings are required to be made by the refuge official under this Act, or the Refuge Recreation Act, for wildlife-dependent recreation to occur.

Other Mandates

Although Service and Refuge System policy and each refuge's purpose provide the foundation for its management, other federal laws, executive orders, treaties, interstate compacts, and regulations on the conservation and protection of natural and cultural resources also affect how national wildlife refuges are managed. The *Digest of Federal Resource Laws of Interest to the USFWS* lists many of them, and can be accessed at *http://laws.fws.gov/lawsdigest/indx.html*.

The November 2005 draft CCP/EA, Chapter 4 "Environmental Consequences," evaluated this plan's compliance with the Clean Water Act, Clean Air Act and the Archeological Resources Protection Act. Moreover, in compliance with the National Historic Preservation Act (NHPA) and the Endangered Species Act we: consulted with the NY State Office Parks, Recreation, and Historic Preservation - Historic Preservation Field Services Bureau to affirm the proposed managment actions would comply with NHPA section 106; and consulted with our New England Field Office for concurrence that our proposed management actions would not affect threatened or endagered species (appendix G). The environmental assessement was completed in accordance with NEPA.

Conservation Plans and Initiatives Guiding the Project

The resource plans and conservation initiatives below influenced the development of this CCP. They are presented hierarchically, from the regional to local level.

Birds of Conservation Concern (2002)

The Service developed this report in consultation with the leaders of bird conservation initiatives and partnerships such as Partners In Flight, the North American Waterbird Conservation Plan, and the U.S. Shorebird Conservation Plan. It fulfills the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act of 1980 (P.L. 100–653, Title VIII), which requires the Secretary of the Interior, through the Service, to "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 of 1973."

The report is actually a series of 45 lists of bird species of conservation concern deemed the highest priority for national, regional, and landscape conservation. It includes a principal national list, seven regional lists corresponding to our seven regional administrative units, and species lists for each of the 37 Bird Conservation Regions in the United States designated and endorsed by the North American Bird Conservation Initiative (NABCI). Those bird conservation regions are ecologically based units, as defined by NABCI for planning, implementing, and evaluating bird conservation.

This report is designed to stimulate coordinated efforts by Federal, state, and private agencies to develop and implement integrated approaches for the conservation and management of those birds deemed to be in the most need of conservation action. The refuge lies in the Appalachian Mountains Bird Conservation Region (BCR28). Nine of the BCR28 listed species occur on the refuge, including the Henslow's sparrow, a high conservation priority species.We considered each of those species to help us focus our habitat objectives, actions and strategies develop our Species of Management Concern List (appendix A).

Partners In Flight Landbird Conservation Plans

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 its long-term strategy for conserving birds is a series of scientifically based bird conservation plans, using physiographic provinces as the planning units.

American woodcock
USFWS photo

The plans for each physiographic area rank bird species according to their conservation priority, describe desired habitat conditions, develop biological objectives, and recommend conservation actions. The priority rankings factor in habitat loss, population trends, and the vulnerability of a species and its habitats to regional and local threats. The physiographic plan that covers our project area is described in more detail below.

Physiographic Area 17—Northern Ridge and Valley (Draft 2003)

PIF Area 17, the Northern Ridge and Valley extends from southeastern Pennsylvania, through northwestern New Jersey and southeastern New York nearly to the base of the Adirondack Mountains. It includes portions of several major river valleys, including the Hudson, Delaware, and Susquehanna rivers. Ecologically, this is a transitional area, with forested ridges grading from primarily oak-hickory forests in the south to northern hardwood forests further north. Pine-oak woodlands and barrens and hemlock ravine forests are also important along ridges, whereas bottomland and riparian forests are important in the valleys which are now largely cleared for agricultural and urban development. Roughly 50 percent of the physiographic area is forested today, the vast majority occurring at higher elevations. About 40 percent of the area is in agricultural production, primarily a mixture of dairy pastureland and corn. Over 49,420 acres is state forest land in PA and NJ. Other important public lands include High Point State Park (NJ), the Wallkill River Refuge, and this refuge.

The top 17 priority species identified in the PIF Area 17 breed on the refuge. Our objectives for grasslands habitat emphasize Henslow's sparrow, upland sandpipers and bobolink, which are all priority species identified in the PIF plan. The final Area 17 PIF plan is available at *http://www.blm.gov/wildlife/plan/pl_17_10.pdf*. Other final PIF plans and inforamtion can be accessed at *http://www.partnersinflight.org*.

Significant Habitats and Habitat Complexes of the New York Bight Watershed (USFWS 1997)

Completed in 1997, the 1,025-page *Significant Habitats and Habitat Complexes of the New York Bight Watershed* focuses on the regional geographic distribution and population status of more than 1,000 key marine, coastal, and terrestrial species inhabiting this watershed. The geographic scope of the study covers the marine waters of the New York Bight (the Atlantic coastlines of Long Island and New Jersey out to the continental shelf), the New York — New Jersey Harbor Estuary and the entire watershed of the Bight and Harbor, including the Hudson River up to the Troy Dam.

The study assessed the status of habitats, threats to their integrity, and threats to the species dependent upon them. It also determined those habitats and fish, wildlife, and plant populations requiring immediate and long-term protection, conservation, enhancement, or restoration. This habitat assessment is being used to emphasize these regionally important sites to Federal, state, regional, and local planners, resource managers, conservation commissions, regulatory authorities, and the many private conservation organizations throughout the region. We used that study to identify resources of concern and develop management goals and objectives.

The Hudson River Estuary Action Plan and the Hudson River Biodiversity Project (2001)

In 1996, Governor Pataki released the first Hudson River Estuary Action Plan (*http://www.dec.state.ny.us*). Revised every 2 years, it provides the framework for all New York State Department of Environmental Conservation (NYSDEC) agencies and those of other government agencies, academic institutions, and concerned citizens to join resources in protecting the entire Hudson River Estuary ecosystem. That ecosystem includes not only the Hudson River and its shoreline, but also considers the uplands in counties bordering the river.

The action plan's overarching goal is to "protect and conserve, restore and enhance the productivity and diversity of natural resources of the Hudson River estuary to sustain a wide array of present and future human benefits." The New York State legislature has appropriated funding through the Environmental Protection Fund and other sources, such as the Clean Water/Clean Air Bond Act. An oversight committee is responsible for identifying and implementing projects that maintain terrestrial biodiversity in the ecosystem.

Particularly important to the refuge are the plan's tasks associated with terrestrial biodiversity. Action plan 2001 commitments include inventorying and assessing areas thought to have great significance for regional biodiversity and promoting their conservation through voluntary measures; providing training on biodiversity conservation; studying the relationship of breeding bird diversity to habitat patterns and trends in the Hudson Valley; and, continuing the use of biological controls to reduce purple loosestrife. The plan's goals and action items helped our planning team establish management goals and objectives on the refuge.

New York Open Space Conservation Plan (Draft November 2005)

The New York Open Space Conservation Plan is revised every 3 years by the Offices of Parks, Recreation, and Historic Preservation. Every region in the state has formed an advisory committee that includes representatives from state agencies, land trusts, county officials, and citizens groups. The committees identify priority areas for inclusion in the plan. It is not a regulatory document, but it conveys to municipalities the recommendations of the State of New York for maintaining open space.

The draft plan of November 2005 includes areas of regionally significant biodiversity adjacent to the refuge: the Shawangunk Kill Corridor (Ulster and Orange Counties); the Wallkill River Corridor (Ulster and Orange Counties), and the Galeville Grasslands, which includes the refuge. The descriptions of the significant resources in this plan helped our team establish management priorities and objectives.

Refuge Establishment History and Purpose

Refuge Establishment History

In 1994, the United States Military Academy at West Point declared excess to its mission the 621 acres of land containing the former Galeville Army Training Site in the Town of Shawangunk, Ulster County, New York. We expressed our interest in that land. On July 27, 1999, the General Services Administration transferred, at no cost to the Service, 566 acres to create a new national wildlife refuge, and subsequently transferred the balance of 55 acres to the Town of Shawangunk to create a community park, under the Federal Lands to Parks Program administered by the National Park Service. We have posted refuge boundary signs to identify the 566-acre refuge; no other lands have been added since it was established. Officially, the transfer of land that established the refuge occurred under the following authorities: the Federal Property and Administrative Services Act of 1949,[2] which allows for property transfers from one Federal agency to another; and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948.[3]

Refuge Purpose

The official refuge purpose listed in the Refuge System database is to provide its "…particular value in carrying out the national migratory bird management program" (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife). However, this purpose was further refined in a memorandum dated October 17, 1997, to the General Services Administration from our Regional Director, emphasizing the importance of the site to wintering raptors and breeding and migrating grassland birds. The memorandum formally requested the transfer of land and defined the primary reason for establishing the refuge as: "[the site] provides critical habitat for migratory birds and raptors. More than 120 species of birds have been identified at the Site. It supports approximately 20 species of Federal or State 'management or special concern.'"

Refuge Administration

This refuge is un-staffed. It is administered by staff from the Wallkill River Refuge Headquarters in Sussex, New Jersey.

[2] 40 U.S.C. 471et seq., repealed by Public Law 107-217, August 21, 2002

[3] 16 U.S.C. 667b; P. L. 80–537, as amended

Existing Refuge Operational Plans

Step-Down Plans

The Service Manual (602 FW 4, "Refuge Planning Policy") lists more than 25 step-down management plans that may be appropriate for a refuge to ensure safe, effective and efficient operations. However, not all of these plans are necessary on every refuge. The plans translate general goals and objectives into specific strategies and action schedules. Some require annual revision; others are revised on 5- or 10-year schedules. Some require additional NEPA analysis, public involvement, and compatibility determinations before we can implement them. These step-down management plans, already underway, are scheduled for completion as follows:

- Habitat Management Plan (HMP, our highest priority; within 1 year of CCP approval)
- Habitat and Species Monitoring and Inventory Plan (HSMIP; within 2 years of CCP approval)
- Fire Management Plan (included in this draft CCP; appendix F)

Compatibility Determinations

Appendix B includes compatibility determinations for priority public uses and several other refuge uses we propose for the refuge. In addition, we have included the final compatibility determination for model airplane flying and model airplane competitive events, approved and dated February 20, 2002, which determined these activities were not compatible with the refuge purposes or the mission of the Refuge System. This use is described in more detail in chapter 3, Refuge and Resource Descriptions. We are incorporating this existing decision on model airplane flying and model airplane competitive events into the CCP (appendix B).

Refuge Vision Statement

Early in the planning process, our team developed this vision statement for the refuge to provide a guiding philosophy and sense of purpose for its plan.

The Shawangunk Grasslands National Wildlife Refuge, located in Ulster County, New York, provides exceptional grassland habitat within the Wallkill River watershed, a major tributary to the Hudson River. We will enhance and sustain this high quality habitat for the full complement of grassland-dependent birds that breed, winter and migrate through, the watershed. Other native grassland-dependent animals and regionally rare plants benefit from our management as well. With easy public access to the refuge's managed grasslands, and because of the open vistas the grasslands afford, it is an ideal setting for wildlife observation, nature photography, and environmental interpretation. All visitors will feel welcomed and encouraged to enjoy and appreciate the contribution of this refuge to the National Wildlife Refuge System.

Refuge Goals

Our planning team developed these goals after reviewing the Refuge System mission, the purpose of the refuge, our vision statement, public and partner comments, policy guidelines, and natural and regional conservation initiatives.

Goal 1. Protect and enhance habitats for Federal trust species and other species of special management concern, with particular emphasis on grassland-dependent migratory birds and wintering raptors.

Goal 2. Manage to enhance regionally significant ecological communities, including large grassland complexes.

Goal 3. Promote actions which contribute towards a healthier Wallkill River.

Goal 4. Provide high quality opportunities for wildlife observation and photography, and other priority, wildlife-dependent uses.

Goal 5. Cultivate a public informed and educated about conservation who work to support the goals of the refuge and the mission of the National Wildlife Refuge System

Chapter 2

American Kestrel
USFWS photo

Planning Process

- The Comprehensive Conservation Planning Process
- Issues, Concerns, and Opportunities
- Key Issues
- Issues Outside the Scope of this Planning Process

The Comprehensive Conservation Planning Process

Service policy establishes an eight-step planning process that also facilitates compliance with NEPA (see figure 1.1, below).[1] Each of its individual steps is described in detail in the planning policy and CCP training materials. While the figure suggests these steps are discreet, there can be 2-3 steps happening concurrently.

Planning Process

We started this planning process in 1998 as a combined CCP for both the Wallkill River and Shawangunk Grasslands refuges. The core team was composed of a Regional planner, Regional Resource Specialist, refuge staff, and representatives from NJ DEP and NYSDEC. The core team first convened in February 1999.

Our early meetings consisted of detailing the steps in the planning process for this project and collecting information on natural resources and public uses that pertained to each refuge.

As part of "Step A: Preplanning," we also developed a preliminary refuge vision statement, management goals, and identified issues and management concerns. During that step, we also began a wilderness review of existing refuge lands.

Our wilderness review evaluates the suitability of refuge lands for inclusion into the National Wilderness Preservation System (NWPS). The review consists of three phases: (1) inventory, (2) study, (3) recommendation. We inventoried all 566 acres of refuge lands in fee title ownership and found no areas that meet the eligibility criteria for a wilderness study area as defined by the Wilderness Act. Therefore, suitability of refuge lands for wilderness designation is not analyzed further in the CCP. The results of the wilderness inventory are included in appendix C.

Also in early 1999, we compiled a mailing list of approximately 3,000 names, including organizations, elected officials, state agencies, individuals, and adjacent landowners, to ensure that we would be contacting a diverse sample of interested groups as we progressed through the process.

Next, we began step B, "Initiate Public Involvement and Scoping," which provided an opportunity for the public to critique or add to the vision, goals, and issues we drafted. In May 1999, we developed issues workbooks to solicit written comments on topics related to the management of the refuge. We realized not everyone could attend planned Open House meetings scheduled for later in May and in June, so the issues workbooks provided an opportunity to reach a larger audience. Workbooks were sent to everyone on our mailing list; were available at the Refuge Headquarters; and were offered to people every time our refuge staff participated in a public function. We received 337 workbooks completed with responses. Those responses strongly influenced our formulating issues and developing alternatives on resource protection and public use.

[1] 602 FW 3, "The Comprehensive Conservation Planning Process" (http://policy.fws.gov/602fw3.html)

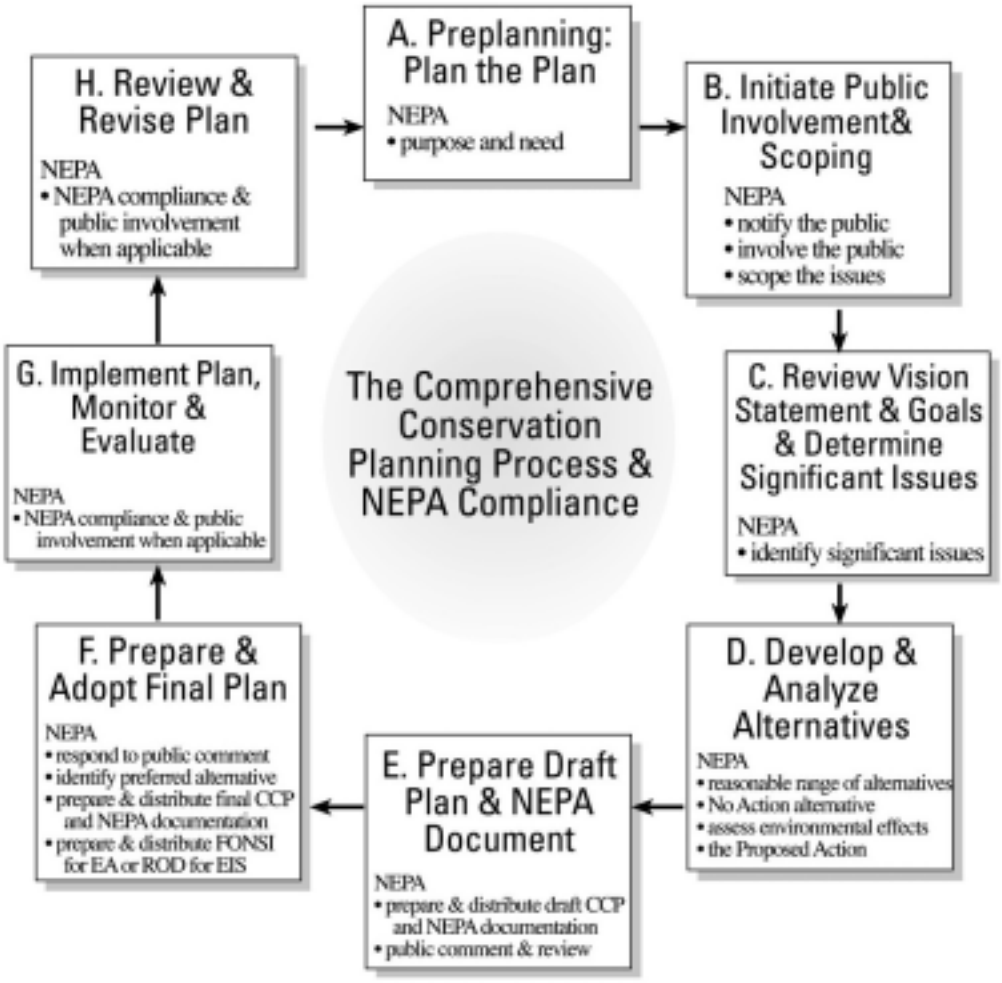


Figure 1.1 The Comprehensive Conservation Planning Process and its relationship to the National Environmental Policy Act of 1969.

In May and June 1999 we held seven Open Houses: two in Sparta, NJ; two in Vernon, NJ; two in Wallkill, NY; and, one in Warwick, NY. We advertised those open houses locally in news releases, radio broadcasts, and notices to our mailing list. More than 50 people attended those meetings. We also organized several separate meetings with conservation partners and state agencies to discuss shared issues.

In October 1999, we released our "Fall 1999 Planning Update" to everyone on our mailing list. That update summarized the public comments we had received from meetings and issues workbooks, identified the key issues we would be dealing with in the CCPs, and shared revised vision statements and goals.

Once we had firmed up the key issues in October, we began step D, "Develop and Analyze Alternatives." The purpose of this step is to develop alternative strategies for addressing and resolving each issue on both refuges. We derived the management alternatives described in draft CCP, chapter 3, from those strategies, public comments, our goals and refuge purposes.

At this stage, we identified and mapped ecologically important lands in the vicinity of the refuge or connected to the Wallkill River valley. Using the expertise of our Connecticut River/Southern New England/New York Bight Coastal Ecosystems Program office and wildlife biologists with NYSDEC, we determined areas of high biodiversity important to our Federal trust resources, including areas with rare or declining wildlife species or plant communities, wetlands, and contiguous grasslands larger than 150 acres. Those areas of high biodiversity were mapped as focus areas.

We identified a Shawangunk Grasslands Focus Area, 3,486 acres in size, surrounding the refuge (map 1–2). In our opinion, land uses in this focus area could have a direct effect on our ability to fully meet our refuge goals and objectives. Unfortunately, some of that area now has been developed and has lost its significance to wildlife.

Despite our interest in seeing these lands protected, we do not propose Service acquisition of additional lands at this time. We do not feel there is enough local community support for a refuge expansion, and from our Regional perspective, with all our other land protection priorities, it is doubtful we would be able to secure funding to buy additional lands here or hire staff to manage those lands. Instead, we plan to work with adjacent landowners and other partners to facilitate land conservation within the focus area. However, if favorable conditions arise in the future to make Service land acquisition in this area possible, we may pursue it under a separate environmental assessment and public review.

At follow-up meetings in 2000, we shared our proposed alternatives with conservation partners, state agencies, and the public. We distributed another newsletter in January 2002 that outlined four management alternatives. Through further analysis, we reduced those alternatives to three. In chapter 5, "Consultation and Coordination with Others," you will find a detailed summary of each public involvement activity.

In November 2002, we determined it would be more efficient to separate our planning efforts for Wallkill River and Shawangunk Grasslands refuges, with priority given to completing a CCP for this refuge.

In November 2005, we completed Step E: "Prepare Draft Plan and NEPA Document."and released a draft CCP/ EA for a 45-day public review and comment. In addittion, we held a public meeting/ open house on January 17, 2006, in the Hamlet of Wallkill, NY. Thirty eight people (non-FWS) attended the public meeting.

We received a total of 589 public responses in oral testimony at public hearings, in phone calls, or in written or electronic documents. Appendix I summarizes those public comments and our responses to them. In some cases, our response resulted in a modification to alternative B, our preferred alternative. Our modifications include additions, corrections, or clarifications which we have incorporated into this final CCP.

Our Regional Director has signed a Finding of No Significant Impact (FONSI) which certifies that this Final CCP has met agency compliance requirements and will achieve refuge purposes and help fulfill the Refuge System mission (appendix J). It also documents his determination that implementing this CCP will not have a significant impact on the human environment, and therefore, an Environmental Impact Statement (EIS) is not required.

These documents will be made available to all interested parties. Implementation can begin immediately.

Issues, Concerns, and Opportunities

From planning team discussions, public and focus group meetings, and public responses to our issues workbooks, we compiled the issues and concerns that we heard and categorized them as follows.

Key issues.—These were unresolved public, partner, or Service concerns without obvious solutions supported by all at the start of our planning process. Along with goals, key issues formed the basis for developing and comparing the three different management alternatives. In the draft CCP, the wide range of opinions on how to address key issues in a way consistent with refuge goals and objectives generated the three alternatives. The key issues listed below also share this characteristic: the Service has the jurisdiction and the authority to address them.

Issues and concerns outside the scope of this analysis.—These issues fall outside the scope of our planning process, or outside the jurisdiction or authority of the Service. Although we discuss them briefly below, we do not address them further in this document.

Key Issues

1. Which species should be a focus for management, and how will the refuge promote and enhance their habitats?

Congress entrusts the Service with protecting Federal-listed endangered or threatened plant and animal species, anadromous and inter-jurisdictional fish species, migratory birds, and certain marine mammals, and mandates their treatment as management priorities when they occur on a refuge. Appendix A identifies Federal trust resources on the refuge, as well as other species and habitats of special management concern.

Although we know of no Federal-listed species on the refuge, it does provide significant habitat for certain migratory birds. The challenge we faced early in the planning process with respect to migratory bird management was determining how this refuge could significantly contribute to the conservation of migratory bird species of concern. An important question we addressed is “Which migratory bird species and habitat types should be management priorities on the refuge?” Placing management emphasis on certain species or species groups may preclude emphasis on other migratory bird species of concern.

For example, our emphasis on managing habitat for grassland-dependent birds reduces the potential for shrub-dependent or forest-dependent birds also in decline throughout PIF Area 17. Our responses to this issue is addressed in refuge goals 1, 2, and 3.

2. How will the refuge manage for regionally significant ecological communities, including the Wallkill River and its associated wetlands?

Several habitat types present on the refuge have been identified as ecologically significant because of their biological diversity, their relative scarcity throughout the Hudson River ecosystem, or their ability to support a complex of species that are regionally declining. Besides the Wallkill River and its tributaries, large grassland complexes (>150 acres) are recognized as regionally important for their biological diversity.

Service policy (601 FW 3) requires us to maintain existing levels of biological integrity, diversity, and environmental health on refuge lands. If necessary, we are to restore lost or degraded habitats, using historical conditions as a frame of reference to identify composition, structure, and functional processes that naturally shaped ecosystems and habitat types. Our responses to this issue is addressed in refuge goals 1, 2, 3 and 4.

3. How will the refuge manage invasive, exotic, or overabundant species?

Invasive plants out-compete native species by dominating light, water, and nutrient resources. Species such as purple loosestrife (*Lythrum salicaria*), Phragmites (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), Canada thistle (*Cirsium arvense*), multiflora rose (*Rosa multiflora*), and reed canary grass (*Phalaris arundinace*a) threaten refuge habitats by displacing native plant and animal species, degrading wetlands and other natural communities, and reducing natural diversity and wildlife habitat values. Those plants are particularly a menace when they impact the viability of native species of concern, such as some of the rare plant species on the refuge.

Once they have become established, getting rid of invasive plants is expensive and labor intensive. Their characteristic ability to easily establish, prolifically reproduce, and readily disperse makes eradicating them difficult. Many of them cause measurable economic impacts, especially in agricultural fields. Preventing new invasions is extremely important for maintaining biological diversity and native plant populations. Controlling them in existing, affected areas requires extensive partnerships with adjacent landowners, state, and local governments. Control of invasive plant is a high priority in this plan

Several wildlife species on the refuge may be adversely affecting natural biological diversity and we need to monitor any impacts. Native species such as deer, resident Canada geese, and small furbearing mammals such as foxes, raccoons, and woodchucks can be a problem when their populations exceed the range of

natural fluctuation and the ability of the habitat to support them. Management issues arise when they adversely affect Federal trust species or degrade natural communities. In particular, small mammalian predators destroy migratory bird nests. While some level of predation in a natural system is expected, concerns arise when that predation prevents our meeting conservation objectives.

Adverse economic impacts can arise when deer or Canada geese forage on landscaping or agricultural fields. Excessively high populations of deer, fox or raccoon also can compromise human health and safety. Greater numbers of vehicle-deer collisions or cases of Lyme disease and rabies all raise community concerns. Not all of those situations exist now on the refuge, but they may surface soon, as surrounding lands become developed and animals are forced to concentrate on or near the refuge. Some of the control measures for each species are controversial; they may include visual or audio deterrence, the destruction of nests or dens, or lethal means. Our responses to this issue is addressed in refuge goals 1 and 2.

4. What opportunities for hunting will the refuge provide?

During public scoping we learned that opinions on hunting ran the full spectrum, from those totally opposed, to those advocating opening the refuge to all State hunting seasons. The Refuge Improvement Act of 1997 stipulates hunting on refuges as one of the six priority public uses to receive our enhanced consideration. The Service also views hunting as an effective management tool in controlling overabundant or invasive wildlife species.

However, a segment of the local community continues to oppose hunting, based on concerns about safety, disturbances, harm to non-target wildlife, and the impact on visitors engaging in other priority public uses. Others opposed to hunting feel that the refuge should function as a complete sanctuary for all native species, and that hunting is incongruous with managing a refuge.

Some support hunting only when it is needed for population control, and not as a recreational activity. Still others fully support it, including the NYSDEC, who would like to see more hunting on the refuge in conformance with State hunting seasons.

The refuge has not previously been open to hunting, but local residents indicate that deer and small game hunting occurred under previous ownerships. Some adjacent landowners were opposed to hunting, expressing a concern about their own safety, especially if a rifle season were allowed. Other individuals indicated a concern about the safety of hunters, since buried drainage structures on the refuge could be hazards.

As we considered whether or not to provide a hunting program, our foremost consideration was for public safety. Our final recomendation, described under Goal 4, is to provide an archery deer hunt.

5. How will the refuge provide opportunities for other compatible, wildlife dependent uses and accommodate their occasional conflicts?

The 1997 Refuge Improvement Act requires our enhanced consideration of opportunities for six priority wildlife-dependent recreational uses—hunting, fishing, wildlife observation and photography, and environmental education and interpretation—when they do not conflict with the mission of the Refuge System or the purposes for which the refuge was established. However, the Act establishes no hierarchy among the six priority uses and, unfortunately, they sometimes conflict.

Some people expressed concerns that refuge resources may be disproportionately allocated toward one use to the detriment of others. An additional challenge for the refuge manager is determining the capacity of the refuge to support those uses and still provide a quality experience for visitors. For example, some people would prefer that the runways be maintained for walking while others prefer that most of them be restored to grasslands. Our responses to this issue is addressed in refuge goals 4 and 5.

A few public uses that historically occurred on the refuge are not priorities, nor wildlife-dependent, and we have determined they are not compatible with the refuge purposes and management priorities. One activity in particular, model airplane flying, received a lot of attention when the refuge was established. Chapter 3 describes the history of that issue in greater detail. Also in Chapter 3, we describe our concerns with the potential for non wildlife-dependent activities drifting onto the refuge with the Town of Shawangunk's proposed 55-acre park and athletic fields on the refuge's north boundary.

6. Should we consider a refuge expansion to protect additional habitat areas?

Northern New Jersey and south-central New York have become commuter communities for cities to the south. Two-hour commutes are now commonplace. According to a June 19, 2005 editorial in the Poughkeepsie Journal, there is concern about the loss of open space and farmland in Ulster County due to demographic changes. The town of Gardiner, for example, experienced a population growth of more than 20% in the last 10 years. That growth, which places extreme pressure on natural resources, is now threatening the county's natural areas; many are becoming isolated islands of habitat, so fragmented that they can no longer support their full diversity of native wildlife and plant species. Species that require large, contiguous areas of natural habitat are the first to suffer. The Town of Shawangunk is developing a comprehensive plan that will include an analysis of current and future needs for open space. Public meetings indicate broad public support for the concept, but no consensus on how much open space is enough. It is also important to recognize the "open space lands" does not necessary equate with lands of greatest wildlife values.

Eastern bluebird
Scott A. Vincent ©

During our public scoping process, we heard from many individuals encouraging the Service to expand the refuge within the focus area for a variety of reasons, including their concern about the rapid rate of development, the increased burden on their communities' services brought on by that development, and their communities' loss of rural character. Some acknowledged the necessity and the direct benefits of maintaining land in its natural state afforded by refuges. They recognized that wetlands are essential habitat for wildlife, lessen the damage from flooding, and naturally break down contaminants in the environment. They also recognized that forests and grasslands protect the quality of our drinking water, help purify the air we breathe, and provide important areas for outdoor recreation.

On the other hand, the fact that 29% of Ulster County is now held in non-taxed ownership, including the refuge, state prisons, religious communities, state owership (parks) and non-profit organizations, is a concern to many people. Some elected officials hold mixed opinions about this tax burden on their communities. They feel that increased Federal ownership will adversely affect property tax revenues. Federal lands are not taxed. However, the Refuge Revenue Sharing Act[2] helps offset the loss of tax revenue through refuge revenue sharing payments to towns, at a maximum rate of three-quarters of 1 percent of the appraised value of refuge land.

As we described under "Planning Process," we do not propose an expansion of the current approved boundary. However, we do recomend Service involvement in identifying important habitats that need protection or cooperative management on private lands in the area. In addition, nothing in this CCP precludes our pursuing land acquisition in the future, after additional NEPA analysis and public involvement. For example, the 55 acres deeded to the Town of Shawangunk for use as a town park, immediately adjacent to the refuge's northern boundary, may become a priority for Service acquisition should the town ever determine it excess to their needs. While this is not anticipated, should the opportunity arise, we would seek its acquisition. Our responses to this issue is addressed in refuge goals 1, 2, and 3.

[2] 16 U.S.C. 715s, June 15, 1935, as amended

7. How will the refuge cultivate an informed and educated public to support the mission of the Service and the purposes for which the refuge was established?

Community involvement in supporting the Refuge System is very important and very rewarding. It helps people understand what we are doing, why we are doing it, and how we can work together to improve our communities. Refuge outreach ties us to local communities and promotes an interest in conserving natural resources. The challenge lies in determining how best to reach out to raise refuge visibility and cultivate relationships in local communities. Some people advocate opening more refuge programs to the public; others desire a "Friends of the Refuge" Group; still others promote refuge staff involvement in established community events, government committees, and conservation organizations. Our responses to this issue is addressed in refuge goals 3 and 5.

8. How will we reduce the potential hazards from the underground drainage system?

On the refuge there is an extensive system of cement culverts that was installed to drain water from the air field which are collapsing, and in some cases are open and exposed. This may represent a safety hazard especially for our staff doing habitat management work or for visitors authorized to walk off the designated trail. Our responses to this issue is addressed in refuge goal 4.

9. How will the refuge obtain the necessary staffing and funding to maintain infrastructure and complete priority projects?

For the foreseeable future, this refuge will continue to be maintained as an unstaffed satellite refuge under the administration of the Wallkill River refuge. Some people expressed concerns about the ability of Wallkill River refuge staff to maintain infrastructure and implement programs and projects on this refuge given the current level of funding.

Some are concerned that any new proposals in this CCP will be substantially above current budget allocations, thus raising unrealistic expectations. It was pointed out that budgets can vary widely from year to year since they depend on annual Congressional appropriations. Other people supported our pursuit of new management goals, objectives, and strategies in the hopes that the CCP will establish new partnerships and funding sources. In fact, some people recommend a visitor contact facility be maintained throughout the year on the refuge. A "Friends Group" was suggested as one way to get assistance with funding and implementation.

We identify seasonal staffing positions and funding levels antecipated as necessary to implement over the next 15 years. Appendix E lists the essential staffing levels already approved for the refuge. All positions assigned to the refuge are currently vacant. Appendix D presents our Refuge Operating Needs (RONS) and Management Maintenance System (MMS) projected needs. These data-

bases are updated regularly, and in fact, we are transitioning to replace the MMS database with the Service Asset Maintenance Management System (SAMMS) database.

Issues Outside the Scope of this Planning Process

Development and local zoning

Many people indicated they are greatly concerned about urban sprawl, the rate and location of development, and the loss of habitat and resulting increased habitat fragmentation near refuge lands. Some wanted zoning for agriculture or something other than residential or commercial development. The authority of the Service does not extend to local zoning. However, we are working with adjacent towns to identify important wildlife habitats that need protection.

Pollution Control

Many refuge neighbors expressed their concern about poor water quality in the Wallkill River and their belief that it has steadily declined over the past years. Some attributed that decline to the use of herbicides and pesticides on agricultural fields and its relationship to the levels of DDE in the river, the highest in any Hudson River tributary. Others expressed their concerns about the effects of town wastewater treatment and pollution from farm operations.

The Service has no jurisdiction on other ownerships, unless polluters are directly impacting Federal trust resources. However, our staff will continue to work with the Wallkill River Task Force and participate in local community planning to promote the best management and restoration practices to benefit water quality and the wetlands of the river and its tributaries.

Chapter 3

Deer at Shawangunk Grasslands National Wildlife Refuge
USFWS photo

Refuge and Resource Descriptions

- Introduction
- Natural Landscape Setting
- Cultural Resources
- Socioeconomic Setting
- Refuge Administration
- Our Partnerships
- Physical and Biological Resources on the Refuge
- Public Use on the Refuge

Introduction

This chapter describes the physical, cultural, socioeconomic, administrative, and biological resources of the refuge environment. It relates those resources to our refuge goals and key management issues, and provides context for our management direction, which we present in chapter 4.

Natural Landscape Setting

Our Southern New England—New York Bight Coastal Ecosystems Program in Charlestown, Rhode Island, published the following information on physiographic provinces and habitat complexes in "Significant Habitats and Habitat Complexes of the Hudson River/New York Bight Watershed" (USFWS 1997). The refuge lies in the northern section of that watershed (map1–1).

Landscape Formation

The watershed is a rich and varied regional physical landscape containing a number of distinctive geomorphic provinces and sections. Its variety results from several concurrent and successional events: the combination of complex bedrock and surficial geology and recent glacial history in the northern half of the region; historic mountain-building and land-uplifting forces; and the dynamic processes of erosion, sedimentation, and chemical and physical weathering acting on rocks of varying hardness. Such extraordinary physiographic diversity and geological complexity, together with climatic and historical events, contributed directly to the region's remarkable biological diversity and the current distribution patterns of its fauna and flora.

One of the most interesting, significant factors in shaping the modern landscape of much of the watershed and, indeed, much of North America, has been the work of glaciers and the continental ice sheet during the most recent glacial period, the Pleistocene Epoch. Although the Pleistocene began more than a million years ago, and was characterized by a series of at least four major glacial advances (glacial stages) and retreats (interglacial stages), its last glacial stage, the Wisconsin, has most profoundly influenced the landscape of the northern section of this region. The Wisconsin glacier, which began between 70,000 and 100,000 years ago, retreated from this region between 10,000 and 15,000 years ago. That process yielded the two sections of the watershed; the northern, glaciated portion, which includes the refuge, and the southern, unglaciated portion. Measurably, observably distinct, their landscapes and biota contrast markedly with each other and with the watershed.

During the height of glaciation, the northern section of the watershed was covered by an ice sheet up to 1.6 kilometers (1.0 mile) thick, although its thickness considerably diminished along its margins and eastern portions. Over the entire glaciated portion of the watershed, a layer of unsorted and unconsolidated glacial debris and glacial till, ranging from clay particles to huge boulders, was deposited directly on the landscape by the advancing glacier.

As the Wisconsin glacial front retreated in response to a warming global climate, the glacier left many smaller recessional moraines and other distinctive glacial landforms, (e.g., kames, kettles, eskers, and drumlins) across the landscape

north of the terminal moraine. Meltwater from the melting ice sheet, in association with the moraines, created several large glacial lakes in the watershed. The most prominent lakes are Glacial Lake Passaic, Glacial Lake Hackensack, Glacial Lake Hudson, and Glacial Lake Albany. Those lakes lasted for thousands of years, and their remnants are visible today in the form of lakeshore sand and dune deposits and basins of deep marsh peat and lake sediments. In addition to those large lakes, many smaller lakes and wetlands north of the terminal moraine also were formed from preglacial streams blocked by glacial deposits, or were excavated into the bedrock by the ice.

Physiographic Provinces and Habitat Complexes

Physiographic provinces and habitat complexes in the watershed are delineated based on the combination of landscape features (geology, landforms, topography, altitude, relief, geologic and glacial history, and hydrology) and associated biological communities and species populations. The province serves as the primary hierarchical landscape unit within which the various individual habitat complexes are grouped and described.

The refuge lies in the Shawangunk Valley Habitat Complex which is a subdivision of the Appalachian Ridge and Valley physiographic province. The valley is broad and gently rolling, with open fields devoted to agriculture. The Shawangunk Ridge forms the western boundary, while the much lower Hoagerburg Ridge forms the eastern boundary.

A prominent feature in this habitat complex is the Shawangunk Kill. It originates in the town of Greenville and flows northeast, parallel to the Shawangunk Ridge for much of its length, before turning east and joining the Wallkill River; its total length is about 56 kilometers (35 miles). The Kill drains a watershed of about 380 square kilometers (147 square miles). Downstream of Pine Bush, it has a gentle gradient, dropping an average of about 1.9 meters per kilometer (10 feet per mile).

Air Quality

National Ambient Air Quality Standards monitor six types of air pollutants (carbon monoxide, nitrogen dioxide, ozone, lead, particulate matter, and sulfur dioxide) known to affect visibility, acid deposition, and human, animal or plant health. Five of those pollutants factor into the EPA's Pollutant Standards Index, a daily measure providing an overall rating of air quality (good, moderate, unhealthful, very unhealthful, or hazardous). The air quality rating in Ulster County was good or moderate throughout 2002 (*http://www.epa.gov/air/data*).

Cultural Resources

Before European settlement, this area was populated by the Munsee branch of the Lenape (Delaware) people, who occupied the upper Delaware Valley, the adjacent Catskill foothills, and most of what is now the state of New York south of the Catskills, as well as northern New Jersey (Kraft, 2001:2,5). The Waronawanka (Waranawankong), known to history as the Esopus Indians, were the Munsee tribe present in the region of the Shawangunk Grasslands Refuge. They inhabited the Rondout-Wallkill Valleys/Shawangunk Mountain region southward to their boundary with the Murderer's Kill Indians (Moodna Creek, near Cornwall) and southwestward along the Shawangunks to their border with the Minisink tribe, near where present Interstate 84 crosses the ridge in western Orange County (Fried, 2005:ix, 113-17, 127, 132-133).

Prehistoric Resources

The Esopus grew maize and a few other crops, in addition to hunting, fishing and gathering. Their first contact with Europeans was with Henry Hudson in 1609. Fur trading by the Dutch took place along the Hudson River during the years that followed, and the first permanent settlers arrived at Fort Orange (Albany) and New Amsterdam (Manhattan) in the mid-1620s. The mouth of the Rondout Creek was recognized very early as a good place to transfer goods between large sailing vessels and smaller boats, since the river was relatively shallow above the point.

Historic Land Uses

In 1652-53, settlers moved south from the Fort Orange area to where a bend in the Esopus Creek brings it within three miles of the Rondout's mouth. Thus began the Dutch settlement known as Esopus or Groote Esopus (also "Wildwyck") and later as Kingston. The settlers farmed the Esopus flood plain using the Rondout as their harbor. Disputes and incidents of violence soon erupted, culminating in two wars, in 1659-60 and 1663-64 (Fried, 1975:11, 17, 22-42, 55-109). A number of Indian tribes served as mediators between the Esopus and the Dutch during the Esopus Wars, including not only nearby tribes such as the Mohicans and Wappingers, but also the Mohawks, Senecas and Hackensack Indians, whose proximity to the major Dutch settlements at Fort Orange and New Amsterdam made them useful to both sides (Fried, 1975:40, 58-59, 66, 88, 93, 104-5). In 1664, a peace treaty ended the final conflict with the now impoverished Esopus Indians. Later the same year, the Dutch lost their North American colonies to the English. By 1684, the Esopus tribe had sold most of their ancestral lands to the colonies, though many Indians continued living on portions of the land until settlers actually took possession during succeeding decades. The Lenape population had been ravaged not only by war, but by European diseases for which they had no natural immunity. The last known sale of land by an Esopus Indian in Ulster County occurred in 1770 (Fried, 2005:113-14, 127, 152).

The refuge itself lies close to two sites of great historic interest; only a mile to the west, the Esopus tribe had a major village on the Shawangunk Kill that was the scene of a dramatic battle and rescue of prisoners by Dutch forces in 1663,

during the Second Esopus War. Two miles northwest of the refuge, Gertrude Bruyn and her three young children became the first people of European ancestry to settle on the Shawangunk Kill, sometime between 1682 and 1686. Bruyn's deed from the Esopus Indians in 1682 contains the earliest reference to the name Shawangunk (Fried, 2005:3-5, 96-97).

In the late seventeenth and early eighteenth centuries, settlement spread rapidly through the valleys of the Wallkill and Shawangunk Kill. During the French and Indian War, there were some Munsee raids on European settlements west of the Wallkill River. Some residents moved east, back toward the Hudson, and four blockhouses were built by the English on the Delaware River (Snell 1881:34 and Headley 1908:63 in Maymon et al. 2002:54). During the French and Indian War, the western Delaware, including some Munsee, sided with the French. Peace settlements resulted in their subjugation to the Iroquois and Iroquois sale of their land to Europeans. The Munsee moved west, first to Ohio, then Indiana, Kansas, Oklahoma, Wisconsin and Canada. Federally recognized tribes which may contain Munsee descendants are:

- Stockbridge-Munsee Community of Wisconsin
- Delaware Tribe of Indians

Henry Hudson's voyage of 1609 had occurred during the terminal stage of the Late Woodland period of Lenape culture. The dispersed, semi-permanent human landscape that Hudson saw drastically changed in the next three centuries through warfare, permanent nucleated settlement, agriculture, industry, mining, transportation and the damming of the Hudson and its tributaries.

From 1790 to 1816, farming on moderate sized tracts produced wheat and other small grains, cheese, butter, wool, liquor, livestock, and maple syrup. About 1800, road construction improved. One of the greatest impacts on the landscape of the Wallkill River Valley took place in 1804: the first attempt to drain the river by ditching its banks. Three years later, the attempt to remove limestone from the riverbed began. Roughly two decades later, the Cheechunk Canal was built to drain the upstream portion of the Wallkill, because valley farmers wanted to create a landscape more suitable for agriculture from the unproductive, swampy area known as the "Drowned lands."

Although these projects made available some of the most productive agricultural lands in New York State, the stagnant waters that resulted created health risks. Farther downstream, major dams on the river at Montgomery, Walden and Wallkill created waterpower for the local industry. When the river is very low, evidence of an old wooden dam is still visible at Galeville, just beyond the east boundary of the refuge. This dam was reportedly destroyed by ice in 1883. An 1880 account indicates the hamlet of Galeville contained "a Methodist church, a hotel, a school-house, a grist-mill, a saw-mill, an axe-helve and spoke-factory, a wagon- and blacksmith-shop," while five years earlier, a map had shown a "store & P.O." as well (Sylvester, 1880:157; Beers, 1875:122). On the

Shawangunk Kill, a dam was built at Tuthilltown, four miles north of the refuge, where a historic eighteenth century mill still operates today using waterpower.

Sheep raising and wool manufacturing become important during the early decades of the nineteenth century (Maymon et al. 2002:54). After the Civil War, the Wallkill Valley Railroad changed not only the landscape and settlement patterns but also agricultural practices of the region. From 1868 to 1872, the new railway was laid down along the valley to Kingston from Montgomery in Orange County, where it linked to the Erie Railway and thus to the great markets of the New York metropolitan area (Mabee, 1995:12, 19, 38). This spurred the livestock and, particularly, the dairy industry. The townships of Shawangunk and Gardiner became a center for dairy farming, a way of life that remained dominant well into the second half of the twentieth century.

An airport, constructed during the 1940's, is one of the many significant land use changes in the refuge's history. USFWS photo

Meanwhile, population and commerce gravitated to locations along the rail corridor; the hamlet of Gardiner sprang up where only fields had existed, and Wallkill increased significantly in size and importance. Older mill-hamlets such as Tuthilltown and Galeville now began their decline. Finally, the automobile played a vital role in development patterns, stimulating the construction of hard-surfaced roads in the valley. With vastly enhanced mobility, commercial growth became concentrated in regional population centers such as New Paltz and Walden and, especially, Newburgh, Kingston, Poughkeepsie and Middletown, while many of the smaller hamlets lost most if not all of their places of business. The recent past of the refuge has included a history as a farm field, use as an airport, and a role as a training location for U. S. Marshals.

Socioeconomic Setting

Demographics

The Wallkill Valley population has increased by 14.8 percent over the past decade. Higher demand for residential development inevitably followed. Housing densities have increased by 20 percent over the past 10 years, while population densities have increased by 13.9 percent. Predictably high occupancy rates will increase that trend exponentially over time. That trend does not directly threaten the refuge. However, coupled with the growth of urban centers, it will increase the demand on the recreational resources of the refuge.

Industry

Tourism is an important economic activity in Ulster County, and offers opportunities for recreation in the Catskill Mountains and on the Hudson River. The Shawangunk Mountain range, just northwest of the refuge, is recognized internationally as a premier area for rock climbing, as a globally unique ecosystem of mountaintop dwarf pine barrens, and as the most spectacular array of vertical cliffs east of the Rockies. Agriculture still contributes to the local economy, but has declined in importance.

Ulster County has a population of 178,028 (U.S. Census Bureau 2001). Its retail and manufacturing sectors employ about 8,000 and 6,500 people, respectively. The Town of Shawangunk, which includes the refuge, has a population of 12,022 (U.S. Census 2000). On a larger, regional perspective, the industries that dominate the Wallkill River Valley are the fields of education, health, and social services, closely followed by the profession of retail trade. The shift between the agricultural and construction industries has been the most notable. Between 1990 and 2000, agriculture decreased by 2.16 percent while construction increased by 1 percent.

Refuge Contributions to the Local Economy

A national wildlife refuge provides many benefits to the local economy. These include, but are not limited to, the benefits of open space and associated reduced cost of community services and increased property tax values; revenues generated from the refuge revenue sharing program; and, revenues from refuge visitors who purchase equipment, lodging, or meals in support of their refuge activities.

Benefits of Open Space

The "cost of community services" compares the cost per dollar of revenue generated by residential or commercial development to that of revenue and savings generated by working land and/or an open space designation. On the one hand, residential development expands the tax base, but the costs of increased infrastructure and public services (e.g. schools, utilities, emergency and and police services, etc., nearly always offset any increase in tax revenue. On the other hand, undeveloped land requires few town services and places little pressure on the local infrastructure.

The American Farmland Trust (2002) and the Commonwealth Research Group (1995) studied over 100 communities in the United States to evaluate the overall contribution of agriculture and open space lands with residential, commercial, and industrial development. In the 11 New York communities evaluated, residential development costs always exceeded revenue, and working land and open space always generated more public revenues than they received back in public services. Another report titled "Economic Benefits of Parks and Open Spaces" provides examples of property values increasing in the vicinity of open spaces (Trust for Public Land, 1999).

Refuges also provide valuable recreational opportunities for local residents and maintain a rural character important to many people's quality of life. Ecologically, refuges maintained as natural lands perform valuable services to a local community, such as the filtration of pollutants from soil and water, that otherwise would have to be provided technologically at great expense.

Refuge Revenue Sharing

Under the Refuge Revenue Sharing Act of June 15, 1935, the Service pays local taxing authorities refuge revenue sharing payments based on the acreage and value of refuge land in their jurisdiction. The payments are calculated in one of three formulas, whichever yields the highest amount: three-quarters of 1 percent of the appraised value of that land, 25 percent of the gross receipts from the sale of refuge products, or 75 cents per acre of land held in fee title. We reappraise the value of refuge land every 5 years. Until we reappraise a newly acquired property, the formula uses the purchase price.

The money for refuge revenue sharing payments comes from the sale of oil and gas leases, timber, grazing, and other Refuge System resources, and from congressional appropriations. Those appropriations are intended to make up the difference between the net receipts in the refuge revenue sharing fund and the total amount due to local taxing authorities. The actual amount paid varies from year to year, because Congress may or may not appropriate funds sufficient for payments at full entitlement.

At full entitlement, refuge revenue sharing payments on wetland and on land formerly assessed as farmland sometimes exceed their real estate taxes; payments at less than full entitlement sometimes fall short. For example, the actual payment in 2001 and 2002 was just less than 50% of full entitlement. The Town of Shawangunk received $2,591 in refuge revenue sharing payments from the Service in 2001; $2,644 in 2002; $2,470 in 2003; and $2,374 in 2004.

Revenues from Wildlife Watching

The refuge provides opportunities for wildlife watching enthusiasts which aligns to local and statewide economic benefits. These benefits are due to trip related amenities, such as food, lodging, transportation and other trip costs, such as equipment rental or public land fees. According to the Service publication, "2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USFWS, October 2002), a total of 3,524,000 people annually participated in wildlife watching in the State of New York: 24 percent State residents and 8 percent non-residents.

Wildlife watching benefits local and state economies
USFWS photo

On the national level, wildlife watching trip-related expenditures decreased in the decade (1991–2001) by 16 percent. On the other hand, equipment purchases nearly doubled from 1991 to 2001, showing a 90-percent rise. Nationally, wildlife watching trip-related expenditures equaled a total of $8.2 billion in 2002. The national average expenditure for an individual wildlife watching participant was $448 annually. Our current estimate of 5,500 annual refuge visitors who are primarily there to view wildlife, potentially contributes $257,840 in expenditures given the estimates in the 2001 survey.

Refuge Administration

Staffing and Infrastructure

Shawangunk Grasslands Refuge does not have permanent staff on location; it is admistrated by Wallkill River Refuge staff based out of that refuge's headquarters in Sussex, NJ. Appendix E presents the approved staffing chart and shows the allocation of staff between the refuges. Annual operating and maintenance funding and staff support for the two refuges are combined. Staffing and equipment to manage the refuge adequately are lacking. Its only facilities are a temporary trailer used for storage, a kiosk and refuge entrance sign, and an access road and small parking area. All equipment and staff are transported as needed from Wallkill River Refuge, about a 1-hour drive away.

Special Use Permits, Including Research

At present and in the recent past, all of our special use permits have been issued to conduct inventories and research. In 2002, we issued a permit to the Wildlife Conservation Society to conduct amphibian and reptile surveys on the refuge. In 2004, we issued a permit to Southern Vermont College to conduct vegetation surveys and test vegetation sampling techniques. In 2005, we issued a permit to Audubon New York to conduct breeding bird surveys. For several years now, we have permitted and cooperated in a study on the impact of using insects as biological control agents for purple loosestrife. That research, initiated by and funded through NYSDEC, is coordinated by Dr. Bernd Blossey of the Department of Natural Resources, Cornell University, in collaboration with Victoria Nuzzo of Natural Areas Consultants. Details on each of these projects can be obtained from the Wallkill River Refuge Headquarters.

Our Partnerships

As a relatively new refuge, developing strong partnerships is critical to achieving our mission. Refuge partnerships, described below, are few at present, but very important in helping to implement our goals and objectives.

New York State Department of Environmental Conservation

We are pleased with the positive relationship we have with the NYSDEC. In addition to participating on our planning team, they have shared data on Federal- and State-listed species and other ecologically diverse areas in the greater Hudson and Wallkill River Valley. They also actively work with local communities to increase the protection of State-listed threatened and endangered species and important migratory bird habitat.

Audubon New York

This organization provided a major supporting role in the establishment of the refuge. Audubon New York designated the former Galeville Airport as an Important Bird Area in 1998. That designation brought awareness of the value of the site for grassland-dependent birds and helped justify its protection as a refuge. Further, Audubon New York has been a steadfast supporter of our position that model airplane flying is not compatible with the mission of the Refuge System or the purposes of the refuge.

Audubon Society, Rockland Chapter

This organization has helped secure funds for the printing of a refuge bird brochure and other items that support wildlife observation. This brochure is still the only publication developed specifically for the refuge.

Edgar A. Mearns Bird Club

This club has actively supported the presence of the refuge and contributed a bench, which has facilitated wildlife observation on the refuge.

John Burroughs Natural History Society

This organization conducts annual grassland breeding bird surveys using standard Service protocol. This monitoring is a critical component of our grassland bird management program.

Wildlife Conservation Society, Metropolitan Conservation Alliance

This organization (MCA) has identified areas outside the refuge of conservation importance and has provided training opportunities for local governments near the refuge in balancing economic growth and development with natural resources protection. Their efforts have assisted the refuge by creating positive and more open communication with municipalities regarding natural resource stewardship. The MCA has also conducted herpetological surveys on the refuge to provide more information to our refuge database.

