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.