Wallkill River Task Force

This group is a bi-state, multi-agency organization developed to bring more awareness to the Wallkill River. The task force has proven very successful in raising local and municipal official awareness, increasing support for protection of the river, and providing opportunities for the public to access the river. Their support for the river has resulted in increased knowledge and support for the refuge.

Wallkill River
USFWS photo

Volunteers and Friends Programs

Although small, our volunteer program at the refuge overlaps our other partnerships, and soon will become more established. It now consists primarily of members of the John Burroughs Natural History Society, who conduct bird surveys; refuge neighbors, who monitor the refuge for problems; and, a number of local residents, who have offered to do various tasks at the refuge. We would like a Friends Group to form in the future, but none has been initiated to date.

Physical and Biological Resources on the Refuge

Topography and Soils

Decades of disturbance to the soils of the refuge include logging, agriculture, and the construction of an airport (Stevens 1992). Local residents recount that its runways and taxiways were created by filling wetlands with thousands of tons of fill imported from nearby floodplains during the 1940s. The concrete runways and asphalt taxiways, comprising 30 acres total, still exist although they have not been maintained and are breaking up in many places. The two runways, running perpendicular to each other, are each approximately 3,500 linear feet, and 100 feet wide. An outer perimeter taxiway extends 7,300 linear feet, and 43 feet wide, and connects to the runways via 7 connector taxiways which are each 415 feet long and 43 feet wide. The airfield pattern can be seen on Map 1-2 in Chapter 1. In addition to the runways and taxiways, an extensive system of cement culverts was installed to drain water from the airfield. That drainage system feeds into an eroded, channeled stream. However, Stevens also describes soils located farther from the runways as less disturbed. Only the surface layer (A–horizon) of those soils has been mixed. Chapter 4 describes our plans to restore the runways to more native habitats.

Perched wetlands and wetland plant communities cover about 400 acres on the refuge (Stevens 1992), where high clay content in the upper soil horizons prevents the downward percolation of rainwater and snowmelt. In fact, the groundwater table is more than 3 feet below the surface throughout much of the refuge, where pits and channels between eroded earthen hummocks characterize the ground surface. That pit and hummock topography may result from freezing and thawing in the saturated surface layer of the soil.

Federal-Listed Threatened or Endangered Species and Other Rare Species or Habitats of Concern

No Federal-listed species are known to inhabit the refuge. However, in August 2005 we learned from our Ecological Service's New York Field Office that a hibernaculum of 30,000 Indiana bats (*Myotis sodalis*), a Federal endangered species, lies in Ulster County 18 miles to the northeast of the refuge. In addition, there is documented summer roosting by these bats nine miles to the north and south of the refuge. This new information indicates that the refuge could provide potential roosting and foraging habitat for these bats since they appear to be in the vicinity. Our New York Field Office provided a fact sheet describing habitat requirements for these species to help guide us in evaluating whether a refuge project would impact potential Indiana bat habitat. Some of the highlights on Indiana bat habitat from the fact sheet include:

- They typically hibernate in caves and mines during the winter and roost under bark or in tree crevices in the spring, summer, and fall;
- Their roost habitat is characterized by a live or dead tree, $\geq$ 5 inches d.b.h., with exfoliating or defoliating bark, or containing cracks or crevices accessible to bats;
- Maternity colonies generally use suitable trees $\geq$ 9 inches d.b.h.;
- Tree structure appears to be more important than a particular tree species or habitat type;

- Streams, floodplain forests, and impounded water bodies provide preferred foraging habitat, and bats may travel 2-5 miles from roost sites to forage; and,
- Other foraging habitat includes forest canopies, open fields, along cropland borders and wooded fencerows; and over farm ponds and pastures, all within proximity to tree cover.

The 1999 Agency Draft Indiana Bat Revised Recovery Plan provides additional descriptions of habitat, natural history, threats, and recommendations for recovery across the species' range. This plan can be accessed at: *http://nyfo.fws.gov/es/ibatdraft99.pdf* . We will continue to work with our New York Field Office to obtain the latest information on where bats are located, and to assess the implications to our refuge management.

Appendix A lists State-listed species and other species of management concern, many of which are described in more detail below.

Several rare or uncommon plants grow on the refuge. Stevens documented one of the most noteworthy, Frank's sedge (*Carex frankii*), which is ranked endangered by the NYSDEC and S1 by the New York Natural Heritage Program (NYNHP) (Stevens 1992). Stevens also documented small-flowered agrimony (*Agrimonia parviflora*), purple milkweed (*Asclepias purpurascens*), small white aster (*Aster vimineus*), Bush's sedge (*Carex bushii*), coontail (*Ceratophyllum echinatum*), and watermeal (*Wolffia brazilinsis*).

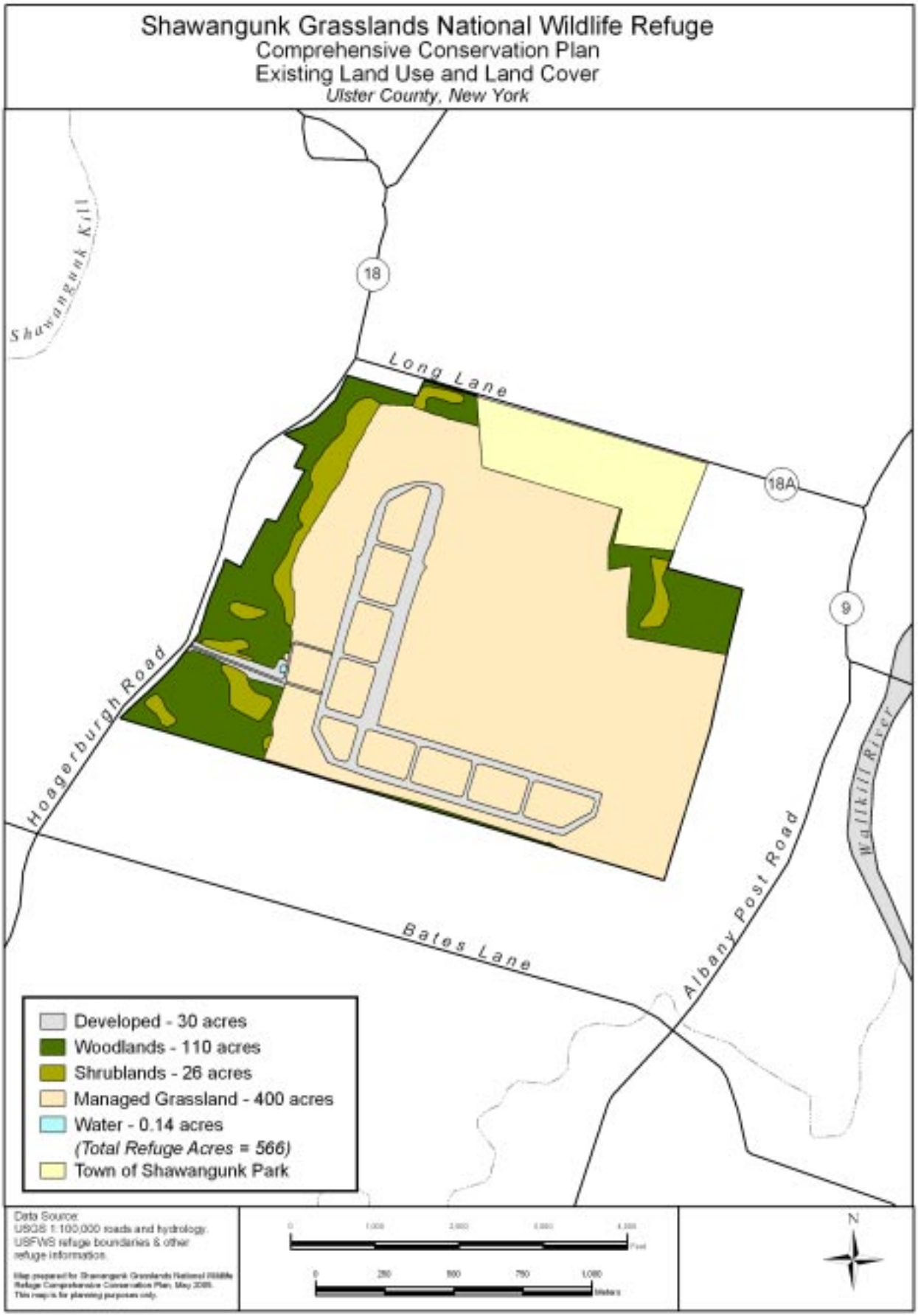
Vegetation and Habitat Types

Wetlands

The refuge comprises 566 acres, of which 400 acres are managed as open fields or grassland, but were classified by Stevens as a "seasonal perched wetland." Stevens (1992) delineated and described those wetlands before the refuge was established. The soils of those areas have a high clay content in the upper horizons, which prevents downward percolation of rainwater and snowmelt. Consequently, they often have standing water into the growing season, but dry out every year. The primary wetland plants include the invasive purple loosestrife (*Lythrum salicaria*), reed canary-grass (*Phalaris arundinacea*), and common reed (*Phragmites australis*). An additional 136 refuge acres is comprised primarily of upland hardwood woodland and some shrubland in transition to woodlands (see map 2–1). The remaining 30 acres of asphalt and concrete runway and taxiway is described above under the topography and soils discussion above.

Grasslands

Most of the 400 acres of the refuge actively managed as open field or grassland habitat is dominated or co-dominated by Kentucky bluegrass (*Poa pratensis*). However, several broadleaf herbaceous plants are also common, including bedstraw (*Galium sp.*), beard-tongue (*Penstemon digitalis*), slender mountain-mint (*Pycnanthemum tenuifolium*), goldenrod (*Solidago spp.*), aster (*Aster spp.*), and common milkweed (*Asclepias syriaca*). The wetlands plants listed


Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Existing Land Use and Land Cover
Ulster County, New York
Shawangunk Kill
18
Long Lane
18A
9
Hoagerburgh Road
Bates Lane
Albany Post Road
Wallkill River
Developed - 30 acres
Woodlands - 110 acres
Shrublands - 26 acres
Managed Grassland - 400 acres
Water - 0.14 acres
(Total Refuge Acres = 566)
Town of Shawangunk Park
Data Source:
USGS 1:100,000 roads and hydrology.
USFWS refuge boundaries & other refuge information.
N

above are also common. Unfortunately, the invasive purple loosetrife is a major component. Trees scattered throughout the grassland include the white ash (*Fraxinus americana*), American elm (*Ulmus americana*), eastern red cedar (*Juniperus virginiana*), and pin oak (*Quercus palustris*).

Our primary habitat management objective on the 400 acres has been to maintain the dominance of grasses in those fields. Without frequent management, natural succession will shift that dominance to broadleaf herbaceous plants and shrubs, and ultimately to trees, causing the refuge to lose its suitability as habitat for grassland-dependent birds. In particular, our current treatment methods aim at suppressing goldenrod, purple loosestrife and gray dogwood (*Cornus racemosa*). Mowing is now our primary technique to halt that succession. We have been mowing 200 to 300 acres annually since 2000. In Chapter 4 we describe our plans to expand the grassland and consider other management techniques, such as haying, grazing, discing, revegetating, applying herbicides, and prescribed burning.

Upland Forest and Shrublands

The 110 acres of woodlands on the refuge are classified primarily as mixed oak-hardwood forest (see Map 2-1). Dominant species include red oak (*Quercus rubra*), white oak (*Q. alba*), pin oak, black oak (*Q. velutina*), red maple (*Acer rubrum*), sugar maple (*A. saccharum*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*), and tulip tree (*Liriodendron tulipifera*). We are allowing the 26 acres in small patches now dominated by shrubs and surrounded by woodland to succeed to woodland.

Ponds

A one-tenth-acre artificial pond created several decades ago by the damming of a drainage ditch stands near the entrance to the refuge. It supports a small warm-water fishery dominated by largemouth bass (*Micropterus salmoides*) and sunfish (*Lepomis spp*), but does not have significant value for wildlife. Fishing there has not been permitted; however, it will be allowed under this CCP.

Pumpkinseed
USFWS photo

Invasive Species

Purple loosestrife is the most abundant, invasive, non-native species on the refuge. Although typically found in emergent marshes, that species has become co-dominant in refuge grassland and wet meadow habitats. The extensive soil alterations during airport construction probably facilitated its invasion by yielding bare soils and a perched water table, thus creating ideal conditions for germination.

A root-mining weevil (*Hylobius transversovittatus*) has been released as a biological control agent of purple loosestrife at the refuge. Although the weevil population has increased annually, it has not had a profound effect. We are cooperating in a Cornell University study of the interaction of the weevils, loosestrife, and mowing at the refuge. Leaf beetles (*Galerucella sp.*) also have been released on the refuge. The leaf-feeding beetles do not appear to have established themselves at the release sites. A native flea beetle is also feeding heavily on purple loosestrife at the refuge and in surrounding areas. We will continue to monitor its impact.

Birds

Breeding, migrating and wintering grassland-dependent birds are our management focus. However, the refuge supports many other species. More than 141 species of birds, including 58 breeding species, have been documented. We maintain an annotated bird list on our website *http://shawangunk.fws.gov*.

Grassland Birds

The refuge is among a dwindling number of sites in New York State, and one of only two sites in the Hudson Valley, large enough to support the entire assemblage of Northeastern grassland birds (NYSDEC and Office of Parks, Recreation and Historic Preservation 2002). This diversity led to our identifying the "Galeville Grasslands" as a significant habitat in the New York Bight watershed (USFWS, 1997). Subsequently, the Hudson River Estuary Biodiversity Project Steering Committee identified the refuge as a Biodiversity Focus Area in the Hudson River Valley (Penhollow 1999). Further, Audubon New York named the refuge an Important Bird Area, a designation given only to places that support significant abundance and diversity of birds (Wells 1998).

Grassland-dependent birds have declined more consistently and over a wider geographic area during the last 30 years than any other group of North American birds (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. The NYSDEC (1997) list of endangered, threatened, and special concern species includes short-eared owl (endangered), northern harrier, upland sandpiper, Henslow's sparrow (threatened), and horned lark, grasshopper sparrow, and vesper sparrow (special concern). Our Northeast Region list of Birds of Conservation Concern (2002) includes upland sandpiper, short-eared owl, and Henslow's sparrow. Partners-In-Flight (PIF) lists upland sandpiper, Henslow's sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region in which the refuge lies (Pashley et al. 2000). The North American Bird Conservation Initiative (NABCI) ranks Henslow's sparrow as a priority species in the Appalachian Mountain Bird Conservation Region (U.S. NABCI Committee 2000). All of these species can be found at the refuge sometime during the year.

The refuge is recognized as one of the most important grassland bird nesting areas in the state (Wells 1998). It hosts nesting birds such as the northern harrier, upland sandpiper, grasshopper sparrow, Henslow's sparrow, savannah

Bobolink
Scott A. Vincent ©

sparrow, vesper sparrow, eastern meadowlark, and bobolink. We conduct point-count surveys of breeding grassland birds at the refuge in cooperation with the John Burroughs Natural History Society (see "Our Partnerships," above). Those "singing male" surveys document maxima of 8 upland sandpipers, 91 bobolinks, and 68 eastern meadowlark (U.S. Fish and Wildlife Service 2002, unpublished data). Further, a maximum of 15 Henslow's sparrows have been reported during the breeding season (Treacy 1982). Table 2–1 summarizes our survey data from 1998 to 2004. Evidence of breeding short-eared owls has been observed, but their nesting has never been confirmed.

The primary wintering grassland birds at the refuge include northern harrier, short-eared owl, horned lark, and eastern meadowlark. According to Wells, up to 16 short-eared owls and 6 northern harriers have been observed at the refuge in winter, as well as flocks of 60 to 80 horned larks. Refuge winter raptor surveys frequently document 7 to 9 short-eared owls and 12 to 17 northern harriers (USFWS 2003, unpublished data). Remarkably, the John Burroughs Natural History Society (1969) reported a maximum of 21 short-eared owls, and Askildsen (1993) reported a maximum of 36 northern harriers.

The refuge also provides important habitat for migrant grassland birds in spring and fall. Northern harriers migrating along the Shawangunk Mountains often stop at the refuge to rest and forage. Migrant short-eared owls arrive at the refuge in early November and depart in late April. Flocks of up to 100 bobolinks gather at the refuge in August and September, and flocks of up to 50 eastern meadowlarks in April, October, and November. As many as 19 vesper sparrows have been counted at the refuge in October (Kahl, USFWS 2001, personal observation).

Table 2–1. Grassland birds breeding on the refuge 1998–2004

Species	Maximum	Years
northern harrier	1	2002 and 2003
upland sandpiper	8	2001 and 2002
grasshopper sparrow	2	1998, 2002 and 2003
Henslow's sparrow	2	2002 and 2003
savannah sparrow	14	1998
vesper sparrow	2	2003
eastern meadowlark	68	1998
bobolink	91	2004

Other Birds of Conservation Concern

Several non-grassland-dependent bird species on the refuge also appear on the State list of endangered, threatened and special concern species (NYSDEC 1997). Loggerhead shrikes (endangered) used to be an uncommon, but regular

migrant at the refuge. They are now very rare. Large flocks of common nighthawks (special concern) forage over the refuge during migration, and have been reported to use the runways as daytime roosts. Sharp-shinned hawk, Coopers hawk, northern goshawk, and red-shouldered hawk (special concern) rest and forage at the refuge in winter, spring, and fall. Peregrine falcons (threatened) have been seen at the refuge during fall migration. Refuge birds on our Northeast Region list of Birds of Conservation Concern, the Partners-In-Flight (PIF) list of high conservation priority species (Pashley et al. 2000), and the North American Bird Conservation Initiative (NABCI) priority species list (U.S. NABCI Committee 2000) include black-billed cuckoo, red-headed woodpecker, yellow-bellied sapsucker, wood thrush, and prairie warbler.

Mammals, Reptiles, Amphibians, Fish, and Invertebrates

We have not conducted systematic surveys on the refuge for mammals, reptiles, amphibians, fish, or invertebrates. However, the wood turtle (*Glyptemys insculpta*) and spotted turtle (*C. guttata*), State-listed species of special concern, have been documented on the refuge.

Contaminants

Even though no significant evidence of serious or widespread environmental contamination appears on the refuge, our New York Field Office and members of the public have expressed concern that its previous use as a military airport may have left some contaminants. For example, the communications center, demolished around 1973, may have contained PCBs, heavy metals, petroleum products or asbestos, which could now be present in soils or groundwater. An environmental engineer from our Division of Engineering, Environmental and Facility Compliance, made the following recommendations for the site:

1. Dispose of old treated timbers and telephone poles (now completed) and test the underlying soil for contaminants.
2. Conduct a Phase I environmental site assessment, in accordance with the standards of the American Society for Testing and Materials (ASTM). That assessment will determine whether hazardous materials are present on the refuge, whether additional testing may be necessary, and identify any corrective actions that may be required.

Public Use on the Refuge

Priority Wildlife-Dependent Public Uses

The refuge has been currently open for wildlife observation and photography, environmental education and interpretation. Bird watching is the most popular activity. Visitors travel from within New York and from adjacent states to view breeding grassland birds and wintering birds of prey. Public access is limited to foot traffic on the existing runways. Access by ski and snowshoe is permitted in winter. Visitor facilities consist of a kiosk with brochures and refuge information, and a parking lot that can accommodate up to five cars. Refuge trails are open year-round 1 hour before official sunrise to 1 hour after official sunset. Hunting has not been previously allowed, but archery hunt will be implemented under this CCP. Fishing has also not previously been allowed in the small man-made pond, but it will also be a new activity allowed with implementaion of this CCP.

Non-wildlife-Dependent Public Uses

We have observed several unauthorized public uses at the refuge, including people walking dogs, jogging, bicycling, riding horses, using all-terrain vehicles and other motorized vehicles, landings and take-offs by private planes on the runways. Since the refuge was established, we have not allowed those activities for several reasons. First, these activities are not wildlife-dependent recreational uses, nor are they necessary for the safe, practical, or effective conduct of a priority public use. Second, based on our observations at this site, birds are more likely to flush from nests and foraging areas in response to these activities, in comparison to a birdwatcher or photographer on foot. Finally, because of this open setting, these activities are likely to interfere with visitors who are engaging in priority public uses.

Despite regulations against these activities, many of them persist and they remain law enforcement issues. In the past, our refuge law enforcement officer concentrates on providing visitor safety on our trails and monitoring and enforcing refuge regulations.

On the refuge's northern boundary, the Town of Shawangunk has a 55-acre parcel planned for a town park (see map 2-1). At present, there are no developments except for a gravel driveway. However, we expect that once additional funding is secured, town officials will follow through with their plans to develop recreational athletic fields. Since no physical barrier, either natural or manmade, is currently planned between ownerships, the developed park may result in occasional non wildlife-dependent activities, such as dog-walking, jogging, horseback riding, and bicycling, drifting onto the refuge. Through outreach, education, and law enforcement we will try to prevent these activities from moving onto refuge lands.

Model airplane flying is another nonwildlife-dependent activity that received a lot of attention when the refuge was first established. In 2001, we drafted a compatibility determination on flying model airplanes and competitive model airplane events on the refuge. In developing that draft, we conferred with NYSDEC and the leading grassland bird researchers in the Northeast. We also consulted local bird experts with a thorough knowledge of the refuge, and completed an extensive review of the ornithological literature. We found scientific evidence that model airplane activities will negatively impact the grassland-dependent birds for which the refuge was established. Consequently, our compatibility determination stated that model airplane activities and competitive events are not compatible, and that this use would not be allowed. We released the draft compatibility determination for a 75-day period for public review on November 26, 2001. We received approximately 2,300 responses, and carefully reviewed them, including about 1,650 form letters from model airplane enthusiasts.

The Regional Chief of the National Wildlife Refuge System approved a final compatibility determination on February 20, 2002 (appendix B). It determines that model airplane flying and competitions will have direct and indirect negative effects on the wildlife being managed at the refuge and on the public visiting the

refuge seeking a wildlife-dependent experience, and will materially interfere with and detract from the fulfillment of the Refuge System mission and refuge purposes. The final compatibility determination concludes that model airplane flying and competitions are not compatible uses, and will not be allowed on the refuge.

Chapter 4

Savannah sparrow
Scott A. Vincent©

Management Direction and Implementation

- Introduction
- General Refuge Management
- Refuge Goals, Objectives and Strategies
- Implementation, Monitoring and Revision

Introduction

This CCP includes an array of management actions that, in our professional judgment, work towards achieving the refuge purposes, the vision and goals for the refuge, and State and regional conservation plans. In our opinion, it will effectively address the key issues. We believe it is reasonable, feasible, and practicable.

In all program areas, this CCP will enhance the quality and sustainability of current resource programs, develop long-range and strategic step-down plans, promote partnerships, and restore grassland for the species of management concern, dependent on this habitat type.

Relating Goals, Objectives, and Strategies

We presented our goals in Chapter 1; they are further detailed as objectives and strategies in this chapter. The relationship between goals, objectives, and strategies follows. Goals are intentionally broad, descriptive statements of the desired future condition of the refuge. By design, they are less quantitative than prescriptive in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statement, provide a foundation for developing specific management objectives, and are shared by all of the alternatives.

Objectives are incremental steps toward achieving a goal; also, they further define the management targets in measurable terms. They also provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. The Service guidance in "Writing Refuge Management Goals and Objectives: A Handbook" (January 2004) recommends that objectives possess five properties. They should be "SMART": (1) specific; (2) measurable; (3) achievable; (4) results-oriented; and (5) time-fixed.

A rationale accompanies each objective to explain its context and why we think it important. We will use the objectives in this CCP in writing refuge step-down plans, including its habitat management plan. We will measure our success by how well we achieve those objectives.

For each objective, we developed strategies: specific actions, tools, techniques, or a combination of those that we may use to achieve the objective. In the process of developing refuge step-down plans, we may revise some of the strategies, but most will translate directly into those plans.

General Refuge Management

We primarily developed our management direction hierarchically from goals to objectives and strategies. However, we also found that there were many actions we wanted to highlight that either relate to multiple goals or represent general administrative or compliance activities. These are presented below.

Refuge Step-down Plans

The following are the step-down management plans scheduled for completion. This schedule depends on obtaining the staffing and budgets indentified in appendixes D and E.

- Habitat Management Plan (HMP), within 1 year of CCP approval (see discussion below)
- Habitat and Species Inventory and Monitoring Plan (HSIMP), within 2 years of CCP approval (see discussion below)
- Fire Management Plan accompanies this CCP (see appendix F)

Habitat Management Plan

A HMP plan for the refuge is the requisite first step to achieving the objectives of goals 1–3, regardless of the alternative. For example, the HMP will establish what specific actions are necessary to manage, enhance, or restore important habitats and minimize impacts on significant species. It will also establish the timing for those actions, and define how we will measure success. We will use current resource information to write the plan, but will update it with new information as needed. It is the highest priority step-down plan to accomplish. The HMP will include the following actions in this CCP.

Mowing. We will continue to mow, cut, or hydro-axe brush to manage habitat and control vegetation in areas such as trails accessible by visitors. Mowing also maintains grass dominance and suppresses broadleaf herbaceous plants, shrubs, and trees.

Purple loosestrife – an invasive, exotic plant widespread on the refuge
USFWS photo

Controlling non-native invasive plants. National and regional teams of experts have convened to deal with the priority issue of controlling non-native invasive or exotic plant populations in the Refuge System. As a group, those plants tend to be aggressive in establishing themselves, and frequent and thorough treatments are required to control them. We need to remain vigilant to prevent their expansion to new areas. We will control their presence and spread, primarily by the continued use of mowing and biological control agents. However, effective vegetation management often requires a combination of treatment methods, and this CCP provides for a range of management actions including the use of prescribed fire, herbicides, haying, and grazing. Purple loosestrife is a particular concern on this refuge.

Managing woodlands. We will maintain the 136 acres of mature hardwood woodland (>60 years old), and the shrubland transitioning to woodland, on the perimeter of the refuge for forest-dependent wildlife. That strip of woodland cannot be converted effectively to grassland habitat. Furthermore, the woodland supports nesting black-billed cuckoo and wood thrush, both forest-dependent

migratory species of high conservation priority. In addition, the refuge is located in the proximity of known summer roost sites for the Indiana bat, a Federal-listed species. Therefore, these woodlands could provide potential roosting and foraging habitat for Indiana bats.

Habitat and Species Inventory and Monitoring Plan

A HSIMP for the refuge is another priority for completion. It is vital for measuring our success in meeting objectives. It will outline the methodology to assess whether our original assumptions and proposed management actions are, in fact, supporting our habitat and species objectives. The results of inventories and monitoring will provide us with more information on the status of refuge natural resources and allow us to make more informed management decisions. A high priority survey to continue is the annual refuge surveys of breeding grassland birds according to Region 5 protocol.

Widlife Diseases

It is our intent to be alert to the potential presence and spread of wildlife diseases on the refuge, especially since chronic wasting disease has been documented in New York. The spread of avian influenza is another concern. We will adhere to Service policy which states, "....prevent and control wildlife diseases on refuges wherever practical or possible. While some loss from disease is inevitable, management practices will be directed at minimizing these losses. The Service will take a leadership role in developing better methods for wildlife disease control and fostering cooperative control activities" (7 RM 17). Our region is in the process of developing a plan to address chronic wasting disease and any relevant strategies applicable to this refuge will become part of this CCP. Other wildlife disease contingency planning may also be developed in the future and incorporated as warranted.

Volunteering and Partnership Opportunities

We will promote existing partnerships, new partnerships, and valuable volunteer opportunities. Those relationships are vital in successfully managing all aspects of the refuge, from protecting land to managing habitat and species and providing wildlife-dependent recreation. One potential example is establishing a partnership with the Town of Shawangunk in developing a trail system and providing other compatible activities.Chapter 3 lists many of our partners in conservation. We will also pursue new partnerships in areas of mutual interest that benefit refuge goals and objectives.

Determining Compatibility

Chapter 1 describes the requirements for compatibility determinations. Our management actions include our 2002 decision on model airplane flying and model airplane competitive events, which determines that those activities are not compatible and are not allowed on the refuge (appendix B). Appendix B also includes the following compatibility determinations: grazing; haying; archery deer hunting; public fishing; wildlife observation, nature photography, environmental education, and interpretation; and, research conducted by non-Service

personnel. This CCP includes the final, approved compatibility determinations that conform to the refuge purposes, vision and goals. We will continue to prohibit the walking of pets, jogging, bicycling, riding horses, driving all-terrain vehicles, model airplane flying and competitions, and the touching down, taking off, or acrobatic flying of aircraft on the refuge.

Non-wildlife- Dependent Public Uses

The refuge is currently open to four of the six-priority wildlife-dependent public uses including wildlife observation, nature photography, and environmental education and interpretation. The remaining two priority wildlife-dependent public uses will be allowed under approval of this CCP. Access for all of these activities is limited to foot traffic only on designated trails, except during winter, when cross-country skiing and snowshoeing are allowed modes of access because they can facilitate priority wildlife-dependent public uses with little to no environmental impact.

Other non-wildlife-dependent public uses, and requests for modes of transport other than foot, have not been allowed for one or more of the following reasons:

1. We have observed the activity disturbing wildlife to a greater degree than impacts generated from visitors who's purpose is to watch or photograph wildlife;
2. The activity could contribute to soil erosion;
3. The activity could spread invasive species;
4. The activity interferes with or raises safety concerns with visitors who are engaging in priority wildlife-dependent public uses; and,
5. It is not an activity necessary for the safe, practical, or effective conduct of a priority wildlife-dependent public use in this open and small refuge setting.

Fishing and Hunting

Other than an archery season for white-tailed deer, we will not open the refuge to hunting, baiting, or the stocking game or non-native fish. We will open the pond to fishing within one year of CCP approval (Objective 4d).

Other State Hunting Seasons

The Refuge Improvement Act identifies hunting as a priority public use. As such, hunting is a compatible use in the refuge and should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable, and appropriate. Chapter 1 identifies hunting as a key issue because we heard a wide range of opinions in public scoping on whether, or how, it should occur.

After public scoping, our core planning team began discussions on the possibility of a hunting program by reviewing the purposes of the refuge. Nothing precluded hunting, assuming it could be done in a safe manner and without impacting non-game grassland-dependent migratory birds or degrading their

habitat on the refuge. We reviewed all State hunting seasons in Wildlife Management Unit 3J, and discussed which seasons might conform with the purpose of the refuge and result in safe, high-quality opportunities for hunting.

We eliminated spring turkey season because it occurs during the breeding and nesting season for grassland birds, and hunter activities could directly disturb adult grassland birds, their nests, or eggs. We did not consider small game seasons that begin in the fall, because most of those species are important prey for wintering raptors. We also eliminated hunting seasons, including furbearer seasons, which occur when wintering raptors are concentrating on the refuge and foraging throughout its grasslands.

We considered big game hunting for bear and white-tailed deer. We eliminated bear hunting due to the small hunt area available on the refuge and the unlikely presence of bears. We also eliminated the gun season for white-tailed deer because of human health and safety and the potential disturbance to wintering raptors. The use of muzzle loading weapons, handguns, shotguns, and rifles were determined to be unsafe, given the size of the refuge hunt area and the close proximity to private residences and other hunters.

We determined that the white-tailed deer archery season is the only hunting season that would result in a safe, high-quality hunting experience with minimal to no disturbance to the grassland-dependent birds and their habitats. We will issue fee permits to help administer and monitor the program (See goal 4, objective 4 c). The majority of hunters will hunt from tree stands in the woodlands on the perimeter of the grasslands, generally only needing to enter the grasslands to retrieve their game. Archery hunting for white-tailed deer is consistent with the refuge purposes (see appendix B, compatibility determination for archery deer hunting).

Stocking Fish and Wildlife

During public scoping, we received questions about whether or not we would allow things such as stocking ring-necked pheasant in the grasslands or stocking sunfish in the small pond. Our decision is that we will not allow stocking of non-native fish or wildlife. Generally, refuge management strives to promote intact, self-sustaining habitats and species populations that existed during historic conditions. In other words, we define a "native" species as one that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

The Refuge Improvement Act stipulates that "In administering the System, the Secretary shall...ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans...." One of several Service policies generated from that act is contained in the Service Manual: 601 FW 3, "Biological Integrity, Diversity, and Environmental Health."

Part 3.14(f) of that policy states "We do not introduce species on a refuge outside their historic range or introduce a species if we determine they were naturally extirpated, unless such introductions are essential for the survival of the species and prescribed in an endangered species recovery plan, or is essential for the control of an invasive species and prescribed in an integrated pest management plan."

Also, we are not proposing any action to eliminate the population of pheasants on the refuge. That inaction also adheres to Service policy. Part 3.16(b) of the policy states "We require no action to reduce or eradicate self-sustaining populations of non-native, non-invasive species unless those species interfere with accomplishing refuge purpose(s). We do not, however, manage habitats to increase populations of these species unless such habitat management supports accomplishing refuge purpose(s)."

Permitting Special Uses

The refuge manager will evaluate activities that require a special use permit for their appropriateness and compatibility on a case-by-case basis. All commercial or economic uses and all research projects require special use permits. Research on species of concern and their habitats will continue as a priority. Generally, we will approve permits that provide a direct benefit to the refuge, or for research that will strengthen our decisions on managing natural resources on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but to the protection or enhancement of native species and biological diversity in the region. To maintain the natural landscape, any proposals for permanent or semi-permanent structures would not be allowed except under extenuating circumstances, and would comply with the requirements of the National Historic Preservation Act.

All researchers will be required to submit detailed research proposals that comply with Service policy in the FWS Refuge Manual, part 4, section 6. Special use permits also must identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other final reports. All publications will acknowledge the Service and the role of Service staff. We will ask our refuge biologists, other divisions of the Service, and State agencies to review and comment on research proposals, and will share research results internally and with the NYSDEC.

Some projects, such as depredation and banding studies, require additional Service permits. The refuge manager will not approve those projects until all of the consultation requirements of the Endangered Species Act have been met.

Removing Contaminants and Debris

We will continue our coordination with the Federal Bureau of Investigation on the removal of building foundations. We will also continue our coordination with the Department of Defense on the evaluation and removal of contaminants, scrap metal and other building debris, and building foundations. While water and soils samples indicate no contamination is present, if we encounter additional buried materials, we will seek their involvement in its removal.

We have also been exploring the most effective and efficient way to restore the runways and taxiways causing the least disturbance to natural resources and allowing for recycling the materials to the extent practicable. Our investigation to date has been sporadic, occurring when funding and staff time allowed. With the implementation of this CCP we will complete the investigation, and initiate a plan to restore the runway.

Sharing Refuge Revenue Payments

As we describe in chapter 3, we pay the Town of Shawangunk a refuge revenue sharing payment based on the acreage and value of refuge land in their jurisdiction. The payments are calculated by formula, and funds are appropriated by Congress. We will continue those payments in accordance with the law, commensurate with changes in the appraised market values of refuge lands or new appropriations by Congress.

Wilderness Review

As we described in chapter 1, Refuge planning policy requires that we conduct a wilderness review during the CCP process. The first step is to inventory all refuge lands and waters in fee title ownership. Our inventory of this refuge determined that no areas meet the eligibility criteria for a Wilderness Study Area as defined by the Wilderness Act. Therefore, we do not need to further analyze the refuge's suitability for wilderness designation. The results of the wilderness inventory are included in Appendix C. The refuge will undergo another wilderness review in 15 years as part of the next planning process.

Protecting Cultural Resources

As a federal land management agency we are entrusted with the responsibility to locate and protect all historic resources, specifically archeological sites and historic structures eligible for or listed in the National Register of Historic Places on the refuge or on land affected by refuge activities, and any museum properties. An evaluation of the effects of our actions on archeological and historical resources, and consultation with respective State Historic Preservation Offices (SHPO), is required under section 106 of the National Historic Preservation Act. In New York, the State Historic Preservation Office is located in the State Office of Parks, Recreation, and Historic Preservation. We will comply with the Act, which may require any or all of the following: a State Historic Preservation Records survey, literature survey, or field survey. We have submitted this CCP to New York SHPO for their comments and have addressed their comments.

As described in Chapter 3, there are no known archeological or historic sites on the refuge; However, we will continue to comply with section 106 of the National Historic Preservation Act as we implement this CCP. In addition, within 5 years of CCP approval, and assuming funding can be secured, we would like to conduct an archeological overview of the refuge to provide background information for future surveys, including an evaluation of its prior disturbance history, and to obtain facts for our interpretive displays. As part of this overview, we may collect oral history about undocumented aspects of the property's recent past.

Protecting Land

We would like to see all unprotected lands with high biodiversity values within the focus area under conservation ownership, easement, or cooperative management. We plan to work with neighboring landowners and other conservation partners to facilitate their protection of its habitat. We do not propose Service land acquisition at this time.

Suppressing Wildfires

We include the wildfire suppression strategies laid out in the Fire Management Plan (appendix F).

Maintaining Facilities

We will continue the periodic maintenance and renovation of existing facilities to ensure the safety and accessibility for staff and visitors. Our current facilities include the 0.2-mile access road, visitor parking area, kiosk and refuge sign, and a trailer we use for storage. All new planned facilities (e.g., interpretative trail) will also be maintained to standards. Appendix D lists our RONS and our MMS projects already in the respective databases.

Operating Hours

We will open the refuge for public use from 1 hour before official sunrise to 1 hour after official sunset, seven days a week, to ensure visitor safety and protect refuge resources. At the refuge manager's discretion, special use permits may allow organized, nocturnal activities, such as celestial observation or wildlife research.

Refuge Goals, Objectives and Strategies

Introduction

The following goals, objectives and strategies are designed to enhance the quality, effectiveness, and sustainability of our management priorities. In the biological program, our priority will continue to be grasslands management to benefit breeding grassland migratory birds and wintering raptors. Our goal will be to create a diverse mosaic of grassland habitat structure capable of sustaining the full complement of grassland-dependent birds during all seasons. We will manage the various grassland structural types (short, medium, tall) as a shifting mosaic over time. We will also increase the available grasslands by up to 30 acres through the restoration of the asphalt and concrete runways and taxiways. We will plan to restore the natural hydrology of the area after evaluating the drainage system while ensuring consistency with our grassland habitat program. We will complete our step-down plans and utilize adaptive management to react quicker to new information. In addition, we will strengthen our biological inventory and monitoring program to allow us to better evaluate our programs and make more informed decisions. Map 4–1 depicts the habitats which will result with implementation of this CCP.

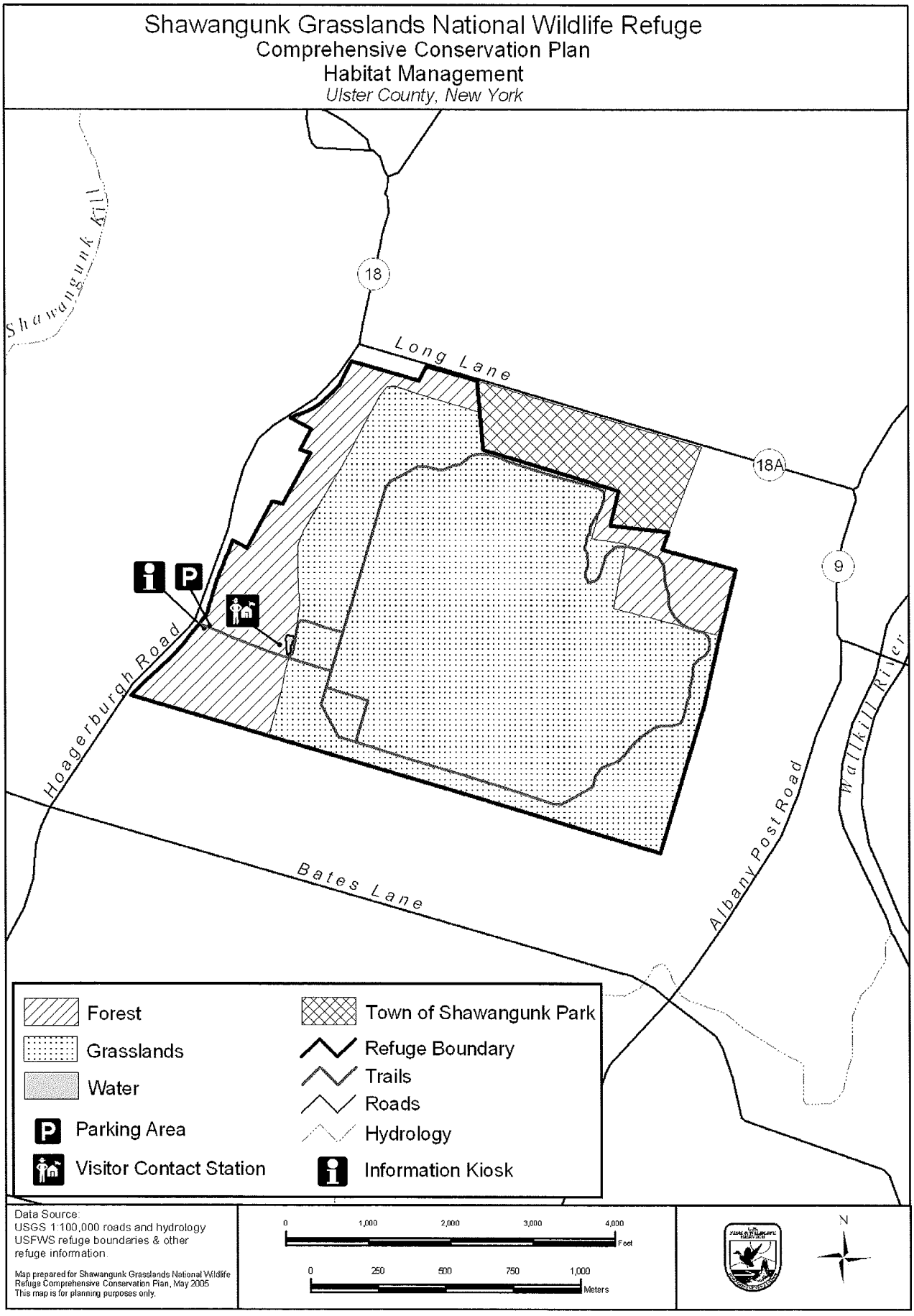
In the visitor services program, we will increase priority wildlife-dependent public uses, especially in wildlife observation, photography and environmental interpretation. We will develop an interpretive trail that affords great opportunities for viewing, photographing, and interpreting the refuge grasslands and management techniques. We will open the refuge to a white-tailed deer archery hunt, under a fee permit, and open the refuge pond to fishing. We expect an overall increase in visitation of approximately 50 percent over current levels by implementing these programs. Map 4–2 depicts the public use opportunities with implementation of this CCP.

We will enhance local community outreach and partnerships, continue to encourage a Friends Group, and improve our relationships with our neighbors and elected officials. We believe these efforts will strengthen support for resource management by the Service and our management priorities in the local communities we serve.

Goal 1. Protect and enhance habitats for Federal trust species and other species of special management concern, with particular emphasis on grassland-dependent migratory birds and wintering raptors

Objective 1a. Within 5 years of CCP approval, of the 400 acres in grasslands, create and maintain approximately 1/3 (~133 acres) in short, sparse grassland (<50 cm tall; <75 percent vegetative cover) to provide nesting habitat for grassland-dependent birds of high conservation priority, especially horned lark, vesper sparrow, and grasshopper sparrow.

Rationale for objective. The primary purpose of the refuge is to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors. Additionally, the Hudson River/New York Bight Ecosystem Team determined the identification of potential grassland restoration areas is a priority action (Service 2000). Audubon New York designated the refuge as an Important Bird Area because it is "one of the most important grassland bird breeding and wintering areas in the state and one of particularly few in the downstate region" (Wells 1998). In fact, the refuge is one of only two sites in the Hudson Valley large enough to support the entire assemblage of grassland birds (NYSDEC and Office of Parks, Recreation and Historic Preservation 2001).


Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Habitat Management
Ulster County, New York
Shawangunk Kill
18
Long Lane
18A
9
Hoagerburgh Road
Bates Lane
Albany Post Road
Wallkill River
Forest
Grasslands
Water
Parking Area
Visitor Contact Station
Town of Shawangunk Park
Refuge Boundary
Trails
Roads
Hydrology
Information Kiosk
Data Source:
USGS 1:100,000 roads and hydrology
USFWS refuge boundaries & other refuge information
Map prepared for Shawangunk Grasslands National Wildlife Refuge Comprehensive Conservation Plan, May 2005
This map is for planning purposes only.
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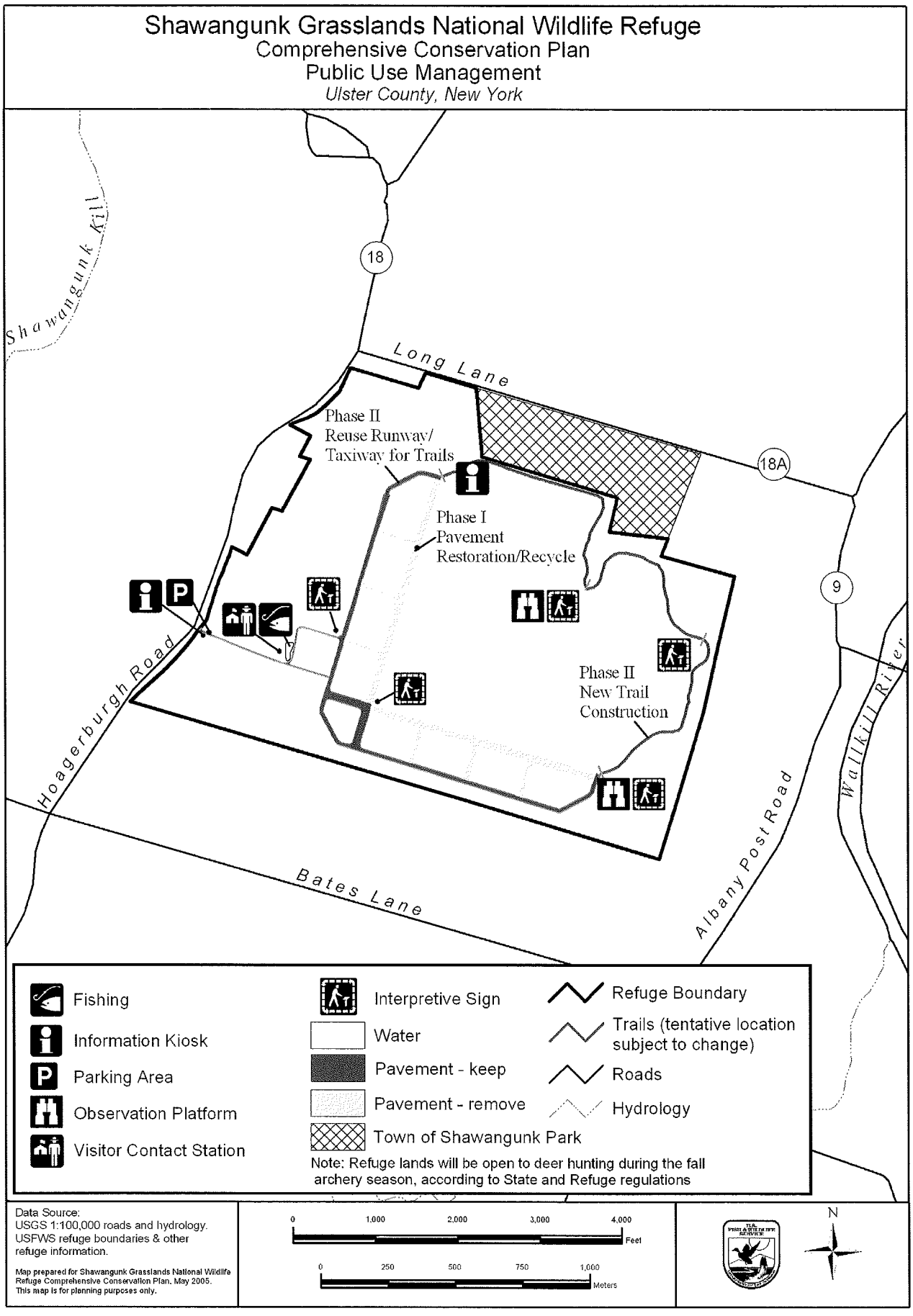
Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Public Use Management
Ulster County, New York
Shawangunk Kill
18
Long Lane
Phase II
Reuse Runway/
Taxiway for Trails
18A
Phase I
Pavement
Restoration/Recycle
9
Hoagerburgh Road
Phase II
New Trail
Construction
Wallkill River
Albany Post Road
Bates Lane
Fishing
Information Kiosk
Parking Area
Observation Platform
Visitor Contact Station
Interpretive Sign
Water
Pavement - keep
Pavement - remove
Town of Shawangunk Park
Refuge Boundary
Trails (tentative location subject to change)
Roads
Hydrology
Note: Refuge lands will be open to deer hunting during the fall archery season, according to State and Refuge regulations
Data Source:
USGS 1:100,000 roads and hydrology.
USFWS refuge boundaries & other refuge information.
Map prepared for Shawangunk Grasslands National Wildlife Refuge Comprehensive Conservation Plan, May 2005.
This map is for planning purposes only.
0 1,000 2,000 3,000 4,000 Feet
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Grassland-dependent migratory birds and the habitat that supports them are rapidly declining throughout the Northeast. Estimates derived from our North American Breeding Bird Survey (NABBS) indicate that grassland birds have declined more consistently over a wider geographic area than any other group of North American birds (Robbins et al. 1986, Askins 1993, Knopf 1995, Askins 1997, Sauer et al. 1997). Species with especially dramatic declines ($P \leq 0.01$) include grasshopper sparrow (69 percent), Henslow's sparrow (68 percent), eastern meadowlark (43 percent), and bobolink (38 percent) (Peterjohn et al. 1995). In an analysis of NABBS routes in New York State, Smith (1989) found that vesper sparrow, savannah sparrow, grasshopper sparrow, Henslow's sparrow, and eastern meadowlark showed statistically significant patterns of population decline ($P \leq 0.5$). Eastern meadowlark showed the most precipitous decrease, declining 80 percent in abundance over 25 years. Upland sandpiper and bobolink showed less certain patterns of population change, but with negative trends.

These grassland-obligate birds are all on lists of rare and declining species and can be found at the refuge. The NYSDEC (1997) list of endangered, threatened, and special concern species includes short-eared owl (endangered), northern harrier, upland sandpiper, Henslow's sparrow (threatened), and horned lark, grasshopper sparrow, and vesper sparrow (special concern). The Service's Northeast Region list of birds of conservation concern includes short-eared owl, upland sandpiper, and Henslow's sparrow (U.S. Fish and Wildlife Service 2002). Partners In Flight (PIF) lists upland sandpiper, Henslow's sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region (Pashley et al. 2000) in which the refuge lies. The North American Bird Conservation Initiative (NABCI) ranks Henslow's sparrow as a priority species in the Appalachian Mountain Bird Conservation Region (U.S. NABCI Committee 2000).

The loss of grassland habitat in the Northeast is most closely associated with agricultural abandonment and changes in agricultural practices. According to Vickery and Dunwiddie (1997) hayfield and pasture lands in New York have declined 60 percent since the 1930s. Exacerbating the impacts from overall habitat loss is the fact that most of the remaining grasslands are smaller, fragmented, and isolated from other grassland patches (Johnson and Temple 1990, Mitchell et al. 2000). Further, agricultural fields that are still used to produce hay are of lower value to grassland birds because they are cut earlier and more frequently (Frawley 1989), thus disrupting nesting activities (Bollinger 1991, Corwin 1992, Swanson 1996). For example, Bollinger (1990) estimated a 40 percent nest mortality rate in bobolinks due to mowing and subsequent field operations. Hay fields are also becoming more dominated by alfalfa (*Medicago sativa*) instead of grasses (Bollinger 1992). Bollinger (1992) found that hayfields with the most grass cover had more than 15 times the number of nesting bobolinks compared to fields with the most alfalfa.

According to Mitchell and Shryer (2000), without active management, refuge grasslands will soon become dominated by purple loosestrife or dense

shrubland. Consequently, the refuge would no longer provide suitable habitat for grassland-dependent birds. Currently, annual mowing is the primary technique to suppress plant succession and maintain grass dominance in refuge grasslands.

Approximately 400 acres of the refuge is composed of grassland dominated by Kentucky bluegrass. Consequently, those grasslands are monotypic in species and structure composition. Maintaining approximately 133 acres in grasslands with a short, sparse vegetational structure of diverse native grasses using several management techniques will increase grassland diversity and improve habitat for grassland-dependent birds, especially horned lark, vesper sparrow, and grasshopper sparrow. These grassland types may shift in location through time in response to various management techniques we will employ.

Short-eared owl
USFWS photo

Skinner et al. (1984), Herkert (1991), Herkert et al. (1993) describe horned lark and vesper sparrow as breeding birds using the shortest, sparsest grasslands. Wiens (1969) and Smith (1996) state that nesting vesper sparrows prefer areas dominated by short vegetation, interspersed with patches of bare ground. Hurley and Franks (1976) describe horned lark breeding areas as sparsely vegetated habitats containing at least some bare ground. Pickwell (1931) points out that horned lark generally select barren sites with minimum vegetation height and maximum bare ground. Mitchell et al. (2000) describe areas that are sparsely vegetated with short grasses and large patches of bare soil as suitable for nesting horned lark and vesper sparrow.

Breeding grasshopper sparrows tend to prefer short, sparse grasslands frequently containing patches of bare ground (Wiens 1969, Whitmore 1979, Janes 1983, Whitmore 1981). Skinner et al (1984), Herkert (1991), Herkert et al. (1993) characterize grasshopper sparrow as a occupying structural zones short to intermediate in height and sparse to intermediate in density. Bollinger (1995) found grasshopper sparrows in fields with the lowest, sparsest, patchiest grass vegetation.

Strategies (see objective 1d)

Objective 1b. Within 5 years of CCP approval, of the 400 acres in grassland, maintain approximately 1/3 (~133 acres) in medium height and density grassland (50–100 cm tall; 75–95 percent vegetative cover) to provide habitat for grassland-dependent birds of high conservation priority, especially upland sandpiper, savannah sparrow, eastern meadowlark, and bobolink.

Rationale for objective. As mentioned under objective 1a, approximately 400 acres of the refuge is composed of grassland dominated by Kentucky bluegrass. These grasslands provide a medium height and density vegetational structure preferred by such nesting grassland bird species as upland sandpiper,

savannah sparrow, eastern meadowlark, and bobolink. Maintaining these grasslands as part of a mosaic of different grassland structural types will enhance nesting and foraging for the whole suite of nesting grassland birds.

Upland sandpiper may require a mix of short, sparse and intermediate height and density grasses. Carter (1992), Skinner et al (1984), Herkert (1991), Herkert et al. (1993) describe breeding upland sandpiper utilizing short, sparse grasslands. Bollinger (1995) found upland sandpiper in fields with the lowest percent total vegetative cover. However, Ailes (1980) found adults with young in short grasslands (0–10 cm), but nests were located intermediate vegetation (25-70 cm). Kirsch and Higgins (1976) found upland sandpiper nests in cover between 15.5 and 30.8 cm tall and that birds appeared to avoid vegetation over 61.5 cm.

Savannah sparrow may be the structural generalist of the grassland bird assemblage (Mitchell 2000). Bollinger (1995) found savannah sparrow across all structural gradients. Skinner et al. (1984), Herkert (1991), Herkert et al. (1993) place savannah sparrow at the short, sparse to intermediate place on the grassland structure scale. Wiens (1969) reported savannah sparrow breeding in areas of intermediate plant height and density.

Skinner et al (1984), Herkert (1991), Herkert et al. (1993) describe eastern meadowlark as preferring short, sparse to intermediate height and density grasslands and bobolink as preferring tall, dense vegetation. Delisle and Savidge (1997) found more bobolinks in moderately dense fields than fields containing taller, denser grasses. Mitchell et al. (2000) state that eastern meadowlark and bobolink, as well as upland sandpiper and grasshopper sparrow occupy habitats dominated by intermediate to tall grasses. Bollinger (1995) found the greatest abundance of breeding eastern meadowlark and bobolink in fields dominated by short, sparse grasses.

Strategies (see objective 1d)

Objective 1c. Within 5 years of CCP approval, of the 400 acres in grassland, create and maintain approximately 1/3 (~133 acres) in tall, dense grassland (100–160 tall; >95 percent vegetative cover) to provide nesting habitat for grassland-dependent birds of high conservation priority, especially northern harrier, short-eared owl, and Henslow's sparrow.

Rationale for objective. As noted above, the 400 acres of grassland dominated by Kentucky bluegrass is monotypic in species and structure. Maintaining approximately 133 acres in grasslands with a tall, dense vegetational structure using diverse native grasses and management techniques will increase grassland diversity and improve habitat quality for grassland-dependent birds, especially northern harrier, short-eared owl, and Henslow's sparrow.

Henslow's sparrows nest in a variety of habitats that contain tall, dense grass and herbaceous vegetation (Smith 1968, Wiens 1969, Skinner (1984), Smith and Smith 1990, Smith 1992, Herkert et al.1993, Herkert1994a, Herkert 1995b, Smith 1997). Mitchell et al. (2000) describe Henslow's sparrow breeding habitat as containing tall vegetation.

Duebbert and Lokemoen (1977), Kerr (1987), Carroll (1990), and Norment (1995) reported the use of fields dominated by tall, dense cover by nesting northern harrier and short-eared owl. Although the refuge primarily serves as a wintering area for short-eared owls and northern harriers, Wells (1998) reported northern harrier nesting at the refuge as recently as 1996, and suspected short-eared owl bred there in 1997.

Strategies (see objective 1d)

Objective 1d. Within 5 years of CCP approval, promote foraging and roosting habitat for wintering birds of prey, especially northern harrier, red-tailed hawk, rough-legged hawk, American kestrel, and short-eared owl in the grasslands resulting from objectives 1a, 1b, and 1c. In the mosaic of grasslands, maintain scattered mature trees (1 tree /10 ac) for wintering raptor hunting and roosting perches.

Rationale for objective. A grassland mosaic with diverse vegetational structural will more likely meet the different requirements of foraging and roosting birds of prey than a grassland monotype. Wakeley (1978), Baker and Brooks (1981), and Bechard (1982) demonstrated that tall, dense vegetation impedes the ability of several species of hawks (*Buteo*) to capture prey. Thus, short, sparse grasslands may yield better foraging habitat because greater prey vulnerability may offset lower prey density. However, tall, dense vegetation may provide better roosting sites for ground-roosting species such as northern harrier and short-eared owl. In fact, we frequently observe northern harriers descending into tall, dense, herbaceous vegetation at dusk during weekly winter raptor surveys at the refuge (Kahl and Holcomb, U.S. Fish and Wildlife Service 2003, personal observation).

Mature trees and other elevated perches are an important component of foraging habitat for many raptors (Hall et al. 1981). In fact, a scarcity of perch sites can limit raptor use of otherwise productive foraging habitats (Millsap et al. 1987). Mature trees also provide singing posts for breeding grassland birds and add to the diversity of the grassland ecosystem. On the other hand, raptors such as northern harrier (MacWhirter and Bildstein 1996) and short-eared owl (Tate 1992, Holt and Leasure 1993) primarily hunt while flying and do not require many trees in their foraging area. Further, grassland management intensity increases as tree density increases. Thus, we will maintain a minimum density of trees.

Strategies *for goal 1, objectives 1a, 1b, 1c, 1d*

- Continue to pursue cooperative haying and grazing with local farmers under a special use permit as as propective methods of accomplishing grassland management objectives;
- Continue to eliminate all trees in excess of one per 10 acres; trees remaining will be maintained for winter raptor perches;

Within 5 years of CCP approval

- Restore native cool season and warm season grasses in areas where Kentucky bluegrass is now dominant. Select the combination of grass species determined to be the most suitable to the physical characteristics of the area (soil type, moisture and chemistry, aspect, growing zone). Employ an array of tools and treatments in annual grassland maintenance, including mowing, discing, haying, grazing, herbicides, biological controls, and revegetation used independently or in combination. Test the effectiveness of management-ignited prescribed fire;
- Use non-lethal and lethal means, including administrative trapping, as a management tool to reduce predation on grassland birds if losses endanger population viability. State-licensed trappers or refuge staff would do the trapping.
- Hire a full-time maintenance worker and wildlife biologist according to the approved staffing chart (appendix E), who will be stationed at the Wallkill River refuge.

Grassland management on the refuge
USFWS photo

Objective 1e. Within 5 years of CCP approval, create up to an additional 30 acres of high-quality habitat for grassland birds of high conservation priority by restoring the concrete and asphalt runways and taxiways to a diverse grassland complex. At least 75% of the acreage will have a dominant cover (>90 percent) of grasses within 5 years.

Rationale for objective. Restoring all or portions of the old airport runways and taxiways to grassland will yield up to an additional 30 acres of high-quality habitat for grassland birds and wintering birds of prey. Altering the pavement is also an essential step to eliminating illegal landings and low-altitude overflights by small airplanes, which are highly disturbing to breeding birds. The current sectional aeronautical chart for the area indicates that the runways on the refuge are closed, and markings on the runways communicate this closure to pilots flying overhead. However, illegal airplane use still occurs causing a disturbance to wildlife. Moreover, airplane trespass is a safety threat to refuge visitors, because the runways are the only public access to the refuge.

We have not fully developed our restoration plan as we continue to explore options for recycling the asphalt and concrete. However, we are considering a range of options including breaking sections of the concrete and asphalt in place to expose the underlying soils, or cutting alternating strips to allow a more natural water flow, importing local fill and placing on top of the runway, allowing decomposition to continue as a result of freezing and thawing action, or a combination of these techniques. For any revegetation work needed, we will use a mix of warm season and cool season native grass species most suitable to

the physical characteristics of the site: soil type, moisture and chemistry, aspect, growing zone. We also plan to leave a concrete strip about 8 feet wide as a trail for public and administrative access.

Strategies

- Continue to consult with engineers, soil scientists, and plant ecologists to determine the feasibility of demolishing pavement and restoring native vegetation. Seek assistance from the U.S. Army Corps of Engineers, Natural Resources Conservation Service, West Point Resource specialists, NYSDEC, and wetland experts.

Within 2 years of CCP approval

- Within 2 years, complete the investigation to determine the most effective and efficient means of restoring runways and initiate the project;

Within 5 years of CCP approval

- Study the underground drainage system on the refuge to determine its effects on natural hydrology and the potential impacts on our grassland management program that may result from its removal;
- Remove remnant building foundations, and conduct additional soil and water quality testing to determine if the refuge is contaminated by remnants of the former military installation;

Within 5 to 10 years of CCP approval

- Establish vegetation monitoring plots to ensure grass species composition and percent cover is achieved within 15 years.

Objective 1f. Monitor breeding grassland birds and wintering raptors and evaluate the effectiveness of grassland habitat management on their populations.

Rationale for objective. Baseline data on the abundance of breeding grassland birds and wintering birds of prey is essential to determine if the refuge is achieving its purpose to sustain and enhance habitat for grassland birds and wintering raptors. Further, measurements of vegetative and bird response to different grassland management regimes will enable us to adapt management to benefit these birds.

Strategies

- Continue to conduct annual breeding grassland bird surveys using regional protocol;
- Continue to conduct weekly winter raptor surveys;

Within 5 years of CCP approval

- Establish and implement a survey design that allows comparison of nesting grassland bird use under different management regimes;
- Conduct vegetation sampling according to recommendations in Mitchell and Shryer (2000);

- Study impacts of mammalian predators on nesting grassland birds to determine necessity of predator control;
- Establish a monitoring protocol to evaluate the disturbance to nesting grassland birds from the town ballpark if it is constructed on lands adjacent to the refuge.
- Hire a full-time biologist as described in objective 1d.

Objective 1g. Within 5 years of CCP approval, manage rare plant populations on the refuge to ensure they are sustained over time and contribute to the native botanic diversity of the area.

Rationale for objective. Stevens (1992) identifies several plant species on the refuge ranked as rare by the NYNHP. These plants include small-flowered agrimony, purple milkweed, small white aster, Bush's sedge, Frank's sedge, coontail, and watermeal. Most important is Frank's sedge, which is ranked as endangered by NYSDEC and S1 by NYNHP. Stevens recommends that any future land use consider "the preservation of adequate habitat and buffer zones for the rare plants."

Strategies

Within 5 years of CCP approval

- Identify all known rare plant sites and measure attributes, including abundance, condition, and potential threats. Map with GPS and enter into GIS database with attribute information;
- Develop and implement a monitoring strategy to assess the viability of rare plant populations;
- Consult NYNHP, other experts, and the scientific literature to develop strategies to sustain the health and productivity of rare plant populations consistent with objectives to maintain grassland bird habitat.

Objective 1h. Maintain 136 acres of successional northern woodlands to provide long-term (>50 years) habitat for forest-dependent migratory birds of high conservation priority such as black-billed cuckoo and wood thrush.

Rationale for objective. The purpose of the refuge is to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors. However, 136 acres of the refuge are composed of woodland or shrubland in transition to woodland, which cannot be converted effectively to grassland habitat. Black-billed cuckoo and wood thrush are declining species that nest in these small woodland patches. Our Northeast Region Birds of Conservation Concern list includes wood thrush (USFWS 2002). PIF lists wood thrush as a high conservation priority species in the Northern Ridge and Valley physiographic region in which the refuge lie (Pashley et al. 2000). The North American Bird Conservation Initiative (NABCI) ranks black-billed cuckoo and wood thrush as priority species in the Appalachian Mountain Bird Conservation Region (U.S. NABCI Committee 2000).

Strategies

- Continue to allow natural succession to proceed; no management of these stands is proposed. However, consider treatments when pests or pathogens threaten the integrity of the woodlands.
- Within 5 years of CCP approval, develop an outreach program to provide technical assistance on forest health and management for migratory birds to interested private landowners in the focus area.

Goal 2. Manage to enhance regionally significant ecological communities, including large grassland complexes

Objective 2a. Improve the biological integrity, environmental health, and productivity of refuge grassland habitats by investigating the presence of contaminated soils. Within 15 years of CCP approval, if contaminated soils exist, remove by means that do not jeopardize long-term management (>15 years) for grassland birds.

Objective 2b. Improve the native biological diversity of all refuge habitats by treating invasive, non-native plants on at least 400 acres. Within 10 years of CCP approval, plants such as purple loosestrife, *Phragmites,* Canada thistle, and multiflora rose will dominate (i.e., >50 percent cover) less than 10 percent of refuge lands.

Objective 2c. Within 15 years of CCP approval, improve the biological integrity, environmental health, and productivity of refuge habitats by restoring natural hydrologic flow on refuge lands, to the extent possible and practicable, by means that do not jeopardize long-term management (>15 years) for grassland birds.

Rationale for objectives 2a, 2b, and 2c. Service policy (601 FW 3) defines biological integrity, diversity, and environmental health and provides refuge managers with guidance for ensuring that each are maintained, and where appropriate, restored on refuge lands to the extent consistent with the refuge purpose. According to the policy, "The highest measure of biological integrity, diversity and environmental health, is viewed as those intact and self-sustaining habitat and wildlife populations that existed during historic conditions."

The presence and continued expansion of invasive, non-native species significantly compromises the biological intengrity of all refuge habitats. Biological diversity is decreased because invasive species out-compete and replace native species. This process yields degraded wildlife habitat and ecosystem function. Before this CCP no actions were being implemented to control overabundant animal populations.

Under this CCP our management direction will focus on the control of invasive, non-native plants as a means of improving biological diversity. As noted above, invasive plants severely degrade habitat quality. We will undertakes a more comprehensive approach to improving the biological diversity, integrity and environmental health of refuge habitats by also addressing soil contaminants and hydrology.

Past land use practices have significantly altered refuge soils, hydrology, and vegetation. Most of the current refuge was in agricultural production prior to acquisition of the site in 1942 by the Department of the Army (DOA). Local residents recount that the runways and taxiways of the Galeville Army Training Site were created by importing thousands of tons of fill. Extensive areas of fill adjacent to the runways created perched wetlands. Also, DOA installed an extensive system of cement culverts to drain water from the airfield to an eroded, channelized stream and constructed several buildings on the site.

We are not presently aware of any significant evidence of serious or widespread environmental contamination on site. However, staff from our New York Field Office, and members of the public have expressed concern that some contaminants may be present from activities associated with the land's previous use as a military airport. For example, the communications center that was demolished around 1973 may have contained PCBs, heavy metals, petroleum products, or asbestos, which could now be present in soils or groundwater.

We will evaluate the extent of hydrologic manipulation and the implications to restoring the biological diversity, integrity, environmental health, and habitat quality for focus species. Restoration projects would be developed after consideration of what is technically feasible, cost effective, without adverse impact to adjacent private property, and consistent with management for grassland birds and wintering raptors.

Strategies

- Continue to annually mow at least 300 acres of purple loosestrife and *Phragmites* in conjunction with managing grassland habitat;
- Continue to cooperate with Cornell University in studying the effects of *Galerucella sp.* beetles and *Hylobius sp.* weevils as biological controls of purple loosestrife in refuge grasslands;

Within 5 years of CCP approval

- Conduct soil contaminants analysis in cooperation with our New York Field Office, our Division of Engineering, Environmental and Facility Compliance Branch, and other partners;
- Conduct a study to evaluate the extent of hydrological impacts of the runways and underground drainage system. Determine the feasibility and cost of restoring the hydrology, including restoring the stream channel through the refuge. Evaluation would include an assessment of impacts to grassland bird habitat;
- Develop treatment protocol for all known invasive plants inhabiting the refuge. Prioritize species and locations for treatment. Use a diverse array of control tools and techniques individually or in combination, including mowing, biological controls, livestock grazing, herbicides, and revegetation. Test the effectiveness of management-ignited prescribed fire;

- Evaluate all ground-disturbing management actions for their potential to facilitate the spread of invasive plants;
- Establish and implement a survey design that monitors invasive species and allows comparison of different management regimes;
- Develop an annual monitoring and mapping strategy for invasive species including a digital mapping system.

Objective 2d. Facilitate the long-term management of large grassland complexes (>150 acres) throughout the focus area through the exchange of technical information with landowners and by demonstrating grassland management on the refuge.

Rationale for objective. Preservation of grasslands throughout the focus area will help maintain habitat quality on refuge grasslands for breeding grassland birds and wintering raptors. Concurrently, many organizations are working to protect or manage grasslands nearby. For example, New York State's Open Space Conservation Plan identifies the grasslands near the refuge as a priority project area (New York State Department of Environmental Conservation and Office of Parks, Recreation and Historic Preservation 2002). The Hudson River Estuary Biodiversity Steering Committee is working with NYSDEC and NRCS to facilitate grassland management on private lands in the Hudson Valley. Also, our Hudson River/New York Bight Ecosystem Team has categorized the identification of potential grassland restoration areas as a priority action (Service 2000). Refuge staff will facilitate the preservation and maintenance of large grasslands in the focus area by providing technical information on grassland birds and grassland management to interested landowners and partners. The information exchange will also be enhanced by developing grassland management demonstration areas on the refuge and by interpreting those management actions and techniques to the public and interested landowners.

Strategies

Within 5 years of CCP approval

- Provide technical information on management of grasslands for wildlife to private landowners in the focus area
- Create opportunities (e.g., workshops, open forums, tours) to demonstrate grassland management practices on the refuge.

Goal 3. Promote actions that contribute to a healthier Wallkill River

Objective 3a. Each year, work in partnership with local communities to improve the biological integrity and environmental health of the Wallkill River and its tributaries through restoration projects and activities that promote river stewardship and protection.

Rationale for objective. Maintaining the biological integrity and environmental health of the Wallkill River and its tributaries is a concern to us because of the impacts to refuge resources. One measure of biological integrity is whether events like flooding are occurring at times and frequencies that existed histori-

cally. Measures of environmental health important to the refuge include water quality and contaminants, soils condition, and the presence and productivity of aquatic life. The Wallkill River is the heart of this river valley and serves as a focal point for humans and wildlife alike. Unfortunately, agricultural practices and residential, commercial and industrial land use developments all along the river are altering the natural function of the river floodplain, eroding streambanks, and degrading water quality. As such, the biological integrity and environmental health of this river system are in jeopardy.

The Wallkill River Task Force operates in both New York and New Jersey with a mission to protect and enhance the Wallkill River and its watershed through land protection, improved water quality, soils and hydrologic stability, and increased use and appreciation by recreationists. The Refuge Manager has been a participant in this task force and utilizes the forum to identify biological issues and concerns.

While the refuge is not immediately adjacent to the Wallkill River, it is connected hydrologically via streams and underground drains. Wildlife, such as whitetail deer, readily travel the 0.4 miles between the refuge and the river. Through outreach and education and participating in local community conservation efforts, we would raise local awareness of threats and impacts to the river's biological integrity and environmental health. In addition, we would promote individual and community responsibility and stewardship through the identification of actions that could minimize threats and impacts.

We are promoting a more ambitious approach to watershed conservation. More active involvement in community-based efforts will increase opportunities for refuge staff to have a positive, visible impact locally, and will establish long-term, cooperative, working relationships aimed at improving the health of the Wallkill River.

Strategies

- Continue refuge staff participation on the Wallkill River Task Force. Work with our New York Field Office to identify priority restoration projects to present to Task Force.

Within 5 years of CCP approval

- Contact local conservation commissions and organizations to identify opportunities for refuge involvement in community-based watershed protection. Refuge staff will become involved in productive efforts that support the Service mission and refuge goals and objectives, such as a local River Clean Up day;
- In cooperation with our New York Field Office Private Lands Coordinator, develop an outreach and technical exchange program for private landowners to promote the restoration of the forested floodplain along the Wallkill River and its tributaries and encourage agricultural and residential practices that minimize non-point-source pollution of the river.

Goal 4. Provide high-quality opportunities for wildlife observation and photography, and other priority, wildlife-dependent public uses

Objective 4a. Within 7 years of CCP approval, create and enhance opportunities to view and photograph wildlife, so that 90 percent of visitors engaged in these activities report they will return to the refuge because it represents to them a high-quality opportunity to observe and photograph wildlife, in particular, grassland birds and wintering raptors.

Rationale for objective. The Refuge Improvement Act identifies wildlife observation and photography as priority public uses that are to receive enhanced consideration when developing goals and objectives for refuges, if they are determined to be compatible. Providing high-quality opportunities for the public to engage in those activities promotes visitor appreciation and support for refuge programs and helps raise public awareness of the plight of grassland-dependent migratory birds.

Savannah sparrow
USFWS photo

With the implementation of this CCP we will expand and enhance the infrastructure to increase opportunities to observe and photograph wildlife. A 2-mile loop trail supplemented by observation platforms and photography blinds will be constructed through wooded areas and along the grassland perimeter. The locations of the trail, platforms, and blinds are planned to provide visitors with quality viewing opportunities without disturbing nesting grassland birds or wintering raptors. We propose to remove most of the runways to restore grassland habitat. However, we will preserve and incorporate into the expanded trail an 8-foot-wide pavement strip. The refuge trail may be connected to a nature trail proposed on the adjacent. Shawangunk Town Park. Infrastructure development will also include expanding the parking area to accommodate 20 cars and establishing a small visitor contact facility.

Refuge trails would remain open year-round from 1 hour before official sunrise to 1 hour after official sunset, seven days a week. Access would be allowed only on foot, on snowshoes, or on cross-country skis. No pets, jogging, horseback riding, bicycling, all terrain or other motorized vehicles are allowed. Use of the runways for acrobatic flying, touchdown and takeoff practices by private planes, and model airplane flying were previously determined inappropriate and incompatible activities on the refuge and are not allowed. Runway restoration and trail development will reduce the likelihood of many of these prohibited activities.

We define high-quality wildlife observation and photography programs as those in which

- Observation occurs in a primitive setting or in safe facilities and provides an opportunity to view wildlife and its habitats in a natural setting;
- Observation facilities or programs maximize opportunities to view the spectrum of species and habitats of the refuge;
- Observation opportunities, in conjunction with education and interpretation opportunities, promote public understanding and appreciation of America's

natural resources and the role of the Refuge System in managing and protecting those resources;

- Observation opportunities are tied to education and interpretation messages about stewardship and key resource issues;
- Facilities, when provided, blend with the natural setting and architectural style of the station, and provide viewing opportunities for all visitors, including persons with disabilities;
- Observers understand and follow procedures that encourage the highest standards of ethical behavior;
- Observation opportunities exist for a broad spectrum of the public; and
- Observers minimally conflict with other priority wildlife-dependent recreational uses or refuge operations.

Strategies

Within 5 years of CCP approval

- Expand the existing parking lot to accommodate approximately 14 vehicles and a bus turn around;
- Hire staff according to approved staffing chart (appendix E) to be stationed at Wallkill River refuge;

Within 10 years of CCP approval

- Complete the expanded trail system in conjunction with runway removal;
- Construct observation platforms and photography blinds.

Objective 4b. Within 8 years of CCP approval, 90 percent of visitors participating in an environmental education or interpretive program will be able to identify grassland bird conservation as the primary purpose of the refuge and will fully describe at least two management actions designed to benefit grassland birds.

Rationale for objective. The Refuge Improvement Act identifies environmental education and interpretation as priority public uses. Providing high-quality opportunities for the public to engage in those activities promotes stewardship of natural resources and an understanding of the refuge purpose. They also garner support for refuge programs and help raise public awareness of the plight of grassland-dependent migratory birds.

We define high-quality environmental education programs as those that:

- Allow program participants to demonstrate learning through refuge tasks as well as projects that they can carry over into their everyday lives;
- Teach awareness, understanding and appreciation of our trust resources, and
- Serve as a means by which refuge employees are seen as role models for environmental stewardship through a continually developing positive relationship with the community.

We define high-quality interpretation programs as those that:

- Increase public understanding and support for the Refuge System;
- Develop a sense of stewardship leading to actions and attitudes that reflect concern and respect for wildlife resources, cultural resources, and the environment;
- Provide an understanding of the management of our natural and cultural resources;
- Provide safe, enjoyable, accessible, meaningful, and high-quality experiences for visitors increasing their awareness, understanding, and appreciation of fish, wildlife, plants, and their habitats.

Strategies

- Continue to maintain the existing information kiosk to provide current refuge information and wildlife sightings;
- Continue to maintain the refuge web site;
- Continue to provide refuge interpretation to outdoor organizations when staff are available;

Within 5 years of CCP approval

- Conduct annual staff-, partner- , or volunteer-led guided nature walks;
- Develop general refuge brochure and update bird list brochure;
- Construct a visitor contact facility on the refuge;
- Hire a full-time outdoor recreation planner (ORP), according to the approved staffing chart (appendix E), to be stationed at the Wallkill River refuge.
- Conduct at least one "Teach the Teacher" workshop per year on the refuge once additional staff is hired and assuming assistance from volunteers, a Friends Group, and/or conservation partner to design and implement the program;
- Conduct at least one "Outdoor Classroom" per year on the refuge in conjunction with local schools once aditional staff is hired and assuming assistance from volunteers, a Friends Group, and/or conservation partner to design and implement the program;
- Hire at least one seasonal intern each year to monitor visitor use, conduct outreach and interpretation, and support the biological program.

Within 10 years of CCP approval

- Develop interpretive signs and install along refuge trails;
- Produce an exhibit describing the historical and cultural background of the refuge including use by Native Americans, European settlement, and its use in World War II as the Galeville Army Training Site.

Objective 4c. Within 1 year of CCP approval, establish a high-quality, fall white-tailed deer archery hunting program under State and refuge regulations, using a fee permit system.

Rationale for objective. The Refuge Improvement Act identifies hunting as a priority public use that is to receive enhanced consideration when developing goals and objectives for refuges, if it is determined to be compatible. Hunting is also an established traditional use locally.

Opportunities for hunting continue to decrease as land throughout New York is subdivided and developed. Consequently, the demand for hunting on public lands has increased. Demand for hunting on the refuge exists as evidenced by annual inquiries prior to the fall season and from public comments received during the planning process. Based on our best professional judgment, with consideration of safety zones, spacing between hunters and tree stands, and hunter interest, we predict between 15 and 50 hunters per season would be accommodated, with an estimated 43 hunting days per year. Hunting will coincide with the State's Southern Zone early archery season, generally from mid-October to mid-November.

Providing a high-quality hunt on the refuge promotes visitor appreciation and support for refuge programs. We will implement a user fee permit program to help pay the cost of administering the program. The program will be administered from the Wallkill River Refuge headquarters. An evaluation of safety hazards from the collapsing underground drainage system must be completed prior to program implementation to ensure hunter safety; otherwise restrictions on accessible hunt areas may be warranted to ensure hunter safety. Only foot access will be allowed, except for disabled hunters possessing a State Non-Ambulatory Hunter permit.

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

- Maximizes safety for hunters and other visitors;
- Encourages the highest standard of ethical behavior in taking or attempting to take wildlife;
- Is available to a broad spectrum of the hunting public;
- Contributes positively to or has no adverse affect on population management of resident or migratory species;
- Reflects positively on the refuge, the System, and the Service;
- Provides hunters uncrowded conditions by minimizing conflicts and competition among hunters;
- Provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program. It also minimizes the reliance on motorized vehicles and technology designated to increase the advantage of hunter over wildlife;
- Minimizes habitat impacts;

- Creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations; and,
- Incorporates a message of stewardship and conservation in hunting.

Strategies

Within 1 year of CCP approval

- Complete the administrative procedures to open the refuge to a fall archery deer hunt subject to State and refuge regulations, in areas where there are no drainage system hazards. Initially, hunters would be charged a $10 fee for permits; increasing as necessary to conform with Wallkill River Refuge permit fees. Regulations may include a limit on number of hunters, season length, or accessible area, if future conditions warrant.

Within 5 years of CCP approval

- Survey and map the drainage system and identify the areas with the greatest potential hazards; as a priority, eliminate the hazards in areas to be accessed by hunters and other visitors.

Objective 4d. Within 1 year of CCP approval, allow fishing in the refuge pond.

Child enjoys fishing
USFWS photo

Rationale for objective. The Refuge Improvement Act identifies fishing as a priority public use that is to receive enhanced consideration when developing goals and objectives for refuges if it is determined to be compatible. Providing opportunities for public fishing promotes visitor appreciation and support for refuge programs.

The small artificial pond near the entrance to the refuge supports warm water fish, including sunfish and largemouth bass. The pond shows evidence of fishing despite the fact that fishing is not officially allowed. We will open the pond to fishing, but will not otherwise enhance the opportunity in the near term. However, in conjunction with the design and development of the visitor contact facility, we will evaluate the potential to expand the pond area if it does not compromise grassland bird management. An enhanced fishing program, including fishing events and stocking non-native fish, would not be developed. Fishing would be permitted throughout the year, but would primarily occur from April to October. Up to five anglers can be physically accommodated around the pond at any one time, but we predict fishing interest would be low due to the low quality fishery and better opportunities in other local ponds, streams, and rivers. We predict only 52 angler days would be provided each year.

Strategies

- Within 1 year of CCP approval, complete all administrative procedures to open the small pond to fishing.

Goal 5. Cultivate a public informed and educated about conservation who work to support the goals of the refuge and the mission of the National Wildlife Refuge System

Objective 5a. Within 8 years of CCP approval, 50 percent of residents contacted in the Town of Shawangunk will have visited the refuge and will be able to identify grassland bird conservation as the primary purpose of the refuge.

Rationale for objective. Greater outreach efforts will increase recognition of the refuge, the Refuge System, and the Service among neighbors, local leaders, conservation organizations, and elected officials. We will strive to increase outreach efforts toward the local citizenry. This publicity will also help generate support for similar conservation efforts in the region.

Strategies

Within 5 years of CCP approval

- Provide a minimum of 3 refuge programs to civic organizations;
- Participate in local community sponsored fairs and events;
- Increase public awareness and attract visitors through use of media and chambers of commerce.

Objective 5b. Promote partnerships with local conservation organizations to facilitate accomplishment of coinciding goals.

Rationale for objective. This objective would encourage broader cooperation between the Service and the local conservation community. Partnerships are essential for this refuge to accomplish its projects and programs. Furthermore, we can provide valuable technical assistance to local conservation organizations, particularly on management of habitat for grassland birds. In addition, the potential for the creation of a refuge Friends Group would be explored.

Strategies

- Continue to work with local conservation organizations to conduct refuge breeding grassland bird and wintering raptor surveys.
- Continue to work with volunteers to maintain grounds, remove trash, monitor public use, and provide wildlife sightings.

Within 5 years of CCP approval

- Contact two additional organizations to develop partnerships.
- Organize a meeting of volunteers, local residents, and local conservation groups to determine level of interest in establishing a Friends Group of the Shawangunk Grasslands Refuge.

Objective 5c. Within 5 years of CCP approval, ensure that all Federal, State, and local elected officials and local business leaders are informed about how the refuge contributes to their communities' amenities, economics, and quality of life.

Rationale for objective. This objective focuses on fostering relationships with elected officials and business leaders, thereby strengthening political support for the refuge and its programs. Its implementation will also raise awareness of

compatible, outdoor, recreational opportunities on the refuge which may attract visitors to the area and contribute to the local economy.

Strategies

■ Continue bi-annual trips to Capitol Hill and/or District Offices to meet with elected officials and their staff to provide updates on refuge activities, management priorities, and issues.

Within 5 years of CCP approval

■ Provide tours to local business leaders and elected officials to highlight refuge activities and emphasize the economic and quality of life benefits of the refuge to the local community.

Implementation, Monitoring and Revision

Refuge Funding Needs

Successful implementation of the CCP relies on our ability to secure funding, personnel, infrastructure, and other resources to accomplish the actions identified. The recommended projects and their recurring costs, such as staff salaries, are listed and prioritized in the Refuge Operations Needs System (RONS) database (appendix D). In this appendix, we also identify new projects that we will include in the RONS database with the next annual update. The source of funding for these projects and salaries primarily comes from Refuge Operations (1261) dollars. Also, included in appendix D are our maintenance funding needs.

Some of the projects may be eligible for funding from the Refuge Roads Program (RRP) under the Transportation Equity Act for the 21st Century (TEA-21), a relatively new source of funding for the Refuge System. Examples include refuge public use roads, parking lots, bridges, restrooms, and trails. These funds can also be used for interpretive enhancements associated with these projects, as long as the costs for the interpretive facilities do not exceed 5% of the project budget. RRP funds can be used as the non-Federal match for Federal Highway Administration (FHA) funds available through State Departments of Transportation. Refuges can also use appropriated Service funds as the non-Federal match for these funds as well. This matching ability can be used to further compatible city, county, and State transportation and transit funds for projects on or near the Refuge.

Staffing the Refuge

The Wallkill River Refuge staff will continue to administer this refuge. In addition, this CCP recommends hiring permanent staff, including a full-time biologist, maintenance worker and visitor services professional to be stationed at the Wallkill River Refuge (appendix E).

Even at the minimal or custodial level of management, we will implement several actions to ensure that visitors have a safe visit, engage in approved compatible activities, and understand and adhere to refuge regulations. Those include maintaining refuge boundary signs and continuing to make visitor contacts and conduct outreach and law enforcement. If RONS funding is not available, we will continue to seek alternate means of accomplishing our projects: for example, through volunteers, challenge cost share grants or other partnership grants, and interns.

Monitoring and Evaluation

Monitoring and evaluating the implementation of this CCP will occur at two levels. The first level, which we refer to as implementation monitoring, responds to the question, "Did we do what we said we would do, when we said we would do it?"

The second level of monitoring, which we refer to as effectiveness monitoring, responds to the question, "Are actions we proposed effective in achieving the results we had hoped for?" Or, in other words, "Are the actions leading us toward our vision, goals, and objectives?" Effectiveness monitoring evaluates an individual action, a suite of actions, or an entire resource program. This

approach is more analytical in evaluating management effects on species, populations, habitats, refuge visitors, ecosystem integrity, or the socio-economic environment. More often, the criteria to monitor and evaluate these management effects will be established in step-down, individual project, or cooperator plans, or through the research program. The HSIMP will be based on the needs and priorities identified in the HMP.

Adaptive Management

We will use a strategy of adaptive management to keep the CCP relevant and current through scientific research and management. We acknowledge that our information on species and ecosystems is incomplete, provisional, and subject to change as our knowledge base improves. The need for adaptive management is all the more compelling today.

> *"The earth's ecosystems are being modified in new ways and at faster rates than at any other time in their nearly 4 billion year history. These new and rapid changes present significant challenges to our ability to predict the inherently uncertain responses and behaviors of ecosystems." (Christensen, et al. 1996)*

Objectives and strategies must be adaptable in responding to new information and spatial and temporal changes. We will continually evaluate management actions, both formally and informally, through monitoring and research to reconsider whether their original assumptions and predictions are still valid. In this way, management becomes an active process of learning what really works. It is important that the public understand and appreciate the adaptive nature of natural resource management.

The Refuge Manager is responsible for changing management actions if they do not produce the desired conditions. Significant changes may warrant additional NEPA analysis; minor changes will not, but will be documented in annual monitoring, project evaluation reports, or the Annual Refuge Narrative.

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, following the procedures outlined in Service policy and NEPA requirements. Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3 C) will only require an Environmental Action Memorandum.

Chapter 5

Bergamot
Scott A. Vincent©

List of Preparers

- Members of the Core Planning Team
- Assistance from Other Service Personnel

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Education:	B.S. Environmental and Forest Biology program, State University of New York; Master of Professional Studies, Environmental and Forest Biology program, State University of New York
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Education:	Ph.D.
Experience:	11 years as a Senior Wildlife Biologist and 3 years as a Regional Wildlife Manager for NYSDEC
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Jeff Shryer, retired, former Assistant Manager of Shawangunk Grasslands Refuge

Education:	B.S. Wildlife Management
Experience:	5 years USFWS, 22 years BLM, 4 years Game Warden, Botswana, Africa
Contribution:	Helped write portions of CCP and develop goals and objectives

Carolina Ferro Vasconcelos, Assistant Planner

Education:	B.S. Biology; B.S Wildlife & Fisheries Conservation, University of Massachusetts Amherst
Experience:	2 years with USFWS, ECO Intern
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Experience:	Worked as a SCEP student at Montezuma NWR for 2 years, then as an Assistant Planner at the Regional Office for 6 months
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Experience:	New York State, University of Rhode Island, U.S. EPA, USFWS Coastal Ecosystems Program and Atlantic Coast Joint Venture
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Tiger Swallowtail butterfly
Gene Stires ©

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.)

aggregate: many parts considered together as a whole.

agricultural land: nonforested land (now or recently orchards, pastures, or crops).

alternative: a reasonable way to fix an identified problem or satisfy a stated need [40 CFR 1500.2 (cf. "management alternative")] .

amphidromous fish: fish that can migrate from fresh water to the sea or the reverse, not only for breeding, but also regularly at other times during their life cycle.

appropriate use: a proposed or existing use on a refuge that meets at least one of the following three conditions: .(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 section 1.11 of that act.

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 desig-nates 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.

anadromous fish: from the Greek, literally "up-running"; fish that spend a large portion of their life cycle in the ocean and return to freshwater to breed.

aquatic: growing in, living in, or dependent upon water.

aquatic barrier: any obstruction to fish passage.

aquifer: a formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

area of biological significance: cf. "special focus area".

area sensitive species: species that require large areas of contiguous habitat.

assemblage: in conservation biology, a predictable and particular collection of species within a biogeographic unit (e.g., ecoregion or habitat).

barrens: a colloquial name given to habitats with sparse vegetation or low agricultural productivity.

barrier : cf. "aquatic barrier".

basin: the land surrounding and draining into a water body (cf. "watershed").

benthic: living at, in, or associated with structures on the bottom of a body of water.

best management practices: land management practices that produce desired results. [N.b. Usually describing forestry or agricultural practices effective in reducing non point source pollution, like reseeding skidder trails or not storing manure 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.

bog: a poorly drained area rich in plant residues, usually surrounded by an area of open water, and having characteristic flora.

breeding habitat: habitat used by migratory birds or other animals during the breeding season.

buffer zones: land bordering and protecting critical habitats or water bodies by reducing runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals, plants, and their habitats.

candidate species: species for which we have sufficient information on file about their biological vulnerability and threats to propose listing them.

catadromous fish: fish that spend most of their lives in fresh water, but migrate to sea to reproduce.

categorical exclusion [CE, CX, CATEX, CATX]: 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 environ-ment [40 CFR 1508.4].

CFR: the Code of Federal Regulations.

Challenge Grant Cost Share Program: a Service-administered grant program that provides matching funds for projects supporting natural resource education, management, restoration, or protection on Service lands, other public lands, and private lands.

citizen monitoring projects: projects coordinated locally to conduct environmental inventories; their data expand what agencies know, and are available to anyone interested.

community: the locality in which a group of people resides and shares the same government.

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: 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: cf. "issue".

conifer: a tree or shrub in the phylum Gymnospermae whose seeds are borne in woody cones. There are 500B600 species of living conifers (Norse 1990).

conservation: managing natural resources to prevent loss or waste. [N.b. Management actions may include preservation, restoration, and enhancement.]

conservation agreements: written agreements among two or more parties for the purpose of ensuring the survival and welfare of unlisted species of fish and wildlife or their habitats or to achieve other specified conservation goals. Participants voluntarily commit to specific actions that will remove or reduce threats to those species.

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 no 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 resource inventory: a professional study to locate and evaluate evidence of cultural resources within a defined geographic area. [N.b. Various levels of inventories may include background literature searches, comprehensive field examinations to identify all exposed physical manifestations of cultural resources, or sample inventories for projecting site distribution and density over a larger area. Evaluating identified cultural resources to determine their eligibility for the National Register follows the criteria in 36 CFR 60.4 (cf. FWS Manual 614 FW 1.7).]

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, manage-ment 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 offices background or literature search described in section VIII of the Cultural Resource Management Handbook (FWS Manual 614 FW 1.7).]

database: a collection of data arranged for ease and speed of analysis and retrieval, usually computerized.

dedicated open space: land to be held as open space forever.

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 1.5 (draft)].

diadromous: fish that migrate from freshwater to saltwater or the reverse; a generic term that includes anadromous, catadromous, and amphidromous fish.

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.

drumlin: a ridge or oval hill with a smooth summit composed of material deposited by a glacier.

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 (cf. "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.

ecosystem service: a benefit or service provided free by an ecosystem or by the environment, such as clean water, flood mitigation, or groundwater recharge.

ecotourism: visits to an area that maintains and preserves natural resources as a basis for promoting its economic growth and development.

ecosystem approach: a way of looking at socio economic and environmental information based on the boundaries of ecosystems like watersheds, rather than on geopolitical boundaries.

ecosystem based management: an approach to making decisions based on the characteristics of the ecosystem in which a person or thing belongs. [N.b. This concept considers interactions among the plants, animals, and physical characteristics of the environment in making decisions about land use or living resource issues.]

emergent wetland: wetlands dominated by erect, rooted, herbaceous plants.

endangered species: a Federal- or State-listed protected species in danger of extinction throughout all or a significant portion of its range.

endemic: a species or race native to a particular place and found only there.

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].

Environmental Impact Statement: (EIS) a detailed, written analysis of the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources [cf. 40 CFR 1508.11].

estuaries: deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from land.

estuarine wetlands: "The Estuarine system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land."Cowardin et al. 1979.

exemplary community type: an outstanding example of a particular community type.

extinction: the termination of any lineage of organisms, from subspecies to species and higher taxonomic categories from genera to phyla. Extinction can be local, in which one or more populations of a species or other unit vanish but others survive elsewhere, or total (global), in which all the populations vanish (Wilson 1992).

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.

Federal-listed species: a species listed either as endangered, threatened, or a species at risk (formerly, a "candidate species") 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.

fish passage project: providing a safe passage for fish around a barrier in the upstream or downstream direction.

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.

focus areas: cf. "special focus areas".

forbs: flowering plants (excluding grasses, sedges, and rushes) that do not have a woody stem and die back to the ground at the end of the growing season.

forest association: the community described by a group of dominant plant (tree) species occurring together, such as spruce-fir or northern hardwoods.

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.

GAP analysis: the use of various remote sensing data sets to build overlaid sets of maps of various parameters (e.g., vegetation, soils, protected areas, species distributions) to identify spatial gaps in species protection and management programs.

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.]

glade: an open space surrounded by forest.

grant agreement: the legal instrument used when the principal purpose of the transact-ion is the transfer of money, property, services, or anything of value to a recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute and substantial involvement between the Service and the recipient is *not* anticipated (cf. “coop-erative agreement”).

grassland: a habitat type with landscapes dominated by grasses and with bio-diversity characterized by species with wide distributions, communi-ties 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.

grassroots conservation organization: any group of concerned citizens who act together to address a conservation need.

groundwater: water in the ground that is in the zone of saturation, from which wells and springs and groundwater runoff are supplied.

guild: a group of organisms, not necessarily taxonomically related, that are ecologically similar in characteristics such as diet, behavior, or microhabitat preference, or with respect to their ecological role in general.

habitat block: a landscape-level variable that assesses the number and extent of blocks of contiguous habitat, taking into account size requirements for populations and ecosystems to function naturally. It is measured here by a habitat-dependent and ecoregion size-dependent system.

habitat fragmentation: the breaking up of a specific habitat into smaller, unconnected areas. [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 judgement, 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.

important fish areas: the aquatic areas identified by private organizations, local, state, and federal agencies that meet the purposes of the Conte Act.

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.

indicator species: a species used as a gauge for the condition of a particular habitat, community, or ecosystem. A characteristic or surrogate species for a community or ecosystem.

indigenous: native to an area.

indigenous species: a species that, other than a result as an introduction, historically occurred or currently occurs in a particular ecosystem.

informed consent: "the grudging willingness of opponents to go along with a course of action that they actually oppose." Bleiker.

interjurisdictional fish: populations of fish that are managed by two or more States or national or tribal governments because of the scope of their geographic distributions or migrations.

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.]

interpretive materials projects: any cooperative venture that combines financial and staff resources to design, develop, and use tools for increasing the awareness and understanding of events or things related to a refuge.

introduced invasive species: non native species that have been introduced into an area and, because of their aggressive growth and lack of natural predators, displace native species.

invasive species: an alien 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).]

kettle hole: a generally circular hollow or depression in an *outwash plain* or *moraine*, believed to have formed where a large block of subsurface ice has melted.

keystone species: species that are critically important for maintaining ecological processes or the diversity of their ecosystems.

lacustrine wetlands: "The Lacustrine system includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (3) total area exceeds eight ha (20 acres)."CCowardin et al. 1979.

Land Protection Plan (LPP): a document that identifies and prioritizes lands for potential Service acquisition from a willing seller, and also describes other methods of providing protection. Landowners within project boundaries will find this document, which is released with environmental assessments, most useful.

land trusts: organizations dedicated to conserving land by purchase, donation, or conservation easement from landowners.

landform: the physical shape of the land reflecting geologic structure and processes of geomorphology that have sculpted the structure.

landscape: an aggregate of landforms, together with its biological communities.

late-successional: species, assemblages, structures, and processes associated with mature natural communities that have not experienced significant disturbance for a long time.

limiting factor: an environmental limitation that prevents further population growth.

limits of acceptable change: a planning and management framework for establishing and maintaining acceptable and appropriate environmental and social conditions in recreation settings.

local land: public land owned by local governments, including community or county parks or municipal watersheds.

local agencies: generally, municipal governments, regional planning commissions, or conservation groups.

long term 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 over the long term.

macroinvertebrates: invertebrates large enough to be seen with the naked eye (e.g., most aquatic insects, snails, and amphipods).

management alternative: a set of objectives and the strategies needed to accomplish each objective [FWS Manual 602 FW 1.4].

management concern: cf. "issue" and "migratory nongame birds of management concern".

management opportunity: cf. "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 (cf. "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 matter).

migratory nongame birds of management concern: species of nongame birds that (*a*) are believed to have undergone significant population declines; (*b*) have small or restricted populations; or (*c*) are dependent upon restricted or vulnerable habitats.

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.]

moraine: a mass or ridge of earth scraped up by ice and deposited at the edge or end of a glacier.

National Environmental Policy Act of 1969: (NEPA) 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 Complex: (Complex) an internal Service administrative linking of refuge units closely related by their purposes, goals, ecosystem, or geopolitical boundaries.

National Wildlife Refuge System: (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.

natural range of variation: a characteristic range of levels, intensities, and periodicities associated with disturbances, population levels, or frequency in undisturbed habitats or communities.

Neotropical migrant: birds, bats, or invertebrates that seasonally migrate between the Nearctic and Neotropics.

non consumptive, wild-life-oriented recreation: wildlife observation and photography and environmental education and interpretation (cf. “wildlife-oriented recreation”).

non-native species: See “exotic species”.

non point source pollution: a diffuse form of water quality degradation in which wastes are not released at one specific, identifiable point but from a number of points that are spread out and difficult to identify and control (Eckhardt 1998).

nonforested wetlands: wetlands dominated by shrubs or emergent vegetation.

nonpoint source: a diffuse form of water quality degradation produced by erosion of land that causes sedimentation of streams, eutrophication from nutrients and pesticides used in agricultural and silvicultural practices, and acid rain resulting from burning fuels that contain sulfur (Lotspeich and Platts 1982).

Notice of Intent: (NOI) an announcement we publish in the Federal Register that we will prepare and review an environmental impact statement [40 CFR 1508.22].

objective: cf. "unit objective".

obligate species: a species that must have access to a particular habitat type to persist.

occurrence site: a discrete area where a population of a rare species lives or a rare plant community type grows.

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.]

outdoor education project: any cooperative venture that combines financial and staff resources to develop outdoor education activities like labs, field trips, surveys, monitoring, or sampling.

outdoor education: educational activities that take place in an outdoor setting.

outwash plain: the plain formed by deposits from a stream or river originating from the melting of glacial ice that are distributed over a considerable area; generally coarser, heavier material is deposited nearer the ice and finer material carried further away.

palustrine wetlands: "The Palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0%."CCowardin et al. 1979.

Partners for Wildlife Program: a voluntary, cooperative habitat restoration program among the Service, other government agencies, public and private organizations, and private landowners to improve and protect fish and wildlife habitat on private land while leaving it in private ownership.

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.

pelagic: living in the water column, well above the bottom and some distance from land, as do oceanic fish or birds (contrast *demersal* and *benthic*).

phytoplankton: the ensemble of tiny plants that float or drift in marine waters. These tiny plants can produce such dense blooms in the Gulf of Maine that they turn our waters green. Phytoplankton are the base of the food chain on which ultimately most shellfish, fish, birds, and marine mammals depend (the exceptions being those that feed mostly on detritus from benthic plants). (See also *Zooplankton.*).

point source: a source of pollution that involves discharge of waste from an identifiable point, such as a smokestack or sewage-treatment plant (Eckhardt 1998).

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 general public use: a compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

private land: land owned by a private individual or group or non-government organization.

private landowner: cf. “private land”.

private organization: any non-government organization.

proposed wilderness: an area of the Refuge System that the Secretary of the Interior has recommended to the President for inclusion in the National Wilder-ness Preservation System.

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 (cf. “long-term ~”).

public: individuals, organizations, and non-government groups; officials of Federal, State, and local government agencies; Native American tribes, and foreign nationsCincludes 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 opinions. We thoroughly study public input, and give it thoughtful consideration in shaping decisions about managing refuges.

public involvement plan: long-term guidance for involving the public in the comprehensive planning process.

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.

recharge: refers to water entering an underground aquifer through faults, fractures, or direct absorption.

recommended wilderness: areas studied and found suitable for wilderness designation by both the Director (FWS) and Secretary (DOI), and recommended by the President to Congress for inclusion in the National Wilderness System [FWS Manual 610 FW 1.5 (draft)].

Record of Decision: (ROD) a concise public record of a decision by a Federal agency pursuant to NEPA. [N.b. A ROD includesk (1) the decision; (2) all the alternatives considered;.(3) the environmentally preferable alternative;.(4) a summary of monitoring and enforcement, where applicable, for any mitigation; and (5) whether all practical means have been adopted to avoid or minimize environmental harm from the alternative selected (or if not, why not).]

refuge goals: “descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units,” Writing Refuge Management Goals and Objectives: A Handbook.

refuge purposes: “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.” National Wildlife Refuge System Improvement Act of 1997.

refuge lands: lands in which the Service holds full interest in fee title or partial interest like an easement.

relatively intact: the conservation status category indicating the least possible disruption of ecosystem processes. Natural communities are largely intact, with species and ecosystem processes occurring within their natural ranges of variation.

relatively stable: the conservation status category between *vulnerable* and *relatively intact* in which extensive areas of intact habitat remain, but local species declines and disruptions of ecological processes have occurred.

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.]

restoration ecology: the process of using ecological principles and experience to return a degraded ecological system to its former or original state.

riparian: referring to the interface between freshwater habitats and the terrestrial landscape.

riparian agricultural land: agricultural land along a stream or river. [N.b. We normally base our CCP analysis of impacts on an estimated 50' of land on both banks, unless otherwise stated.]

riparian forested land: forested land along a stream or river.

riparian habitat: habitat along the banks of a stream or river [cf. 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 (cf. “urban runoff”).

sandplain grassland: dry grassland that has resisted succession due to fire, wind, grazing, mowing, or salt spray. [N.b. Characterized by thin, acidic, nutrient-poor soils over deep sand deposits, sandplains primarily occur on the coast and off-coast islands, or inland, where glaciers or rivers have deposited sands.]

scale: the magnitude of a region or process. Refers to both spatial sizeCfor example, a (relatively small-scale) patch or a (relatively large-scale) landscape; and a temporal rateCfor example, (relatively rapid) ecological succession or (relatively slow) evolutionary speciation**.**

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.

site improvement: any activity that changes the condition of an existing site to better interpret events, places, or things related to a refuge. [e.g, improving safety and access, replacing non-native with native plants, refurbishing footbridges and trailways, and renovating or expanding exhibits.]

source population: a population in a high-quality habitat where the birth rate greatly exceeds the death rate, and the excess individuals emigrate.

special focus area: an area of high biological value. [N.b. We normally direct most of our resources to SFA's that were delineated because of (1) the presence of Federal listed endangered and threatened species, species at risk (formerly, “candidate species”), rare species, concentrations of migrating or wintering waterfowl, or shorebird stopover habitat;.(2) their importance as migrant landbird stopover or breeding habitat;.(3) the presence of unique or rare communities; or (4) the presence of important fish habitat.]

special habitats: wetlands, vernal pools, riparian habitat, and unfragmented rivers, forests and grasslands. [N.b. Many rare species depend on specialized habitats that, in many cases, are being lost within a watershed.]

special riparian project: restoring, protecting, or enhancing an aquatic environment in a discrete riparian corridor within a special focus area.

species assemblage: the combination of particular species that occur together in a specific location and have a reasonable opportunity to interact with one another.

species at risk: a species being considered for Federal listing as threatened or endangered (formerly, a "candidate species").

species of concern: species not Federal-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 (Fiedler and Jain 1992).

State agencies: natural resource agencies of State governments.

State land: State-owned public land.

State-listed species: cf. "Federal-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].

stopover habitat: habitat where birds rest and feed during migration.

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 and 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 iteself."

telecommunications: communicating via electronic technology.

telecommunications project: any cooperative venture that combines financial and staff resources to develop and use computer based applications for exchanging information about a watershed with others.

terrestrial: living on land.

threatened species: a Federal-listed, protected species that is likely to become an endangered species in all or a significant portion of its range.

tiering: incorporating by reference the general discussions of broad topics in environmental impact statements into narrower statements of envi-ronmental analysis by focusing on specific issues [40 CFR 1508.28].

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 state parks and national wildlife refuges.]

turbidity: refers to the extent to which light penetrates a body of water. Turbid waters are those that do not generally support net growth of photo-synthetic organisms.

unfragmented habitat: large, unbroken blocks of a particular type of habitat.

unit objective: desired conditions that must be accomplished to achieve a desired outcome. [N.b. Objectives are the basis for determining management strategies, monitoring refuge accomplishments, and measuring their success. Objectives should be attainable, time-specific, and stated quantitatively or qualitatively (FWS Manual 602 FW 1.4).]

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.]

upwelling: a process whereby nutrient-rich waters from the ocean depths rise to the surface; it commonly occurs along continental coastlines**.**

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 unit could achieve in the next 10 to 15 years.

warm-season grass: native prairie grass that grows the most during summer, when cool-season grasses are dormant.

watchable wildlife: all wildlife is watchable. [N.b. A watchable wildlife program is one that helps maintain viable populations of all native fish and wildlife species by building an active, well informed constituency for conservation. Watchable wildlife programs are tools for meeting wildlife conservation goals while at the same time fulfilling public demand for wildlife-dependent recreational activities (other than sport hunting, sport fishing, or trapping).]

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.

watershedwide education networks: systems for sharing educational information, like curriculum develop-ment projects, student activities, and ongoing data gathering; a combination of telecommunications and real-life exchanges of information.

well-protected: in CCP analysis, a rare species or community type is considered well protected if 75 percent or more of its occurrence sites are on dedicated open space.

wet meadows: meadows located in moist, low-lying areas, often dominated by large colonies of reeds or grasses. [N.b. Often they are created by collapsed beaver dams and exposed pond bottoms. Saltmarsh meadows are subject to daily coastal tides.]

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.

"Wetlands are 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." Cowardin et al 1979.

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 System (cf. "recommended wilderness"). [N.b. A wilderness study area must meet these criteria: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 contiguous, roadless acres, or sufficient size to make practicable its preservation and use in an unimpaired condition. (FWS Manual 610 FW 1.5 (draft)).]

wilderness: cf. "designated wilderness".

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].

wildland fire: every wildland fire is either a wildfire or a prescribed fire [FWS Manual 621 FW 1.3].

wildlife-dependent recreational use: a use of a national wildlife refuge involving hunting, fishing, wildlife observation and photography, or environmental education and 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.

wildlife-oriented recreation: recreational activities in which wildlife is the focus of the experience ["The terms 'wildlife-dependent recreation' and 'wildlife-dependent recreational use' mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation." National Wildlife Refuge System Improvement Act of 1997].

working landscape: the rural landscape created and used by traditional laborers. [N.b. Agriculture, forestry, and fishing all contribute to the working landscape of a watershed (e.g., keeping fields open by mowing or by grazing livestock).]

Wood turtle
USFWS photo

Bibliography

Ailes, I. W. 1980. Breeding biology and habitat use of the upland sandpiper in central Wisconsin. Passenger Pigeon 42:53-63.

American Farmland Trust. 2002. Cost of Community Services Studies: Making the Case for Conservation. AFT publication. 78 pp.

Askildsen, J. P. 1993. Region 9 - Hudson-Delaware. The Kingbird 43:157.

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Pages 1-34 *in* D. M. Power editor. Current ornithology. Volume 11. Plenam Press, New York, New York, USA.

_____. 1997. History of grasslands in the northeastern United States: implications for conservation. Pages 119-136 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America: ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Baker, J. A. and R. J. Brooks. 1981. Distribution patterns of raptors in relation to density of meadow voles. Condor 83:42-47.

Bechard, M. J. 1982. Effect of vegetative cover on foraging site selection by Swainson's hawk. Condor 84:153-159.

Beers, Frederick W., *County Atlas of Ulster, New York.* New York: Walker & Jewetted, 1875.

Bollinger, E. K. 1991. Conservation of grassland birds in agricultural areas. Pages 279-287 *in* D. J. Decker, M. E. Krasny, G. R. Goff, C. R. Smith, and D. W. Gross editors. Challenges in the conservation of biological resources: a practitioner's guide. Westview Press, Boulder, Colorado, USA.

_____. 1995. Successional changes and habitat selection in hayfield bird communities. Auk 112:720-730.

_____, P. B. Bollinger, and T. A. Gavin. 1990. Effects of hay-cropping on eastern populations of bobolink. Wildlife Society Bulletin 18:142-150.

_____, and T. A. Gavin. 1992. Eastern bobolink populations: ecology and conservation in an agricultural landscape. Pages 497-506 *in* J. M. Hagan III, and D. W. Johnson editors. Ecology and conservation of neotropical migrant landbirds. Smithsonian Institution Press, Washington, D.C.

Carter, J. W. 1992. Upland sandpiper. Pages 235-252 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Commonwealth Research Group, Inc. 1995. Cost of Community Services in Southern New England. Southern New England Consortium, Inc. Boston, MA. 102pp.

Corwin, K. 1992. Status and management of grassland and shrubland dependent migratory birds in New York State. Unpublished report to New York State Department of Environmental Conservation, Delmar, NY, USA.

Deslisle, J. M. and J. A. Savidge. 1997. Avian use and vegetation characteristics of conservation reserve program fields. Journal of Wildlife Management 61:318-325.

Duebbert, H. F. and J. T. Lokemoen. 1977. Upland nesting of American bitterns, marsh hawks, and short-eared owls. Prairie Naturalist 9:33-40.

Dunn, Shirley W. 1994. The Mohicans and Their Land 1609-1730. Purple Mountain Press: Fleischmanns, New York.

Dupont, Ronald J. 1994. Vernon 200: A Bicentennial History of the Township of Vernon, New Jersey, 1792-1992. General Press, Highland Lakes, NJ.

Environmental Protection Agency. Draft report on the environment 2003. *http://www.epa.gov/indicators/roe/pdf/tdAir101.pdf*.

_____. Federal Register Notice on 2004 Clean Air Non-road diesel. Final rule. *http://www.epa.gov/nonroad-diesel/2004fr.htm*.

_____. Non-road engine and vehicle emission study. Report EPA 460/3-91-02. November 1991. *http://www.epa.gov/nonroad/nrstudy.pdf*.

ESPN Outdoors Whitetail deer forecast for New York. *httn://espn.go.com/outdoors/hunting/hunting/s/h_deer_forecast04_NY.html*.

Frawley, B. J. 1989. The dynamics of nongame bird breeding ecology in Iowa alfalfa fields. Thesis, Iowa State University, Ames Iowa, USA.

Fried, Marc B. *The Early History of Kingston & Ulster County,* NY. Kinston, NY: Ulster County Historical Society, 1975.

_____. *Shawangunk: Adventure, Exploration, History and Epiphany from a Mountain Wilderness.* Privately published, 1998.

_____. *Shawangunk Place Names: Indian, Dutch and English Geographical Names of the Shawangunk Mountain Region: Their Origin, Interpretation and Historical Evolution.* Privately published, 2005.

Hall, T. R., W. E. Howard, and R. E. Marsh. 1981. Raptor use of artificial perches. Wildlife Society Bulletin 9:296-298.

Headley, Russell (ed.). 1908. The History of Orange County, New York. Van Deusen and Elms, Middletown.

Herkert, J. R. 1991. Prairie birds of Illinois: population response to two centuries of habitat change. Illinois Natural History Survey Bulletin 34:393-399.

_____. 1994. The effects of habitat fragmentation on Midwestern grassland bird communities. Ecological Applications 4:461-471.

_____, R. E. Szafoni, V. M. Kleen, and J. E. Schwegman. 1993. Habitat establishment, enhancement, and management for forest and grassland birds in Illinois. Natural Heritage Publication #1. Division of Natural Heritage, Illinois Department of Conservation, Springfield, Illinois, USA.

Holt, D. W., and S. M. Leasure. 1993. Short-eared owl (*Asio flammeus*) *in* A. Poole and F. Gill editors. The birds of North America, Number 62. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Hurley, R. L. and E. W. Franks. 1976. Changes in the breeding ranges of two grassland birds. Auk 93:108-115.

Kerr, T. 1987. Wildlife usage of switchgrass. Unpublished report on file at New York State Department of Environmental Conservation office, Alabama, New York, USA.

Kirsch, L. M. and K. F. Higgins. 1976. Upland sandpiper nesting and management in North Dakota. Wildlife Society Bulletin 4:16-20.

Janes, S.W. 1983. Status, distribution, and habitat selection of grasshopper sparrows in Morrow County, Oregon. Murrelet 64:51-54

John Buroughs Natural History Society. 1969. Worth mentioning. The chirp. Volume 16 Number 3.

Johnson, R. G. and S. A. Temple. 1990. Nest predation and brood parasitism of tallgrass prairie birds. Journal of Wildlife Management 54:106-111.

Kerpez, Ted A. 2006. Regional Wildlife manager, New York State Department of Environmental Conservation. Personal Communication. New Paltz, NY.

Knopf, F. L. 1995. Declining grassland birds. Pages 296-298 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. National Biological Service, Washington, D.C., USA.

Kraft, Herbert C. *The Lenape-Delaware Indian Heritage: 10,000 B.C.-A.D. 2000.* Lenape Books, 2001.

Mabee, Carleton. *Listen to the Whistle: An Anectodal History of the Wallkill Valley Railroad in the Ulster and Orange Counties, New York.* Fleischmanns, NY: Purple Mountain Press, 1995.

MacWhirter, R. B., and K. L. Bildstein. 1996. Northern harrier (*Circus cyaneus*) *in* A. Poole and F. Gill editors. The birds of North America, Number 210. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Maymon, Jeffrey H., Martha Williams, Colby Childs, and Brian A. Stone. 2002. Phase IA Archeological and Historical Reconnaissance of the Wallkill River National Wildlife Refuge, Sussex County, New Jersey and Orange County, New York. Submitted as a report to the U.S. Fish and Wildlife Service, Hadley, MA by Christopher Goodwin and Associates, Inc., Frederick, Maryland.

Milsap, B. A., K. W. Cline, and B. A. Giron Pendleton. 1987. Habitat management. Pages 215-237 *in* B. A. Giron Pendleton, B. A. Milsap, K. W. Cline, and D. M. Bird editors. Raptor Management Techniques Manual. National Wildlife Federation, Washington, D.C., USA.

Mitchell, L., and J. Shryer. 2000. Aids to grassland management planning for Wallkill and Shawangunk Grasslands NWR (draft). Unpublished report on file at Wallkill River National Wildlife Refuge headquarters, Sussex, New Jersey, USA.

Mitchell, L. R., C. R. Smith, and R. A. Malecki. 2000. Ecology of grassland breeding birds in the northeastern United States – a literature review with recommendations for management. U.S. Geological Survey, Biological Resources Division, New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

National Park Service. Undated. Kingston: Discover 300 years of New York History. Washington, D.C. *http://www.cr.nps.gov/nr/travel/kingston/text.htm#colonization*.

New York State Department of Environmental Conservation. 1997. Endangered, threatened and special concern fish and wildlife species of New York State. New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Delmar, New York, USA.

_____. 2004. Report on deer harvest in the Town of Shawangunk. *http://www.dec.state.ny.us/website/dfwmr/wildlife/deer/2004deertkbyco.pdf*.

_____, and Office of Parks Recreation and Historic Preservation. 2002. New York State Open Space Conservation Plan 2002: New York State Open Space Conservation Plan and Generic Environmental Impact Statement. New York State Department of Environmental Conservation and Office of Parks Recreation and Historic Preservation, Albany, New York, USA.

New York State, Office of Property Services, 2002. Ulster County: Summary of Exemptions by Roll Year 2002 Assessment Rolls. *http://www.orps.state.ny.us/cfapps/MuniPro/*.

Norment, C. R. 1999. Effects of grassland bird management on nongame bird community structure and productivity. Final report. Challenge cost share agreement no. 14-48-0005-94-9055 between the U.S. Fish and Wildlife Service and the Research Foundation of the State University of New York, Brockport, New York, USA.

Oregon State University. Pesticide Information Profiles (PIPs). *http://extonet.orst.edu.pips*.

Pashley, D. N., C. J. Beardmore, J. A. Fitzgerald, R. P. Ford, W. C. Hunter, M. S. Morrison, K. V. Rosenberg. 2000. Partners In Flight: conservation of the landbirds of the United States. American Bird Conservancy, The Plains, Virginia, USA.

Penhollow, M. E. 1999. Executive summary: Hudson River Estuary biodiversity conservation plan (draft). Cornell University, New York Cooperative Fish and Wildlife Research Unit, Ithaca, New York, USA.

Peterjohn, B. J., J. R. Sauer, and S. Orsillo. 1995. Breeding Bird Survey: population trends 1966-92. Pages 17-21 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. National Biological Service, Washington, D.C., USA.

Pickwell, G. B. 1931. The prairie horned lark. Transactions of the Academy of Science of St. Louis 27:1-153.

Redish, Laura. Date unavailable. Native Languages of the Americas: Munsee Delaware (Minsi, Muncee, Muncey). First Languages of the Americas website: *http://www.native-languages.org/munsee.htm*.

Robbins, C. S., D. Bystrak, and P. H. Geissler. 1986. The Breeding Bird Survey: its first fifteen years, 1965-1979. U.S. Fish and Wildlife Service Resource Publication 157.

Sauer, J. R., J. E. Hines, G. Gough, I. Thomas, and B. J. Peterjohn. 1997. The North American =Breeding Bird Survey results and analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, Maryland, USA. *http://www.mbr-pwrc.usgs.gov/bbs/bbs.html* (December 1999).

Skinner, R. M., T. S. Baskett, and D. M. Blendon. 1984. Bird habitat on Missouri prairies. Terrestrial Series 14. Missouri Department of Conservation, Jefferson City, Missouri, USA.

Smith, C. R. 1989. An analysis of New York State Breeding Bird Surveys 1966-1985. Revised final project report, contract no. C00167, prepared for New York State Department of Environmental Conservation, Delmar, New York, USA.

_____. 1992. Henslow' sparrow. Pages 315-330 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

_____. 1997. Use of public grazing lands by Henslow's sparrows, grasshopper sparrows, and associated grassland birds in central New York State. Pages 171-186 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America: ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

_____. 1998. Vesper sparrow. Pages 508-509 *in* E. Levine editor. Bull's birds of New York State. Cornell University Press, Ithaca, New York, USA.

Smith, D. J. and C. R. Smith. 1990. Summer bird species diversity and use of pastures by summer birds of the Finger Lakes National Forest. Final project report no. 40-1681-9-0470. U.S. Forest Service, Green Mountain National Forest, Middlebury, Vermont, USA.

Smith, W. P. 1968. *Passerhubulus henslowii susurrans* Brewster eastern Henslow's sparrow. Pages 776-778 *in* O. L. Austin, Jr. editor. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Part 2. Smithsonian Institution Press, U.S. National Museum Bulletin 237.

Stevens, G. 1992. Wetlands on the Galeville Army Training Site: report to the United States Military Academy (West Point). Hudsonia Ltd., Bard College Field Station, Annandale, New York, USA.

Sultzman, Lee. 2000. Delaware History. "Compact history at First Nation". A website maintained by Jordan S. Dill. *http://www.tolatsga.org/Compacts.html*.

Swanson, D. A. 1996. Nesting ecology and nesting habitat requirements of Ohio's grassland-nesting birds: a literature review. Ohio Fish and Wildlife Report 13:1-60.

Sylvester, Nathaniel Bartlett. History of Ulster County, New York. Philadelphia: Events & Peck, 1880.

Tate, G. R. 1992. Short-eared owl, *Asio flammeus*. Pages 171-189 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Treacy, E. D. 1982. Region 9 - Delaware-Hudson. The Kingbird 32:221.

Trust for Public Land. 1999. The economic benefits of parks and open space: how land conservation helps communities grow smart and protect the bottom line. *http://www.tpl.org/newsroom/reports/econbenz_html*.

U. S. Fish and Wildlife Service. 1997. Significant habitats and habitat complexes of the New York Bight watershed. Southern New England - New York bight Coastal Ecosystems Program, Charlestown, Rhode Island, USA.

U. S. Fish and Wildlife Service. 2003. Birding in the United States: A Demographic 2001and Economic Analysis. Addendum to the 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation Report 2001-1.

U. S. Fish and Wildlife Service. 2002. 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

U.S. North American Bird Conservation Initiative Committee. 2000. North American Bird Conservation Initiative; bringing it all together. U.S. Fish and Wildlife Service, Arlington, Virginia, USA.

Vickery, P. D. and P. W. Dunwiddie. 1997. Introduction. Pages 1-13 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America: ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Wakeley, J. S. 1978. Factors affecting the use of hunting sites by ferruginous hawks. Condor 80:316-326

Wells, J. V. 1998. Important Bird Areas in New York State. National Audubon Society, Albany, New York, USA.

Whitmore, R. C. 1979. Short-term change in vegetation and its effect on grasshopper sparrows in West Virginia. Auk 96:621-625.

_____. 1981. Structural characteristics of grasshopper sparrow habitat. Journal of Wildlife Management 45:811-814.

Wiens, J. A. 1969. An approach to the study of ecological relationships among grassland birds. Ornithological Monographs 8:1-93.

U.S. Census Bureau. 2000. *http://quickfacts.census.gov/qfd/states/23000.html*.

Appendix A

Bobolink
Scott A. Vincent©

Species of Conservation Concern

Shawangunk Grassland NWR Trust Species and other Species of Conservation Concern (see *notes* on next page*)

Scientific Name	Common Name(s)	FWS BCC (1)	NY State-listed (2)	Global HP (3)	NYNHP (4)	NABCI BCR28 (5)	PIF B (6)	PIF W (6)
Carex frankii	Frank's sedge		E	G5	S1			
Clemmys guttata	spotted turtle		SC					
Glyptemys insculpta	wood turtle		SC					
Aix sponsa	wood duck						IIb	
A. rubripes	American black duck						Ib	I
Circus cyaneus	northern harrier		T	G5	S3B, S3N		V	IIc
Accipiter striatus	sharp-shinned hawk		SC				V	
A. cooperii	Cooper's hawk		SC				V	
A. gentilis	northern goshawk		SC				V	
Buteo lineatus	red-shouldered hawk		SC				V	
Falco peregrinus	peregrine falcon	X	E	G4	S3B, SZN	X	V	
Bartramia longicauda	upland sandpiper	X	T	G5	S3B	X	IIc	
Scolopax minor	American woodcock						Ia	I
Coccyzus erythropthalmus	black-billed cuckoo	X				X		
Tyto alba	barn owl			G5	S3			
Asio otus	long-eared owl						V	
Asio flammeus	short-eared owl	X	E	G5	S2	X		IIc
Chordeilis minor	common nighthawk		SC				V	
Melanerpes erythrocephalus	red-headed woodpecker	X	SC			X	Ib	IIIb
Sphyrapicus varius	yellow-bellied sapsucker	X				X		
Contopus virens	eastern wood-pewee						IIa	
Lanius ludovicianus	loggerhead shrike	X	E	G4	S1B, SZN		V	
Eremophila alpestris	horned lark		SC				V	
Toxostoma rufum	brown thrasher						IIa	
Hylocichla mustelina	wood thrush	X				X	Ia	
Vermivora pinus	blue-winged warbler						IIIb	
Dendroica discolor	prairie warbler	X				X	IIIb	
D. palmarum	palm warbler			G5	S1			
Icteria virens	yellow-breasted chat		SC				V	
Piranga olivacea	scarlet tanager						IIb	
Pipilo erythropthalmus	eastern towhee						IIa	
Spizella pusilla	field sparrow						Ia	
Pooecetes gramineus	vesper sparrow		SC				V	
Passerculus sandwichensis	savannah sparrow						V	
Ammodramus savannarum	grasshopper sparrow		SC				IIc	
A. henslowii	Henslow's sparrow	X	T	G4	S3B, SAN	X	Ib	
Dolichonyx oryzivorus	bobolink						IIIb	
Icterus galbula	Baltimore oriole						IIa	

Notes:

(1) U.S. Fish and Wildlife Service, region 5, Birds of Conservation Concern 2002

(2) New York State; E= endangered, T= threatened, SC= species of concern

(3) New York Natural Heritage Program: Global rank
- **G1** Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.
- **G2** Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.
- **G3** Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
- **G4** Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- **G5** Demonstrably secure globally, though it may be quite rare
- **GH** Historically known, with the expectation that it might be rediscovered.
- **GX** Species believed to be extinct.
- **GU** Status unknown.

(4) New York Natural Heritage Program: State Rank
- **S1** typically 5 or fewer occurrences
- **S2** typically 6-20 occurrences
- **S3** typically 21 - 100 occurrences
- **S4** apparently secure in NYS
- **S5** demonstrably secure in NYS
- **SA** accidental species
- **SH** historically known from NYS, but not seen in the past 15 years
- **SX** apparently extirpated from NYS
- **SR** reported to occur in NYS, but no specific locations documented
- **SU** species unrankable due to uncertainty about number of occurrences
- **SZ** species occurs in NYS, but generally not in specific locations
- **S?** species not evaluated yet
- **NR** not rated yet

Modifiers: (B) signifies that the species breeds instate, (N) signifies it does not breed instate

(5) North American Bird Conservation Initiative, Bird Conservation Region 28, species of concern

(6) Partners in Flight, Area 17, (B) = breeding, (W) = wintering

Tier I. *High Continental Priority.*
Tier IA. *High Continental Concern - High Regional Responsibility*.
Tier IB. *High Continental Concern - Low Regional Responsibility*.
Tier II. *High Regional Priority*.
Tier IIA. *High Regional Concern*.
Tier IIB. *High Regional Responsibility*.
Tier IIC. *High Regional Threats*.
Tier III. *Additional Federally Listed*.
Tier IV. *Additional State Listed*.
Tier V. *Additional Stewardship Responsibility*.
Tier VI. *Local concern* - species of justifiable local concern or interest.

***** There is no documentation that the Indiana bat occurs on the refuge; however, it is also true that no surveys have been conducted. It is possible they could be present due the proximity of the refuge to known roost sites (pers. comm. with Laury Zicary, NYFO) and the presence on the refuge of trees in excess of 5 inches dbh.

Appendix B

Research on Shawangunk Grasslands National Wildlife Refuge
USFWS photo

Compatibility Determinations

- Public Fishing
- Haying
- Wildlife Observation, Nature Photography, Environmental Education and Interpretation
- Grazing
- Archery Deer Hunting
- Research by Non-Service Personnel
- Model Airplane Flying and Competitive Events

COMPATIBILITY DETERMINATION

Use: Public Fishing

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use? Is the use a priority public use?
The use is public fishing. It 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), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
The only practicable site on the refuge for public fishing is a 1/10-acre man-made pond located approximately one quarter-mile from the refuge's public parking area on Hoagerburgh Road. This site is accessible from the refuge's entrance road. This is the largest pond on the refuge and the only pond open to public access. Further, it is the only aquatic habitat on the refuge capable of sustaining a fishing program. Map 2-1, in Chapter 2 of the draft CCP/EA, illustrates the location of this pond on the refuge.

When would the use be conducted?
Fishing would be permitted throughout the year from 1 hour before official sunrise to 1 hour after official sunset, but would primarily occur from April to October.

How would the use be conducted?
All fishing would be in accordance with State regulations with additional refuge restrictions. We would permit fishing by rod and reel or hook and line only. No bait trapping, stocking of non-native

fish, and fishing competitions would be allowed. A refuge permit would not be required. The small size and narrow width of this pond yields an approximate maximum of 5 anglers at any given time. Given the length of the season, we estimate this would result in 52 fishing-days per year.

Why is the use being proposed?
Providing opportunities for visitors to fish will promote stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: Shawangunk Grasslands Refuge is an unstaffed satellite refuge administered by Wallkill River Refuge. No additional equipment, facilities, or improvements will be necessary to implement a fishing program. Further, existing facilities and access for fishing will be maintained to facilitate other currently permitted uses, including wildlife observation, photography, environmental education, and interpretation. A fishing program will create minor staff costs from biological monitoring, law enforcement, and office administration. Staff time would be required to develop the refuge's fishing plan, maintain shoreline access, and contact and educate visitors. Of the costs listed below, which reflect our current total operations costs associated with managing the refuge, approximately 5% would be dedicated to managing a fishing program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$ 175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$ 1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: Fishing will cause disturbance to wildlife that uses the pond, including waterfowl and shorebirds. However, this very small pond is infrequently used by a very small number of these birds. Discarded fishing line and other fishing litter can entangle migratory birds and mammals and cause injury and death (Gregory 1991). Additionally, litter impacts the visual experience of refuge visitors (Marion and Lime 1986). Law enforcement issues related to fishing include illegal stocking of fish, littering, and fires.

The refuge believes that with the proper management, fishing will not result in any short or long-term impacts that will adversely affect the purpose of the refuge or the mission of the National Wildlife Refuge System.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Anglers must comply with all State and refuge regulations. We would permit fishing by rod and reel or hook and line only. Use of lead sinkers would not be permitted. Bait trapping, stocking and fishing competitions would not be permitted. A law enforcement presence would be required to prevent illegal stocking of fish, littering and fires.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies fishing as a priority public use. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. This use can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing fishing opportunities will promote public appreciation and support for the refuge. This activity will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** Anthony D. Léger June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

Literature Cited:

Gregory, M.R. 1991. The hazards of persistent marine pollution: drift plastics and conservation islands. Journal of Royal Society of New Zealand 21(2):83-100.

Marion, J. L. and D. W. Lime. 1986. Recreational resource impacts: visitor perceptions and management responses. Pages 229-235 *in* D. L. Kulhavy and R. N. Conner editors. Wilderness and natural areas in the eastern United States: a management challenge. Center for Applied Studies, Austin State University, Nacogdoches, Texas, USA.

COMPATIBILITY DETERMINATION

Use: Haying

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use? Is the use a priority public use?
The use is haying. It is not identified as 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.

Where would the use be conducted?
Haying would occur within the refuge's 400 acre grassland. This activity would not occur on 135 acres of the refuge comprised of woodland, shrubland, or in administrative areas.

When would the use be conducted?
Haying would occur from mid-July to late-October.

How would the use be conducted?
Haying would be conducted through a program with cooperating farmers via special use permit. Refuge grasslands would be divided into sections and hayed rotationally. Haying frequency and intensity would be controlled to suppress broadleaf plant invasion and develop a mosaic of grassland vegetation.

Why is the use being proposed?
The refuge was established to sustain and enhance habitats for grassland-dependent migratory birds. 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, U.S. Fish and Wildlife Service 2002). Moreover, all of these species can be found at the refuge. In fact, Audubon New York has designated the refuge as an Important bird Area because it is one of the most important grassland bird nesting and wintering areas in the State (Wells 1998). However, without active management, refuge grasslands will soon become dominated by purple loosestrife or dense shrubland (Mitchell and Shryer 2000). Consequently, the refuge would no longer provide suitable habitat for grassland-dependent birds.

Haying combined with mowing, is a useful and effective grassland management technique (U.S. Fish and Wildlife Service 1982). Mitchell et al. (2000) states that haying and mowing are economic means of controlling invasion of grasslands by forbs and woody plants. Further, haying is generally a more convenient technique to apply than prescribed fire or grazing. Herkert et al. (1993) recommend rotational haying and mowing as a grassland management alternative with subunits left idle. This strategy may provide a complex of grassland successional stages to meet the respective nesting requirements of a diversity 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. 2001a), upland sandpiper (Kirsch and Higgins 1976, Dechant et al. 2001b), short-eared owl (Tate 1992, Dechant et al. 2001c), horned lark (Dinkins et al. 2001), grasshopper sparrow (Dechant et al. 2001d, Vickery 1996), Henslow's sparrow (Smith 1992, Herkert 2001), vesper sparrow (Camp and Best 1993, Dechant et al. 2001e), savannah sparrow (Swanson 2001), bobolink (Bollinger and Gavin 1992, Dechant et al. 2001e), and eastern meadowlark (Lanyon 1995, Hull 2000).

Availability of Resources: A haying program will create minor staff costs from biological monitoring, law enforcement, and administration. No additional equipment, facilities, or improvements will be required from the Service. Cooperators will be required to use their own equipment. A permit fee may be required. The amount of this fee would be based on level of demand from cooperators. Of the costs listed below, which reflect our current total operations costs associated with managing the refuge, approximately 10% would be dedicated to managing a haying program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: A managed haying program would have positive impacts to the refuge's grassland habitat and wildlife. Haying suppresses invasion of grasslands by perennial forbs and shrubs. Consequently, grass-dominated plant communities are maintained. Further, rotational haying will help to develop a mosaic of grassland vegetation. Diverse grasslands provide habitat for a greater diversity and abundance of grassland birds.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Bollinger et al. (1990) estimated a 40% nest mortality rate in bobolinks in central New York hayfields due to mowing and subsequent field operations. Haying or mowing should be avoided during the early nesting season to avoid destruction to the nests, eggs, and young of breeding grassland birds, including northern harrier (Berkey et al. 1993, Dechant et al. 2001a), upland sandpiper (Lokemoen and Beiser 1997, Dechant et al. 2001b), short-eared owl (Tate 1992), grasshopper sparrow (Dechant et al. 2001d, Vickery 1996), Henslow's sparrow (Smith 1992, Herkert 2001), vesper sparrow (Bryan and Best 1994, Dechant et al. 2001e), savannah sparrow (Dale et al. 1997, Swanson 2001), bobolink (Bollinger and Gavin 1992, Dechant et al. 2001e), and eastern meadowlark (Granfors et al. 1996, Hull 2000). Most grassland birds have fledged young by mid-July in New York (Andrle and Carroll 1988).

Justification: A haying program will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes of Shawangunk Grasslands Refuge. Haying will contribute to the purposes of the refuge by maintaining and enhancing the habitat for grassland-dependent migratory birds and wintering raptors for which the refuge was established. Therefore, it is the determination of the Service that haying is a compatible use of the refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ 6/13/06
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

Literature Cited:

Andrle, R. F., and J. R. Carroll, editors. 1988. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Pages 1-34 *in* D. M. Power, editor. Current ornithology. Volume 11. Plenam Press, New York, New York, USA.

_____. 1997. History of grasslands in the northeastern United States: implications for conservation. Pages 119-136 *in* P. D. Vickery and P. W. Dunwiddie, editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Berkey, G., R. Crawford, S. Galipeau, D. Johnson, D. Lambeth, and R. Kreil. 1993. A review of wildlife management practices in North Dakota: effects on nongame bird populations and habitats. Report submitted to Region 6, U.S. Fish and Wildlife Service, Denver, Colorado, USA.

Bollinger, E. K., P. B. Bollinger, and T. A. Gavin. 1990. Effects of hay-cropping on eastern populations of the bobolink. Wildlife Society Bulletin 18:142-150.

Bollinger, E. K., and T. A. Gavin. 1992. Eastern bobolink populations: ecology and conservation in an agricultural landscape. Pages 497-506 *in* J.M. Hagan, III and D.W.

Johnston, editors. Ecology and conservation of neotropical migrant landbirds. Smithsonian Institute Press, Washington, DC, USA.

Bryan, G. G., and L. B. Best. 1994. Avian nest density and success in grassed waterways in Iowa rowcrop fields. Wildlife Society Bulletin 22:583-592.

Camp, M., and L. B. Best. 1993. Bird abundance and species richness in roadsides adjacent to Iowa rowcrop fields. Wildlife Society Bulletin 21:315-325.

Dale, B. C., P. A. Martin, and P. S. Taylor. 1997. Effects of hay management on grassland songbirds in Saskatchewan. Wildlife Society Bulletin 25:616-626.

Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, B. D. Parkin, and B. R. Euliss. 2001. Effects of management practices on grassland birds: upland sandpiper. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm* (Version 17FEB2000).

Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, and B. R. Euliss. 2001. Effects of management practices on grassland birds: vesper sparrow. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm* (Version 29FEB2000).

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 2001. Effects of management practices on grassland birds: northern harrier. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/harrier/harrier.htm* (Version 17FEB2000).

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 2001. Effects of management practices on grassland birds: short-eared owl. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/shortear/shortear.htm* (Version 17FEB2000).

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. 2001. Effects of management practices on grassland birds: grasshopper sparrow. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/grasshop/grasshop.htm* (Version 17FEB2000).

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, A. L. Zimmerman, and B. R. Euliss. 2001. Effects of management practices on grassland birds: bobolink. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/bobo/bobo.htm* (Version 17FEB2000).

Dinkins, M. F., A. L. Zimmerman, J. A. Dechant, B. D. Parkin, D. H. Johnson, L. D. Igl, C. M. Goldade, and B. R. Euliss. 2001. Effects of management practices on grassland birds: horned lark. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA.

Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/hola/hola.htm* (Version 16JUN2000).

Granfors, D. A., K. E. Church, and L. M. Smith. 1996. Eastern meadowlark nesting in rangelands and Conservation Reserve Program fields in Kansas. Journal of Field Ornithology 67:222-235.

Herkert, J. R. 2001. Effects of management practices on grassland birds: Henslow's sparrow. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/henslows/henslows.htm* (Version 17FEB2000).

Herkert, J. R., R. E. Szafoni, V. M. Kleen, and J. E. Schwegman. 1993. Habitat establishment, enhancement and management for forest and grassland birds in Illinois. Division of Natural Heritage, Illinois Department of Conservation, Natural Heritage Technical Publication Number 1, Springfield, Illinois, USA.

Hull, S. D. 2000. Effects of management practices on grassland birds: eastern meadowlark. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/fpeame/fpeame.htm* (Version 16JUN2000).

Kirsch, L. M., and K. F. Higgins. 1976. Upland sandpiper nesting and management in North Dakota. Wildlife Society Bulletin 4:16-20.

Knopf, F. L. 1995. Declining grassland birds. Pages 296-298 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. National Biological Service, Washington, D.C., USA.

Lanyon, W. E. 1995. Eastern meadowlark (*Sturnella magna*). *In* A. Poole and F. Gill editors. The birds of North America. Number 160. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Lokemoen, J. T., and J. A. Beiser. 1997. Bird use and nesting in conventional, minimum-tillage, and organic cropland. Journal of Wildlife Management 61:644-655.

Mitchell, L. R., C. R. Smith, and R. A. Malecki. 2000. Ecology of grassland breeding birds in the northeastern United States - a literature review with recommendations for management. U.S. Geological Survey, Biological Resources Division and New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Mitchell, L., and J. Shryer. 2000. Aids to grassland management planning for Wallkill and Shawangunk Grasslands NWR (draft). Unpublished report on file at Wallkill River National Wildlife Refuge headquarters, Sussex, New Jersey, USA.

New York State Department of Environmental Conservation. 1997. Endangered, threatened and special concern fish and wildlife species of New York State. New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Delmar, New York, USA.

Pashley, D. N., C. J. Beardmore, J. A. Fitzgerald, R. P. Ford, W. C. Hunter, M. S. Morrison, K. V. Rosenberg. 2000. Partners In Flight: conservation of the landbirds of the United States. American Bird Conservancy, The Plains, Virginia, USA.

Robbins, C. S., D. Bystrak, and P. H. Geissler. 1986. The Breeding Bird Survey: its first fifteen years, 1965-1979. U.S. Fish and Wildlife Service Resource Publication 157.

Sauer, J. R., J. E. Hines, G. Gough, I. Thomas, and B. J. Peterjohn. 1997. The North American Breeding Bird Survey results and analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, Maryland, USA. *http://www.mbr-pwrc.usgs.gov/bbs/bbs.html* (12/1999).

Smith, C. R. 1992. Henslow's sparrow, *Ammodramus henslowii*. Pages 315-330 *in* K. J. Schneider and D. M. Pence, editors. Migratory nongame birds of management concern in the Northeast. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Swanson, D. A. 2001. Effects of management practices on grassland birds: savannah sparrow. Northern Prairie Wildlife Research Center, Jamestown, North Dakota, USA. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/savannah/savannah.htm* (Version 17FEB2000).

Tate, G. R. 1992. Short-eared owl, *Asio flammeus*. Pages 171-189 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Department of the Interior, Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Vickery, P. D. 1996. Grasshopper sparrow (*Ammodramus savannarum*). *In* A. Poole and F. Gill, editors. The birds of North America. Number 239. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

U.S. North American Bird Conservation Initiative Committee. 2000. North American Bird Conservation Initiative; bringing it all together. U.S. Fish and Wildlife Service, Arlington,Virginia, USA.

U.S. Fish and Wildlife Service. 1982. Refuge Manual: 6 RM 5.6C. Division of Refuges, Arlington, Virginia, USA.

_____. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia, USA.

Wells, J. V. 1998. Important Bird Areas in New York State. National Audubon Society, Albany, New York, USA.

COMPATIBILITY DETERMINATION

Use: Wildlife Observation, Nature Photography, Environmental Education, and Interpretation

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use? Is the use a priority public use?
The uses are wildlife observation, nature photography, environmental education, and interpretation. They are 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), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
All uses would be allowed only on designated refuge trails.

When would the use be conducted?
All uses would be allowed only when the refuge is open to the public from 1 hour before official sunrise to 1 hour after official sunset.

How would the use be conducted?
Currently, the refuge is open to the public for wildlife observation, photography, environmental education, and interpretation. Existing facilities to support these activities include a small parking lot and an informational kiosk. Additionally, the closed runways and taxiways of the former Galeville Army Training Site serve as the refuge's trail system. Foot, snowshoe, or cross-country ski access is allowed only on refuge trails from sunrise to sunset. No pets, jogging, horseback riding, bicycling, or motorized vehicles are allowed.

The Service's preferred alternative in the refuge's draft Comprehensive Conservation Plan would enhance the infrastructure and programs to increase wildlife observation, photography, environmental education, and interpretation opportunities at the refuge. The current trail system will be expanded to a two-mile loop trail. New sections of trail will be constructed through wooded areas and along the grassland perimeter. The trail will be supplemented with an observation platform, photography blind and interpretive signs. The refuge trail may be connected to a nature trail proposed on the adjacent Galeville Town Park. Facilities development will also include expansion of the existing parking area and establishment of a visitor contact facility. Enhanced public use programs will include staff or volunteer guided nature walks, teacher workshops, and outdoor classroom programs.

Why is the use being proposed?
Providing opportunities for visitors to engage in wildlife observation, photography, environmental education, and interpretation will promote stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: Estimates derived from the Service's Region 5 *Construction and Rehabilitation Cost Estimating Guide* in part.

Parking area expansion	$16,500	increase from 10 space to 20 space lot; gravel; ($1,400/space) (10 spaces) = $14,000; round-rail fence barrier = ($25/LN) (100 LN) = $2500
Trail expansion	$54,000	1 mile foot trail
Blind		$13,500 1 blind
Platform	$27,000	1 platform
Interpretive signs	$15,000	5 signs
Staff costs	$20,500	law enforcement, biological monitoring, administration, maintenance, programs; 0.5 GS 09 FTE
Vehicle fuel	$ 700	($1.40/gal) (2.5 gal/trip) (200 trips) = $700
Equipment use/replacement	$ 5,000	vehicles, mowers, hand tools
	TOTAL $152,200	

Anticipated Impacts of Proposed Actions: Wildlife observation, photography, environmental education, and interpretation activities on refuge trails will have minimal impacts upon the refuge's wildlife. These impacts will most likely be limited, short term disturbances to wildlife immediately adjacent to trails during the activity. This level of disturbance should not decrease wildlife abundance or inhibit the ability of wildlife to nest, rest, or feed at the refuge.

Opening a portion of the Shawangunk Grasslands National Wildlife Refuge may cause disturbance to avian species. Some research suggests human intrusion in wildlife habitats, such as walking on trails, can cause disturbance to wildlife. One example of this is a study done in 1997 (Gutzwiller, et. al, 1997) that showed human intrusion influences avian singing behavior in some species. During breeding season, the seasonal timing of male song affects the timing of territory establishments, male attraction, pair formation, egg laying and transmission of information about breeding songs to young (Gutzwiller, et. al, 1997). Therefore, if human

intrusion affects singing, it could ultimately affect reproduction and survival of some species. Another study conducted in 1996 (Riffell et. al) suggests that when repeated human intrusion recurs over an extended period of time, impacts on avian reproductive fitness have the potential to accumulate temporally at the individual, population and community levels.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____ **Use is Not Compatible**
__X__ **Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Location of the expanded trail, kiosks, platform, and blind will be planned to minimize disturbance to wildlife. Refuge visitors will only be allowed to participate in these activities on designated trails from sunrise to sunset. Trespass off refuge trails for these uses will not be permitted.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies wildlife observation, photography, environmental education, and interpretation, as priority public uses. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. These activities can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing opportunities for visitors to engage in wildlife observation, photography, environmental education, and interpretation will promote public appreciation and support for the refuge. These activities will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: **Refuge Manager:** [signature] 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** [signature] June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

COMPATIBILITY DETERMINATION

Use: Grazing

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use?Is the use a priority public use?
The use is grazing. It is not identified as 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.

Where would the use be conducted?
Grazing would occur within the refuge's 400 acre grassland habitat. This activity would not occur on 135 acres of the refuge comprised of woodland, shrubland, or in administrative areas.

When would the use be conducted?
Grazing would occur from early July to mid-October.

How would the use be conducted?
Grazing would be conducted through a program with cooperating livestock owners via special use permit. Refuge grasslands would be divided into sections and grazed rotationally. Grazing frequency and intensity would be controlled to suppress broadleaf plant invasion and produce heterogeneous vegetative structure.

Why is the use being proposed?
The refuge was established to sustain and enhance habitats for grassland-dependent migratory birds. 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, U.S. Fish and Wildlife Service 2002). Moreover, all of these species can be found at the refuge. In fact, Audubon New York has designated the refuge as an Important bird Area because it is one of the most important grassland bird nesting and wintering areas in the State (Wells 1998). However, without active management, refuge grasslands will soon become dominated by purple loosestrife or dense shrubland (Mitchell and Shryer 2000). Consequently, the refuge would no longer provide suitable habitat for grassland-dependent birds.

With proper timing, stocking rate, and frequency, grazing can be used to achieve wildlife objectives (U.S. Fish and Wildlife Service 1982). Mitchell et al. (2000) describe several benefits of grazing for managing habitat for breeding grassland birds. These benefits include reduced thatch accumulation, increased structural complexity, and suppressed plant succession. Smith (1997), states that grazing is a cost-effective means of suppressing plant succession, which benefits grassland birds. Herkert et al. (1993) recommend rotational grazing as a means to provide a structural mosaic of grasslands to meet the respective nesting requirements of each grassland bird species.

Light to moderate grazing is beneficial to several grassland birds (Bollinger 1991, Jones and Vickery 1997), particularly those that prefer to nest in fields with short, sparse to intermediate height and density vegetation (Mitchell et al. 2000). These species include upland sandpiper, grasshopper sparrow, savannah sparrow, eastern meadowlark, and bobolink (Herkert et al. 1993). Kirsch and Higgins (1976) indicate that periodic light grazing may be desirable for the long-term maintenance of suitable upland sandpiper habitat and to maintain the best ecological condition of grasslands. Dechant et al. (2001a) recommend moderate rotational grazing as a means of providing optimal nesting habitat for upland sandpipers. Vickery (1996) states that light to moderate grazing is beneficial to grasshopper sparrows in the Northeast. In central New York Smith and Smith (1990) found Henslow's sparrow and grasshopper sparrow nesting in lightly and moderately grazed pastures respectively. Light to moderate grazing is recommended as a management technique for grasslands used by nesting short-eared owl (Dechant et al. 2001b) and bobolink (Dechant et al. 2001c). Swanson (2001) recommends light grazing as a technique to create medium height and density vegetation preferred by nesting savannah sparrows.

Intensive grazing may benefit grassland birds that nest in fields with the shortest, sparsest vegetation, including horned lark and vesper sparrow (Skinner et al. 1984, Herkert 1991, Herkert et al. 1993). Wakeley (1978), Baker and Brooks (1981), and Bechard (1982) demonstrated that tall, dense vegetation impedes the ability of several species of *Buteo* hawks to capture prey. Thus, higher stocking rates may also benefit wintering raptors by increasing availability of rodent prey.

Availability of Resources: A grazing program will create minor staff costs from biological monitoring, law enforcement, and administration. No additional equipment, facilities, or improvements will be required from the Service. Cooperators will be required to provide, install, and remove temporary fencing and transport livestock. A permit fee will be required. The amount of this fee will be based on level of demand from cooperators. Of the costs listed below, which reflect

our current total operations costs associated with managing the refuge, approximately 5% would be dedicated to managing a grazing program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: A managed grazing program would have positive impacts to the refuge's grassland habitat and wildlife. Grazing suppresses invasion of grasslands by perennial forbs and shrubs. Consequently, grass-dominated plant communities are maintained and controlled grazing yields greater vegetative structure complexity. Structurally heterogeneous grasslands provide habitat for a greater diversity and abundance of grassland birds.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____ Use is not Compatible
___X__Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Nest trampling may be an important consideration when choosing grazing as a management tool for refuge grasslands. Smith (1992) mentions this potential threat to Henslow's sparrows breeding in areas grazed by cattle. Livestock trampling has damaged upland sandpiper nests (Ailes 1980). To prevent this damage grazing activities will not be initiated on the refuge until most grassland birds have fledged young. This period begins in early July in New York (Andrle and Carroll 1988).

Intensive grazing throughout the refuge would yield vegetation too denuded to provide habitat for grassland birds that nest in tall, dense vegetation, including northern harrier, short-eared owl (Duebbert and Lokemoen 1977), and Henslow's sparrow (Smith 1992). This grazing regime would also be detrimental to wintering short-eared owls and northern harriers at the refuge which rely on thick, herbaceous vegetation to roost (Kahl and Holcomb, U.S. Fish and Wildlife Service 2003, personal observation). High stocking rates would similarly affect grassland birds that nest in intermediate height and density vegetation, including upland sandpiper, grasshopper sparrow, savannah sparrow, eastern meadowlark, and bobolink. Grassland areas would be managed as a complex and grazed rotationally to provide heterogeneous grassland structure. This strategy would maximize the potential to provide habitat for the greatest diversity and abundance of grassland bird species.

Justification: A grazing program will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes of Shawangunk Grasslands Refuge. Grazing will contribute to the purposes of the refuge by maintaining and enhancing the habitat for grassland-dependent migratory birds and wintering raptors for which the refuge was established. Therefore, it is the determination of the Service that grazing is a compatible use of the refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

Literature Cited:

Ailes, I. W. 1980. Breeding biology and habitat use of the upland sandpiper in central Wisconsin. Passenger Pigeon 42:53-63.

Andrle, R. F., and J. R. Carroll, editors. 1988. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Pages 1-34 *in* D. M. Power, editor. Current ornithology. Volume 11. Plenam Press, New York, New York, USA.

_____. 1997. History of grasslands in the northeastern United States: implications for conservation. Pages 119-136 *in* P. D. Vickery and P. W. Dunwiddie, editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Baker, J. A., and R. J. Brooks. 1981. Distribution patterns of raptors in relation to density of meadow voles. Condor 83:42-47.

Bechard, M. J. 1982. Effect of vegetative cover on foraging site selection by Swainson's hawk. Condor 84:153-159.

Bollinger, E. K. 1991. Conservation of grassland birds in agricultural areas. Pages 279-287 *in* D.J. Decker, M.E. Krasny, G.R. Goff, C.R. Smith, and D.W. Gross, editors. Challenges in the conservation of biological resources: a practitioners guide. Westview Press, Boulder, Colorado, USA.

Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, B. D. Parkin, and B. R. Euliss. 2001. Effects of management practices on grassland birds: upland sandpiper. Northern Prairie Wildlife Research Center, Jamestown, ND. Northern Prairie Wildlife Research Center Home Page. *http://www.npwrc.usgs.gov/resource/literatr/grasbird/upsa/upsa.htm* (Version 17FEB2000).

Duebbert, H. F., and J. T. Lokemoen. 1977. Upland nesting of American bitterns, marsh hawks, and short-eared owls. Prairie Naturalist 9:33-40.

Herkert, J. R. 1991. Prairie birds of Illinois: population response to two centuries of habitat change. Illinois Natural History Survey Bulletin 34:393:399.

_____, R. E. Szafoni, V. M. Kleen, and J. E. Schwegman. 1993. Habitat establishment, enhancement and management for forest and grassland birds in Illinois. Division of Natural Heritage, Illinois Department of Conservation, Natural Heritage Technical Publication Number 1, Springfield, Illinois, USA.

Jones, A. L. and P. D. Vickery. 1997. Distribution and population status of grassland birds in Massachusetts. Pages 187-199 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Kirsch, L. M., and K. F. Higgins. 1976. Upland sandpiper nesting and management in North Dakota. Wildlife Society Bulletin 4:16-20.

Knopf, F. L. 1995. Declining grassland birds. Pages 296-298 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. National Biological Service, Washington, D.C., USA.

Mitchell, L., and J. Shryer. 2000. Aids to grassland management planning for Wallkill and Shawangunk Grasslands NWR (draft). Unpublished report on file at Wallkill River National Wildlife Refuge headquarters, Sussex, New Jersey, USA.

Mitchell, L. R., C. R. Smith, and R. A. Malecki. 2000. Ecology of grassland breeding birds in the northeastern United States - a literature review with recommendations for management. U.S. Geological Survey, Biological Resources Division and New York Cooperative Fish and Wildlife Research Unit, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

New York State Department of Environmental Conservation. 1997. Endangered, threatened and special concern fish and wildlife species of New York State. New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Delmar,New York, USA.

Pashley, D. N., C. J. Beardmore, J. A. Fitzgerald, R. P. Ford, W. C. Hunter, M. S. Morrison, K. V. Rosenberg. 2000. Partners In Flight: conservation of the landbirds of the United States. American Bird Conservancy, The Plains, Virginia, USA.

Robbins, C. S., D. Bystrak, and P. H. Geissler. 1986. The Breeding Bird Survey: its first fifteen years, 1965-1979. U.S. Fish and Wildlife Service Resource Publication 157.

Sauer, J. R., J. E. Hines, G. Gough, I. Thomas, and B. J. Peterjohn. 1997. The North American Breeding Bird Survey results and analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, Maryland, USA. *http://www.mbr-pwrc.usgs.gov/bbs/bbs.html* (12/1999).

Skinner, R. M., T. S. Baskett, and D. M. Blendon. 1984. Bird habitat on Missouri prairies. Missouri Department of Conservation, Terrestrial Series 14, Jefferson City, Missouri, USA.

Smith, C. R. 1992. Henslow's sparrow, *Ammodramus henslowii*. Pages 315-330 *in* K. J. Schneider and D. M. Pence, editors. Migratory nongame birds of management concern in the Northeast. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

_____. 1997. Use of public grazing lands by Henslow's sparrows, grasshopper sparrows, and associated grassland birds in central New York State. Pages 171-186 *in* P. D. Vickery and P. W. Dunwiddie, editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

_____, and D. J. Smith. 1990. Summer bird species diversity and use of pastures by summer birds of the Finger Lakes National Forest. U.S. Forest Service, Green Mountain National Forest, Final Project Report P.O. Number 40-1681-9-0470, Middlebury, Vermont, USA.

U.S. Fish and Wildlife Service. 1982. Refuge Manual: 6 RM 5.6A. Division of Refuges, Arlington, Virginia, USA.

_____. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia, USA.

U.S. North American Bird Conservation Initiative Committee. 2000. North American Bird Conservation Initiative; bringing it all together. U.S. Fish and Wildlife Service, Arlington,Virginia, USA.

Vickery, P. D. 1996. Grasshopper sparrow (*Ammodramus savannarum*). *In* A. Poole and F. Gill, editors. The birds of North America. Number 239. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Wakeley, J. S. 1978. Factors affecting the use of hunting sites by ferruginous hawks. Condor 80:316-326.

Wells, J. V. 1998. Important Bird Areas in New York State. National Audubon Society, Albany, New York, USA.

COMPATIBILITY DETERMINATION

Use: Archery Deer Hunting

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use?Is the use a priority public use?
The use is hunting. It 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), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
Hunting would be allowed on the entire refuge, but is expected to primarily occur from tree stands on 136 acres of woodland on the refuge. Specifically, this area includes the wooded and brush-dominated west and north sides of the refuge. The refuge's 400 acre grassland is not expected to be desirable to archery hunters, who prefer to work from tree stands. However, hunters may retrieve deer from this grassland area. Hunting will not be allowed in safety zones. These zones will be established around the parking area, near private residences, and the Town Park that are adjacent to the refuge.

When would the use be conducted?
Hunting will coincide with the State's Southern Zone early archery season, generally from mid-October to mid-November. Specific stipulations, including when hunters will be allowed on the refuge during the season, will be developed in a separate Refuge Hunt Plan.

How would the use be conducted?
All hunting will comply with State and Federal regulations. Further, hunters will be required to obtain a refuge permit from the Wallkill River Refuge Headquarters. There will be a fee for the permit consistent with the fee charged for hunting at Wallkill River Refuge (currently $10/permit). The number of permitted hunters will be restricted to ensure safety and minimize impacts to grassland birds, wintering birds of prey, and other priority public uses. Based on our best professional judgment we predict between 15 and 50 hunters per season and estimate 43 hunting days per year. Hunters will be required to report harvest data. Specific hunting regulations and procedures will be described in the Hunt Plan. The refuge hunt program will be reviewed annually to ensure deer management goals are achieved and that the program is providing a safe, high quality hunting experience for participants.

Why is the use being proposed?
Implementing a hunting program will help achieve the biological objective of reducing the density of the refuge's whitetail deer population. An overabundance of deer yields intensive browsing which has direct negative impacts to plant communities. In particular, the structural complexity of the forest understory and shrub-dominated areas is significantly decreased. Over-browsing also yields vegetation monotypes composed only of the plants that are unpalatable to deer. In fact, deer over-browsing may threaten several rare plants at the refuge, including Frank's sedge (*Carex frankii*) which is a State-listed endangered species. Over-browsing also causes indirect impacts to refuge fauna. The decrease of species and structural diversity in refuge plant communities yields degraded habitat for a wide diversity refuge wildlife. Further, providing an opportunity to hunt at the refuge promotes stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: An archery deer hunting program will require development of informational materials. Staff time for law enforcement, biological monitoring, and administration will also be necessary. A permit fee would be implemented to offset costs. The fee will be consistent with what is charged at Wallkill River Refuge.

Staff costs	$ 9,737	0.20 GS 09 FTE (set-up, outreach, monitoring)
Informational materials	$ 1,000	signs, brochures, maps
Vehicle fuel	$ 87	($1.40/gal) (2.5 gal/trip) (25 trips)
Equipment and facility use and Replacement	$ 500	vehicles
TOTAL	$11,324	

Anticipated Impacts of Proposed Actions: The impacts of allowing hunting may include disturbance of non-target species in the course of tracking prey, trampling of vegetation, possible creation of unauthorized trails by hunters, littering and possible vandalism and subsequent erosion.

Many landowners suffer landscape damage due to deer on a regular basis, transmission of Lyme disease becomes a significant issue with large numbers of deer, starvation is a possibility when deer numbers are high as food supplies dwindle in bad weather and deer-vehicle collisions become more common and problematic.

Archery deer hunting will cause inconsequential disturbance to wildlife not targeted for removal. Moreover, we expect a beneficial overall impact to the plants and wildlife of the refuge.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Hunters will be allowed to install temporary blinds in the forested areas of the refuge. We will assess after the program has been implemented at least 2 years, whether to allow temporary blinds in the Refuge grasslands. The concern with placement in the grasslands is the potential to disturb grassland birds and wintering birds of prey. Firearms hunting and deer drives will not be permitted. Hunters must comply with all State and Federal regulations and possess a refuge permit. Hunters will be required to report harvest data.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies hunting as a priority public use. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. This use can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing hunting opportunities will promote public appreciation and support for the refuge. This activity will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

COMPATIBILITY DETERMINATION

Use: Research conducted by non-Service personnel

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

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

Description of Use:
What is the use?Is the use a priority public use?
The use is research conducted by non-Service personnel. It is not identified as 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.This use is not a priority public use of the Refuge System.

Where would 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 that are absolutely necessary to conduct of the research project.

When would the use be conducted?
The timing of the research will depend entirely on the individual research project's approved design. Scientific research would 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.

How would the use be conducted?
The methods of the research will depend entirely on the individual research project that is conducted. The methods of each research project will be scrutinized well before it will be allowed to occur on the refuge. No research project will be allowed to occur if it does not have an approved scientific method, negatively impacts grassland birds and wintering raptors, or compromises public health and safety.

Why is the 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. This research would further the understanding of the natural environment and could be applied to management of the refuge's wildlife.

Availability of Resources: Shawangunk Grasslands Refuge is an unstaffed satellite refuge administered by Wallkill River NWR. No additional equipment, facilities, or improvements will be necessary to allow research by non-Service personnel. Staff time would be required to review research proposals and oversee permitted projects. We expect that conducting these activities will require less than one-tenth of a work-year for one staff member (0.1 FTE Wildlife Biologist GS 9 = $4,093).

Anticipated Impacts of Proposed Actions: 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, mist-netting, banding, and accessing the study area by foot or vehicle. It is possible that direct mortality could result as a by-product of research activities. Mist-netting for example, can cause stress, especially when birds are captured, banded and weighed. There have been occasional mortalities to these birds, namely when predators such as raccoons and cats reach the netted birds before researchers do.

Minimal impact will occur when research projects which are previously approved are carried out according to the stipulations stated in the Special Use Permit issued for each project. Overall, however, allowing well designed and properly reviewed research to be conducted by non-Service personnel is likely to have very little impact on refuge wildlife populations. If the research project is conducted with professionalism and integrity, potential adverse impacts are likely to be outweighed by the knowledge gained about an entire species, habitat or public use.

Allowing research to be conducted by non-Service personnel would have very little impact on Service interests. If the research project is conducted with professionalism and integrity, potential adverse impacts can far outweigh the data and knowledge gained.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____ **Use is Not Compatible**
__X__ **Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: All researchers will be required to submit a detailed research proposal following 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. Proposals will be prioritized and approved based on need, benefit, compatibility, and funding required. Special Use Permits (SUP) will be issued for all research conducted by non-Service personnel. The SUP will list all conditions necessary to ensure compatibility. The SUP will also identify a schedule for annual progress reports and submission of a final report or scientific paper. Refuge staff would consult with Regional refuge biologists, other Service Divisions, and State agencies on research proposals. All researchers will be required to obtain appropriate State and Federal permits.

Any research project may be terminated at any time for non-compliance with the SUP conditions, or modified, redesigned, relocated or terminated, upon a determination by the refuge manager that the project is causing unanticipated adverse impacts to wildlife, wildlife habitat, approved priority public uses, or other refuge management activities.

Justification: The Service encourages and supports research and management on refuges. This research provides scientific data upon which decisions regarding management of the refuge may be based. Approved research conducted by non-Service personnel 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:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

COMPATIBILITY DETERMINATION

Use: Model airplane flying and model airplane competitive events.

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: 16 U.S.C. Section 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife)

Refuge Purpose: To carry out the national migratory bird management program.

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

Description of Use: This activity is the conduct of free flight and radio-controlled model airplane flying and competitive events.

Model airplane flying was permitted for 26 years at the former Galeville Army Training Facility in Ulster County prior to the acquisition of the site. This use was suspended by the West Point Military Academy in 1995. In July 1999, 566 acres were transferred to the U.S. Fish and Wildlife Service (Service) for the protection and management of migratory bird habitat, with a special emphasis on grassland dependant birds. The site is now known as the Shawangunk Grasslands National Wildlife Refuge (Refuge).

Representatives from the East Coast Free Flight Conference and other model airplane organizations, such as the Academy of Model Aeronautics, began asking for permission to recommence model airplane flying and competitions as early as 1995. Congressman Benjamin Gilman (R-NY) has asked the Service to allow model airplane flying and competitions at the Refuge.

Use of the Refuge would range from a single individual to groups of people engaging in free flight or radio-controlled model airplane flying during daylight hours, probably for a period of several hours. Model airplane use would primarily occur from April through November, but would also be possible through the rest of the year, depending upon the weather. The size of the groups is unknown and accounts vary, but groups of six to twelve people engaging in recreational flying or practicing for competition would not be unlikely. Most of the group flying would likely occur on the weekends. Historically, six to seven two-day events were organized each year at the facility, including special competitions that would attract 300 people. Continuation of these events, which include qualifications for International Competition Classes, is one of the major reasons why the interest in model airplane flying at this Refuge has not abated. Given the size of the Refuge, model airplane flying would occur throughout the entire Refuge.

The launching of free flight and radio-controlled model airplanes would generally take place on the existing runways, which are now used by the public for wildlife observation, nature photography, and environmental education. Depending on the speed and direction of the wind, modelers generally move to the furthest upwind area in the boundary of the flying site, as this gives the model more room to drift downwind. Some free flight planes, known as gliders, are towed to their initial starting altitude on a line as long as 50 meters. Modelers tow the plane to the location with the best air (a thermal). Modelers launched planes from the fields as well as the runways, particularly during competitions, in order to gain maximum time aloft.

Once launched, free flight planes cannot be controlled by the modeler. Thus, frequent retrieval of the planes in the grasslands and surrounding forests is expected. Radio-controlled planes are more likely to stay under the control of the modeler and will generally be able to return to the launch site. However, both types of models will crash, and retrieval may occur anywhere on the Refuge. Motorized vehicles and bicycles have been used in the past to retrieve models.

Models would fly over Refuge grasslands that are being managed for breeding and wintering grassland birds. These grasslands and the associated woodlands are also heavily used by migratory birds in the spring and fall.

Additional use of the area would require parking for upwards of 125 vehicles, including motor homes, during competitive events. Currently, the only place to park vehicles is on the runways. Competitions also draw family members and other spectators. Consequently, other incidental uses that would likely occur that have detrimental impacts to wildlife and habitat include picnicking, littering, and trespass.

Anticipated Impacts of the Use: The primary management objective of this Refuge is to provide large expanses of undisturbed grasslands so that birds may nest, incubate their eggs, rear their young, rest, and feed. Disturbance in winter is minimized to increase the survival of raptors and other species during periods of scarce food resources. Current public use activities are designed to minimize impacts. Only foot traffic is allowed on existing paved or concrete surfaces and visitors are prohibited from entering the grasslands.

The National Audubon Society of New York State has identified this site as an “Important Bird Area”, a designation given only to places that support a significant abundance and diversity of birds (Wells 1998). In particular, the Refuge is among a dwindling number of sites in New York State and one of only two sites in the Hudson Valley large enough to support the entire assemblage of grassland birds (New York State Department of Environmental Conservation and Office of Parks, Recreation and Historic Preservation 2001). Grassland dependant 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). Grassland birds nest, roost, and forage on the ground and are especially susceptible to human disturbance.

Several grassland birds that use the Refuge are on lists of rare or declining species, including northern harrier, upland sandpiper, short-eared owl, horned lark, bobolink, grasshopper sparrow, Henslow's sparrow, and vesper sparrow. The Service Northeast Region list of Birds of Conservation Concern (draft) includes upland sandpiper, short-eared owl, and Henslow's sparrow. Partners In Flight (PIF) lists upland sandpiper, Henslow's sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region in which the Refuge lies (Pashley et al. 2000). The North American Bird Conservation Initiative (NABCI) ranks Henslow's sparrow as a priority species in the Appalachian Mountain Bird Conservation Region (U.S. NABCI Committee 2000). The New York State Department of Environmental Conservation (1997) lists short-eared owl as an endangered species, northern harrier, upland sandpiper, and Henslow's sparrow as threatened species, and horned lark, grasshopper sparrow, and vesper sparrow as species of special concern.

The Refuge is one of the most important grassland bird nesting and wintering areas in the state (Wells 1998). Grassland dependant birds that nest at the Refuge include northern harrier, upland sandpiper, grasshopper sparrow, Henslow's sparrow, savannah sparrow, vesper sparrow, eastern meadowlark, and bobolink. Evidence of breeding short-eared owl has been observed, but nesting has never been confirmed. Grassland birds that find valuable wintering habitat at the Refuge include northern harrier, short-eared owl, and horned lark. According to Wells (1998) up to 16 short-eared owls and six northern harriers have been observed at the Refuge in winter, as well as flocks of 60 to 80 horned larks. However, Refuge winter raptor surveys frequently document 12 to 17 northern harriers (U.S. Fish and Wildlife Service 2002, unpubl. data) and Alfred Ott (2002) of the Queens County Bird Club reports a maximum of 35 northern harriers.

The Refuge also provides important habitat for migrant grassland birds in spring and fall. Northern harriers migrating along the Shawangunk Mountains often stop at the Refuge to rest and forage. Migrant short-eared owls arrive at the Refuge in early November and depart in late April. Flocks of up to100 bobolinks gather at the Refuge in August and September and flocks of up to 50 eastern meadowlarks are found at the Refuge in April, October, and November. Up to 19 vesper sparrows have been counted at the Refuge in October (Kahl 2001, U.S. Fish and Wildlife Service, pers. obs).

The Refuge offers sanctuary to several other birds that are on lists of rare or declining species. Loggerhead shrikes (state endangered) use the extensive grassland habitat during both southbound and northbound flights. Large flocks of common nighthawks (state special concern) forage over the Refuge and use the runways as daytime roosting areas before continuing their flights. Sharp-shinned hawks, Cooper's hawks, northern goshawks, and red-shouldered hawks (state special concern) rest and forage at the Refuge in winter, spring, and fall. Peregrine falcon (state threatened) has been seen at the Refuge during fall migration. Other birds that nest at the Refuge or stop during migration that are on the Service list of Birds of Conservation Concern, PIF list of high conservation priority species, and NABCI priority species list include; black-billed cuckoo, red-headed woodpecker, yellow-bellied sapsucker, black-capped chickadee, wood thrush, prairie warbler, bay-breasted warbler, and Canada warbler.

Fifty-eight bird species nest on the Refuge. These include American kestrel, killdeer, American woodcock, willow flycatcher, eastern kingbird, eastern bluebird, brown thrasher, chestnut-sided warbler, blue-winged warbler, field sparrow, and chipping sparrow. Many of these species nest near the edge of the runways and are especially susceptible to disturbance. Although the Service intends to remove the runways, the area will be re-vegetated with a plant community suited to these birds.

Hudsonia, a non-profit organization affiliated with Bard College, studied this site in 1992 (Stevens). Hudsonia found that, "(i)n spite of its generally disturbed condition, the importance of this site to native biological diversity may exceed that of many more pristine areas of equal or larger size. The design of any development or land use change contemplated for this property should incorporate the preservation of adequate habitat and buffer zones for the rare plant and animal species known to occur there."

Impacts to migratory birds from model airplane flying and competitions are both direct and indirect. These impacts stem both from the act of model airplane flying and its associated activities, such as retrieval of planes. There are no specific studies that describe the impact of model airplane disturbance to grassland birds. However, there has been research showing that response to aircraft is influenced by many variables, including aircraft size, proximity, flight profile, engine noise, and sonic booms (Smith et al. 1988). Piping plovers have been observed to modify their behavior in the presence of kite-flying activities. Loons have been observed to engage in avoidance behavior when small airplanes are near. Gladwin et al. (1987) surveyed Service Endangered Species and Ecological Services Field Offices, National Wildlife Refuges, Hatcheries, and Research Centers to determine the nature and extent of aircraft impacts on fish and wildlife. Small propeller aircraft caused disturbance at 50% of the installations. Bélanger and Bédard (1995) described aircraft overflights as the most important cause of disturbance to migrant snow geese in Quebec. Bélanger and Bédard suggested that aircraft flights should be strictly regulated over snow goose staging areas with flights below 500 meters prohibited. Owens (1977) found that slow, noisy aircraft were most disruptive to brant. In fact, brant flew away in response to aircraft below 500 meters and up to 1.5 kilometers. Owens suggested that the strong response was partly due to the visual resemblance of planes to large predatory birds. Knight and Cole (1995) state that smaller fixed-winged aircraft may be more likely to disturb wildlife because they fly slower and at lower altitudes.

These authors describe the effects of passenger aircraft upon mainly waterfowl. Still, these examples are most relevant because they demonstrate that small, loud planes flown at low altitudes, low speeds, and unpredictable intervals cause the most disturbance to birds. These aircraft are most similar to model airplanes. In fact, model airplanes are a tool used to deter birds from occupying airport runways and flight paths (Transport Canada 1994).

Some airports, if managed properly, do provide important habitat for grassland birds. Examples include Logan Airport and Westover Air Reserve Base in Massachusetts (Jones and Vickery

1997) and Bradley International Airport in Connecticut (Crossman 1989) to name a few. At these sites, however, air traffic is dominated by large planes flown at frequent, predictable intervals that enable wildlife to become habituated. Also, the general public is not allowed to traverse the fields surrounding the runways. Model airplane flying at the Refuge would not have the same characteristics.

Direct impacts from modelers include the destruction of nests or the modification of feeding and nesting behavior during the retrieval of stray models. Modelers prefer to walk in a straight line to the point where the model airplane lands to increase the chance that the model will be successfully retrieved. A model can often be unseen even when a person is only a few feet away. Therefore, modelers will want to walk through grasslands and wetlands that may have nesting, resting, or feeding birds to retrieve their planes. Additionally, individuals will enter grassland areas and disturb wildlife to launch free flight models when winds do not parallel the runways.

Scarlatelli (1996) of Northeast Environmental Management Systems, in a report prepared at the request of the East Coast Free Flight Conference, concluded that model airplane flying would be compatible with efforts to preserve the area's ecological importance. This recommendation is based partly on the deduction that ground nesting birds of concern, including upland sandpiper, short-eared owl, vesper sparrow, savannah sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark, present distraction displays in response to predators near their nests. Hence, the birds would be conspicuous to model airplane enthusiasts traversing fields to retrieve stray airplanes and the nests would be easy to avoid.

This reasoning ignores the fact that individuals walking through grassland areas to retrieve or launch model planes create a direct liability for breeding grassland birds. While adult birds are engaged in attempting to lure a perceived predator from their nests, the eggs and young are exposed to increased risk of nest predation and exposure to adverse temperatures. Lanyon (1995) relates that adult eastern meadowlarks become wary and delay visits back to nests with young after disturbance. Further, predation of eggs, young, and attendant adults can occur as a result of nest predators following scent paths and disturbed vegetation to the nest area. Predation of northern harrier young has occurred when predators followed humans to nests (Watson 1977, Toland 1985). At a minimum, adult birds that are attempting to divert humans from nests, or are simply frightened from nests, are unnecessarily expending energy and time during a critical period in their annual cycle.

Moreover, the conclusion that virtually all the breeding grassland birds of the region display diversionary behaviors near the nest is only partly accurate and misses the point. If the modeler can see that the bird is disturbed, which is not always obvious, then the disturbance has already occurred and the bird has expended energy in nest defense that is best used either incubating or rearing young.

In fact, the behavior of these birds from disturbance varies greatly between species, between individuals within species, and throughout the stages of the nesting cycle. This pattern is well-documented. Townsend (1961) gives the accounts of Saunders (1913), Urner (1921), and Urner

(1923), of "wounded bird" acts of short-eared owls stimulated by humans near nests with young. These accounts sometimes include adult birds stooping or diving at the intruder. Tate (1992) and Clark (1975) also describe elaborate distraction displays, most often used by the male. However, Tate also states that both male and female short-eared owls often vacate the vicinity of the nest while an intruder is present. Thus, this species does not always make its nest location easy to determine and avoid.

Similarly, adult upland sandpipers sometimes feign injury, give alarm calls, and even fly directly at human intruders near fledglings (Coues 1874, Forbush 1912) or nests with eggs (Coues 1874, Bowen 1976). However, this behavior was not observed by Sordahl (1981). Indeed, the former description reflects a significant diversion of resources that should be prevented.

Adult savannah sparrows respond to predators within 10 to 15 meters of the nest by giving alarm calls, fanning tails, raising crests, and making short nervous flights (Wheelwright and Rising 1993), not a conspicuous display to the unpracticed eye. Furthermore, Potter (1974) describes only about 25% of females flushed from nests giving a conspicuous distraction display of scurrying and crouching with quivering wings.

Berger (1968) gives the account of Roberts (1932) of dramatic injury feigning by vesper sparrows flushed from the nest. Contrastingly, Roberts also states that vesper sparrows more commonly fly "directly away, low over the ground." Berger states that female vesper sparrows will respond to humans near nests with young by running along the ground conspicuously, with tail spread and wings raised. Berger further states that the same stimulus near nests with eggs consistently cause the female to fly 50 to 60 yards away without feigning injury or giving alarm notes.

Vickery (1996) states that grasshopper sparrows give a broken-wing distraction display at the nest and probably near fledged young. Smith (1968) states that female grasshopper sparrows flushed from the nest may give a distraction display or may fly 25 to 30 feet away and hide in the grass. Smith also gives Nicholson's (1936) description that some female grasshopper sparrows "will run off the nests before they are found" while others gave conspicuous distraction displays.

Both bobolink sexes perform diversionary displays in response to humans near their nests according to Martin and Gavin (1995). Martin and Gavin further state that, if pursued, these behaviors may proceed until the intruder is more than 100 meters from the nest.

Lanyon (1995) states that male and female eastern meadowlarks may attempt to lure humans from nests through distraction displays of spread wings and tail. Lanyon further states that females may also explode off the nest causing injury to eggs and young. Arbib (1988) noted that bobolink was confirmed in far more New York State Breeding Bird Atlas blocks by observation of distraction displays than eastern meadowlark, although the two species were found in a similar number of blocks.

Response of Henslow's sparrows to human intruders near their nests is not described. However, Smith (1968) characterizes the species as "a shy and retiring inhabitant of open fields and grasslands." Smith further writes of "its custom of skulking or running mouselike through the grass at the approach of an intruder." Eaton (1988a) calls Henslow's sparrow "one of the most inconspicuous land birds in the Northeast."

This variation in response indicates that displays of disturbance may not be sufficient to protect nests from direct impacts associated with the inadvertent trampling of vegetation.

Scarlatelli (1996) also concluded that individuals searching fields for errant model airplanes would not impact ground-nesting birds, including northern harrier, upland sandpiper, short-eared owl, vesper sparrow, savannah sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark, because these species are "well-adapted to minor, temporary disturbances." This conclusion fails to acknowledge that there are significant differences in the sensitivity of ground-nesting birds to disturbance between species, between individuals within species, and through the stages of the nesting cycle.

Upland sandpipers and savannah sparrows seem least disturbed by human presence near the nest. Bowen (1976) states that repeated flushing during nest checks does not cause nest desertion by upland sandpipers. Baird (1968) and Welsh (1975) indicate that breeding savannah sparrows are tolerant of human disturbance near the nest.

In contrast, Northern harriers are sensitive to nest disturbance. Macwhirter (unpubl. data) found that none of 15 northern harrier nests with three or more eggs were abandoned after discovery. However, nine of 20 nests with two or fewer eggs were subsequently abandoned, and only four pairs re-nested within their territory. Simmons (1983) found that harriers rarely deserted nests with young when observation blinds were placed within five to eight meters, but found the opposite when nests contained eggs. Saunders (1986) found that 25% of harrier adults behaved erratically in response to an occupied blind near nests with young. Serrentino (1992) suggests that suitable northern harrier breeding habitat in coastal New England is vacant in part because of heavy use by humans. In fact, volunteers field observers working on the New York State Breeding Bird Atlas project were warned to avoid disturbing the nest of this species (Smith 1988).

Leasure and Holt (1991) state that short-eared owls are generally not sensitive to human activity near the nest. However, they base this on the fact that short-eared owl nests are difficult to find. Further, Holt (1992) found that three of four female short-eared owls abandoned nest scrapes after being flushed by researchers and re-nested nearby. New York State Breeding Bird Atlas volunteers were advised against attempting to locate the nest of this species also (Eaton 1988b). Both this species and northern harrier are also sensitive to winter roost disturbance.

Eastern meadowlarks are particularly sensitive to human disturbance near their nests, especially before hatching. Lanyon (1995) states that a female flushed from the nest during incubation "invariably aborts." Lanyon also states that desertion of nests with young is less likely.

Furthermore, the frequency of disturbance to breeding grassland birds should not be considered temporary or minor. Scarlatelli (2002) gives Jean Pailet's (ex-officer of the Academy of Model Aeronautics and member of the Skyscrapers Club) account of two to 12 individuals using the site on a typical weekend day and competitions rarely attended by more than 100 people. According to Langelius (1998 and 2002, ECFFC, pers. com.), the Galeville Army Training Facility was used daily by modelers. In addition, six to seven two-day events were held annually from May to October, drawing up to 125 modelers and 150 family members per event. Thus, the disturbance to wildlife would be very significant, even if only a fraction of these users walked across the fields to retrieve or launch model airplanes, or used loud, radio-controlled models.

The impact of model retrieval to nesting birds is compounded when modelers use all terrain vehicles (ATVs) or other motorized vehicles to cross through fields. Scarlatelli (2002) states that modelers typically used two-wheeled, powered motor bikes or motor scooters and that a minority used three- or four-wheeled vehicles. Scarlatelli further states that vehicles were primarily used on runways and "established paths" to approach the vicinity of the stray aircraft, but final retrieval was done on foot. Conflictingly, correspondence from Refuge neighbors and bird watchers describe ATVs frequently being driven throughout the grassland interior by modelers, sometimes becoming stuck.

Nor is the level of noise generated by radio-controlled planes a minor disturbance. The noise is high-pitched, irregular, random, and fluctuates with the aeronautic maneuvering of the model. The Radio Control Club of Rochester (AMA Charter 465), New York recommends a 95 decibel (dBA) maximum for radio-controlled planes at nine feet at full power on the ground (Radio Control Club of Rochester 2001). This level exceeds the noise produced by a chainsaw, lawnmower, or air compressor. Under certain atmospheric conditions, this noise can carry more than one mile. In addition, radio-controlled planes with 0.09cc internal combustion engines can produce sound levels up to 115 dBA. The noise generated from radio-controlled model airplane competitions has been described as like "an angry swarm of bees" (Madison Radio Controlled Airplane Society 2001).

Currently, parking for 125 cars would only be possible if the existing runway system in the middle of the Refuge were used. This accommodation would create disturbance from vehicles driving into the grasslands, hydrocarbon pollution from emissions and oil leaks, and litter associated with the parking area. It would also displace visitors on the nature trail, which is currently comprised of the entrance road and runways. Moreover, the Service intends to remove these runways, except for an approximately eight-foot wide strip for the nature trail and administrative access. Consequently, approximately 30 acres of grassland habitat will be restored. Allowing model airplane use would create an incentive to preserve the runways, halt the Service's plan to restore wildlife habitat, and is contrary to the mission of the Refuge and the National Wildlife Refuge System.

The runways are in the least desirable area of the Refuge to accommodate parking, as they are located in the center of the field. Hence, a new parking area would have to be constructed on a

location where the negative impacts to wildlife and visitors will be less. The most likely place would be along the current access road into the Refuge. Although the detrimental effects would be less than parking on the runways, construction of a new 125 car parking lot will create a direct negative impact to wildlife through conversion of natural habitat to pavement.

Individuals crossing grassland areas on foot or with motorized vehicles could also negatively impact the Refuge's flora. Five state-listed rare plant species occur on the Refuge (Stevens 1992). These include small-flowered agrimony (*Agrimonia parviflora*), small white aster (*Aster vimineus*), purple milkweed (*Asclepias purprascens*), Bush's sedge (*Carex bushii*), and Frank's sedge (*Carex frankii*). Identification of these protected species is quite difficult to the untrained eye. Any unnecessary disturbance from people and motorized vehicles traversing areas off designated trails could harm or eliminate the habitat of these plants.

Purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*) are invasive, exotic plant species that occur on the Refuge and significantly degrade wildlife habitat (Smith 1964, Stuckey 1980, Rawinski and Malecki 1984, Malecki 1987, Thompson et al. 1987, Baldassarre and Bolen 1994). Purple loosestrife has undoubtedly become so well established because of previous degradation of the site, including clearing, filling, road and runway construction. Allowing motorized vehicles to access the grasslands to launch or retrieve models could exacerbate the spread of purple loosestrife and common reed due to soil disturbance.

In an update commissioned by the Academy of Model Aeronautics, Scarlatelli (2002) states that model airplane flyers have pursued their hobby on "conservation lands" with positive outcomes, citing Hambly (1996) of the Massachusetts Division of Fish and Wildlife, Buffington (1989) of the Colorado Division of Parks and Outdoor Recreation, and personal observation at the Hackensak Meadowlands of New Jersey. The Oregon Department of Fish and Wildlife (2002) reported a good relationship with model airplane organizations using lands the agency administers. Additionally, Knetzger (2002) listed several sites in Wisconsin and Illinois that modelers have used, including county parks, village parks, state recreation areas, and state forest preserves. However, all of these examples are from areas administered by agencies that include provision of recreational opportunities as equal or higher in priority than management for wildlife.

Moreover, conflict between model airplane use, wildlife, and outdoor enthusiasts does occur at some locations. Scarlatelli (2002) gives the account of Porutski (1996) of the New Jersey Division of Fish, Game and Wildlife on model airplane use at Assunpink Wildlife Management Area entailing few, minor problems that were easily resolved. However, Porutski further states that:

"the most difficult issue to deal with is the noise associated with this type of activity and its effect on wildlife, sportsmen and the general public. Sportsmen and the general public seek to enjoy the outdoors and wildlife in a quiet and serene environment. Model airplane flying in this type of environment represents a very serious conflict. I would

> recommend that this type of activity take place in a park which accommodates a diversity of recreational uses such as picnicking, ball fields and swimming."

Dorosh (2002) of the Brooklyn Bird Club cites model airplane use as one of the contributing factors causing a virtual extirpation of breeding grassland birds at Floyd Bennett Field, New York. Neuendorffer (2001) describes a severe negative impact of model airplane activities at Latadomi Nature Center in Pennsylvania, including trampled vegetation, soil erosion and compaction, excessive noise, and decreased wildlife. The model airplane group no longer uses this site.

Further, 32 local and national organizations submitted comments (Appendix) on the draft Compatibility Determination expressing strong concern over the negative impact of model airplane flying upon grassland birds and the ability of the public to enjoy priority wildlife-dependant uses at the Refuge. Certainly, the ability of a bird watcher to hear bird vocalizations is directly impaired by the noise of radio-controlled planes, motorized vehicles, and crowds at competitive events. Likewise, their ability to observe wildlife is diminished due to the avoidance behavior of wildlife in this environment. Thus, permitting model airplane flying would prevent the Refuge staff from providing a high quality experience for the wildlife-dependant visitor. Additionally, residents near the Refuge have applauded our decision to not issue special use permits for model airplane flying.

Hunting is not currently allowed on the Refuge, but alternatives being considered as part of the Refuge's Comprehensive Conservation Plan open some hunting seasons. Hunting has been established as a priority public use through the National Wildlife Refuge System Improvement Act of 1997. Moreover, hunting will be a vital tool for controlling the Refuge's deer population. This control is critical, for an overabundant deer population has adverse impacts on the Refuge's plant community, and therefore the rest of the Refuge's wildlife. Model airplane activities conducted in the fall would interfere with hunting. However, restrictions will be implemented on hunting seasons and techniques to minimize disturbance to migrant or wintering birds.

Availability of Resources: If allowed, this use would increase maintenance, law enforcement, biological monitoring, and administrative costs. The Refuge currently has a four-car parking lot, which will be expanded in 2002 to accommodate ten cars. Facilities do not exist to accommodate the 125 cars likely associated with competitive events (Langelius, ECFFC, 1998, pers. com.). In the past, modelers parked on the runways. These runways are now accessible by foot only. While a small portion of the runways will be retained for use as a nature trail, the majority of the runways will be removed and the area restored to native grasslands. Therefore, allowing competitive events would require the construction of a 125-car parking lot.

If model airplane flying were allowed, a monitoring program would have to be developed and implemented to determine the impacts of model airplane flying and its associated activities on wildlife and visitors seeking a wildlife-oriented experience. A law enforcement presence would be required for all competitive events and at other times to ensure compliance with stipulations

and Refuge regulations. The issuance of special use permits and the development of stipulations would entail administrative costs.

Anticipated annual costs to allow model airplane flying on an individual basis, through special use permit, are estimated below. These numbers assume that individual modelers use the Refuge four days per week from May through September, and weekends from April through October. This estimation is based on personnel communication (1998 and 2002, Langelius, East Coast Free Flight Conference), Scarlatelli's (2002) figures, and correspondence from individuals who used the site when it was in the ownership of West Point Military Academy. The estimation that individual modelers would use the Refuge 101 days per year is conservative.

Biological monitoring oversight:	$21,008	($26/hour @ 8 hours/day for 101 days)
Law enforcement:	$26,260	($32.5/hour @ 8 hours/day for 101 days)
Administrative:	$ 5,000	($25/hour @ 200 hours, assumes 400 individual permits issued and processed annually; per Ross, ECFFC, 1996, correspondence to Senator D'Amato)
Fuel/Vehicle:	$ 683	($1.30/gallon @ 2.6 gallons/trip for 202 trips)
Equipment Use/Replacement:	$ 5,000	(wear on vehicles)
Total costs:	$57,951	

In order to hold seven competitive events annually (Langelius, 1998, ECFFC, pers. com.), the following additional costs would be necessary:

Parking area development:	$345,000	(costs from Construction and Rehabilitation Cost Estimating Guide, 1999, U.S. Fish and Wildlife Service)
Additional law enforcement:	$3,640	($32.5/hour @ 8 hours/day for 14 days)
Additional biological monitoring:	$2,912	($26/hour @ 8 hours/day for 14 days)
Administrative:	$ 980	($35/hour average cost for 28 hours to develop agreements, issue permits, and process payments)
Total additional costs for competitive events:	$352,532	

The combined expense to the Service to allow model airplane flying and competitive events at the Refuge would be $410,483 the first year that competitive events were allowed, and $65,483 annually thereafter (not adjusted for inflation and cost of living increases in salaries).

Annual user fees of $250 per individual or $5,000 per competitive event could be collected to help offset the costs of administering this program. However, the parking area would need to be constructed prior to the holding of competitive events. Expending $345,000 to build a parking lot to support model airplane competitions, while decreasing migratory bird habitat, increasing impacts to grassland birds, and decreasing or preventing wildlife observation and photography opportunities for priority public users, is not an appropriate or legitimate use of resource dollars.

Public Review and Comment: The draft Compatibility Determination was advertised with a public notice in two daily and one weekly newspaper with wide local distribution. The draft determination was posted on the Refuge web site <http://shawangunk.fws.gov> until the Department of the Interior was disconnected from the Internet on December 5, 2001, due to a court order. Notices of the determination were also posted at the Refuge kiosk, the Shawangunk Town Supervisor's office, and the Wallkill Library. Copies of the draft Compatibility Determination were mailed to stakeholders, Congressman Benjamin A. Gilman, and Congressman Maurice D. Hinchey. The draft determination was available for public review for 75 days.

A total of 2,343 written comments were received. Of these, 222 were in favor of the Service position and 2,121 were opposed. Approximately 1,650 comments received were form letters expressing dissatisfaction with the content of the draft determination and requesting reconsideration of the Service's position.

Comments addressed 14 primary issues, including concern over the impact of model airplane activities to wildlife, impact of model airplane flying on the quality of experience for Refuge visitors, diversion of Service resources to accommodate use, precedent set for model airplane flying throughout the National Wildlife Refuge System, and effect of model airplane flying on Refuge neighbors. Other issues addressed included contention over model plane flying practices or techniques and intensity of past use by modelers.

Several comments described observations of wildlife using flying areas simultaneous with model airplane enthusiasts. However, the vast majority of these observations were of species that are very adaptable and tolerant of human disturbance, including Canada goose, red-tailed hawk, American kestrel, turkey vulture, wild turkey, killdeer, barn swallow, raccoon, red fox, coyote, woodchuck, and whitetail deer.

Many comments disputed the anticipated impacts of model airplane flying upon wildlife, stating that the Galeville Army Training Facility supported a thriving bird community during the 26 year period that the site was used for model airplane flying, including the assemblage of grassland

bird species that currently occurs on the Refuge. However, model airplane advocates have not proven that negative impacts, such as decrease in nest productivity, did not occur. Presence of an adult alone is not an indication of successful nesting or undisturbed feeding or resting.

Several individuals questioned the calculation of costs associated with individual use and model airplane competitions. The cost of these calculations has been modified to increase the cost of biological monitoring and law enforcement and the size of the parking area needed, based on a more accurate, though probably still conservative, estimate of the level of use (based on information received from model airplane representatives). The cost has been decreased to eliminate charges for garbage collection and port-a-potty rentals during competitive events. These costs have historically been paid by the model airplane clubs and would continue to be the responsibility of the organizing club.

Many comments related cooperative use of areas administered by agencies or organizations with missions similar to the National Wildlife Refuge System. These comments are reviewed on pages 9 and10. Several comments questioned the allowance of hunting while disallowing model airplane use. This topic is discussed on page 10.

A portion of the comments described illegal activities. Some described poor behavior or offenses of model airplane enthusiasts, including trespass onto private property, and destruction of private property. Some comments expressed that the Service is not enforcing current regulations prohibiting hunting and ATVs on the Refuge and that these abuses are more harmful to wildlife than model airplane activities. However, the Refuge is regularly patrolled by law enforcement staff and these violations are rare. Further, this disturbance is minor compared to historic use of the site for model airplane activities and competitive events.

Determination:

___x___Use is Not Compatible
_____Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility: No stipulations can be developed to ensure compatibility of this activity with the purpose of the Refuge or the National Wildlife Refuge System.

Justification: Model airplane flying and competitions are not compatible uses and will not be allowed on the Refuge. Both have direct and indirect effects on the wildlife being managed at the Refuge and the visiting public seeking a wildlife-dependant experience. More importantly, no evidence exists that the activities of modelers had no impact upon the nesting productivity of these grassland birds or wintering raptors. Clearly, sound professional judgment indicates that hundreds of people using the site through the nesting season, flying predator-shaped objects, and walking and riding motorized vehicles through fields would have a negative impact upon the breeding productivity of grassland birds. Several of the species using this Refuge are state-listed

endangered, threatened, or special concern species. Some of these are also target species for population stability and enhancement under the Partners in Flight program. This Refuge is one of the largest and most productive grasslands in the Northeast. The restoration and management of the site into a mosaic of grasslands to benefit a variety of grassland species and to facilitate wildlife observation, photography, interpretation and environmental education is the highest priority of this Refuge. Therefore, it is the determination of the Service that this use will materially interfere with and detract from the fulfillment of the National Wildlife Refuge System mission and the purposes of the Refuge.

Signature: **Refuge Manager:** Elizabeth A Herland 2/19/2002
(Signature and Date)

Concurrence: **Regional Chief:** Anthony D. Lege 2/20/2002
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: February 19, 2017

Literature Cited

Arbib, R. 1988. Eastern meadowlark *Sturnella magna*. Pages 470-471 *in* R. F. Andrle and J. R. Carroll editors. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

Askins, R. A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North Ameriça. Pages 1-34 *in* D. M. Power editor. Current ornithology. Volume 11. Plenam Press, New York, New York, USA.

_____. 1997. History of grasslands in the northeastern United States: implications for conservation. Pages 119-136 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Baird, J. 1968. *Passerculus sandwichensis savanna* (Wilson) eastern savannah sparrow. Pages 678-698 *in* O. L. Austin, Jr. editor. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Part 2. Smithsonian Institution Press, U.S. National Museum Bulletin 237.

Baldassarre, G. A. and E. G. Bolen. 1994. Waterfowl ecology and management. John Wiley & Sons, Inc., New York, New York, USA.

Bélanger and Bédard. 1990. Energetic cost to man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36-41.

_____ and _____. 1995. Hunting and waterfowl. Pages 243-256 *in* R. L. Knight and K. J.. Gutzwiller editors. Wildlife and recreationists: coexistence through management and research. Island Press, Washington, DC, USA.

Bent, A. C. 1958. *Dolichonyx oryzivorus* (Linnaeus) bobolink. Pages 28-52 *in* Life Histories of North American blackbirds, orioles, tanagers, and allies. Smithsonian Institution U.S. National Museum Bulletin 211.

Berger, A. J. 1968. *Pooecetes gramineus gramineus* (Gmelin) eastern vesper sparrow. Pages 868-882 *in* O. L. Austin, JR. editor. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Part 2. Smithsonian Institution Press, U.S. National Museum Bulletin 237.

Bowen, D. E. 1976. Coloniality, reproductive success, and habitat interactions in upland sandpipers, *Bartramia longicauda*. Dissertation, Kansas State University, Manhattan, Kansas, USA.

Buffington, G. K. 1989. Correspondence to Geoff Styles, Director of Public Relations, Academy of Model Aeronautics. State of Colorado, Division of Parks and Outdoor Recreation (02/01/1989).

Clark, R. J. 1975. A field study of the short-eared owl (*Asio flammeus*) Pontoppidan in North America. Wildlife Monographs 47:1-67.

Coues, E. 1874. Birds of the Northwest. Government Printing Office, Washington, D.C., USA.

Crossman, T. I. 1989. Habitat use of grasshopper and savannah sparrows at Bradley International Airport and management recommendations. Thesis, University of Connecticut, Storrs, Connecticut, USA.

Davis, R. A. and A. L. Wiseley. 1974. Normal behaviour of snow geese on the Yukon-Alaska north slope and the effects of aircraft-induced disturbance on this behaviour, September 1973. Arctic Gas Biological Report Series 27:1-85.

Dorosh, P. 2002. Correspondence to Steven Kahl, U.S. Fish and Wildlife Service, Wallkill River National Wildlife Refuge. President, Brooklyn Bird Club (02/06/2002).

Eaton, S. W. 1988a. Short-eared owl *Asio flammeus*. Pages 210-211 *in* R. F. Andrle and J. R. Carroll editors. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

_____. 1988b. Henslow's sparrow *Ammodramus henslowii*. Pages 450-451 *in* R. F. Andrle and J. R. Carroll editors. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

Forbush, E. H. 1912. A history of game birds, wild-fowl, and shore birds of Massachusetts and adjacent states. Massachusetts State Board Agriculture, Boston, Massachusetts, USA.

Gladwin, D. N., D. A. Asherin, and K. M. Manci. 1987. Effects of aircraft noise and sonic booms on fish and wildlife: results of a survey of U.S. Fish and Wildlife Endangered Species and Ecological Services Field Offices, Refuges, Hatcheries, and Research Centers. NERC-88/30. U.S. Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado, USA.

Hambly, L. S. 1996. Correspondence to Donald Ross, Academy of Model Aeronautics. Commonwealth of Massachusetts, Division of Fisheries and Wildlife (9/10/1996).

Holt, D. W. 1992. Notes on short-eared owl (*Asio flammeus*) nest sites, reproduction and territory sizes in coastal Massachusetts. Canadian Field Naturalist 106:352-356.

Jones, A. L. and P. D. Vickery. 1997. Distribution and population status of grassland birds in Massachusetts. Pages 187-199 *in* P. D. Vickery and P. W. Dunwiddie editors. Grasslands of northeastern North America, ecology and conservation of native and agricultural landscapes. Massachusetts Audubon Society, Lincoln, Massachusetts, USA.

Knetzger, R. 2002. Correspondence to Steven Kahl, U.S. Fish and Wildlife Service, Wallkill River National Wildlife Refuge. Secretary, Milwaukee Association of Radio Control Clubs (01/15/2002).

Knight, R. L. and D. N. Cole. 1995. Wildlife responses to recreationists. Pages 51-69 *in* R. L. Knight and K. J. Gutzwiller editors. Wildlife and recreationists: coexistence through management and research. Island Press, Washington, DC, USA.

Knopf, F. L. 1995. Declining grassland birds. Pages 296-298 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac editors. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. U.S. National Biological Service, Washington, D.C., USA.

Lanyon, W. E. 1995. Eastern meadowlark (*Sturnella magna*). *In* A. Poole and F. Gill editors. The birds of North America. Number 160. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Leasure, S. M. and D. W. Holt. 1991. Techniques for locating and capturing nesting female short-eared owls (*Asio flammeus*). North American Bird Bander 16:32-33.

Madison Radio Controlled Airplane Society. 2001. "Fun Fly." Http://www.autism.org/ausome/ausep01.htm (9/2001).

Malecki, R. A. 1987. Purple loosestrife (*Lythrum salicaria*). Pages 39-45 *in* D. J. Decker editor. Exotic plants with identified detrimental impacts on wildlife habitats in New York State. Natural Resources Research and Extension Series 29, Ithaca, New York, USA.

Martin, S. G. and T. A. Gavin. 1995. Bobolink (*Dolichonyx oryzivorus*). *In* A. Poole and F. Gill editors. The birds of North America. Number 176. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Neuendorffer, C. 2001. Correspondence to Steven Kahl, U.S. Fish and Wildlife Service, Wallkill River National Wildlife Refuge (12/2001).

New York State Department of Environmental Conservation. 1997. Endangered, threatened and special concern fish and wildlife species of New York State. New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources, Delmar, New York, USA.

_____, and Office of Parks Recreation and Historic Preservation. 2001. Conserving open space in New York State 2001: draft open space conservation plan and generic environmental impact statement. New York State Department of Environmental Conservation and Office of Parks Recreation and Historic Preservation, Albany, New York, USA.

Nicholson, W. H. 1936. Notes on the Florida grasshopper sparrow. Auk 53:318-319.

Ott, A. 2002. Correspondence to Steven Kahl, U.S. Fish and Wildlife Service, Wallkill River National Wildlife Refuge. President, Queens County Bird Club (02/07/2002).

Pashley, D. N., C. J. Beardmore, J. A. Fitzgerald, R. P. Ford, W. C. Hunter, M. S. Morrison, K. V. Rosenberg. 2000. Partners In Flight: conservation of the landbirds of the United States. American Bird Conservancy, The Plains, Virginia, USA.

Porutski, R. 1996. Correspondence to Donald Ross, East Coast Free Flight Conference. State of New Jersey, Department of Environmental Protection, Division of Fish, Game and Wildlife, Central Region Office (9/27/1996).

Potter, P. E. 1974. Breeding behavior of savannah sparrows in southeastern Michigan. Jack-Pine Warbler 52:50-63.

Radio Club of Rochester (AMA Charter 465). 2001. Noise Recommendations. Http://home.rochester.rr.com/start.html.

Rawinski, T. J. and R. A. Malecki. 1984. Ecological relationships among purple loosestrife, cattail and wildlife at the Montezuma National Wildlife Refuge. New York Fish and Game Journal 31:81-87.

Robbins, C. S., D. Bystrak, and P. H. Geissler. 1986. The Breeding Bird Survey: its first fifteen years, 1965-1979. U.S. Fish and Wildlife Service Resource Publication 157.

Roberts, T. S. 1932. The birds of Minnesota. Volume 2.

Ross, D. 1996. Correspondence to Senator Alfonse D'Amato. East Coast Free Flight Conference.

Sauer, J. R., J. E. Hines, G. Gough, I. Thomas, and B. J. Peterjohn. 1997. The North American Breeding Bird Survey results and analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, Maryland, USA. Http://www.mbr-pwrc.usgs.gov/bbs/bbs.html (12/1999).

Saunders, A. A. 1913. Some notes on the nesting of the short-eared owl. Condor 15:121-125.

Saunders, M. B. 1986. Food provisioning of nesting northern harriers (*Circus cyaneus*) during a year of low vole abundance on the Tantramar Marsh, New Brunswick. Thesis, Mount Allison University, Sackville, New Brunswick, Canada.

Scarlatelli, K R. 1996. Site survey report: runway facilities Galeville Army training site. Northeast Environmental Management Systems, Lodi, New Jersey, USA.

_____. 2002. Response to the U.S. Fish and Wildlife Service's draft Compatibility Determination on model airplane flying and model airplane competitive events at the Shawangunk Grasslands National Wildlife Refuge. Northeast Environmental Management Systems, Lodi, New Jersey, USA.

Serrentino, P. 1992. Northern harrier, *Circus cyaneus*. Pages 89-117 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Department of the Interior, Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Simmons, R. E. 1983. Polygyny, ecology and mate choice in the northern harrier *Circus cyaneus* (L.). Thesis, Acadia University, Wolfville, Nova Scotia, Canada.

Smith, D. G., D. H. Ellis, and T. H. Johnson. 1988. Raptors and aircraft. Pages 360-367 *in* R. L. Glinski et al. editors. Proceedings of the Southwest raptor management symposium and workshop. National Wildlife Federation, Washington, DC, USA.

Smith, G. A. 1988. Northern Harrier *Circus cyaneus*. Pages 102-103 *in* R. F. Andrle and J. R. Carroll editors. The atlas of breeding birds in New York State. Cornell University Press, Ithaca, NewYork, USA.

Smith, R. H. 1964. Experimental control of purple loosestrife (*Lythrum salicaria*). New York Fish and Game Journal 11:35-46.

Smith, R. L. 1968. *Ammodramus savannarum* (Gmelin) grasshopper sparrow. Pages 725-742 *in* O. L. Austin, Jr. editor. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Part 2. Smithsonian Institution Press, U.S. National Museum Bulletin 237.

Smith, W. P. 1968. *Passerhubulus henslowii susurrans* Brewster eastern Henslow's sparrow. Pages 776-778 *in* O. L. Austin, Jr. editor. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. Part 2. Smithsonian Institution Press, U.S. National Museum Bulletin 237.

Sordahl, T. A. 1981. Predator-mobbing behavior in the shorebirds of North America. Wader Study Group Bulletin 31:41-44.

Stevens, G. 1992. Wetlands on the Galeville Army Training Site: report to the United States Military Academy (West Point). Hudsonia Ltd., Bard College Field Station, Annandale, New York, USA.

Stuckey, R. L. 1980. Distributional history of *Lythrum salicaria* (purple loosestrife) in North America. Bartonia 47:3-20.

Tate, G. R. 1992. Short-eared owl, *Asio flammeus*. Pages 171-189 *in* K. J. Schneider and D. M. Pence editors. Migratory nongame birds of management concern in the Northeast. U.S. Department of the Interior, Fish and Wildlife Service, Newton Corner, Massachusetts, USA.

Thompson, D. Q., R. L. Stuckey, and E. B. Thompson. 1987. Spread, impact, and control of purple loosestrife (*Lythrum salicaria*) in North American wetlands. Fish and Wildlife Research Number 2. U.S. Department of the Interior, Washington, D.C., USA.

Toland, B. 1985. Nest site selection, productivity, and food habits of northern harriers in southwest Missouri. Natural Areas Journal 5:22-27.

Townsend, C. W. 1937. *Asio flammeus flammeus* (Pontoppidan) short-eared owl. Pages 169-182 *in* A. C. Bent editor. Life histories of North American birds of prey. Part 2. Smithsonian Institution U.S. National Museum Bulletin 170.

Transport Canada. 1994. Control procedures manual: visual repellants. Transport Canada, Ottawa, Ontario, Canada. Http://www.tc.gc.ca/aviation/aorodrom/birdstrike/info.html (11/2001).

U. S. Fish and Wildlife Service. 1999. Construction and Rehabilitation Cost Estimating Guide. Hadley, Massachusetts, USA.

U.S. Military Academy. 1994. Fish and wildlife management cooperative plan for the United States Military Academy West Point, New York. Natural Resources Branch *in* Department of the Army. Final environmental assessment: excess of the Galeville Army Training Site Town of Shawangunk, Ulster County, New York. United States Military Academy West Point, New York.

U.S. North American Bird Conservation Initiative Committee. 2000. North American Bird Conservation Initiative; bringing it all together. U.S. Fish and Wildlife Service, Arlington, Virginia, USA.

Urner, C. A. 1921. Short-eared owl nesting at Elizabeth, N. J. Auk 38:602-603.

_____. 1923. Notes on the short-eared owl. Auk 40:30-36.

Vickery, P. D. 1996. Grasshopper sparrow (*Ammodramus savannarum*). *In* A. Poole and F. Gill editors. The birds of North America. Number 239. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

Ward, D. H. and R. A. Stehn. 1989. Response of brant and other geese to aircraft disturbance at Izembek Lagoon, Alaska. Final Report by the U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center for the U.S. Minerals Service.

Watson, D. 1977. The hen harrier. T.E.A.D. Poyser, Ltd., Berkhamsted, Hertfordshire, England.

Wells, J. V. 1998. Important Bird Areas in New York State. National Audubon Society, Albany,
New York, USA.

Welsh, D. A. 1975. Savannah sparrow breeding and territoriality on a Nova Scotia dune beach. Auk 92:235-251.

Wheelwright, N. T. and J. D. Rising. 1993. Savannah sparrow (*Passerculus sandwichensis*). *In* A. Poole and F. Gill editors. The birds of North America. Number 45. The Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, and The American Ornithologists' Union, Washington, D.C., USA.

APPENDIX: Organizations and agencies submitting comments on the draft Compatibility Determination on model airplane flying and model airplane competitive events at Shawangunk Grasslands National Wildlife Refuge.

Supporting

Audubon New York
American Birding Association
Buffalo Audubon Society
Brooklyn Bird Club
Defenders of Wildlife
Edgar A. Mearns Bird Club
Federation of New York State Bird Clubs
Friends of the Shawangunks
Fyke Nature Association
Genesee Valley Audubon Society
Great South Bay Audubon Society
John Burroughs Natural History Society
The Linnaean Society
Lyman Langdon Audubon Society
National Audubon Society
National Wildlife Refuge Association
New Jersey Audubon Society
New Jersey Department of Environmentat Protection
    Division of Fish and Wildlife, Endangered and Nongame Species Program
New Jersey Environmental Lobby
New York City Audubon Society
New York State Department of Environmental Conservation
    Division of Fish, Wildlife and Marine Resources, Region 3
    Division of Fish, Wildlife and Marine Resources, Endangered Species Unit
North Shore Audubon Society
Northern Catskills Audubon Society
Orange County Audubon Society
Public Employees for Environmental Responsibility
Putnam Highlands Audubon Society
Queens County Bird Club
Ralph T. Waterman Bird Club
Rockland Audubon Society
SUNY - College of Environmental Science and Forestry Birding Club
Wallkill River Task Force
Webster Groves Nature Study Society

189 letters from individuals

Opposed

Academy of Model Aeronautics
Auburn - Finger Lakes Radio Control Club
Barons Model Club
Brooklyn Skyscrapers Model Aeroplane Club
Button Valley Bombers
The Charles River Radio Control Club
East Coast Free Flight Conference
Englewood Flyers
Flying Dutchmen Aeromodelers
Hillsdale Flyers
Hilltop Radio Control Club
International Miniature Aircraft Association
Islip Model Aviation Society
Kent County Aeromodelers
Keystone Radio Control Society
Meroke Radio Club
Milwaukee Association of Radio Control Clubs
New England Sport Scale Association
Ocean County Modelers
Oregon Department of Fish and Wildlife
Pennsylvania Fun Flyers
Pinkham Field Irregulars
Rondout Valley Flyers
Society of Antique Modelers
Spirits of St. Louis Radio Control Flying Club
Sullivan Orange Ulster Radio Society
Top of New Jersey
Tuscon Free Flight Club
Valley Radio Control Flying Club
Vidalia Sky Vikings Radio Control Club
York Area Radio Control Club

1650 form letters from individuals

440 individual letters

Appendix C

View of the refuge
Edward Henry/ USFWS photo

Wilderness Review

- Documentation of Wilderness Inventory
- Inventory Criteria
- Inventory Conclusions

Documentation of Wilderness Inventory

The wilderness review process consists of three phases: inventory, study, and recommendation. The purposes of the wilderness inventory phase are:

- to identify areas of System lands and waters with wilderness character and establish these areas as Wilderness Study Areas (WSAs);
- to identify areas of Refuge System lands and waters that do not qualify as WSAs; and
- document the inventory findings for the planning record.

Inventory Criteria

WSAs are areas that meet the criteria for wilderness identified in the Wilderness Act. Section 2(c) provides the following definition.

A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological or other features of scientific, educational, scenic, or historical value.

Permanent roads are prohibited in wilderness under Section 4(c) of the Act, so WSAs must also be roadless. For the purposes of the wilderness inventory, a "roadless area" is defined as: "A reasonably compact area of undeveloped Federal land that possesses the general characteristics of a wilderness and within which there is no improved road that is suitable for public travel by means of four-wheeled, motorized vehicles intended primarily for highway use. A route maintained solely by the passage of vehicles does not constitute a road."

In summary, the inventory to identify WSAs is based on an assessment of the following criteria: absence of roads (roadless); size; naturalness; and either outstanding opportunities for solitude or primitive and unconfined recreation.

The Shawangunk Grasslands NWR was initially assessed based on the size criteria. The size criterion is satisfied for areas under Service jurisdiction in the following situations:

- An area with over 5,000 contiguous acres (2,000 ha). State and private land inholdings are not included in calculating acreage.
- A roadless island of any size. A roadless island is defined as a roadless area that is surrounded by permanent waters or that is markedly distinguished from surrounding lands by topographical or ecological features such as precipices, canyons, thickets, or swamps.
- An area of less than 5,000 contiguous 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.
- An area of less than 5,000 contiguous acres that is contiguous with a designated wilderness, recommended wilderness, or area of other Federal lands under wilderness review by the U.S. Forest Service (USFS), Bureau of Land Management (BLM), or National Park Service (NPS).

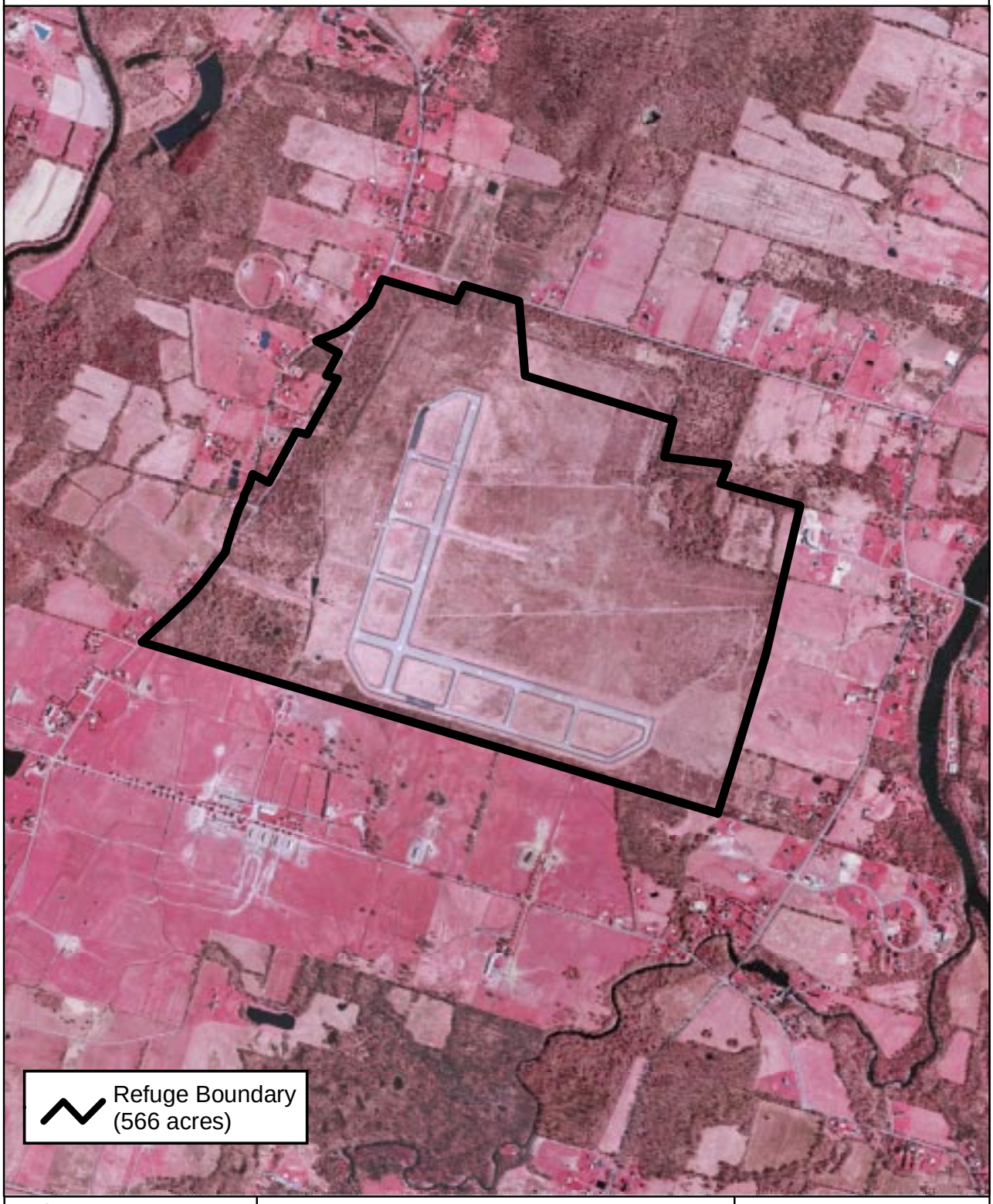
Inventory Conclusions

The 566 acre Shawangunk Grasslands NWR does not meet the size criteria for a WSA.

Please see the attached Map C-1.

Shawangunk Grasslands National Wildlife Refuge

Ulster County, New York



Appendix D

Standing on the refuge runway facing the Shawangunk Ridge
Edward Henry/ USFWS photo

Refuge Operations Needs System (RONS) and Maintenance Management System (MMS)

Table D-1: Refuge Operations Needs (RONS) Projects for Shawangunk Grasslands Refuge

Project No.	Project Description	Refuge Rank*	Tier**	Regional Rank	FTEs*** (personnel)	First Year Cost ($1000)	Recurring Cost ($1000)	Duration years
00007	Design and construct interpretive trail #	1	Not ranked			280	2	15
00013	Provide Kiosk, Information and Entrance Signs	2	1	137	0	23	0	1
99002	Conduct Wildlife Inventory and Develop Management Plans (Biologist)	3	1	123	1	65	86	15
00006	Evaluate the Effects of Invasive Plant Biological Control on Grasslands and Grassland-dependent Species	4	1	183	0	151	0	1
02002	Improve Grassland Management Program	5	2	55	0	264	40	
00002	Provide Environmental Education and Interpretation (Visitor Services Specialist)	6	1	100	1	65	73	15
00201	Enhance Grassland and Shrubland Management (Maintenance Worker)	7	1	104	1	65	66	15
02001	Enhance Refuge Daily Operations	8	2	56	1	65	73	
02003	Study Collapsing Drainage System	9	2	62	0	55	0	
00003	Survey Vegetation and Invertebrate Communities	10	1	141	0	49	0	1
	Totals	**-**	**-**	**-**	**4**	**$1,082**	**$340**	**-**

NOTES

*Refuge ranking is independent of other stations in the complex.

**Tier 1 projects identify essential staff and mission-critical activities; Tier2 are all other priority projects.

***FTE: full- time equivalent; refers to the proportion of a full time employee. An FTE of "1.0" means one person is needed full-time

#: Estimates from Regional Office Engineering for designing and constructing an interpretive trail is $280,000. This estimate is based on construction occurring in phases and may overlap with Project #00013 and MMS project 01001.

Table 2: Maintenance Management System (MMS) Projects for Shawangunk Grasslands Refuge

Project No.	Project Title	Refuge Rank*	Regional Rank	Cost Estimate ($1000)
01001	Partially Restore/ Recycle Runways and Taxiways Phase I # - (Restore/Recycle Asphalt and Concrete)	1	1	1,000
01001	Develop Visitor Services Infrastructure using sections of Runways and Taxiways - Phase II #	2	1	20
00001	Replace Trailer: Construct Small Office/ Visitor Contact Facility	3	New construction (not ranked)	200
00020	CN Widen, Repave Roadway (.2 mi.) and Public Use Parking Area	4	2	432
00017	Remove remnants of FBI compound	5	3	39
	Totals	-	-	**$1,691**

NOTES

*Refuge ranking is independent of other stations in the complex.

Phase I - Estimates from Regional Office Engineering and Facilities Specialist for runway and taxiway restoration; Phase II - Includes use of runways for interpretative trail. It is difficult to get an accurate estimate until the project is fully designed and goes out for bid.

Appendix E

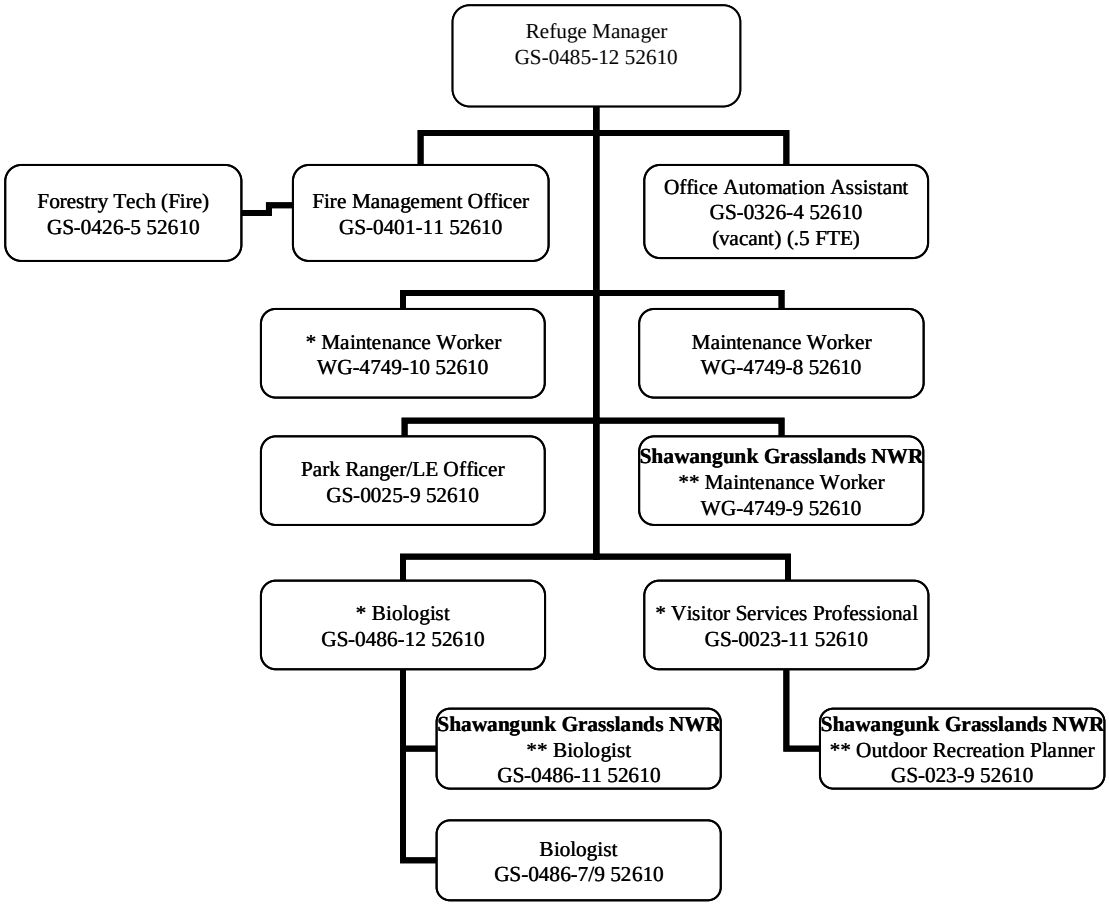
Meadow hawk dragonfly
USFWS photo

Staffing Chart

U.S. Fish and Wildlife Service

Wallkill River and Shawangunk Grasslands National Wildlife Refuges

Staffing



* Essential Staff

** New/Expanded Staff

All position stationed at the Wallkill NWR office

Appendix F

Prescribed fire is an important tool for reducing hazardous fuels while maintaining refuge grasslands to benefit the refuge's primary wildlife resources
USFWS photo

Fire Management Plan

- Signatures
- Introduction
- Relationship to Land Management Planning/Fire Policy
- Wildland Fire Management Program Options, Goals, Objectives, and Strategies
- Wildland Fire Management Program Components
- Organization and Budget
- Definitions
- Literature Cited
- Attachment A: Cooperative Agreements
- Attachment B: Fire and fuel treatment occurrence at Shawangunk Grasslands NWR
- Attachment C: Behave Runs
- Attachment D: Stepup Plan
- Attachment E: Delegation of Authority
- Attachment F: FMIS Wildland Fire Report

FIRE MANAGEMENT PLAN

SHAWANGUNK GRASSLANDS
NATIONAL WILDLIFE REFUGE

ULSTER COUNTY, NEW YORK

May 2006

Shawangunk Grasslands NWR
c/o Wallkill River NWR
1547 County Route 565
Sussex, NJ 07461

WILDLAND FIRE MANAGEMENT PLAN

Shawangunk Grasslands National Wildlife Refuge

Prepared by: _____ 5/10/06

Michael G Durfee
Central Zone Fire Management Officer
Northeast Region, US Fish and Wildlife Service

Date

Concurred by: _____ 5/10/06

William Koch
Project Leader
Great Swamp, Wallkill River, Shawangunk Grasslands
National Wildlife Refuge Complex

Date

_____ 5/10/06

Edward Henry
Refuge Manager
Wallkill River National Wildlife Refuge

Date

_____ 5/10/06

Allen Carter
Fire Management Branch Chief
Northeast Region, US Fish and Wildlife Service

Date

_____ 6/13/06

Janet Kennedy
Refuge Supervisor
Northeast Region, US Fish and Wildlife Service

Date

Approved by: _____ Acting 6-14-06

Marvin Moriarty
Regional Director
Northeast Region, US Fish and Wildlife Service

Date

I. Introduction

A. Need and Reason for the Plan

The Department of the Interior (DOI) fire management policy requires that all refuges with vegetation that can sustain fire must have a Fire Management Plan (FMP) that details fire management guidelines for operational procedures and values to be protected / enhanced. The FMP for the Shawangunk Grasslands National Wildlife Refuge (NWR) will provide guidance on preparedness, wildfire suppression, prescribed fire and non-fire fuels treatments, and prevention in an expanding wildland urban interface (WUI) area. Values to be considered in the FMP include: protection of refuge and neighboring private properties to include structures and improvements, endangered, threatened and special concern species, cultural and historical sites, and enhancement of Refuge habitats. The FMP will be reviewed periodically to ensure the fire program advances and evolves with the U.S. Department of Interior, U.S. Fish and Wildlife Service (FWS), and the Shawangunk Grasslands NWR mission.

B. Fire Management Plan as related to Refuge Management Objectives.

- Uncontrolled wildfire has the potential for negative impacts (out of season, wind events, fire trespass, destruction of real property, burning onto neighboring properties...).

- Prescribed fire and non-fire treatments are important tools for reducing hazardous fuels while maintaining refuge grasslands to benefit the primary wildlife resources which the refuge was established to protect, including grassland birds and wintering birds of prey.

C. National Environmental Protection Act (NEPA) Requirements

This plan meets NEPA requirements. A specific Environmental Assessment (EA) will not be completed for this plan. An EA is being developed as part of the Comprehensive Conservation Planning (CCP) process and will address fire management planning to include fire suppression, prescribed fire, and mechanical treatment operations.

Regulations published in the Federal Register (62 FR 2375) January 16, 1997, categorically exclude prescribed fire when used for habitat improvement purposes when conducted in accordance with local and State ordinances and laws. Wildfire suppression and prescribed fire are both categorically excluded, as outlined in 516 DM 2. Regulations published on June 5, 2003 (68 FR 33813) also categorically exclude certain hazardous fuels reduction activities and rehabilitation activities for lands and infrastructure impacted by fires or fire suppression.

The Refuge will circulate drafts of this plan to its cooperators and other interested parties for review and comment.

D. Collaborative Development and Implementation Opportunities

Development of the Plan has been a collaborative process with New York State Department of Environmental Conservation (NYSDEC) and Shawangunk Valley Volunteer Fire Department (VFD). Public involvement in the form of public meetings has been conducted as part of the

NEPA process for the refuge CCP which this document will be a step down from. Partner involvement will continue to be critical to implementing successful wildland fire prevention, suppression, prescribed fire, and other non-fire fuels treatments.

E. Authority and Guidance for Implementation

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.

- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.

- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.

- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.

- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.

- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.

- Wildfire Suppression Assistance Act of 1989. (P.L. 100-428, as amended by P.L 101- 11, April 7, 1989).

- Departmental Manual (Interior), Part 620 DM, Chapter 1, Wildland Fire Management General Policy and Procedures (April 10, 1998): defines Department of Interior Fire Management Policies.

- National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).

- Clean Air Act (42 United State Code (USO) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit
- Endangered Species Act of 1973.
- Federal Fire Management policy of 1995

II. Relationship to Land Management Planning/Fire Policy

A. Agency Specific Policies Related to Fire Management.

U.S. Fish & Wildlife Service fire policy is tiered to 620 DM 1 of the Departmental Manual (April 1998) and is contained in 621 FW 1 of the Service Manual (February 2000) and the Fire Management Handbook. The following key points summarize the information contained in these manuals:

- Firefighter and public safety is the first priority of the Fire Management Program.
- Only trained and qualified people will conduct fire management duties.
- Trained and certified employees will participate in the wildland fire management program as the situation demands. Agency administrators are responsible and accountable, and will make employees available to participate in the program.
- Fire management activities will be conducted on an interagency basis with the involvement of all partners when appropriate.
- An approved Fire Management Plan must be in place for all of our lands with burnable vegetation.
- We will integrate fire as an ecological process into resource management plans and activities on a landscape scale, across bureau boundaries, based on the best available science.
- We will use wildland fire to meet identified resource management objectives when appropriate and the Fire Management Plan contains such direction.
- We will employ prescribed fire whenever it is an appropriate tool for managing our resources, and will protect against unwanted wildland fire whenever it threatens human life, property, and natural or cultural resources. Once we commit people to an incident, these human resources become the highest value we protect. If we must prioritize between property and natural or cultural resources, we will base the decision on relative protection values, commensurate with fire management costs.

- Regions will provide safe, cost-effective fire management programs in support of land, natural, and cultural resource management plans through appropriate planning, staffing, training, and equipment.

- Management actions we take on wildland fires will consider firefighter and public safety, be cost effective, consider benefits and protection values, and be consistent with natural and cultural resource objectives.

B. Relationship of FMP to Enabling Legislation and Purpose

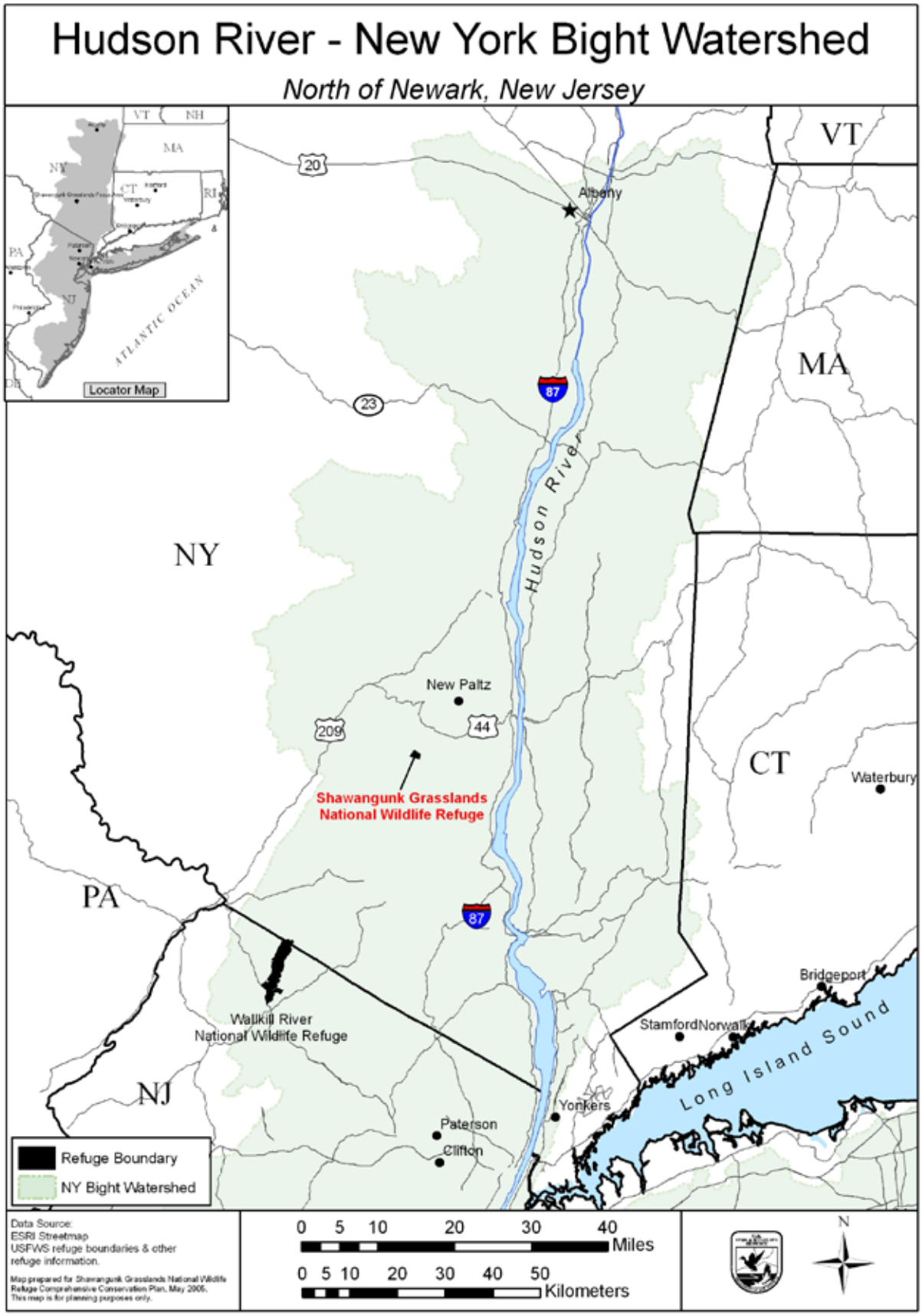
Shawangunk Grasslands National Wildlife Refuge is managed as an unstaffed satellite of Wallkill River NWR in NJ and is located in the Town of Shawangunk, Ulster County, New York (see Chapter 1, Map F-1 and F-2).

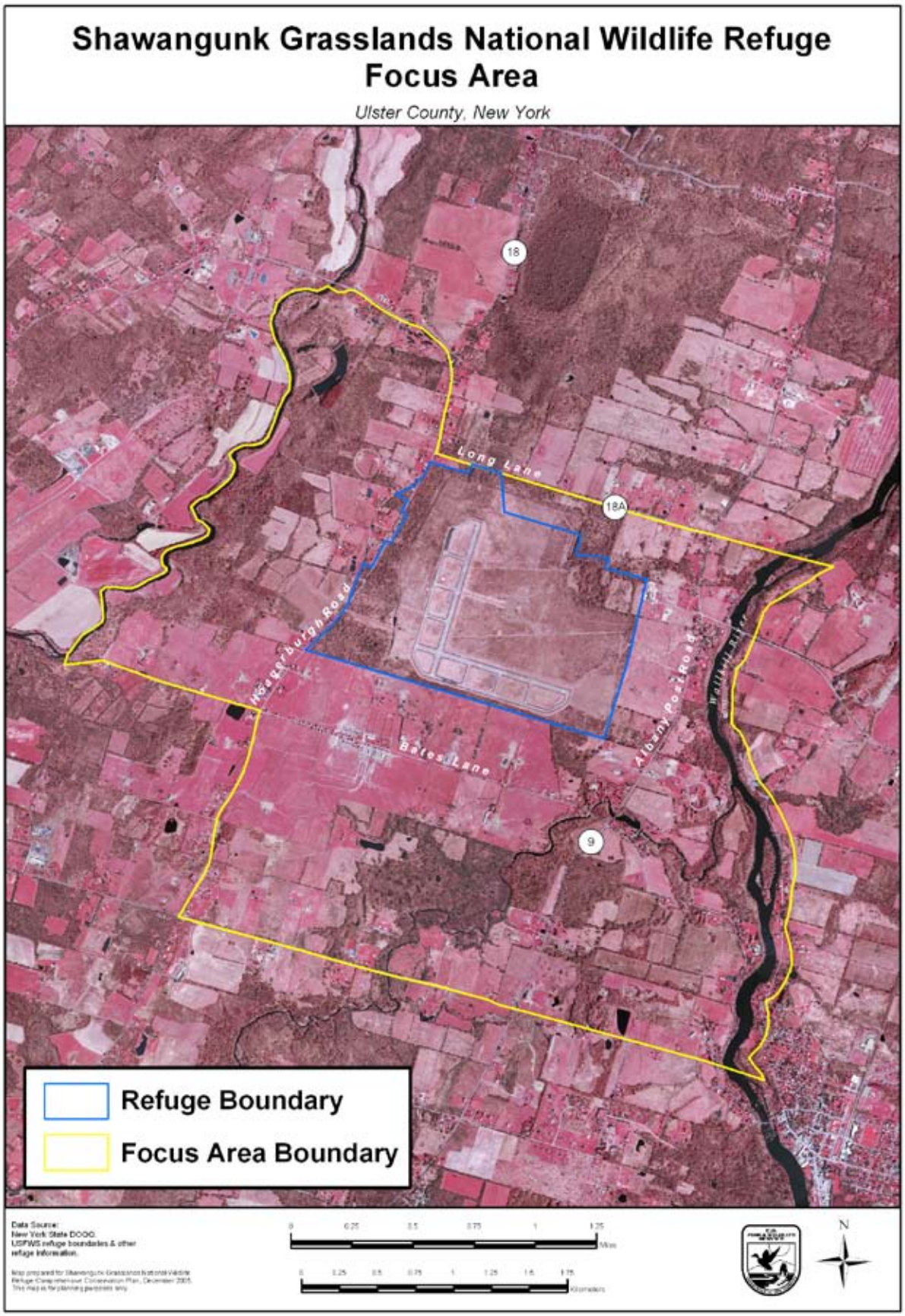
The refuge was established in July 1999 through a no-cost transfer of 566 acres of the former Galeville Army Training Facility from the Department of the Army to the U.S. Fish and Wildlife Service. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (U.S.C. 471531 and other U.S.C. sections), as amended and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667d; Public Law 80537), as amended. The purpose of the refuge is to sustain and enhance habitats for grassland dependent migratory birds and wintering raptors.

C. Significant Resources and Values

Audubon New York has identified this site as an "Important Bird Area", a designation given only to places that support a significant abundance and diversity of birds. In particular, the refuge is among a dwindling number of sites in New York State and one of only two sites in the Hudson Valley large enough to support the entire assemblage of grassland birds. Grassland dependent birds have declined more consistently and over a wider geographic area than any other group of North American birds over the last 30 years. Additionally, the refuge is one of the most important sites for wintering birds of prey in New York, especially northern harrier and short-eared owl.

Several grassland birds that use the refuge are on lists of rare or declining species, including northern harrier, upland sandpiper, short-eared owl, horned lark, bobolink, grasshopper sparrow, Henslow's sparrow, and vesper sparrow. The Service Northeast Region list of Birds of Conservation Concern includes upland sandpiper, short-eared owl, and Henslow's sparrow. Partners In Flight lists upland sandpiper, Henslow's sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region in which the Refuge lies. The North American Bird Conservation Initiative ranks Henslow's sparrow as a priority species in the Appalachian Mountain Bird Conservation Region. The New York State Department of Environmental Conservation (NYSDEC) lists short-eared owl as an endangered species, northern harrier, upland sandpiper, and Henslow's sparrow as threatened species, and horned lark, grasshopper sparrow, and vesper sparrow as species of special concern.


Hudson River - New York Bight Watershed
North of Newark, New Jersey
Locator Map
VT
NH
MA
NY
CT
RI
PA
NJ
ATLANTIC OCEAN
20
23
87
Albany
Hudson River
New Paltz
209
44
Shawangunk Grasslands
National Wildlife Refuge
Waterbury
Bridgeport
Stamford
Norwalk
Long Island Sound
Wallkill River
National Wildlife Refuge
Yonkers
Paterson
Clifton
Refuge Boundary
NY Bight Watershed
Data Source:
ESRI Streetmap
USFWS refuge boundaries & other
refuge information.
Map prepared for Shawangunk Grasslands National Wildlife
Refuge Comprehensive Conservation Plan, May 2005.
This map is for planning purposes only.
0 5 10 20 30 40 Miles
0 5 10 20 30 40 50 Kilometers
N


Shawangunk Grasslands National Wildlife Refuge
Focus Area
Ulster County, New York
18
Long Lane
18A
Wallkill River
Albany Post Road
Bates Lane
9
Refuge Boundary
Focus Area Boundary
Data Source:
New York State DOGC
USFWS refuge boundaries & other
refuge information.
N

Several rare or uncommon plants occur on the refuge. Most noteworthy is Frank's sedge (*Carex frankii*). This species is ranked as endangered by NYDEC and S1 by the New York Natural Heritage Program. Other uncommon plants include small-flowered agrimony (*Agrimonia parviflora*), purple milkweed (*Asclepias purpurascens*), small white aster (*Aster vimineus*), Bush's sedge (*Carex bushii*), coontail (*Ceratophyllum echinatum*), and watermeal (*Wolffi*a *brazilinsis*).

D. Refuge Management Purpose and Goals.

1. Purpose

   The FMP is being co-written with the CCP to ensure it is compatible with the refuge's purpose to sustain and enhance habitats for grassland dependent migratory birds and wintering raptors.

2. Goals

   The primary goals for the refuge under the Service's proposed alternative in the CCP are to:

   - Protect and enhance habitats for Federal trust species and other species of special management concern, with particular emphasis on grassland-dependent migratory birds and wintering raptors;
   - Manage to enhance regionally-significant ecological communities, including large grassland complexes;
   - Promote actions which contribute toward a healthier Wallkill River;
   - Continue land acquisition and land management partnerships to support accomplishment of species, habitat, and ecosystem goals;
   - Increase opportunities for environmental education and other priority, wildlife dependent public uses;
   - Cultivate an informed and conservation-educated public that works to support the goals of the refuge and the mission of the National Wildlife Refuge System;
   - Provide refuge staffing, operations, and maintenance support to effectively accomplish refuge purposes and legal mandates.

III. Wildland Fire Management Program Options, Goals, Objectives, and Strategies

A. General Management Considerations

1. The 10-Year Comprehensive Strategy

The National Fire Plan identifies the three core principles of collaboration, priority setting, and accountability. This Plan addresses these principles in the following manner:

Collaboration -

The land area portion of Shawangunk Grasslands National Wildlife Refuge directly abuts or is interspersed with both interagency and private lands. The planning for and implementation of wildland fire management activities will be a collaborative effort with NYSDEC- Forest Rangers, Shawangunk VFD, and Town of Shawangunk Government and community representatives.

The refuge recognizes that the key to successful fire management activities (suppression and prevention) lies with the surrounding fire departments. The fire departments provide the closest forces capable of responding safely to a wildland fire incident, since the Refuge itself does not maintain an initial attack suppression force. The Refuge and the Region will continue to support and foster these relationships by encouraging collaborative meetings for training and information sharing, and requesting their input into the fire management decision-making process.

Fire suppression for the Refuge will be covered under several cooperative agreements (Attachment A). The Service agrees to delegate responsibility and authority of Incident Command to the Departments, in consultation with the refuge designated resource advisor, to suppress wildland fires on NWR lands. The Service agrees to reimburse the Departments for suppression costs based on a rate schedule agreed to on an annual basis. The Cooperative agreement is effective for five years from date of signing.

Surrounding Fire Departments that provide for the suppression of all wildland fires at Shawangunk Grasslands NWR:

Fire Department or District	Agreement	Date
Shawangunk Valley Volunteer Fire Department:	agreement pending	

Priority Setting

The safety and property of private citizens and incident personnel are paramount concerns. Provided there is minimal threat on human life, suppression methods (direct vs. indirect attack) that impact fragile habitats should be weighed carefully against the need to protect property within and adjacent to the Refuge.

Emphasis of the fire management program will be protection of human life and property, specifically the local community. Other priorities include:

- Protection of watersheds, such as the various tributaries of the Wallkill and Hudson Rivers, from the undesirable effects of wildland fire.
- Hazard fuel treatments to reduce fire prone invasive vegetation and maintenance of roads and trails for equipment access.
- Wildland fire prevention and education programs.

Accountability -

Establish uniform and cost-effective measures, standards, reporting processes, and budget information in implementation plans that will fold into the Government Performance and Results Act (GPRA) process.

2. Safety

   The Refuge manager and Zone Fire Management Officer (FMO) will ensure that all fire management actions and activities are completed with safety being the first priority.

3. Endangered Species Act

   A programmatic section 7 will be completed as part of the Shawangunk Grasslands CCP. All fuels projects and wildland fires should include an assessment of the threat to state and federally-listed endangered, threatened, and special concern species and their habitats from the fire and suppression measures. A project level section 7 consultation may be conducted for any planned activity that could affect a listed or threatened species.

4. Clean Air Act

   Refuge fire management activities which result in the discharge of pollutants (smoke, carbon monoxide, particulate, and other pollutants from fires) are subject to and must comply with all applicable Federal, State, and local air pollution control requirements as specified by Section 118 of the Clean Air Act, as amended 1990. Any planned activity requires a permit from the NYDEC Air Pollution Division through the State Forest Rangers.

5. Clean Water Act

   Fire inhibiting chemicals (e.g., aerially applied retardants and Class A foam solutions) may be used with the concurrence of the Refuge Manager. Direct application of these chemicals into waterways such as impoundments, inflows, stream channels, or drainage ditches must be avoided. Federal guidelines implemented in June 2000 require that application of retardants and Class A foams be avoided within a 300 foot buffer zone of waterways.

6. National Historic Preservation Act

   Wildfire size-up requires an assessment of the threat to cultural resources from the fire itself or suppression actions. In the event that a new sensitive resource is discovered during any fire activity, the area will be noted and protected from further disturbance. A report will be made and the proper agencies notified. Any preplanned activities causing significant ground disturbance will require a consultation with the Regional Historic Preservation Office.

B. Wildland Fire Management Goals

The goals of the Shawangunk Grasslands NWR fire management program support the goals and objectives of the Refuge as outlined in II.D., and also support the principles outlined in the USDA/DOI National Fire Plan, 10 Year Comprehensive Strategy, and Cohesive Strategy:

- Ensure firefighter and public safety is the highest priority of all fire and fuels management activities.
- Suppress all wildland fires in a safe and cost effective manner consistent with resources and values at risk.
- Develop and implement a comprehensive non-fire fuels/vegetation management program to reduce hazardous fuels and invasive species, and restore or maintain habitats for declining grassland breeding birds.
- Protect sensitive biological communities from the effects of wildfire.
- Utilize Minimum Impact Suppression Tactics (MIST) whenever feasible, commensurate with firefighter safety and resources to be protected to minimize opportunities for invasive species introductions when utilizing heavy equipment on wildfires, or when assessing rehabilitation and restoration needs following wildfire occurrence.
- Collaborate with local, state, and federal partners when planning and implementing wildland fire preparedness, prevention, and suppression actions.
- Educate employees and the public about the scope and effect of wildland fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
- Identify fire management research needs, work with partners to develop proposals and obtain funding, and apply research results to fire planning through the adaptive management process.

C. Wildland Fire Management Options

Normally a fully-evolved fire management program on Department of Interior lands includes a variety of options for dealing with wildland fire:

- Wildland Fire – Full Suppression.
- Wildland Fire Use - Allow fire to assume its natural role in a fire-adapted ecosystem or to achieve resource benefits.
- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.
- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

The fire management program at Shawangunk Grasslands NWR will concentrate the following:

- Wildland Fire – Full Suppression.

- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.

- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

Associated actions needed to take effective wildfire suppression include: preparedness, prevention, and operational planning meetings with cooperators. These will be discussed in some detail later in the Plan.

Wildland fire use is not considered an appropriate fire management option at Shawangunk Grasslands NWR due to urban interface, fuel type, and low frequency of natural caused fire.

D. Fire Management Unit (Zone) (FMU/FMZ)

A Fire Management Unit (FMU) can be defined as "any land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and so on, that set it apart from the management characteristics of an adjacent FMU." Shawangunk Grasslands NWR is identified as a component of the New England and New York Fire Planning Unit (FPU) which includes all National Park Service, Forest Service, and Fish & Wildlife Service lands in New England and New York for the Fire Program Analysis (FPA).

Shawangunk Grasslands NWR will be managed as a single FMU. Suppression and prescribed fire, and non-fire strategies, management restrictions, fuels, fire environment, and values at risk are similar throughout the Refuge. Wildland fires will be suppressed using the appropriate suppression response. Prescribed fires and non-fire treatments will be used to reduce hazardous fuels and to meet resource and habitat improvement objectives. Due to staff limitations, relatively small land management parcels, valuable resources, and values at risk on neighboring lands, this plan does not recommend wildland fire use as an option.

1. Objectives

   - Strive to contain 95% of all fires during initial response with no firefighter or public injuries.

   - Acquire resources for a maximum response time of one half hour from time fire is reported.

   - Employ MIST tactics when possible, with special consideration given to protecting sensitive habitat and biological communities from suppression activities and fire encroachment.

   - Utilize prescribed fire and non-fire (mechanical/chemical) treatments to reduce hazardous fuel loadings where appropriate while maintaining habitat and controlling the encroachment of invasive species.

   - Prepare and implement an effective fire prevention plan to minimize fires and prevent human-caused wildland fires

- Prepare and present programs to educate the public regarding fire management practices and prevention within the Refuge and system wide.

2. Strategies
   - Conduct all fire management programs in a manner consistent with applicable laws, policies and regulations.
   - The Incident Commander, working in collaboration with the Refuge Manager or Resource Advisor, will determine the appropriate level of suppression and tactics to be employed based on considerations of human safety, actual and potential fire behavior, values to be protected, access, and expected suppression costs.
   - Maintain Cooperative Agreements with the NY DEC and Shawangunk Valley Volunteer Fire Department to promote cooperative prevention and suppression activities. Provide assistance to local or federal cooperators under the "closest resources" principles in accordance with Service policy.
   - Identify areas of concern and develop response plans and tactics to expedite the initial attack and full suppression of the fire.
   - MIST tactics will be employed to the maximum extent possible, given the considerations of safety, fire behavior, values, access, and cost.
   - Use of dozers, skidders, and other heavy equipment will be undertaken only with the consent of the Refuge Manager.
   - Avoid use of chemical retardants and Class A foams near waterways and wetland areas.
   - Develop a fuels treatment plan annually.
   - Utilize prescribed fire as a management treatment for achieving hazard fuel and resource management objectives.
   - Initiate cost effective fire monitoring to ensure burn objectives are being met and conduct an investigation into the historical role of fire in the Refuge.
   - Use monitoring data to refine burn prescriptions to better achieve objectives.
   - Use non-fire mechanical methods, and/or herbicide treatments in combination to reduce hazardous fuels and protect and restore wetlands for migratory birds.
   - In collaboration with local and other partners prepare and implement a fire prevention program to inform the public about wildland fire.
   - Integrate fire ecology, management, and prevention themes into existing interpretive and education programs.

3. Fuel/Habitat, Weather, and Fire Behavior Characteristics

a. Fuel/Habitat Types

The generalized vegetation map (map F-3) and table offers some indication of the Northern Forest Fire Laboratory (NFFL) fuel models used to estimate potential fire behavior on a localized scale, and corresponding National Fire Danger Rating System (NFDRS) fuel models used for fire danger purposes. Particularly for the NFFL fuel models, this discussion is intended only to give a very generalized idea of the type of fire behavior which can be expected; the actual fuel model appropriate for a given acre of ground requires first hand observation of the conditions present on the scene.

Table 1: Fuel/Habitat Types – Shawangunk Grasslands National Wildlife Refuge

Fuel/Habitat Types	Acres	Percent
Tall Grasslands (NFFL Model 3)	259	46
Short Grasslands (NFFL Model 1)	172	30
Hardwood Forest	135	24
Total	**566**	**100**

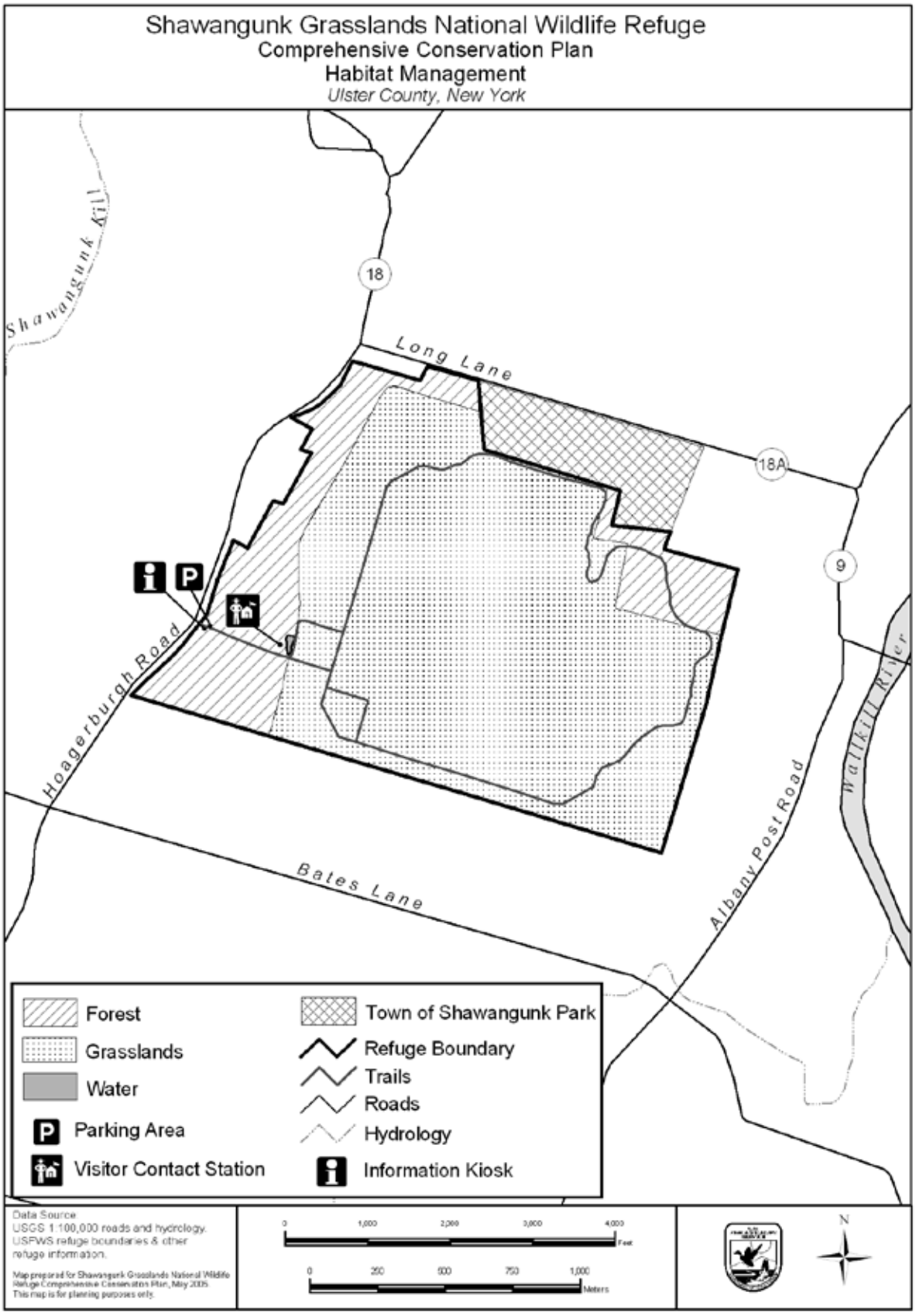
b. Weather and Climate Patterns

The Hudson River moderates the area's micro-climate, and the Atlantic Ocean influences the overall weather pattern for all of southeastern NY creating a humid, temperate climate. Days below zero degrees and above 100 degrees Fahrenheit (F) are rare. The average frost-free period runs from late April to early October. Precipitation averages about 41 inches annually, and snowfall averages about 51 inches. Rainfall is heaviest during July, August, and September. Prevailing winds are from the northwest during the winter and from the southwest during the summer. Annual wind speed averages 9.3 mph with March the windiest month and July, August, and September the least windy months. Generally, the area's weather diminishes the likelihood of a catastrophic wildfire with its high humidity, moderate rainfall, and relatively calm winds.

c. Fire Season (occurrence) and Fire Danger Indices

The largest number of fires occur in the fall (late Sept. to Dec.) and early spring (Feb. to April). However there is potential for wildland and prescribed fires year-round. No fire history exists for this unit due to the recent acquisition of the property. History is being developed for all fuel treatments occurring. (Attachment B)

National Fire danger Rating System (NFDRS) data is compiled by the NY Department of Environmental Conservation (NYDEC) for daily fire danger levels. Shawangunk Grasslands NWR will use this information to set the daily fire danger levels. No historical weather data is available from a refuge NFDRS weather station. Future historical weather data will be compiled and averaged using the zone and NY State NFDRS stations


Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Habitat Management
Ulster County, New York
Shawangunk Kill
18
Long Lane
18A
9
Hoagerburgh Road
Bates Lane
Albany Post Road
Wallkill River
Forest
Grasslands
Water
Parking Area
Visitor Contact Station
Town of Shawangunk Park
Refuge Boundary
Trails
Roads
Hydrology
Information Kiosk
Data Source
USGS 1:100,000 roads and hydrology.
USFWS refuge boundaries & other refuge information.
Map prepared for Shawangunk Grasslands National Wildlife Refuge Comprehensive Conservation Plan, May 2005.
This map is for planning purposes only.
0 1,000 2,000 3,000 4,000 Feet
0 250 500 750 1,000 Meters
N

d. Fire Regime

A natural fire regime is a general classification of the role would play across a landscape. The five natural (historical) fire regimes are classified based on the average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

- I – 0-35 year frequency, low to mixed severity (<75% overstory replaced)
- II – 0-35 year frequency, high severity (>75% overstory replaced)
- III – 35-100 year frequency, low to mixed severity (<75% overstory replaced)
- IV – 35-100 year frequency, high severity (>75% overstory replaced)
- V – 200+ year frequency, high severity (>75% overstory replaced)

Using the FIREMONv1.1, Fire Regime and Condition Class Field Procedures-Standard & Scorecard Methods, Shawangunk Grasslands NWR has two fire regime classes.

For the grasses the fire regime is II.

The hardwood forests have a regime of III.

e. Potential Fire Behavior

The following fire behavior outputs are based on the average conditions found during a normal fire season using the 14:00 weather observations. These averages ranges include: temp – 55-70 degrees Fahrenheit, relative humidity – 25%-35%, mid-flame wind speed of 6 mph, and 6% average 1hr (< 1/4 " diameter) fine dead fuel moisture. The slope is 0 to 2% and the rate of spread is for a head fire. The outputs are calculated from the BEHAVE - Fire Behavior Prediction Models (v. 2.2) algorithms. (Attachment C)

Fuel Model 1 (A) 40% - Field Grasslands: Fire spread is governed by the fine and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. The fire behavior is directly related to the fuel moisture and windspeed. Fuel loading is 0.74 tons/acre and consists of 1/4" or smaller (1 hr) dead fuel component. Spot fires are generally not produced because fuels are consumed too quickly and thoroughly. Resistance to control is low to moderate, depending on windspeed. The behavior output includes:

Rate of Spread - 135 chains/hr (1.7 mph)

Flame Length - 5.4 feet

Fuel Model 3 (N) 60% - Field Grasslands: Fires in this model display high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water. Stands are tall, averaging about 3' to 6', but considerable variation may occur. Approximately 1/3 or more of the stand is

considered dead or cured and maintains the fire. Fuel loading is 3.0 tons/acre and consists of up to 1/4"-1" and 10 hr) dead fuel component. Fire behavior is directly related to the fuel moisture and windspeed. Short-range (up to 100') spotting usually occurs and causes high to extreme control problems. The behavior output includes:

Rate of Spread – 148.4 chains/hr (1.9 mph)

Flame Length – 14.9 feet

Fuel Model 9 (E/R) - Deciduous Hardwood Forest: Fires are carried by dead, loosely compacted leaves and understory grasses. Wind tumbled leaves and torching trees may cause short to mid-range spotting that may increase the rate of spread above the predicted value. Fuel loading is 3.5 tons/acre and consists of <3"of dead and live fuel. Fire behavior is directly related to the fuel moisture and fuel loading with windspeed in exposed areas. Resistance to control is moderate except during drought conditions when extreme fire conditions are present. The behavior output includes:

Rate of Spread – 11.7 chains/hr (0.2 mph)

Flame Length – 3.4 feet

4. Management Considerations Affecting Operational Implementation

   a. Safety

      Firefighter and public safety (urban interface) is always of the highest priority when determining suppression strategy and tactics. No natural resource or property value is worth exposing humans to high risk situations. Fuels in the grasslands are light and flashy (models 3 and 1) and can pose a significant danger and is one factor of fatality fires.

   b. Values at Risk

      Once human safety is assured, the values to be protected play into the decision of the strategy and tactics to be employed. The most significant values at risk are the adjacent private properties. These properties include multiple single homes, a large horse facility, Town of Shawangunk Recreation area, refuge structures and improvements, and wildlife habitat.

   c. Protection of Resources

      Natural and cultural resources will be protected to the maximum extent feasible, but their protection will not be the highest priority. Appropriate suppression action will first and foremost ensure firefighter and public safety. When no threat to human life or damage to improvements and private property exists, protection of natural and cultural resources from fire or suppression damage will be the next highest priority. Foam suppressants or retardants should not be used within 300 feet of waterways to protect various water related resources. If new natural or cultural resources of concern are discovered during fire suppression activities, the Refuge Manager/Resource Advisor will ensure, to the extent appropriate and possible, their protection from damage related to fire suppression activities. The Refuge Manager will consult with the Regional Historic Preservation Officer to avoid, minimize, or mitigate potential or actual damage to cultural resources.

d. Wildlife:

Wildlife will be protected to the maximum extent feasible, but their protection will not be the highest priority. Appropriate suppression action will first and foremost ensure firefighter and public safety. When no threat to human life or damage to improvements and private property exists, protection of natural and cultural resources from fire or suppression damage will be the next highest priority. Once these concerns are protected, wildlife will be protected to the extent possible. Both birds and reptiles nest on the refuge and the areas in which the nests occur will be protected to the extent appropriate and possible. The adult birds would fly away, but the eggs and chicks still in the nests would be vulnerable to fire. Adult and hatchling turtles would most likely be in or near the water resources on the refuge, but again, the eggs in the nests would be vulnerable to the heat from the fire. Nesting for all of these species occurs primarily in spring and summer months. Mammals also breed on the refuge, but they would hopefully be able to move their young out of danger. The Refuge Manager and Wildlife Biologist would advise the Incident Commander of the areas of concern.

e. Minimum Impact Suppression Tactics Guidelines (MIST)

All personnel involved with fire management are expected to have an understanding of minimum impact suppression tactics Suppression efforts can sometimes cause more resource damage than the actual fire. Efforts to minimize resource damage must be a consideration with all suppression actions and shall be outlined in the cooperative agreements or delegation of authority. As a general rule, the assigned Incident Commander, with the input from a resource advisor, while minimizing the threat to human life and property will evaluate the suppression resource needs and seek alternatives to mechanized equipment, limit soil movement, maintain natural water courses, and minimize land degradation. Further guidelines can be found in the Fire Management Handbook.

The Resource Advisor should be an employee with resource management knowledge to advise the IC on issues related to mitigating the affects of suppression operations on cultural and natural resources.

f. Air Quality

Visibility and clean air are valued natural resources for Shawangunk Grasslands NWR and the protection of them will be given full consideration in fire management planning and operations. The station will comply with all applicable federal, state, and local air pollution control requirements, as specified within Section 118 of the Clean Air Act, as amended (42 USO 7418). Further guidance is in the Services Fire Management Handbook.

Shawangunk Grasslands NWR has not been designated as a Federal area where visibility is an important issue (Federal Class I Area) under the Clean Air Act Amendments of 1977. Smoke issues must be considered during the planning and implementation of any burn projects to lessen the potential impact to the surrounding community and area.

g. Access

Vehicular access to Shawangunk Grasslands is possible in most areas of the refuge. Before sending vehicles off the main access road or trails (old runways), ground conditions need to be assessed and considered in the initial size-up. Areas off the roads can be wet or not support heavy vehicles, and in such cases tracked low ground pressure vehicles or indirect tactics should be considered.

h. Barriers

Barriers to fire spread exist on the refuge as roads, trails (old runways), wetland, and fuel type changes and can be used effectively to hasten construction of control lines and minimize the impacts of constructed lines. Barriers can also be used effectively for indirect attack, as a safe location to make a stand or as a secure place to burn out by removing fuels in front of an advancing fire.

i. Cost

The Refuge Manager with input from the Zone Fire Management Officer or Incident Commander should weigh the relative costs of various suppression and fuel treatment strategies in comparison to values at risk, being sure not to compromise safety concerns. Too many resources on an incident can elevate the costs unnecessarily. Aircraft can be an effective resource under some circumstances, but may also be unnecessary or ineffective in many situations and can greatly escalate the cost of suppression operations. The Zone FMO should be consulted prior to the major expenditures of fire operation funds.

Wildland Fire Suppression actions require a cost code from FIRECODE. Those numbers will be generated by the Zone FMO and activated by the Denver Finance Center.

The Refuge manager is responsible to assure the costs of all fire operations are properly spent and accounted for through the Federal Financial System (FFS) and Budget Tracking System (BTS) accounting systems. A quarterly expenditure report should be submitted to the Zone FMO for tracking and accountability of fire operation funds.

j. Regional and National Concerns

The regional preparedness level tends to follow the national preparedness level unless the eastern seaboard is experiencing very dry conditions and a high potential for wildfire. Expect normal refuge operations to occur through National Preparedness Level IV.

At National Preparedness Level V, when local fire conditions permit, and subject to supervisory approval, all qualified individuals should be made available to meet regional and national needs.

IV. Wildland Fire Management Program Components

The full range of fire management program elements were reviewed and considered when developing this fire management plan. These include wildfire suppression (and with it the associated elements of preparedness, training, prevention, and detection), wildland fire use, prescribed fire, non-fire fuel applications, and emergency rehabilitation and restoration. As outlined in III.C, Shawangunk Grasslands will implement the following elements:

- Wildland Fire – Full Suppression.
- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.
- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

A. Wildland Fire Suppression

1. Suppression/appropriate management response.

   All Wildland fire regardless of cause will be suppressed. The local incident commander will determine the appropriate response based on local and FWS policies.

   Collaboration with the NYDEC – Forest Rangers and Shawangunk Valley VFD will be utilized for suppression operations on the refuge with procedures for the responding agencies to report the incident to the Refuge Manager at the Wallkill River NWR office. All suppression efforts will be dictated by the following priorities:

   - Life and Safety
   - Refuge Resources and Property

   Although resource impacts of suppression alternatives always must be considered in selecting a fire management strategy, resource benefits will not be the primary consideration. Appropriate suppression action will be taken to ensure firefighter safety, public safety, and protection of the resources.

   Suppression strategies should be applied so that the equipment and tools used to meet the desired objectives are those that inflict the least impacts upon the natural and cultural resources. Minimum impact suppression tactics (MIST) will be employed to protect all resources. Natural and artificial barriers will be used as much as possible for containment. When necessary, fire line construction will be conducted in such a way as to minimize long-term impacts to resources.

2. Preparedness.

   a. Readiness

      The Refuge staff should meet with area fire department personnel semi-annually to review cooperative agreements, contact information, and fire suppression policies and

procedures. Refuge staff should also meet with the Zone FMO yearly to review and update fire management activities, plans, and updated fire program information.

(1) Cooperative Agreements

Agreements are being written with the NYDEC and Shawangunk Valley VFD to provide protection for the refuge wild lands. These agreements will be reviewed annually to ensure currency.

- Updated costs for equipment and personal.
- Update phone contact numbers.
- Review communications and assigned frequencies.
- Coordinate prescribed burn schedule.

(2) Community assistance and grant programs (RFA)

The Shawangunk VFD will be notified of any program opportunities, deadlines, and procedures.

(3) Pre-Attack Plan

Pre-attack planning data will be updated annually by the refuge fire staff. Pre-attack plans will be placed in the Zone Engine, the Fire Management Office, and at the Refuge Headquarters. A copy of the plan will be forwarded to the Shawangunk Valley VFD. Pre-attack plans should include:

- Response map(s): roads, gates, trails, water sources.
- Mutual aid zones / fire cooperator districts (include map with boundaries).
- Hazard/Risk map: rivers and streams, power lines, main ditches and canals.
- Natural and Cultural Resources map: sensitive zones, non-sensitive zones, restricted vehicle access areas.
- Structure list.

b. Step-Up Actions

Due to the low level of fire occurrence and the lack of historic archived weather data upon which to calculate NFDRS indices and breaking points, the preparation of a site specific step-up plan is not essential. However, a calculation of NFDRS indices and step-up plan break points is implemented throughout the Central Fire Management Zone (section III D 4 c.) (Attachment D).

c. Detection

Most fires on the Refuge will be discovered and reported by local residents and members of the public using the area for recreation. These may or may not be reported directly to the Refuge Manager; it is expected that often the individual will contact the local fire department or 911 directly and Refuge staff may not find out about the fire until after it has already been attacked.

Response and coordination will be a part of the cooperative agreements with the NYDEC and Shawangunk Valley VFD. Contact and response information will be a part of the agreement process as well as the delegation of authority.

d. Communication

Interagency- The refuge radio system is the primary communication link. This is linked to the Delaware Water Gap NRA and the Wallkill River NWR Office. Cell phones will be used as a back-up to the radio system. During fire operations, radios will be issued to the overhead staff and at least 1 radio to each crew.

Local - Most of the local agencies have capability to communicate using a local frequency. For those local cooperators that do not have that capability, a Service radio will be provided and cell phone information exchanged to ensure communication during the incident.

e. Prevention and community education

Human caused fires have the potential to be the most damaging because they can occur at a time of the year when fewer initial attack resources are available and fuels are drier.

Due to the low occurrence of natural fire starts in the Hudson River and Catskill Regions of NY, it is assumed that most of the fires in the area are human caused. No documented fire history exists for the Shawangunk Grasslands prior to and after FWS acquisition.

Fire prevention programs will be a collaborative effort with the NYDEC-Forest Rangers and Shawangunk Valley VFD to protect human life and property, and prevent damage to natural and cultural resources or physical facilities. Public outreach using bulletin board materials, handouts, and interpretive programs should be utilized to increase visitor and neighbor awareness of fire hazards. Trained employees need to relate to the public the beneficial effects of prescribed fires as opposed to unwanted human-caused fires, with emphasis on information essential to understanding the potential severity of human-caused wildland fires and how to prevent them.

It is essential that employees be well informed about fire prevention and the objectives of the refuge's fire management program. Further, employees must be kept informed about changes in existing conditions throughout the fire season.

During periods of extreme or prolonged fire danger emergency restrictions regarding refuge operations or area closures may become necessary. Such restrictions, when imposed, will be consistent with those implemented by the Local and State Fire Officials. Closures will be authorized by the Refuge Manager.

f. Training & Qualifications

The Refuge will conform strictly to Service-specific guidelines as well as the National Wildfire Coordinating Group (NWCG) Publication 310-1, "Wildland Qualification System Guide" (January 2006). Service employees participating in any wildland fire activities on Fish and Wildlife Service lands must meet these requirements as well as those for fitness, and personal protective equipment (PPE). More information about

training, fitness and PPE is provided in the FWS Fire Management Handbook, and the Central Zone Fire Management Officer at Wallkill River NWR. Consult with the Zone FMO on arranging fire training for Refuge staff.

The Refuge relies on Shawangunk Valley VFD for initial attack response, and all department members may not meet NWCG standards. The Shawangunk Valley VFD is in the process of training their members to the NWCG standards through the NYDEC-Forest Rangers. This will not be a limiting factor for the first burning period of initial attack, as Federal agencies have agreed to honor the qualifications standards of assisting entities during this initial phase. Should the fire extend into additional burning periods, then by policy, all suppression personnel will need to meet NWCG standards.

g. Aircraft operations

All aircraft operations, other than initial attack, will follow the interagency aircraft use regulations and policies. During initial attack the closest resource including state owned aircraft may be used. After the first burn period or if needed for extended attack contractors must be used.

Aircraft used in prescribed fire and non-fire treatments will meet the interagency standards and an aircraft use plan will be required as part of the project plan.

3. Initial Attack

All wildland fires will be suppressed with fire fighter and public safety as the highest priority. Fires will be suppressed in a prompt, safe, aggressive, and cost-effective manner to produce smallest resource/acreage adverse impacts. Generally direct attack is the most cost effective tactic, provided it can be done safely. Otherwise indirect tactics are necessary, as determined by the Incident Commander (IC). In most cases, the Shawangunk Valley VFD will be the primary initial attack responder to wildfires on the Refuge as covered under the Cooperative Agreements.

a. Refuge Response

Once notified of a fire the Refuge Manager or designee will contact the Shawangunk Valley VFD with a request to respond or confirmation of response. The Refuge Manager or designee will also inform the Zone FMO. Qualified and available refuge staff should respond as well, performing such tasks as securing the fire origin, fire suppression, checking for visitors at risk, and implementing public closure at the scene. If the fire threatens to burn outside the Refuge boundary, the Manager and/or the Incident Commander will notify adjacent landowners.

b. Incident Commander

The Refuge will use the Incident Command System (ICS) as a guide for suppression organization. When the responding Fire Department arrives, the senior officer of that Department will serve as the Incident Commander responsible for the fire. The IC will brief the Refuge Manager on the location and status of the fire. The Refuge Manager will provide pertinent details on location and protection of special natural or cultural resources.

The Incident Commander will:

- Locate, size-up, and coordinate suppression actions, including briefing subordinates, directing their actions and providing work tools.
- Provide public and firefighter safety.
- Considering current and predicted fire conditions, assess need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action.
- Assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc,
- Keep the Refuge Manager informed.
- Provide information to the Refuge Manager so that a fire report can be prepared and provided to the Zone FMO.
- Notify Refuge Manager when initial attack is not successful, so that planning for extended attack can begin and a Wildland Fire Situation Analysis (WFSA) can be developed for the next operational period.
- Other duties of the Incident Commander are described in the National Wildfire Coordinating Group Fireline Handbook.

c. Public Safety

Public safety will require coordination between all Refuge staff and the Incident Commander. Notices should be posted to warn visitors, areas may be closed, and traffic control will be necessary if smoke crosses roads. Where wildland fires cross or burn areas adjacent to the road, mopped up and felling dangerous snags will be completed. If needed, individuals not involved in suppression efforts may be evacuated.

4. Extended Attack

The IC will notify the Refuge Manager whenever it appears that a fire will exceed initial attack efforts, threaten Service/private lands, or when fire complexity will exceed the capabilities of command or operations. The Refuge Manager will be responsible for coordinating with the IC all extended attack actions including:

- Notifying the Zone Fire Management Officer
- Completion and daily review of a wildland fire situation analysis (WFSA)(Zone FMO to be contacted for software and participation)
- Assignment or ordering of appropriate resources
- Completion of Delegation of Authority (Attachment E)

5. Fire Investigation

   After a wildland fire has been detected, responding personnel should be wary of suspicious individuals or vehicles. Personnel should not disturb a fire location in the event an investigation is needed. Personnel responding should attempt to locate and protect the probable point of fire origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene, and report findings to the Incident Commander. All suspicious fires will be promptly and efficiently investigated. Individuals should not question suspects or pursue the fire investigation unless they are commissioned law enforcement officers.

   Personnel from other agencies may investigate wildland fire arson or fire incidents involving structures. All fire investigations should follow guidelines in the Services Fire Management Handbook. The Central Zone Fire Management Officer should be contacted if needed.

6. Required Reporting

   The Refuge Manager must report all wildland fires to the Central Zone Fire Management Officer, who will issue a project cost code number from the FIRECODE system and add the fire to the Fire Management Information System (FMIS). The Incident Commander will be responsible for documenting decisions and completing a fire report (e.g., ICS-214, Agency Wildland Fire Report). Fire reviews will be documented and filed with the final fire report (Attachment F). The Zone Fire Management Officer will retain a copy and will be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document fires by type, acres burned by fuel type, cost summary, personnel utilized, and fire effects.

B. Wildland Fire Use

As mentioned previously under section III.C, Wildland fire use is not considered a viable management option.

C. Prescribed Fire

1. Objectives

   Shawangunk Grasslands National Wildlife Refuge has identified prescribed burning as part of the overall management of the resources. The prescribed fire activity is established and coordinated yearly as part of each Refuge's Habitat Management Plan. The use of prescribed fire to remove excess vegetation in grasslands and hardwood forests creates a mosaic that reduces fuel loading while providing quality habitat desirable for many wildlife species.

   - Hazard fuel reduction should occur within or near wildland urban interface, refuge development zones, sensitive natural resources, and boundary areas. These areas are used to reduce the risk from wildland fire, and to the greatest extent possible hazard fuel burns should compliment habitat/resource management objectives. Goals of hazard fuel reduction for prescribed burning include:

- Establish defensible space along urban interface boundary and around refuge improvements and structures.
- Protect habitat from wildfire trespass.
- Maintain fuel loadings within the natural ranges (determined by fuel type).
- Aid in control of invasive plants and weeds that contribute to the fuel load.

- Habitat/resource management prescribed fire is used to restore, create, or maintain a diversity of plant communities in order to restore and perpetuate native wildlife species. The frequency of achieving many of the goals requires repeated prescribed burns. Goals of resource management burns include:
  - Control woody plants
  - Maintain dominance by graminoids.

2. Annual Preparation

   The Refuge Manager, in consultation with the Wildlife Biologist and Zone Prescribed Fire Specialist or Fire Management Officer will formulate the annual prescribed fire program. The results of this planning effort will be:

   - The designation of Burn Units.
   - The preferred treatment interval (this can vary by fuel type).
   - The recommended method of treatment (fire, fire/mechanical/chemical, etc).
   - The recommended treatment sequence (rotation).
   - The annual target acreage scheduled for treatment.
   - The total target acreage to be treated annually refuge-wide.
   - Type of monitoring and frequency needed.

   The Zone FMO/Prescribed Fire Specialist or Burn Boss will write individual prescribed fire plans for the units to be treated.

   Prescribed fire plans are submitted to the NYSDEC-Forest Rangers for review. Due to the review process, plans should be submitted as early as possible. Following the review, the NYSDEC-Forest Rangers will issue a burn permit. A smoke management plan is required by the State and the prescribed fire plans include adequate information to meet the State requirement. The Air Quality permit is issued as part of the prescribed fire permit.

3. Recommended Fire Qualified Staffing

   The Zone Fire Management Officer or Prescribed Fire Specialist shall assign the Burn Boss of the appropriate level to implement the burn. The Burn Boss will follow all the guidelines and procedures that are contained in the prescribed fire plan.

   Shawangunk Grasslands is an unstaffed satellite of the Wallkill River NWR.

Position	Location	Minimum Qualifications
Fire Management Officer and/or Prescribed Fire Specialist	Zone	RXB2 or 1, TFLD, ICT3
Burn Boss	Zone	RXB3, FFT1

The Refuge will meet or exceed standard and qualification requirements as outline in Service Fire Management Handbook and Interagency prescribed fire qualification (NWCG publication 310-1). The Refuge Manager, with consultation from the Zone Fire Management Officer/Prescribed Fire Specialist, will be responsible for ensuring Refuge personnel maintain the qualifications necessary to implement the growing fire program.

4. Sensitive Resource Considerations (T&E, Cultural Resources, Smoke targets, etc.)

   There are two critically important constraints/limitations to consider, when prescribing fire as a habitat management tool for the refuge:

   - Fire is not recommended as a tool on the site in areas of extensive invasion of Purple Loosestrife (PL). According to Malecki and Rawinski (1985) and Malecki (pers. communication), fire does not carry through PL and does not affect belowground tissues. Thompson (1987) reports that prescribed spring fire at Montezuma Refuge resulted in less than 10% plant mortality. More importantly, Purple Loosestrife requires bare substrate for germination. In areas infested with the invasive plant, up to 38,090 seeds can exist per square foot, in the top 2 inches of soil (Welling and Becker 1990). Since PL seeds are viable for 2 or more years, prescribed fire would likely provide a substrate for extensive PL germination at Shawangunk NWR If, however, the Refuge has made/makes significant progress in controlling/eradicating Purple Loosestrife in the open habitats on the site, then fire may be a viable tool for controlling woody plant invasion, and maintaining grassland cover.

   - As previously mentioned, the silt loam soils observed on-site, especially in “pit and hummock” wetlands, can be compacted easily by heavy equipment, and potentially rendered less suitable for the rare grassland/wetland plants documented on the Refuge. Therefore, any work requiring heavy equipment, such as mowing, constructing firebreaks, etc. should be done with low ground-pressure vehicles, when the site is extremely dry.

5. Prescribed Fire Plan and Prescription Requirements

   Prescribed fire plan contents are provided in the FWS Fire Management Handbook. All burn plans must be reviewed and signed by the designated Burn Boss and the Regional Fire Management Branch Chief prior to Refuge Supervisor approval.

6. Required Reporting

   a. Reporting and Documentation

      The Refuge Manager will report all prescribed fires to the Zone FMO who will add the fire to the Fire Management Information System (FMIS) and the National Fire Plan Operations and Reporting System (NFPORS). The burn boss will be responsible for providing input to and documenting decisions for completion of the fire report (e.g.,

ICS-214, Agency Wildland Fire Report). Fire reviews will be documented and filed with the final prescribed fire report.

The Zone Fire Management Officer will retain a copy and be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document fires by type, acres burned by fuel type, cost summary, personnel utilized, and fire effects.

b. Cost Accounting

All prescribed fire costs will be tracked using the Specific fire project code generated from the FMIS and opened from the Denver finance Center. The Wallkill River Refuge Manger will be responsible to accurately track and document the costs and expenditures associated with the prescribed burn. The Refuge Manager will keep the Zone Fire Management Officer informed as to the expenditures and costs for inclusion in the annual regional fire management summary report and meeting national fire performance measures.

D. Non-Fire Fuel Applications (mechanical/chemical)

1. Objectives

Shawangunk Grasslands National Wildlife Refuge has identified mechanical and chemical applications as part of the overall management of the resources. The activities are established and coordinated yearly as part of each Refuge's Habitat Management Plan. The use of non-fire activities is to remove excess vegetation in grasslands and hardwood forests creating a mosaic that reduces fuel loading while providing quality habitat desirable for many wildlife species.

Hazard fuel reduction should occur within or near wildland urban interface, refuge development zones, sensitive natural resources, and boundary areas to reduce the risk from wildland fire, and hazard fuel treatments should compliment habitat/resource management objectives when possible. Goals of non-fire hazard fuel reduction include:

- Establish defensible space along urban interface boundary and around refuge improvements and structures. Per Departmental direction, WUI treatments should involve collaboration with local communities and partners, and development of risk assessment and hazard mitigation plans.
- Protect habitat from wildfire trespass.
- Maintain fuel loadings within the natural ranges (determined by fuel type).
- Aid in control of invasive plants and weeds that contribute to the fuel load.

2. Annual Preparation

The Refuge Manager, in consultation with the Wildlife Biologist and Zone Prescribed Fire Specialist or Fire Management Officer will formulate the long term non-fire treatment program.

Following the approval, the planning team will designate units and a long-term treatment strategy will be developed. The results of this planning effort will be:

- The designation of units (priority to urban interface).
- The preferred treatment interval (this can vary by fuel type).
- The recommended method of treatment
- The recommended treatment sequence (rotation).
- The annual target acreage scheduled for treatment.
- The total target acreage to be treated annually refuge-wide.

3. Restrictions

    a. Any work requiring heavy equipment, such as mowing, constructing firebreaks, etc. should be done with low ground-pressure vehicles, when the site is extremely dry.

    b. Seasonal

    The only time that non-fire treatments will be precluded is during the nesting season from early may to early July. During that time no unnecessary activity should occur.

4. Required Reporting

    a. Documentation and Reporting

    The Refuge Manager will report all non-fire treatments to the Zone FMO who will add the information to the Fire Management Information System (FMIS) and the National Fire Plan Operations and Reporting System (NFPORS). The project manager will be responsible for providing input to and documenting decisions for completion of the treatment report (e.g., ICS-214, Agency Wildland Fire Report).

    The Zone FMO will retain a copy and be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document treatment by type, acres treated by fuel type, cost summary, personnel utilized, and effects.

    b. Cost Accounting

    All non-fire treatment costs will be tracked using the Specific fire project code generated from the FMIS and opened from the Denver finance Center. The Wallkill River Refuge Manger will be responsible to accurately track and document the costs and expenditures associated with the treatment. The refuge manager will keep the Zone FMO informed as to the expenditures and costs for inclusion in the annual regional fire management summary report and meeting national fire performance measures.

E. Emergency Rehabilitation and Restoration

Post-fire repairs will fall into one of three categories: fire suppression activity damage, emergency stabilization, and rehabilitation (620 DM 3). Fire suppression activity damage is damage to resources, lands, and facilities resulting from wildland fire suppression actions, in contrast to damages resulting from the fire itself. Repair actions are planned and performed primarily by the suppression incident organization as soon as possible prior to demobilization. The incident management team, during transition back to the local unit, must document the fire suppression activity damage repair actions accomplished and those which are still needed. Fire suppression activity damage is paid by the same Wildland Fire Suppression Operations subactivity (9141) and project code as the fire suppression effort.

Emergency stabilization may be defined as planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildland fire. Stabilization actions must be documented in an approved plan which will describe in detail the actions proposed and costs, provision for monitoring of results, delineation of funding, and responsibilities for implementation. Funding is provided under the Wildland Fire Suppression Operations account, but using a different subactivity (9142, Emergency Stabilization) than suppression only. Plans are jointly reviewed by the Regional Fire Management Coordinator and the National Burned Area Emergency Rehabilitation Coordinator. Funding up to $500,000 may be approved at the Regional Director level. Larger requests must be approved by the Fire Management Branch Chief. Examples of emergency stabilization actions that may be permitted include replacing or repairing minor facilities essential to public health and safety when no other options are available; placing structures to slow soil and water movement; stabilizing soils; increasing road drainage frequency and/or capacity to handle additional post-fire runoff; installing protective fences or barriers to protect treated or recovering areas; seeding to prevent establishment of invasive plants, and direct treatment of invasive plants; using integrated pest management techniques to minimize the establishment of non-native species within the burned area; and monitoring of treatments and activities for up to three years.

Rehabilitation efforts are undertaken within three years of containment of a wildland fire to repair or improve fire-damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by the fire. These are long-term actions that have been already identified in approved land management plans. A rehabilitation plan will be written as a separate plan, independent of an emergency stabilization plan. Funding must be approved on a priority basis by the National Burned Area Emergency Rehab (BAER) Coordinators in consultation with the Office of Wildland Fire Coordination. Funds will fall under a burned area rehabilitation subactivity, not the Wildland Fire Operations account. Allowable actions may include chemical, manual, and mechanical removal of invasive species, and planting of native species to restore or establish a healthy, stable ecosystem; tree planting to reestablish burned habitat, reestablish native tree species lost in fire, and prevent establishment of invasive plants; and repair or replace fire damage to minor

operating facilities such as campgrounds, interpretive signs and exhibits, and fences. Funding for rehabilitation treatments falls under the 9262 subactivity.

V. Organization and Budget

A. Fire Management Team Responsibilities

- Refuge Manager: The Refuge Manager is responsible for the full range of management duties within the Refuge including fire management activities that implement an effective fire management program. Appropriate action will be taken by the Refuge Manager for fires on or adjacent to Refuge lands. Related fire management activities include delegation of authority, designation of resource advisors on incidents, implementing extended initial attack organizations, developing cooperative agreements with local fire departments and state agencies, and authorizing the use of vehicles and heavy equipment within designated resource sensitive areas of the Refuge.

- Refuge Wildlife Biologist: Acts as Resource Advisor on initial and extended attack or project size wildfires.

- Regional Fire Management Branch Chief (RFMC): Provides coordination, training, evaluation, and technical guidance, as requested, to the Refuge staff, approves fire preparedness and fuels treatment budget requests. The RFMC will be informed of all wildfire suppression activity occurring on the Refuge through the Zone FMO.

- Zone Fire Management Officer (Zone FMO): The Region 5 Central Zone FMO, stationed at Wallkill River National Wildlife Refuge, advises the Refuge Manager or staff on matters relative to fire planning, fire preparedness, suppression, and prescribed burning. The Zone FMO supplies technical assistance and experience relative to fire management activities and also advises the Refuge Manager on priorities, strategies, and tactics to reduce adverse fire impacts. The Zone FMO coordinates fire training for Refuge staff, enters fire reports into the computerized database, maintains staff qualifications through the IQCS system, and enters Refuge base information and requests into the FireBase/Fire Program Analysis (FPA) workload analysis and budgeting systems. The Zone FMO makes recommendations to the Regional Fire Management Branch Chief on fire budget allocations to the Refuge and provides guidance to the refuge on proper fire expenditures. The Zone FMO may be called upon to gather additional resources necessary to implement this Plan.

B. Budget

1. Refuge Fire Funding

   No fire funds are specifically earmarked to conduct fire management activities at Shawangunk Grasslands NWR. Funds can be requested to meet wildland urban interface/ hazard fuel treatment, prevention, or minor equipment and personal protective equipment needs through the Zone FMO on an annual basis. Other funds from regional fire program

sources are available to cover training associated travel and physical exams. In addition, costs of emergency suppression to local cooperators are reimbursable from the national fire management emergency operations fund. Cooperating fire departments close to the Refuge serve to meet suppression needs and suppression objectives of this Plan.

2. Fire Program Analysis (FPA)

   Fire Program Analysis (FPA) is an interagency fire management workload analysis and budgeting system that will replace the existing FireBase system beginning in fiscal year 2008. All federal land ownerships within a given Fire Planning Unit (FPU) will be subject to a common optimization model that will determine optimum levels of resources by unit for a given funding level. Shawangunk Grasslands NWR is part of the Northeast Compact FPU which includes all National Park Service, Forest Service, and Fish & Wildlife Service land in New England and NY. It is unknown at this time what effect, if any, FPA will have on allocation of fire resources to Shawangunk Grasslands and other area refuges.

VI. Monitoring and Evaluation

The following Fire Research is needed at Shawangunk Grasslands NWR:

- Comprehensive inventory and assessment of the Refuge's hazard fuels, and the identification and prioritization of hazard fuel units.
- Assessment of hazard fuel management options, and their effects upon Refuge resource objectives
- Assessment of long and short term fire effects in the habitats of the Refuge with recommendations for treatment activities.
- Assessment of treatment affects monitoring needs and preparation of monitoring plan.

A. Monitoring and Research

The effects of fuel treatments upon the Refuge's plant and animal population's needs to be better understood. Through applied research and careful application non-fire treatments, data collected can provide managers with a better understanding of the natural ecological effects, and the information needed to refine treatment types to meet resource objectives.

Monitoring will comply with accepted scientific methods. This data, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program. Levels of data collection, from least expensive and intensive to the most elaborate, are as follows:

- Minimum levels (photopoints)
- Intermediate (NPS Fire Effects Monitoring Handbook)
- Volume/weight removed measurements

- Maximum levels – integrate with other refuge monitoring programs to support adaptive management.

B. Evaluation

1. After Action Review

   Wildland and Prescribed fire activities with be evaluated by the IC and the Refuge Manger in the form of an After Action Review (AAR) as outlined in the Incident Response Pocket Guide.

2. Significant Wildland Fire Event Review

   The Regional Fire Management Branch Chief, Refuge Manager, Incident Commander, and Zone FMO will conduct formal fire reviews in the event of:

   - significant injury/accident
   - significant property or resource damage
   - significant safety concerns

3. National Wildland Fire Performance Measures

   The Refuge Manger and Zone FMO will conduct a yearly review of the overall fire management program. The review will cover project funding and expenditures, non-fire treatment accomplishments, and program review. This information will be compiled for inclusion in the yearly Regional Fire Management Government Performance Results Act (GPRA) goals.

Definitions

Agency Administrator. The appropriate level manager having organizational responsibility for management of an administrative unit. May include Director, State Director, District Manager or Field Manager (BLM); Director, Regional Director, Complex Manager or Project Leader (FWS); Director, Regional Director, Park Superintendent, or Unit Manager (NPS), or Director, Office of Trust Responsibility, Area Director, or Superintendent (BIA).

Appropriate Management Action. Specific actions taken to implement a management strategy.

Appropriate Management Response. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy. A plan or direction selected by an agency administrator which guide wildland fire management actions intended to meet protection and fire use objectives.

Appropriate Suppression. Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Bureau. Bureaus, offices or services of the Department.

Burning Index (BI). A number combining the spread and energy release component related to the contribution of fire behavior to the effort of containing a fire.

Class of Fire (as to size of wildland fires):

Class A - ¼ acre or less.
Class B - more than ¼ but less than 10 acres.
Class C - 10 acres to 100 acres.
Class D - 100 to 300 acres.
Class E - 300 to 1,000 acres.
Class F - 1,000 to 5,000 acres.
Class G - 5,000 acres or more.

Emergency Fire Rehabilitation/Burned Area Emergency Rehabilitation (EFR/BAER). Emergency actions taken during or after wildland fire to stabilize and prevent unacceptable resource degradation or to minimize threats to life or property resulting from the fire. The scope of EFR/BAER projects are unplanned and unpredictable requiring funding on short notice.

Energy Release Component (ERC). A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Extended attack. A fire on which initial attack forces are reinforced by additional forces.

Fire Suppression Activity Damage. The damage to lands, resources and facilities directly attributable to the fire suppression effort or activities, including: dozer lines, camps and staging areas, facilities (fences, buildings, bridges, etc.), handlines, and roads.

Fire effects. Any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial.

Fire intensity. The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire management. All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire Management Plan. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire prescription. A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fuels. Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel loadings. Amount of burnable fuel on a site, usually given as tons/acre.

Hazard fuels. Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Initial Attack. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Keetch - Byram Drought Index (KBDI). An indicator of drought on the availability of fuel to burn in the heavier fuels and litter and duff layers.

Maintenance burn. A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Natural fire. A fire of natural origin, caused by lightning or volcanic activity.

NFDRS Fuel Model. One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the US Forest Service and are general in nature rather than site specific.

NFFL Fuel Model. One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by US Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

Prescription. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, public health, environmental, geographic, administrative, social, or legal considerations.

Prescribed Fire. A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a

fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition. NEPA requirements can be met at the land use or fire management planning level.

Preparedness. Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Prevention. Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rehabilitation. (1) Actions to limit the adverse effects of suppression on soils, watershed, or other values, or (2) actions to mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

Spread Component (SC). A rating of the forward rate of spread of a head fire

Suppression. A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Unplanned ignition. A natural fire that is permitted to burn under specific conditions, in certain locations, to achieve defined resource objectives.

Wildfire. An unwanted wildland fire.

Wildland Fire. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland/urban interface fire A wildland fire that threatens or involves structures.

Literature Cited

A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10-Year Comprehensive Strategy, August 2001

Anderson, H.E. 1982. Aids to Determining Fuel Models For Estimating Fire Behavior. USDA Forest Service. 22p. Ogden, Utah

_____ 2004. Fireline Handbook – NWCG Handbook 3, National Wildfire Coordinating Group. Washington, DC

Anderson, R. C. 1990. The historic role of fire in the North American grassland. In: *Fire in North American Tallgrass Prairies* (S.L. Collins and L.L. Wallace, eds.). Pp. 8-18. University of Oklahoma Press, Norman, Oklahoma. ISBN 0-8061-2281-1.

Anderson, R. C. 997. ummer fires. In: *The Tallgrass Restoration Handbook, for Prairies, Savannahs, and Woodlands* (Packard, S. and C. F. Mutel, eds.). Pp. 245-249. Island Press, Washington, D.C. ISBN 1-55963-320-4.

Department of Interior Manual.

Environmental Protection Agency web page: http://www.epa.gov

Fairweather Consulting. 2003. Draft Master Plan, Town of Shawangunk Comprehensive Plan (http://www.shawangunk.org/Final%20Plan%20with%20Summary.pdf).

FIREMONv1.1, 10/30/2003. *Fire Regime and Condition Class Field Procedures-Standard & Scorecard Methods*.

Herkert, J. R. 1994. Breeding bird communities of midwestern prairie fragments: the effects of prescribed burning and habitat-area. Natural Areas Journal 14(2): 128-135.

Howe, H. F. 1995. Succession and fire season in experimental prairie plantings. Ecology 76:1917-1925.

Hudsonia. 1992. Unpublished wetlands delineation of the Galeville Army Training Site, Town of Shawangunk, Ulster County, NY. Authorized by the United States Military Academy, West Point.

Interagency Agreement between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service of the United States Department of the Interior and the Forest Service of the United States Department of Agriculture (1996).

Interagency Fire Business Management Handbook

Jones, A. L. and P. D.Vickery. [No date]. Conserving grassland birds: managing agricultural lands including hayfields, crop fields, and pastures for grassland birds. Massachusetts Audubon Society, Lincoln, MA. 17 p.

Malecki, R. A. and T. J. Rawinski. 1985. New methods for controlling purple loosestrife. New York Fish and Game Journal. 32:9-19.

National Wildfire Coordinating Group, *Wildland and Prescribed Fire Qualification System Guide*, PMS 310-1, January 2000.

Partners in Flight 2004. Draft PIF BCR Plan for PIF Region 17. http://www.blm.gov/wildlife/plan/status17.htm

Pyne, Stephen J. 1982. *Fire in America: A Cultural History of Wildland and Rural Fire*. Princeton, NJ: Princeton University Press.

Robbins, C. S. and A. T. Blom. 1996. Atlas of Breeding Birds of Maryland and the District of Columbia.

University of Pittsburgh Press, Pittsburgh, PA.

Rothermel, R. 1983. General Technical Report INT 143 - How to Predict the Spread and Intensity of Forest and Range Fires. USDA Forest Service. Intermountain Forest and Range Experiment Station. Ogden, Utah

Sauer, J. R., J. E. Hines, I. Thomas, J. Fallon, and G. Gough. 2000. *The North American Breeding Bird Survey, Results and Analysis 1966 - 1999. Version 98.1, USGS Patuxent Wildlife Research Center, Laurel, MD. [http://www.mbr-pwrc.usgs.gov/bbs/bbs.html]*

The Nature Conservancy. 2004. Webpage for Eastern Shawangunk Mountains. http://nature.org/wherewework/northamerica/states/newyork/preserves/art12373.html

Thompson, D. Q. 1987. Spread, impact, and control of purple loosestrife (Lythrum salicaria) in North American wetlands. Fish and Wildlife Research 2. Washington, D.C. U.S. Department of Agriculture, Fish and Wildlife Service. 55 p.

U.S. Fish and Wildlife Service. Fire Management Handbook

U.S. Fish and Wildlife Service. 1994. Air Quality Management Plan. Air Quality Branch – Division of Refuges. 14p. Denver, Colorado

U.S. Fish and Wildlife Service. 2004. Shawangunk Grasslands National Wildlife Refuge homepage, http://shawangunk.fws.gov/history.htm

Welling, C. H. and R. L. Becker. 1990. Seed bank dynamics of Lythrum salicaria: implications for control of this species in North America. Aquatic Botany. 38:303-309

Consultation and Coordination

All fire management program activities will be implemented in cooperation and coordination with federal, state, county, and local agencies. The following individuals were contacted and contributed during the development of this plan:

Allen Carter, RFMC – Region 5, U.S. Fish and Wildlife Service

Michael Durfee, Region 5 Central Zone FMO, Wallkill River National Wildlife Refuge

Steve Kahl, Refuge Manager, Shiawassee National Wildlife Refuge

William Koch, Project Leader, Great Swamp, Wallkill River, Shawangunk Grasslands NWRC

Kevin Holcomb, Refuge Biologist, Wallkill River National Wildlife Refuge

Ed Henry, Refuge Manager, Wallkill River National Wildlife Refuge

Laura Mitchell, Regional Fire Ecologist, Region 5, U.S. Fish and Wildlife Service

Attachment A: Cooperative Agreements

Cooperative Agreement No.:
DCN:
COST CODE:
COOPERATIVE AGREEMENT
BETWEEN
THE U.S. FISH AND WILDLIFE SERVICE
AND
THE TOWN OF SHAWANGUNK, NEW YORK

I. PURPOSE

This Cooperative Agreement is made and entered into by and between the U.S. Fish and Wildlife Service, hereinafter referred to as the "Service," and the Town of Shawangunk for the Shawangunk Valley Volunteer Fire Department, hereinafter referred to as "Shawangunk FD," under authority of the Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856a. and b.). The purpose of this Agreement is to facilitate cooperation between the two parties in the prevention, detection, and suppression of wildland fires on the Shawangunk Grasslands National Fish and Wildlife Refuge (hereinafter referred to as the "Refuge") within the Town of Shawangunk and adjoining lands. The Service provides maximum protection for the Refuge, its lands, wildlife, personnel, and facilities from fire in compliance with 620 Departmental Manual 1.4.H. which states in part, that it is policy "to (1) protect human life and (2) property and natural/cultural resources … commensurate with fire management costs." Likewise, the Shawangunk FD is responsible for providing the Town of Shawangunk with fire protection for its lands, citizens, and buildings

The objectives of this cooperative effort are to ensure that Shawangunk FD is authorized to: 1) suppress wildland fires on the Refuge; and, 2) cooperatively work with the Refuge to plan and implement prescribed fire for the purposes of managing fire risk.

This Agreement provides for the limited interchange of services, personnel, equipment, funds and facilities to achieve this goal.

II. SCOPE OF WORK

For the period hereinafter set forth, Shawangunk FD and the Service will jointly provide, to the extent practicable, necessary personnel, materials, services, facilities, funds, and otherwise perform all things necessary for, or incidental to, the performance of this Cooperative Agreement.

Specifically, the Shawangunk FD agrees to do the following.

A. To provide, as is available, the qualified personnel and equipment necessary to suppress wildland fires on Refuge lands in the Town of Shawangunk, New York, under the direction of the Fire Chief or other superior officer of the Shawangunk FD and the supervision of the Refuge Manager or his designated representative.

B. To notify the Refuge Manager when suppression equipment and personnel are not available for any wildland fire response on Refuge lands.

C. To notify the Refuge Manager, as soon as practicable, when the Shawangunk FD is notified of a fire incident on the Refuge.

Specifically, the Service agrees to do the following.

A. To provide, when available, the qualified personnel and/or equipment necessary and available for use, upon request by the Fire Chief, to suppress fires on Refuge lands.

B. During wildland fire suppression activities on Refuge lands by the Shawangunk FD, to delegate the authority to the Shawangunk FD necessary to put the Fire Chief, or his designee, in command of the firefighting effort, in consultation with the local New York Department of Environmental Conservation Forest Ranger (NYDEC).

C. Consult with the Shawangunk FD and local NYDEC Forest Ranger on prescribed fire projects on the Refuge.

D. Provide funds to the Shawangunk FD as detailed in Appendix B, for cost reimbursement of fire suppression and any other fire management related activities authorized and approved by the Refuge Manager.

III. PERIOD OF AGREEMENT

This Cooperative Agreement will be effective for five years from the signature date of both parties. The Agreement may be modified, extended, or terminated in writing at any time by mutual consent of the parties hereto, or may be terminated by either party by giving 60 days written notice to the other party.

IV. FINANCIAL ADMINISTRATION

A. If the Shawangunk FD requests reimbursement for specific actions or activities, it will submit to the Service statements of reimbursement, detailing what charges were incurred for specific items and units of work (see Appendix B for the rate schedule), for appropriate expenditures covered by this Agreement as necessary. Invoices will include the name and address of the Shawangunk FD, the project name, and the invoice amount. The Service will reimburse Shawangunk FD via Electronic Funds Transfer.

B. Reimbursement of Shawangunk FD expenses by the Service will be contingent upon the availability of funds and shall not obligate the Service in the event of unavailability of funds resulting from failure to appropriate by the U.S. Congress.

C. The Service and Shawangunk FD will annually agree on the rates of reimbursement for activities under this Agreement.

D. The Service and Shawangunk FD will meet at least annually, prior to April 1, to review operations and planning. It is agreed that the Refuge Manager shall be responsible for setting a mutually convenient date, time, and place for said meeting.

V. PROJECT OFFICERS

Project Officers, for the purpose of administering this Agreement, including the receiving and reviewing of reports and the handling of termination notices are:

For the Service: William Koch, Refuge Manager
U.S. Fish and Wildlife, Service, Great Swamp NWR

For Shawangunk Valley VFD: Chief
Shawangunk Valley Volunteer Fire Department
Shawangunk, NY

VI. SPECIAL PROVISIONS

A. Liability. Each party agrees that it will be responsible for its own acts and the results thereof and shall not be responsible for the acts of the other party and the results thereof. Each party, therefore, agrees that it will assume all risk and liability to itself, its agents or employees, for any injury to persons or property resulting in any manner from conduct of its own operations, and the operations of its agents or employees, under this Agreement, and for any loss, cost, damage, or expense resulting at any time from any and all causes due to any act or acts, negligence, or the failure to exercise proper precautions, of or by itself or its own agents or its own employees, while occupying or visiting the premises under and pursuant to this Agreement. Each party shall waive all claims against the other party for compensation for any loss, damage, personal injury, or death occurring as a result of or in consequence of the performance of this agreement.

B. During the performance of this Agreement, the cooperatives agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person because of race, color, religion, sex, or national origin. The cooperatives will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin.

C. No member of, or delegate to the Congress, or resident Commissioner, shall be admitted to any share of this Agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Agreement if made with a corporation for its benefit.

D. It is hereby certified that Shawangunk FD and the Service will comply with all applicable Federal, State, and local laws, ordinances and regulations with respect to the care, handling, storage and disposal of any materials furnished by the Service or purchased as a result of this Agreement. It is further certified that Shawangunk FD is the user of such materials and is capable of complying with all applicable Federal, State, and local laws.

E. This agreement and the obligations of the Service hereunder shall be subject to the availability of funding and nothing herein contained shall be construed as binding the Service to expend in any one fiscal year any sum in excess of appropriations made by Congress or administratively allocated for the purpose of this Agreement for the fiscal year, or to involve the Service in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.

F. Nothing herein contained shall be construed as binding the Shawangunk FD to expend any sum, or to involve the Shawangunk FD in any contract or other obligation for the further expenditure of money.

G. Lobbying with appropriated funds – No part of the money appropriated by any enactment of Congress shall, in the absence of express authorization by Congress, be used directly or indirectly to pay for any personal service, advertisement, telegram, telephone, letter, printed or written matter, or other device, intended or designed to influence in any manner a Member of Congress, a jurisdiction, or an official of any government, to favor, adopt, or oppose, by vote or otherwise, any legislation, law, ratification, policy or appropriation, whether before or after the introduction of any bill, measure, or resolution proposing such legislation, law, ratification, policy or appropriation; but this shall not prevent officers or employees of the United States or of its departments or agencies from communicating to Members of Congress on the request of any such Member or official, at his request, or to Congress or such official, through the proper official channels, requests for any legislation, law, ratification, policy or appropriations which they deem necessary for the efficient conduct of the public business, or from making any communication whose prohibition by this section might in the opinion of the Attorney General, violate the Constitution or interfere with the conduct of foreign policy, counter-intelligence, intelligence or national security activities. Violations of this section shall constitute violations of section 1352(a) of title 31.

VII. GENERAL PROVISIONS

This Agreement shall be subject to the following Appendices which are incorporated by reference herein:

1. Appendix A - 43 C.F.R. § 12

2. Appendix B- Certifications Regarding Debarment, Suspension and Other Responsibilities matters, Drug Free Workplace Requirements and Lobbying, DI-2010

3. Appendix C - Civil Rights Assurance, DI-1350 (See attachment A-1)

4. Appendix D – Schedule of Suppression Reimbursement

VIII. MODIFICATIONS

The scope of work and terms of Agreement may be modified or amended in writing at any time by mutual consent of the signatory parties.

IN WITNESS WHEREOF, the parties have executed this Cooperative Agreement on the day, month and year indicated:

Chief Contracting and General Services U.S. Fish and Wildlife Service Region 5	Chair Town Supervisor Shawangunk, New York	Fire Chief Shawangunk Valley Fire Department Shawangunk, New York
Date	Date	Date

Attachment A-2

SCHEDULE OF SUPPRESSION REIMBURSEMENT

The U.S. Fish and Wildlife Service will reimburse the Shawangunk Fire Department (Shawangunk FD), for services as listed below to be paid in half hour increments calculated from the time the suppression unit departs the station and until it returns. Equipment costs listed below do not include operators. In addition, upon return to the station, the Shawangunk FD will be reimbursed for personnel (only) time used to restore the responding equipment to proper readiness status. This schedule is updated annually (on or about April 1) and applies throughout the current year.

Engine Pumper	$150.00 per hour
Tanker	$100.00 per hour
Special Services Vehicles (support)	$100.00 per hour
Ladder Trucks	$200.00 per hour
Fire Officers	$20.00 per hour
Personal Labor	$15.00 per hour

Attachment B:

YEAR	WF	ACRES	RX	ACRES	HF/WUI	ACRES (m,c,f)
2002						250 (m)
2003						125 (m)
2004						200 (m)

* Hazard Fuel/Wildland Urban Interface Treatment Types (WUI) Codes - (m) - mechanical (c) - chemical (f) – fire

Attachment C: Behave Runs

Direct Inputs	
Dominant fuel model	3
Percent cover	100
Other fuel model	3
1-h fuel moisture (%)	6
10-h fuel moisture (%)	9
100-h fuel moisture (%)	15
Herbaceous fuel moisture (%)	
Woody fuel moisture (%)	
Mid flame wind speed (mph)	6
Cardinal wind direction (°)	NW
Terrain slope (%)	0
Aspect of slope (°)	SE
Calc maximum spread rate	Yes
Directions are relative to the	
Dir.for spread calculation (°)	

Direct Outputs	
Rate of spread (ch/hr)	148.4
Heat per unit area (Btu/ft²)	742
Fireline intensity (Btu/ft/s)	2,019
Flame length (feet)	14.9
Reaction intensity (Btu/ft²/m)	2,900
Effective windspeed (mph)	6
Direction of maximum spread (°)	135

Direct Inputs	
Dominant fuel model	1
Percent cover	100
Other fuel model	3
1-h fuel moisture (%)	6
10-h fuel moisture (%)	9
100-h fuel moisture (%)	15
Herbaceous fuel moisture (%)	
Woody fuel moisture (%)	
Mid flame wind speed (mph)	6
Cardinal wind direction (°)	NW
Terrain slope (%)	0
Aspect of slope (°)	SE
Calc maximum spread rate	Yes
Directions are relative to the	
Dir.for spread calculation (°)	

Direct Outputs	
Rate of spread (ch/hr)	135
Heat per unit area (Btu/ft²)	91
Fireline intensity (Btu/ft/s)	224
Flame length (feet)	5.4
Reaction intensity (Btu/ft²/m)	826
Effective windspeed (mph)	6
Direction of maximum spread (°)	135

Direct Inputs	
Dominant fuel model	9
Percent cover	100
Other fuel model	3
1-h fuel moisture (%)	6
10-h fuel moisture (%)	9
100-h fuel moisture (%)	15
Herbaceous fuel moisture (%)	
Woody fuel moisture (%)	
Mid flame wind speed (mph)	6
Cardinal wind direction (°)	NW
Terrain slope (%)	0
Aspect of slope (°)	SE
Calc maximum spread rate	Yes
Directions are relative to the	
Dir.for spread calculation (°)	

Direct Outputs	
Rate of spread (ch/hr)	11.7
Heat per unit area (Btu/ft²)	370
Fireline intensity (Btu/ft/s)	79
Flame length (feet)	3.4
Reaction intensity (Btu/ft²/m)	2,391
Effective windspeed (mph)	6
Direction of maximum spread (°)	135

Attachment D: Step-up Plan

Daily fire danger indices will be compiled and averaged using the NFDRS stations located at Forsythe NWR in New Jersey and Prime Hook NWR in Delaware, then compared to the indices used by the NJ State Forest Fire Service.

Fuel Model R - May 15 to October 15

Adjective Class	KDBI	Burning Index
Low	<140	0 - 10
Moderate	141-260	11-15
High	261-380	16-20
Very High	381-500	21-25
Extreme	500+	25+

Fuel Model E - October 15 to May 15

Adjective Class	KDBI	Burning Index
Low	<140	0-30
Moderate	141-260	31-38
High	261-380	39-47
Very High	381-500	48-53
Extreme	500+	54+

PREPAREDNESS ACTIONS	STAFFING LEVELS		
	Low and Medium	**High**	**Very High and Extreme**
REFUGE STAFF/COLLATERAL FIREFIGHTERS			
Carry PPE with them while on duty (Including Nomex and boots)		X	X
May be assigned to an engine at a station or patrol			X
Work weeks and/or tours of duty may be extended			X
FIRE EQUIPMENT			
Engines in ready status (15 min or less)	0	1	1
FIRE PREVENTION ACTIVITIES			
Post fire danger signs at high public use areas			X
Restrict vehicles to paved/gravel parking areas, remain within boats and close select trails and public use areas			X
MISCELLANEOUS EMERGENCY PRESUPPRESSION ACTIONS			
Notify Zone FMO and open emergency preparedness account			X
Preposition FWS and interagency resources as needed			X

Attachment E: Delegation of Authority

Name of Incident Commander is assigned as Incident Commander of the ***Name of Incident, Name of Refuge or Unit*** for the US Fish and Wildlife, effective ***Time and Date.***

The Incident Commander has full authority and responsibility for managing the fire suppression activities within the framework of the law and Fish and Wildlife Service policy and direction as provided by this office. The Resource Advisor will provide habitat Management Plans and other appropriate documents.

Names of Resources Advisors and contact Information are assigned as Resource Advisors. They or the Refuge Manager will be consulted in situations where natural resource decisions or trade offs are involved unless life safety issues require immediate attention and those actions will be documented.

Specific direction and fire suppression priorities for the ***Name of Incident*** are as follows, and are in priority order:

1. Provide for firefighter and public safety.
2. Use of minimal impact techniques should be employed to reduce habitat damage. Use natural barriers and roads if possible for burnout operations.
3. Use of dozers or tractors requires approval of the Refuge manager of their designate (resource advisors) prior to implementation.

Turn Back Standards

1. All ***Name of Incident*** contracts, agreements, bills, medical problems, equipment repairs, and fire cache re-supply shall be closed out prior to team being released.
2. Road or levee damage during suppression efforts will be repaired prior to the teams departure.
3. Fire perimeter mopped-up ***Specify*** and all lines checked for heat and integrity.
4. Rehabilitation Plan will be completed in Coordination with the Refuge Biologists and resource Advisors.
5. Fire perimeter mapped by GPS and loaded into the Refuges GIS Database.
6. Tort claims reviewed by Refuge Manager or their designee.

The Deputy Refuge Manager, Fire Program Manager, or their designate will represent the Refuge Manager on any occasion where Refuge Manager is not immediately available.

Refuge Manager, _____

Name of Refuge or Unit, Date and Time.

Attachment F: FMIS Wildland Fire Report

GENERAL TAB

(1) Fire Type:
(2) Org. Code:
(3) Fire Name:
(4) Discovery Date:
(5) County: Code:
(6) Cong. District:
(7) Fire Subtype:
(8) Measurement Method:
(9) Ignition Owner:
(10) Ignition State:
(11) Ignition Cause:
(12) WFSA? Yes or No
(13) If WFSA = yes, Date:

(14) Burn State:
Burn State:
(15) Burn Owner:
Burn Owner:
(16) Burn Acres:
Burn Acres:

(17) Management Level:

(18) **Resource Type**	(19) **Quantity**	**Resource Type**	**Quantity**

Values at Risk

(20) **Type**	(21) **Subtype**

(22) Discovery Date: (23) Time: (24) Initial Attack Date: (25) Time:

(26) Control Date: (27) Time: (28) Out Date: (29) Time:

LOCATION TAB

(30) Latitude: (31) Longitude:
(32) Aspect: (33) Lay of Land: (34) Slope:
(35) Position of Slope: (36) Elevation:
(37) Special Area Type:

EMISSIONS TAB

(38) Fire Danger Index: (39) Value:

FINAL TAB

(40) Person Completing Form: (41) Title: _____ (42) Date:

(43) I.C.:

(44) Narrative:

Appendix G

Indiana bat
Indiana DNR; Rich Fields Photo

ESA Section 7 Consultation

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Nancy McGarigal, Refuge Planner
Telephone Number 413-253-8562
Date: October 12, 2005

I. **Region:** Region 5

II. **Service Activity (Program):** National Wildlife Refuge System (NWRS)

III. **Pertinent Species and Habitat:**

A. **Listed species and/or their critical habitat within the action area**
Indiana bat (*Myotis sodalis;* Federal endangered species)

B. **Proposed species and/or proposed critical habitat within the action area**
None documented

C. **Candidate species within the action area:**
None documented

IV. **Geographic area or station name and action:**
Shawangunk Grasslands National Wildlife Refuge (NWR); Development of a Draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA); implementation of Alternative B (Service-preferred alternative)

V. **Location (attach map):**

A. **Ecoregion Number and Name:** #37, Hudson River/New York Bight

B. **County and State:** Ulster County, New York

C. **Section, township, and range (or latitude and longitude):**
41° 38' 10.54" north latitude
74° 12' 36.85" west longitude

D. **Distance (miles) and direction to nearest town:** 10 miles northeast to New Paltz, New York

E. **Species/habitat occurrence:** Of the 566 total refuge acres, 400 acres are in old fields or grasslands dominated by Kentucky bluegrass and invasive plants, including purple loosestrife and Phragmites; 30 acres are in asphalt or concrete runway and taxiway; and, 136 acres are in successional mixed oak-hardwood forest dominated by red, white, pin and/or black oak, and red maple. The refuge

is known for its breeding and wintering grassland bird species, some of which are state-listed. Breeding grassland birds of note include: northern harrier, upland sandpiper, grasshopper sparrow, Henslow's sparrow, savannah sparrow, vesper sparrow, eastern meadowlark, and bobolink. Wintering grassland birds of note include: short-eared owl, and northern harrier, eastern meadowlark, and horned lark.

There is no documentation that Indiana bat occur on the refuge; however, it is also true that no surveys have been conducted. It is possible they could be present due the proximity of the refuge to known roost sites (pers. comm. with Laury Zicary, NYFO) and the presence on the refuge of trees in excess of 5 inches dbh.

VI. **Description of proposed action (attach additional pages as needed):** The Draft CCP, and accompanying EA, for Shawangunk Grasslands NWR evaluates 3 alternative scenarios for managing the refuge over the next 15 years. The CCP Planning Team and NWRS Senior Leadership have identified Alternative B as the Service-preferred alternative. The primary biological emphasis of this alternative is enhancing the existing grasslands, including the removal and restoration of the runways and taxiways. We also propose to restore the natural stream hydrology on the refuge to the extent it does not impact our grassland management objectives. No habitat conversions are proposed. We are seeking informal consultation on Alternative B. The Draft CCP/EA document is an attachment to this biological evaluation form.

VII. **Determination of effects:**

A. **Explanation of effects of the action on species and critical habitats in items III. A, B, and C (attach additional pages as needed):** We predict no adverse impacts on Indiana bats with implementing Alternative B for several reasons: 1) we do not plan to convert, or otherwise disturb, the 136 acres of woodland forest which could potentially serve as summer roosting or maternity colonies; 2) the old field/grasslands management identified in the plan would maintain foraging habitat; 3) the proposed restoration of the asphalt runways and the plans to improve natural hydrology would increase preferred foraging habitat; 4) the old field/grassland management activities (e.g. mowing, haying, grazing, etc) would primarily occur between July 15 and October 31, the exception being burning, which would occur during February and April (re: NYFO Fact Sheet, August 2005); and 5) there are no mines or caves on the refuge.

B. **Explanation of actions to be implemented to reduce adverse effects:** N/A

VIII. Effect determination and response requested: [* optional]

A. Listed species/critical habitat:

Determination	**Response requested**
no effect (species:_____)	**___*Concurrence**
is not likely to adversely affect (species: Indiana bat (*Myotis sodalis*))	**XX Concurrence** **___*Formal Consultation**
is likely to adversely affect (species: _____)	**___Formal consultation**

B. Proposed species/proposed critical habitat:

Determination	**Response requested**
no effect (species: _____ No species known**_____)**	**___*Concurrence**
is not likely to adversely affect (species: _____)	**___ Concurrence**
is likely to adversely affect (species: _____)	**___Informal conference**
is likely to jeopardize/adverse modification of critical habitat (species: _____)	**___Conference**

C. Candidate species:

Determination	**Response requested**
no effect (species: _____ No species known**_____)**	**___*Concurrence**
is likely to jeopardize (species: _____)	**___Conference**

Steve Lundeburg 10/13/2005

Signature and Date
Regional Chief, Division of Conservation Planning and Policy, NWRS

IX. Reviewing ESO Evaluation:

A. Concurrence X

B. Formal consultation required _____

C. Conference required _____

D. Remarks (attach additional pages as needed):

Robyn Darnell
Signature

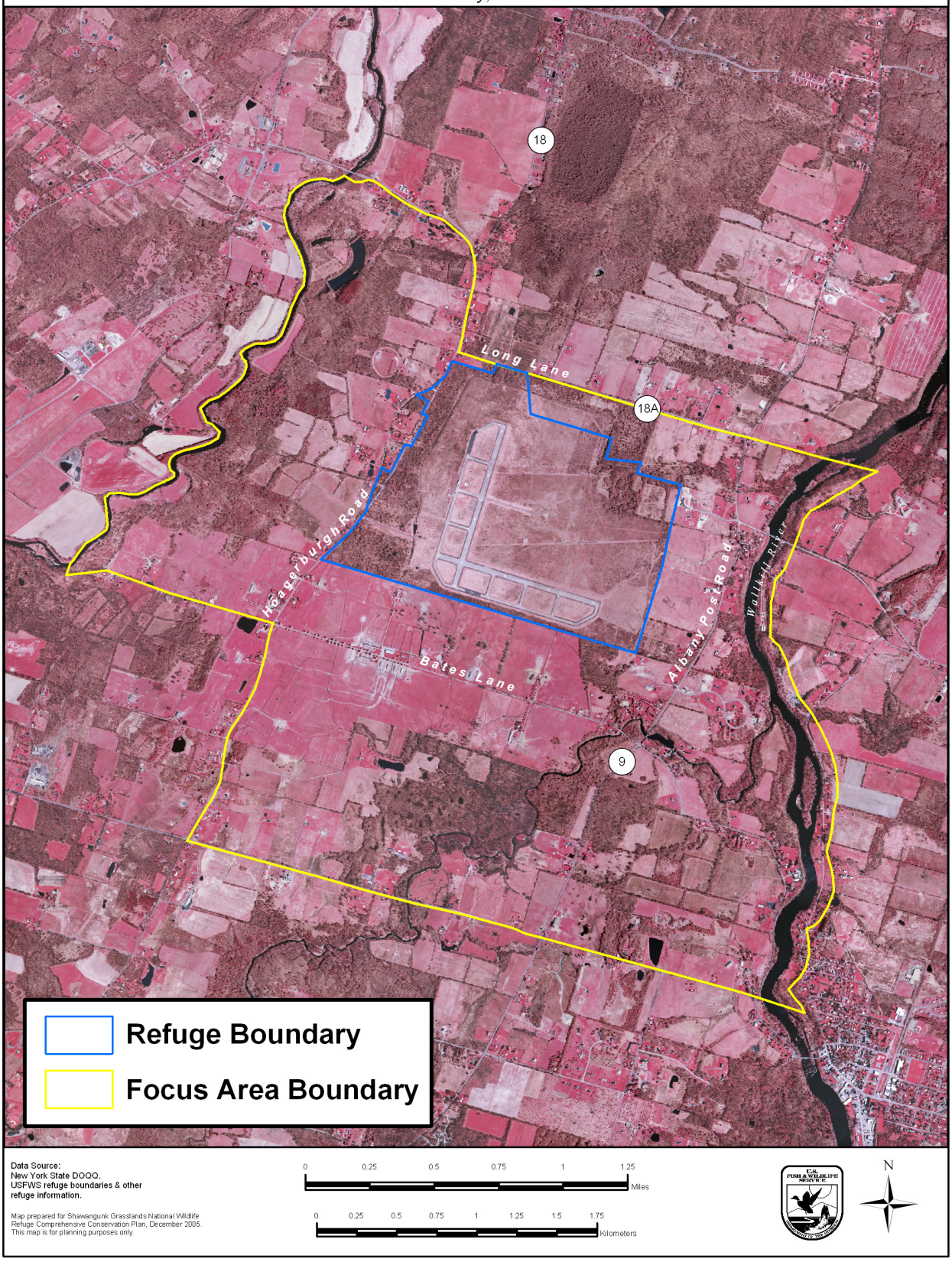
11-9-05
date

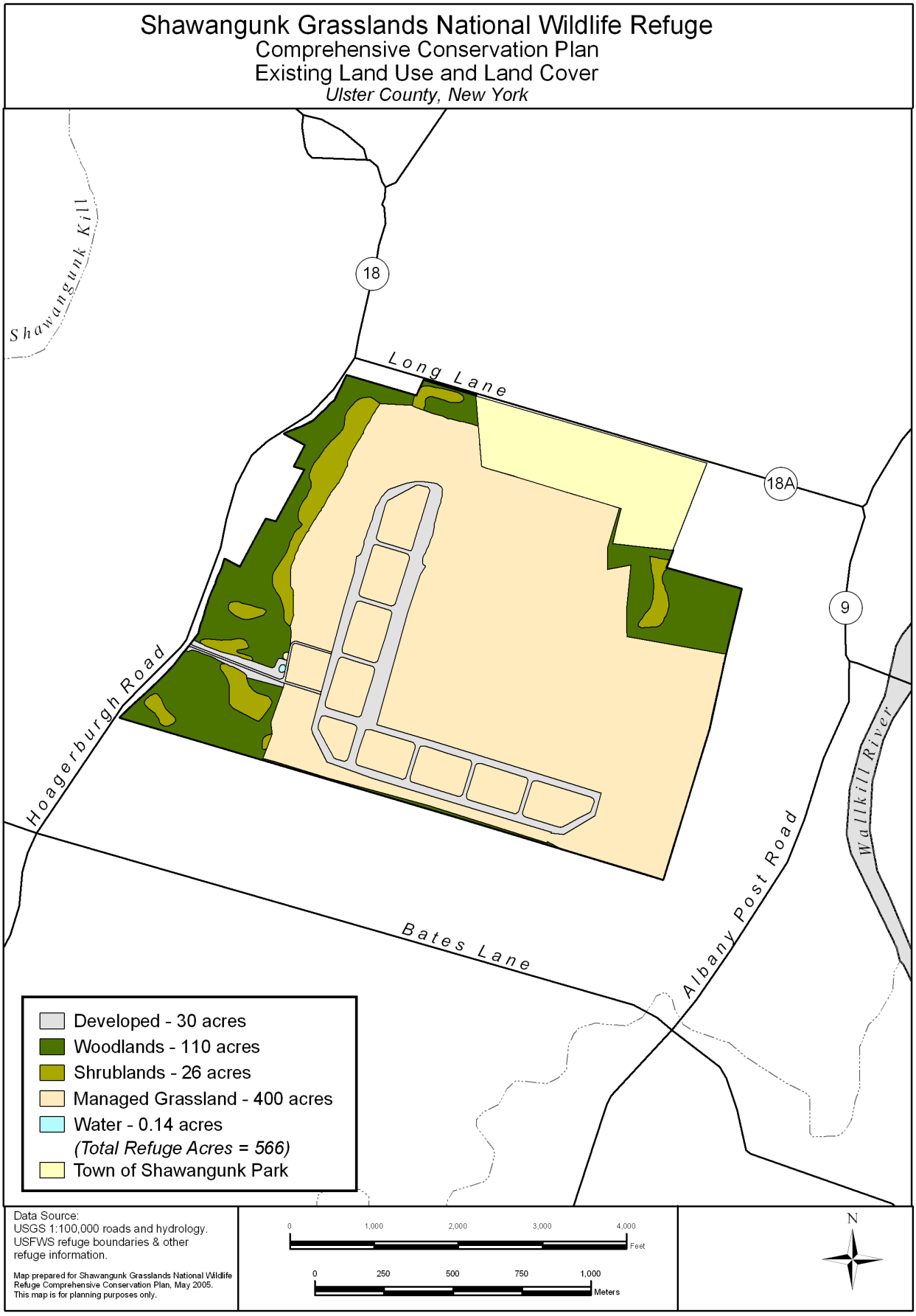
[Title/office of reviewing official]

End. Spp. Biologist

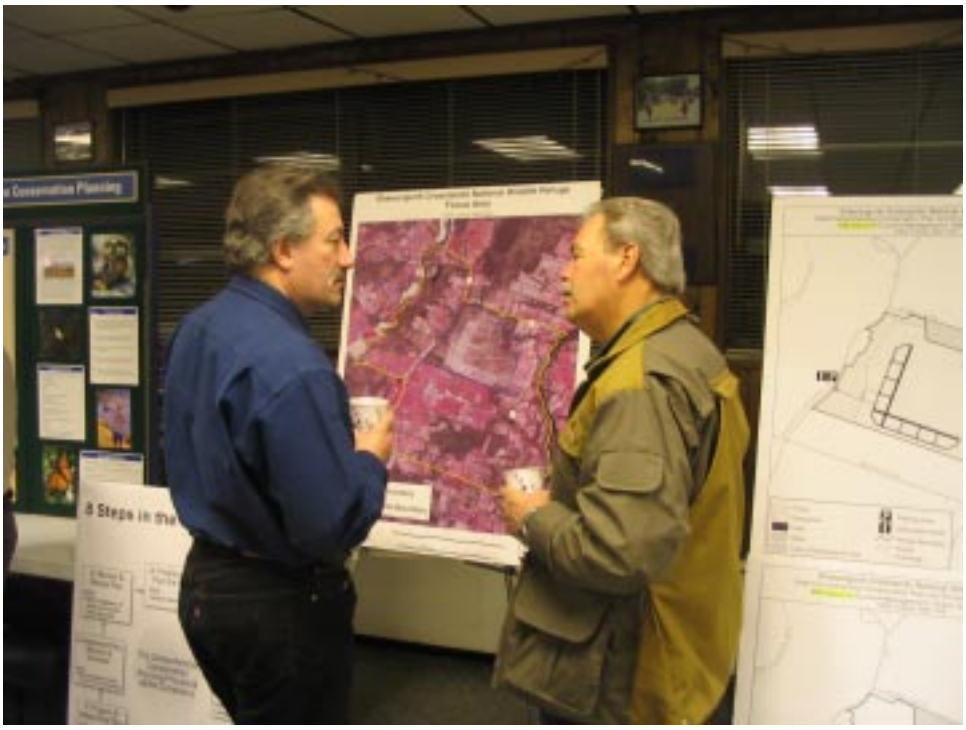
Shawangunk Grasslands National Wildlife Refuge Focus Area

Ulster County, New York




Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Existing Land Use and Land Cover
Ulster County, New York
Shawangunk Kill
18
Long Lane
18A
9
Hoagerburgh Road
Wallkill River
Albany Post Road
Bates Lane
Developed - 30 acres
Woodlands - 110 acres
Shrublands - 26 acres
Managed Grassland - 400 acres
Water - 0.14 acres
(Total Refuge Acres = 566)
Town of Shawangunk Park
Data Source:
USGS 1:100,000 roads and hydrology.
USFWS refuge boundaries & other refuge information.
Map prepared for Shawangunk Grasslands National Wildlife Refuge Comprehensive Conservation Plan, May 2005.
This map is for planning purposes only.
0 1,000 2,000 3,000 4,000 Feet
0 250 500 750 1,000 Meters
N

Appendix H



Public meeting
USFWS photo

Consultation and Coordination with Others

- Background
- Public Outreach
- Release of Draft CCP

Background

We presented in Chapter 1, figure 1-2, the steps in the comprehensive conservation planning process and how it integrates NEPA requirements, including public involvement. What follows is the chronology of public outreach activities we conducted while preparing this document.

In November 2002, we determined that it would be more efficient to plan separately for the Wallkill River and Shawangunk Grasslands refuges. We selected the latter as our first priority.

In November 2005, we completed and released the Draft CCP/EA for a 45-day public review and comment.

Public Outreach

Meeting our refuge neighbors at open houses

May 18, 1999
Number of non-FWS attendants: 4
Location: Sparta, NJ

May 19, 1999
Number of non-FWS attendants: 20
Location: Vernon, NJ

June 9, 1999
Number of non-FWS attendants: 25
Location: Wallkill, NY (Ulster County)

June 17, 1999
Number of non-FWS attendants: 25
Location: Warwick, NY

Updating various constituencies on our progress

November 1, 2000
Number of non-FWS attendants: 10
Location: Goshen, NY
Audience: Orange County Audubon Society

March 7, 2001
Number of non-FWS attendants: 25
Location: Wallkill, NY
Audience: Shawangunk-Gardiner Historical Society

April 24, 2001
Number of non-FWS attendants: 25
Location: Wallkill, NY
Audience: Wallkill Women's Club

July 11, 2001
Number of non-FWS attendants: 40
Location: New Paltz, NY
Audience: Wallkill River Task Force

October 20, 2001
Number of non-FWS attendants: 10
Location: Shawangunk, NY
Audience: Wallkill River Task Force

December 7, 2001
Number of non-FWS attendants: 35
Location: West Nyack, NY
Audience: Rockland Audubon Society

April 13, 2002
Number of non-FWS attendants: 36
Location: Middletown, NY
Audience: Edgar A. Mearns Bird Club

May 1, 2002
Number of non-FWS attendants: 16
Location: Goshen, NY
Audience: Orange County Audubon Society

September 28, 2002
Number of non-FWS attendants: 60
Location: Monticello, NY
Audience: Audubon Council of NYS

October 16, 2002
Number of non-FWS attendants: 18
Location: Hackensack, NJ
Audience: Bergen County Audubon Society

Working meetings with conservation experts

We also organized working meetings in fall 1999 and 2000 to synthesize expert opinions, both inside and outside the Service, on creating effective strategies for preservation.

September 21, 1999

Outreach Activity:	Planning Meeting
Purpose:	Update the status of the CCP for the Wallkill and Shawangunk Effects on Cultural and Historic Resources refuges and discuss goals and objectives for future development of the CCP
Non-FWS attendants:	6
Audience:	Leslie Fisheries, DEC Biologist; Glen Cole, DEC Wildlife; Mark King, TNC Hudson River; Ted Kerpez, DEC Endangered Species; Al Breisch, DEC NonGame; Bruce MacMillan, DEC Lands

	Topics:	Species of concern; ecological communities; water quality in Wallkill River; land protection; wildlife-dependent use; working with the public; budget and staff
October 13–14, 1999	Outreach Activity:	Planning Meeting
	Purpose:	Update the status of the CCP for the Wallkill and Shawangunk refuges and discuss alternatives
	Non-FWS attendants:	3
	Audience:	Jim Sciascia, Principal Biologist, NJ DEP Fish, Game & Wildlife; Joe Penkala, Regional Superintendent, NJ DEP Fish, Game & Wildlife; Ted Kerpez, Endangered Species Coordinator, NY DEC
	Topics:	Focus areas; marsh and grassland bird nesting in Wallkill; species of concern; land prioritization; public use; alternatives
October 3, 2000	Outreach Activity:	CCP Planning Meeting, New York Focus
	Purpose:	Discuss hunting alternatives; examine fire management recommendations for the Shawangunk grasslands.
	Non-FWS attendants:	1
	Audience:	Ted Kerpez, NY DEC, Non-Game Coordinator for Northern Region
	Topics:	How the New York Open Space Conservation Plan, the Biodiversity Project, and the Hudson River Estuary Management Program relate to and affect the refuge, fire management on the refuge; the issue of the existing concrete runways; the impact of hunting on the refuge
October 4, 2000	Outreach Activity:	CCP Planning Meeting, New Jersey Focus
	Purpose:	Update the CCP process; discuss the draft PPP proposal
	Non-FWS attendants:	6
	Audience:	Mike Valent, NJ DEP Non-Game Program; John Garcia, NJ DEP Parks and Forestry, Chief of Capital Planning and Programming; Lou Cherapy, NJ DEP Parks and Forestry, Regional Superintendent; Paul Stern, NJ DEP Superintendent, Northern Regional Office NJ DEP Parks and Forestry; Terry Caruso, NJ Green Acres Program; Beverly Muzalla, NJ Natural Lands Trust/NJ Parks and Forestry

	Topics:	Various land protection programs; how cooperation can be achieved; local responses to state land acquisition
Briefing elected officials and others	June 20, 2001	Representative Benjamin A. Gilman at Washington, DC.
	June 20, 2001	Aides to Representative Maurice D. Hinchey at Washington, DC.
	March 12, 2002	Aides to Representative Gilman at Washington, DC.
	March 12, 2002	Aides to Representative Hinchey at Washington, DC.
	July 30, 2002	Representative Hinchey's Chief of Staff, Paul Brotherton, at the refuge.
	March 27, 2003	Steve Kahl, Kevin Holcomb and Beth Goldstein brief Ted Kerpez, Regional Wildlife Manager, Bill Rudge, Natural Resources Supervisor, and Leslie Zucker, Hudson River Estuary Program, NYSDEC.
	May 17, 2004	Shawangunk Ridge Biodiversity Partnership
Planning updates and other newsletters	May 1999	Distributed an Issues Workbook to all 3,000 names on our mailing list
	October 1999	Distributed our "Fall 1999 Planning Update" to everyone on our mailing list
	January 2002	Distributed our "Winter 2002 Planning Update" to everyone on our mailing list
	November 2005	Distributed a "Planning Update" to everyone on our mailing list.

Release of Draft CCP

In November 2005, we completed and released the Draft CCP/EA for a 45-day public review and comment. In addtition, we held a public meeting/ open house on the following date and location:

January 17, 2006
Number of non-FWS attendants: 38
Location: Hamlet of Wallkill, NY

We analyzed all of the comments on the draft CCP/EA we received during its 45 day public review, and applied them when we revised it into our final CCP. Appendix G summarizes those public comments and our responses to them.

Each year, we will evaluate our accomplishments on the refuge in accordance with the prefered action selected in the final CCP. We may intensify refuge monitoring without additional NEPA compliance. However, any results of our future monitoring that predict a new, significant impact would require our analysis and public involvement in an additional Environmental Assessment.

Appendix I

Refuge kiosk
USFWS photo

Summary and Response to Public Comments

Introduction

We received 590 responses on our draft CCP/EA in oral comments at our public meeting, in phone calls, written correspondence, or electronic documents. The comment period extended 57 days, from December 5, 2005, to January 31, 2006.

We received two letters from state agencies:

- New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources (NYSDEC)
- New York State Office of Parks, Recreation, and Historic Preservation, Historic Preservation Field Services Bureau (SHPO)

We received three letters from town and county government officials:

- Ulster County Legislature Environmental Committee
- Town of Shawangunk Supervisor
- Town of Gardiner Environmental Conservation Commission

We received seven letters from local and national conservation organizations, associations, groups, or clubs:

- Mohonk Preserve
- Orange County Audubon Society, Inc.
- Audubon New York
- The Nature Conservancy Eastern New York Chapter
- Wildlife Watch, Inc.
- New York State Ornithological Association, Inc.
- Edgar A. Mearns Bird Club

We received 579 responses from individuals:

- 541 electronic mailings
- 25 letters
- 1 phone call
- 11 facsimiles

Thirty-eight people attended our public meeting on January 17, 2006, from 7:00 p.m. to 9:00 p.m., at the Wallkill Hook, Ladder & Hose in Wallkill, New York. Some submitted written instead of oral comments, while others submitted both. More comments arrived later by post or electronic mail.

The following discussion summarizes the substantive issues they raised and our responses to them. Many of our responses refer to the full text copy of our draft CCP/EA, and indicate how the final CCP reflects our proposed changes. If you would like to view or download copies of the draft CCP/EA or final CCP, they are available online at http://library.fws.gov/ccps.htm. You may also request them on CD-ROM or in print by contacting the refuge headquarters. Phone: (973) 702-7266. Email: WallkillRiver@fws.gov

Wallkill River National Wildlife Refuge
1547 Route 565
Sussex, New Jersey 07461

I. Priority Public Uses

a. Hunting

Comment. The majority of the comments we received came from people who oppose any form of hunting on national wildlife refuges. They expressed their concern that hunting is inconsistent with the very definition of the word "refuge," violates federal policy, and contradicts the mission of the National Wildlife Refuge System.

Response. The National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) identifies hunting as one of six priority, wildlife-dependent recreational uses that are to receive enhanced consideration in refuge planning. The others are fishing, wildlife observation and photography, and environmental education and interpretation. The Improvement Act directs us to provide high-quality opportunities for those priority uses when they are compatible with refuge purposes, goals, and other management priorities. The act did not establish a hierarchy among the six uses, but enables refuge managers to facilitate them when they are compatible and appropriate. Appendix B includes our compatibility determination on the archery deer hunt.

Comment. Some expressed their opposition to archery hunting, in particular. They believe it is the most inhumane, cruel form of deer hunting, resulting in high rates of wounding and extended suffering for deer that are hit, but are not killed.

Response. We respectfully disagree that a well-managed archery hunt program would be an inhumane, cruel form of hunting. No published statistics from peer-reviewed, professional publications support that concern. In addition, we have not witnessed a significant concern on refuges throughout the Northeast region that have offered an archery deer hunt program for years.

Comment. We heard from several reviewers, including the NYSDEC, who support hunting as a way to control deer populations and provide a recreational activity**.** A few other reviewers suggested there is no biological need to control deer on the refuge that warrants opening it for archery hunting.

***Response*.** Hunting is one method for managing deer populations, a legitimate, generally accepted recreational activity, and one of the six priority public uses of the Refuge System. Whether deer have overpopulated an area or have damaged resources is not the sole justification for a deer hunt on a national wildlife refuge.

For example, the NYSDEC has determined there is a harvestable deer population in its wildlife management unit 3J, which includes the refuge. That agency is a strong advocate for this hunting opportunity, because areas open to public hunting continue to decline in the area. Our strong partnership with that agency and its encouragement provide a strong incentive. The refuge manager has the authority to implement a deer-hunting program upon the approval of this CCP, after developing a hunt plan and publishing a notice in the Federal Register.

Although we have not conducted a formal census, we believe the number of deer that use the refuge is increasing. We also believe that increase primarily results from the increase in residential development in the area. Several refuge neighbors who attended the public meeting said that they have also observed increasing numbers of deer in recent years.

The draft CCP/EA (page 4-19) mentions that an overpopulation of deer would degrade habitat by overbrowsing, would increase the number of deer-automobile collisions, and would cause the depredation of crops or landscaping on adjacent properties. Ted Kerpez, Regional Wildlife Manager of NYSDEC, told us "deer overabundance is one of the top threats to biodiversity in the Shawangunk Ridge Area" (Kerpez, pers. comm. 2006). We would like to add that an overabundant deer population might also increase the potential for chronic wasting disease, an increasing concern since its recent discovery in upstate New York. A hunt program operated under state regulations on the refuge would help maintain its deer population within the carrying capacity of its habitat. We would work with NYSDEC and their goals for wildlife management unit 3J in managing refuge deer populations at the level necessary to maintain quality habitat for diverse wildlife and minimize threats to agriculture and public health.

Two people questioned our statement in the draft CCP/EA (page 4-19) that an overabundant deer population could contribute to increased local incidences of Lyme disease in the human population. We checked the Center for Disease Control (CDC) website at http://www.cdc.gov/ncidod/dvbid/lyme/ld_transmission.htm for clarification. We apologize for any misstatement. The CDC site states

> "The Lyme disease bacterium (*Borrelia burgdorferi*) normally lives in mice, squirrels, and other small animals. It is transmitted among these animals – and to humans – through the bites of certain species of ticks….Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations."

In our draft CCP/EA (page 4-20), we predict that the present deer population on the refuge would lessen over the long term, but would remain relatively stable within the carrying capacity of the habitat. A predicted maximum of 50 hunters with a success rate of 15 percent could take eight deer each year.

Comment. Several reviewers were concerned that opening the refuge to hunting will affect other priority public uses, such as wildlife observation.

Response. We recognize that hunting may affect other priority public uses on the refuge during the hunting season. However, we will attempt to minimize conflicts among users through outreach and communications. We will post a warning at the refuge entrance during the hunt season, but otherwise do not plan to close the refuge to other uses. In 2005 and 2006, the early archery deer season is relatively short: it lasts from October 15 to November 16.

Comment. Adjacent landowners have expressed concern about allowing archery hunting near their homes. They are worried about the safety of children, domestic animals, etc.

Response. Safety is our paramount consideration in developing this hunting program. It will comply with all state and federal safety regulations on discharging bows. New York State hunting regulations make it illegal to discharge a bow so that its load, or arrow, passes over any part of a public highway (any road maintained by state, county, or town) or within 500 feet of any dwelling, farm building, or structure in occupation or use.

Comment. One reviewer was unsure whether the proposed hunting site was adequate, that the woods along Hoagerburg Road were too thick to hunt.

Response. Deer hunters will operate from temporary tree stands, where they will be able to view deer below. Except when they access their tree stands or retrieve game, we do not expect them to be walking on the ground.

Comment. Some reviewers expressed a desire for the refuge to offer additional opportunities for hunting. They suggested that the refuge provide opportunities for shotgun and muzzleloader hunting as well as turkey hunting on the refuge.

Response. The draft CCP/EA (pages 3-8 and 3-9) describes our rationale for not including more hunting seasons. We are concerned about the disturbance of federal trust resources at sensitive times of the year, or that the hunts would require a lot of hunter access across country in areas that pose a safety hazard (e.g., exposed, broken culverts, or the excavated foundations of former buildings). We determined that the white-tailed deer archery season, when hunters will hunt primarily from tree stands, is the only hunting season that would produce a safe, high-quality hunting experience with either minimal or no disturbance of grassland-dependent birds and their habitats. We define a "high-quality" hunt program in the draft CCP/EA (page 3-33).

b. Fishing

Comment. Several reviewers supported our plan to open the pond for fishing**.** A few others opposed it, expressing concern over the possibility that anglers will leave garbage, including monofilament line, which would degrade the site or create a threat to birds.

Response. Federal regulations require all refuge visitors to remove their trash before leaving the refuge. Through outreach and education, we will alert visitors to that responsibility. In addition, our staff and law enforcement personnel will check periodically to ensure that visitors, including anglers, are complying with refuge regulations. If trash becomes a persistent problem at the pond, or the site becomes degraded, or wildlife is threatened, the refuge manager has the authority to close the refuge to fishing.

Comment. One reviewer was concerned that restocking the pond would be necessary to provide continued satisfaction for anglers: that restocking will not only reduce the biodiversity of fish, but also, the increased number of anglers would disturb wildlife.

Response. Although we are opening the pond to fishing, we do not propose to stock it at this time. We describe in the draft CCP/EA (pages 3-9 and 3-10) why we would not allow the stocking of non-native fish. Although stocking with native fish is a low priority now, we may consider it in the future, but only in cooperation with NYSDEC. As a result, we expect fishing pressure to be very low at the pond, because it does not provide a high-quality fishing experience, and the nearby Wallkill River and tributaries offer better fishing. We predict the composition of fish species in the pond would not change over the short term, but their populations would diminish over time.

II. Non-priority Public Uses

a. Bicycling, Jogging, and Horseback Riding

Comment. A few reviewers expressed their desire to see the refuge open for bicycling, jogging, or horseback riding. Those interested specifically in biking or jogging suggested that, if they remain on the runways, their impact on wildlife would be minimal. The reviewer interested in horseback riding cited the limited areas available for that activity in the surrounding area, and suggested that if they ride on the edge of the woodlands and grasslands, their impact on wildlife would be minimal.

Response. The refuge manager frequently receives requests for new activities on the refuge. However, as we describe in the draft CCP/EA (page 1-8), before any new activity is initiated or permitted, the refuge manager must determine that it is a compatible use and consistent with laws, regulations, Service policy and public safety (603 FWS 2). In the draft CCP/EA (page 3-9), we identify several reasons why we have not allowed those activities on this refuge. In addition, the refuge manager has the discretion to allow or deny any use based on the resources available to administer it, such as funding or personnel. Although those activities would not require new infrastructure, they would require regular monitoring to ensure they do not affect refuge resources. The refuge manager has determined that the best way to spend limited refuge resources is in sustaining the refuge programs for priority, wildlife-dependent recreational use.

b. Furbearer Management

Comment. Several reviewers, including the NYSDEC, would like to see the refuge offer a general trapping program. They are concerned about the increasing populations of such species as fox, raccoon, and coyote, and they believe development and restrictions on public access increasingly limit opportunities for trapping.

Response. Furbearer management is not one of the six priority public uses. In addition, the refuge manager does not want to divert limited staffing and funding to administer this program, but plans to focus those resources on hunting, wildlife observation and photography, and interpretation. However, we do plan to use furbearer management as an administrative tool, when needed, to protect federal trust resources of conservation concern, such as nesting and wintering migratory birds. The refuge manager will determine when conditions on the refuge warrant administrative trapping.

c. Model Airplane Flying

Comments. Several reviewers opposed model airplane flying because of concerns about noise, the disturbance of wildlife and interference with "passive recreation." Others, including several who attended the public meeting, expressed their desire to see the refuge allow model airplane flying, which the previous owner of this former Galeville Military Training Site allowed. They claim that it was very popular and regionally important for enthusiasts of model airplane flying, and that the conditions this site affords (e.g., the large, open, unobstructed air space outside major air traffic) are not available anywhere else in the region.

Response. We recognize the dedication of enthusiasts of model airplane flying, and acknowledge that the pursuit is popular among people of all ages. We also recognize that opportunities are limited on public lands in the region. However, after thorough analysis in a formal compatibility determination and a public review and

comment period, in 2002 the former refuge manager determined model airplane flying was not compatible. Our Director reviewed and upheld that formal determination. Members of the New York congressional delegation also reviewed it. The current refuge manager supports it, and the draft CCP/EA and this final CCP incorporate it. Please refer to appendix B for the compatibility determination on model airplane flying and model airplane aeronautical events.

III. Habitat Management

a. Prescribed Burning

Comment. Two reviewers expressed concern over the use of prescribed burning to manage grassland habitat on the refuge. They are concerned about the health of animals on the refuge as well as animals and people in the surrounding area.

Response. We described our potential use of this habitat management tool in the draft CCP/EA on pages 3-23 and 4-11. The latter states "the wet soils of the refuge inhibit our extensive use of fire, and the cool-season grasses that dominate refuge fields have only a short time period during which fire can be applied to invigorate growth….Most likely, we would burn on one or two days per year."

We also describe on page 4-11 how we would comply with all applicable federal, state, and local requirements to control air pollution, manage smoke and avoid safety risks. Our prescribed fire plan (appendix F) addresses smoke emissions, plume direction, and identifying and protecting sensitive areas. We would pay close attention to wind conditions when burning near roads and highways to prevent driving hazards, and would not hesitate to postpone a burn in questionable wind conditions. This final CCP would allow the use of fire as a management tool under the conditions noted above.

b. Grazing

Comment. Several reviewers expressed concern about the use of grazing on the refuge.

Response. We described our potential use of this habitat management tool in the draft CCP/EA on pages 3-23, 4-14, and 4-15. We would use livestock grazing (cattle, horses, goats, and sheep) to control non-native species and reduce shrub and tree seedlings that encroach on the grasslands. We would issue special use permits to local farmers that include terms and conditions about the numbers, timing, and area allowed for grazing. We would monitor the program and, if its impacts become unacceptable, could terminate it at any time.

Cooperating with local farmers will not only achieve our habitat goals, but also help the local farming community sustain its agricultural business and way of life. It would also provide us an outreach opportunity to share grassland management techniques to benefit wildlife. This final CCP would allow the use of grazing as a management tool under the conditions noted above

c. Herbicide Use to Control Invasive Species

Comment. Several reviewers supported our use of herbicides as needed to control invasive species and preserve grasslands habitat. One suggested it should be used judiciously, if at all. Others expressed concern over any use of herbicides on the refuge. Some claimed the practice was not in keeping with the purpose of a wildlife refuge, that the "cure was worse than the disease." Others worried that the herbicides are more malignant than the evidence shows, and questioned the source for our discussion of impacts. Local residents attending the public meeting are concerned that herbicides will end up in surrounding water systems, and expressed concern about the cumulative impact from the surrounding landowners. Several reviewers encouraged the refuge to use, and continue research on, primarily biological methods as the best way to control non-native species.

Response. Controlling purple loosestrife on this refuge is a huge concern. The draft CCP/EA (page 1-19) describes that issue in more detail. We identify herbicides as one of several tools we could use to control invasive plants and enhance our ability to maintain high-quality grassland habitats. We have not used herbicides on the refuge, and would use them only when mechanical and biological control treatments lose their effectiveness. We will continue to cooperate with Cornell University in monitoring the viability of biological control agents on purple loosestrife. If we could rely on the biological control agents as the sole treatment for reducing purple loosestrife, that would be ideal, but we have not substantiated yet their effectiveness over the long term.

We describe our maximum potential use of herbicides and their potential impacts in the draft CCP/EA on pages 4-12, 4-14, 4-15, and 4-16. We have used those herbicides successfully on many other refuges in the Northeast without deleterious effects. The Service requires the development of a detailed pesticide use proposal, which our regional contaminants coordinator must review and approve annually before any use. The use of pesticides on refuges is highly regulated; human health and safety are the paramount concerns.

We stand by our source for information on the predicted impacts of herbicide use at the levels proposed. According to our contaminants coordinator, this website includes research summaries by scientists published in objective, peer-reviewed publications. However, we would like to point out an error in the draft CCP/EA (pages 4-12 and 4-14) about the location of the website. The correct site for additional information on herbicides is http://extoxnet.orst.edu/pips/ghindex.html. If you would like specific information on glyphosate or 2, 4-D please visit: http://extoxnet.orst.edu/pips/glyphosa.htm or http://extoxnet.orst.edu/pips/24-D.htm.

d. Planting Food Plots

Comment. One reviewer suggested that the refuge establish food plots for turkeys and other hunted species.

Response. Our management priority is to provide high-quality habitat for grassland-nesting birds and wintering raptors. We will direct our available staffing and funding resources to support that priority. Although we acknowledge that turkeys are a native species, and hunting is a priority public use, we would not direct our limited resources away from activities that do not directly support refuge purposes or management goals.

e. Runway Removal and Restoration

Comment. Several reviewers supported the removal of the runways to create a more natural setting and provide additional, high-quality grasslands. Several others voiced their opposition to any restoration design that would result in the complete removal of the runways. Their reasons varied. Some expressed concern that the cost of the runway removal is too high. They suggested other alternatives such as removing, or breaking up, alternating sections of the runway, cutting a series of swaths through the runways to improve or increase surface water flow, or bringing in soil to cover them. Others expressed concern that hauling the thousands of tons of debris off-site would affect the road system in local communities and their safety in that congested truck traffic.

Two refuge neighbors worried that removing the runway would damage the drainage system and affect the hydrology of the area. One suggested that we plan nothing until we have conducted a Phase I Environmental Site Assessment. He was concerned that contamination under the runway could negate any plans. Another reviewer questioned whether completely removing the runways was even feasible, given information indicating their depth was several feet.

Several reviewers explained the benefits the runways provide to the refuge. They provide habitat for several nesting and foraging birds. Refuge visitors have sighted killdeer, horned larks, northern harriers, and short-eared owls that feed or nest near or on the runways. They also provide easier access for people with disabilities, as well as locations for birders to set up stationary scopes. Some visitors concerned about ticks and Lyme disease would prefer to maintain the runways as a tick-free alternative to walking in grassy areas.

Response. We appreciate the thoughtful, heartfelt concerns about removing the runways completely and hauling debris off-site. People at the public meeting shared some great ideas with us**.** In response to those ideas, we plan to redesign our restoration proposal to a less intensive, less expensive project, but one that still meets the refuge purpose and our priority objective to enhance the area for grassland birds. At this time, we continue to expect some removal of runway material, although not to the extent originally planned. In addition, we will explore all means of recycling or using the debris in a constructive way on-site or in the town park nearby, if town officials are interested. Although we are modifying our plans to be more realistic from a logistical and funding standpoint, we also wish to clarify that, in our professional judgment, even if grasslands birds have adapted to the presence of the runways, their presence affects the biological integrity of the site.

For those who expressed their concern that the depth of the runways would hamper restoration, we offer the results of a survey by a consultant we hired in 2001. Infrasense, Inc. determined that the depth of the concrete and asphalt of the runways averaged between 6.43 and 8.26 inches. If you would like additional information, please contact refuge headquarters to receive a copy of *Shawangunk Grasslands NWR, Ground Penetrating Radar Pavement Thickness Survey Report by Infrasense, Inc. November 29, 2001.*

f. Tree Cutting

Comment: One reviewer expressed concern about our proposal to cut trees that have established themselves in the grasslands and leave only one tree every 10 acres.

Response: In the draft CCP/EA, on page 3-22, we acknowledge that raptors may use those trees for perching and as a base for foraging, and some breeding grassland birds may use them for singing posts. However, we also noted that northern harriers and short-eared owls, our two wintering raptor focal species, primarily hunt while flying, and do not require many trees in their foraging areas.

The presence of the trees hampers the efficiency and effectiveness with which we can manage the grasslands. Our equipment must avoid a 12-foot-wide swath around each tree to avoid hitting it. The costs associated with grassland management increase as tree density increases. We believe our plan to leave one tree every 10 acres is reasonable, and most efficiently achieves our grassland management objectives, which are the highest priority in our biological program. The final CCP includes this management action.

g. Wetlands Restoration

Comment. One reviewer wanted us to restore the artificial pond to wetland habitat as alternative C proposes. That reviewer believes such habitat is in short supply on the refuge, and the cost of restoration would be "minimal."

Response. Goal 2, objective 2c in the draft CCP/EA (page 3-26), includes recommending an evaluation to determine the extent to which past land use practices affected natural hydrology and wetlands and identify restoration opportunities. We would develop specific projects after considering what is technically feasible, cost-effective, without adverse impact on adjacent private property, and consistent with management for grassland birds and wintering raptors. However, we would not eliminate the pond as long as the refuge manager determines it is providing a viable fishing opportunity.

h. Monitoring

Comment. One reviewer stated that developing a monitoring program to evaluate the effectiveness of our habitat management, especially the response o the bird species targeted, should be a priority. That reviewer states that such a program is important to detect any negative impacts early on and develop plans to reverse them.

Response. We describe our commitment to develop a Habitat and Species Inventory and Monitoring Plan in the draft CCP/EA on page 3-4. That step-down plan is a priority for completion within 2 years of final CCP approval. It will outline the methodology to assess whether our original assumptions and proposed management actions are, in fact, supporting our habitat and species objectives.

i. Expansion of Focus Area

Comment. Some reviewers expressed their desire to expand the focus area of the refuge to include the Wallkill River and a riparian buffer corridor.

Response. We have included that expanded focus area in our final CCP. Please refer to map 1-2 in chapter 1 of the final CCP.

IV. Infrastructure

a. New Trail System

Comment. A reviewer expressed skepticism as to why we were proposing a new trail for the refuge, given its limited resources. In contrast, the Shawangunk Town Supervisor suggested the town and refuge cooperate on a trail project that would include a link between the refuge and the town park.

Response. The Improvement Act identifies, wildlife observation and photography and environmental interpretation as three of the six priority wildlife-dependent recreational uses that are to receive enhanced consideration in refuge planning. Our mandate is to provide high-quality opportunities for those priority uses when they are compatible with refuge purposes, goals, and other management priorities. The planned interpretive trail, with observation platforms and blinds, would greatly facilitate those activities on the refuge. The trail would be self-guided, thus minimizing the need for a dedicated Service presence.

We fully support the idea of cooperating with the town on that trail project, as well as the suggestion of pursuing grant funding under the partnership. Our final CCP includes this project.

Comment. One reviewer suggested that the proposed trail be located in the archery hunting areas to help provide access.

Response. The priority consideration for the location of the trail is to facilitate wildlife observation of the grasslands while minimizing the impacts on the habitat and species of concern by using the runways to the extent practicable. The location of the trail may also improve access for hunters, but is not a high consideration in its design.

b. Expansion of Parking Area

Comment. Some reviewers opposed expanding the parking area for one of two reasons. First, they believed that the area should stay "natural". Second, they questioned whether the parking area really needed expansion at all. One reviewer whether the need would ever arise for 20 parking spaces at one time. Another suggested we move the parking area closer to the pond where, in winter, people could stay in their cars and view wildlife.

Response. As we add fishing and hunting programs, we expect the number of refuge visitors to increase. On many weekends, the present lot is full to capacity, and people park their cars on Hoagerburgh Road. That is most likely during peak birding seasons and when local birding clubs host a group trip. We want to ensure

that all visitors at the refuge have safe access to the opportunities it provides. Expanding the parking area will facilitate that access.

In addition, although we describe a "20-car lot size" expansion in the draft CCP/EA, we were really trying to convey a lot size that would allow a school bus to turn around safely. Our latest design actually includes parking for 12 to 14 vehicles and a 3-point turnaround for a school bus. It is true that some additional disturbance of approximately a quarter of an acre will occur when we reconfigure the existing parking area; however, we do not believe it will significantly diminish the naturalness of the area, because it is immediately adjacent to a paved county road and incorporates the present parking area.

Providing parking at the pond to benefit people who view raptors in winter would require us to keep the road open by plowing it. In addition, if this were our primary parking year-round, we would have to create a wide barrier to prevent people in their motorized vehicles from venturing out onto the runways. We do not have the equipment in the area to plow, nor do we want to commit additional funds to a contractor to plow the road, nor do we want to create an additional enforcement concern about people driving off-road. The existing gate location is very effective in keeping motorized street vehicles off the refuge. Unfortunately, we still have a problem with the illegal use of all-terrain vehicles. The final CCP includes the proposal to reconfigure the parking area.

b. Constructing Visitor Contact Station

Comment. Some reviewers opposed the construction of a visitor contact station on the refuge. One found a visitor contact station unnecessary because the refuge is not staffed. Another expressed the desire to keep the area as "natural" as possible and minimize development on the refuge.

Response. We would locate the visitor contact facility we have planned near the pond, on a site already disturbed and leveled just off the asphalt road. Our plan is to place a small, pre-manufactured building, of approximately 1,100 square feet, to accommodate one seasonal staffer, a small office, bathroom, supply room, and a one-bay garage for storing equipment. We believe that development is minimal, and very important in visitor outreach and the administration of this refuge. This final CCP includes this proposal.

V. Refuge Administration, Staffing and Budgets

a. Service Presence on Refuge

Comment. One reviewer wanted the Service to increase its presence on the refuge, and mentioned that, even if refuge staff were not available from day to day, perhaps a volunteer group could play a role in watching over or helping to administer the refuge as an alternative.

Response. We appreciate the interest in increasing the Service presence on the refuge; it is also a concern of ours. However, we do not foresee a change in our budget forecasts over the next few years that would allow us to commit permanent staff to this refuge. As we describe in the draft CCP/EA (page 3-7) and in this final CCP, staff from the Wallkill River refuge primarily will administer the Shawangunk Grasslands refuge. We plan to hire one seasonal staff and promote a Friends Group to help watch over the refuge.

b. Budgets

Comment. Several reviewers commented that the costs estimated in the draft CCP/EA (appendix D) to implement the programs our preferred alternative B proposes are unrealistic, given the forecast of a declining Service budget. Others commented that, despite being a highly specific 15-year plan, its projected costs should be more "nailed down." Several people commented that we might better spend the cost of restoring 30 acres in purchasing land, since we claim that the loss of important wildlife habitat to development is escalating.

Response. This disclaimer appears on the inside cover of every draft CCP/EA: "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."

In appendix D, we identify our estimates of costs for our major construction and maintenance projects, including proposed staffing needs and each project's regional and refuge ranking. As we develop detailed step-down plans or project plans, our estimated costs will change accordingly.

In response to the comment that we should forego a restoration or visitor services project and purchase land instead, it is important to recognize that funding for land acquisition is a separate appropriation. A land acquisition project does not compete with construction, operations, or maintenance projects on a refuge. Those are all separate budget allocations. Congress appropriates the monies to acquire refuge land through the Land and Water Conservation Fund or the Migratory Bird Conservation Fund. In the draft CCP/EA, pages 1-21 and 1-22, we describe why we are not pursuing an expansion of the refuge at this time.

c. Prioritization of Projects

Comment. One reviewer commented that although trails, improved parking, and a visitor contact facility are desirable, those should not come at the expense of grasslands habitat management. He recommended we develop a prioritization of those projects.

Response. We concur that a prioritization should be in place, and apologize for not making it clearer in the draft CCP/EA. The final CCP, appendix D, clarifies the distinctions among the refuge manager's priorities for the major projects in the CCP.

d. Projected Contributions to the Local Economy

Comment. One reviewer commented that we inflated the predicted contributions of hunter spending to the local economy.

Response. In chapter 4, page 4-10, we based the estimated revenues to the local economy from our proposed hunt program on figures from our National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USFWS 2001). It includes six tables that detail hunting trip and equipment expenditures in New York. We used the average total expenditures per hunting sportsperson as our figure.

However, if we approached it more conservatively, and used the survey's average hunter trip and equipment expenditures for hunting big game, that figure is $687 per hunter. The expenditures include food and lodging, transportation, other trip costs, and equipment. In addition, we could also assume that figure applies only to out-of-state hunters, which we estimate would be about 50 percent of our hunters, about 50 percent of the time. Given those more conservative figures, the proposed hunt program potentially could contribute an additional $100,989 to the state or local economy. Although that figure is much lower than our original estimate in the draft CCP/EA, it would not reverse our plan to offer the fall archery hunt for white-tailed deer.

e. Cultural Resources Protection

Comment. The Historic Preservation Field Services Bureau (SHPO) of the New York State Office of Parks, Recreation, and Historic Preservation wrote to recommend that we consider federal and state cultural resources requirements before conducting any ground-disturbing activity anywhere on the refuge. One reviewer provided us specific annotations on our descriptions of "Cultural Resources" in chapter 2, "Affected Environment."

Response. We addressed the SHPO comments by agreeing to remove our mention in the draft CCP/EA (page 3-6) that we would focus our activities to comply with the National Historic Preservation Act, Section 106, on the "east corner of the refuge," which contains less disturbed vegetation. We agree that any undertaking, anywhere on the refuge, will comply with the requirements of Section 106.

Our regional archeologist has reviewed the comments of the reviewer who provided us with edits for our description of cultural resources, and we have included most of them in this final CCP in chapter 3, "Refuge and Resource Descriptions."

VI. Support for a Specific Alternative

Most people who commented indicated their support for or concern about a particular activity or specific aspects of our preferred alternative B. However, we found it noteworthy that some people either prefaced their comments or summarized them by stating their preference for a particular alternative. Their totals follow.

- Support Alternative A: 5
- Support Alternative B: 17
- Support Alternative C: 0

Appendix J

Shawangunk Grasslands National Wildlife Refuge
Edward Henry/ USFWS photo

Finding of No Significant Impact (FONSI)

Finding of No Significant Impact
Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan

In November 2005, we published the draft Comprehensive Conservation Plan and Environmental Assessment (draft CCP/EA) for the Shawangunk Grasslands National Wildlife Refuge (NWR). That draft evaluates three alternatives for managing the refuge over the next 15 years, and carefully considers their impacts on the environment and their potential contribution to the mission of the National Wildlife Refuge System and refuge purposes and goals. Its appendixes provide additional information supporting the assessment. It also identifies a 3,486-acre Shawangunk Grasslands Focus Area that includes the refuge and contiguous, ecologically important areas. None of the alternatives proposes that we acquire additional land at this time. A brief overview of each alternative follows.

Alternative A: The Council of Environmental Quality regulations on implementing the National Environmental Policy Act require this "No Action" alternative. It would not change our resource management programs on refuge lands. We would continue to maintain 400 acres of the 566-acre refuge as open fields and grasslands, primarily by mowing, to benefit breeding, migrating and wintering grassland-dependent birds. Asphalt and concrete runways and taxiways covering 30 acres of the refuge would remain intact. We would not manage the remaining 136 acres on the refuge classified as upland hardwood woodland, with some shrub land transitioning to woodland. Staff from the Wallkill River refuge headquarters in Sussex, New Jersey, would continue to administer the Shawangunk Grasslands refuge. It will offer wildlife observation, photography, environmental education, and interpretation. Bird watching remains the most popular among those activities. Selecting this alternative would maintain the status quo in refuge management over the next 15 years. Thus, it provides a baseline for comparing or contrasting the two "action" alternatives.

Alternative B: The draft CCP/EA identifies this alternative as the Service-preferred alternative. We would enhance our present grasslands management on 400 acres, by increasing our program and using a wider diversity of tools and techniques, such as grazing, haying, prescribed burning, and applying herbicides to promote native vegetation and discourage invasive plants. We would restore the 30 acres of asphalt and concrete runways and taxiways to native grassland, except where we could incorporate some into a planned interpretive trail. We would also restore the natural hydrology of the refuge to the extent it does not impede our grasslands management. Alternative B includes opening a small pond for fishing, and opening the refuge in the fall for an archery hunt for white-tailed deer.

Alternative C: Under this alternative, we would allow all 400 acres of current managed grasslands and open fields to revert to shrub land, and eventually to woodland, to benefit shrub- and forest-dependent birds of conservation concern for the region. Re-establishing the natural hydrology of the area would become a high priority, which would eliminate the small pond and the opportunity for fishing on the refuge. As in alternative B, we would restore the 30 acres of runways and taxiways, create an interpretive trail, and open the refuge in the fall for an archery hunt for white-tailed deer.

We distributed the draft CCP/EA for a 57-day period of public review and comment, from December 5, 2005 to January 31, 2006. We received 590 responses. Appendix I in the final CCP includes a summary of those comments and our responses to them.

After reviewing the proposed management actions, considering all public comments and our responses to them, I have determined that the analysis in the EA is sufficient to support my findings, described below.

I am selecting draft CCP/EA Alternative B (the Service-preferred alternative) as the final CCP for implementation, with these clarifications.

1) We will design the archery hunt for white-tailed deer in the fall with the utmost consideration for the safety of other visitors and refuge neighbors. As one example, we will post highly visible signs at the refuge entrance and at strategic locations along the refuge perimeter well before the hunt begins.

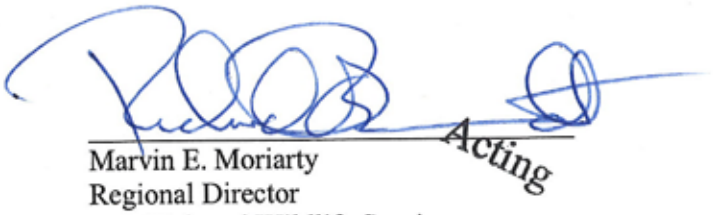
2) We will closely monitor the new activity of fishing at the small refuge pond. If trash becomes a problem, the site becomes degraded or wildlife threatened, the refuge manager will exercise his authority to close the refuge for this activity.

3) We recognize that some people are concerned about some of our grassland enhancement and maintenance tools or techniques, particularly prescribed burning, applying herbicides, and allowing grazing. We will be judicious in their use. In any year, the extent to which we use them will be at the discretion of the refuge manager, after careful consideration and consultation with our regional contaminants coordinator and fire management officer.

4) We will redesign our project to restore the 30 acres of asphalt and concrete runways and taxiways to grasslands. Instead of mechanically digging up all 30 acres and hauling the debris offsite, we will design a lower impact, less intensive, and less expensive project that still meets our objective of enhancing the area for grassland birds. We will explore further all means of recycling or using the debris in a constructive way onsite or in areas nearby.

I have selected Alternative B, with the clarifications noted above, for several reasons. It helps fulfill the mission of the NWRS; best achieves the refuge purpose, vision, and goals; maintains and, where appropriate, restores the ecological integrity of the refuge; addresses the major issues identified during the planning process; and is consistent with the principles of sound fish and wildlife management.

I find that implementing Alternative B adheres to all legal mandates and Service policies, and will not have a significant impact on the quality of the human environment, in accordance with Section 102(2)(c) of the NEPA. Therefore, I have concluded that an Environmental Impact Statement is not required, and this Finding of No Significant Impact is appropriate and warranted.



Acting

Marvin E. Moriarty
Regional Director
U.S. Fish and Wildlife Service
Hadley, Massachusetts

6-14-06
Date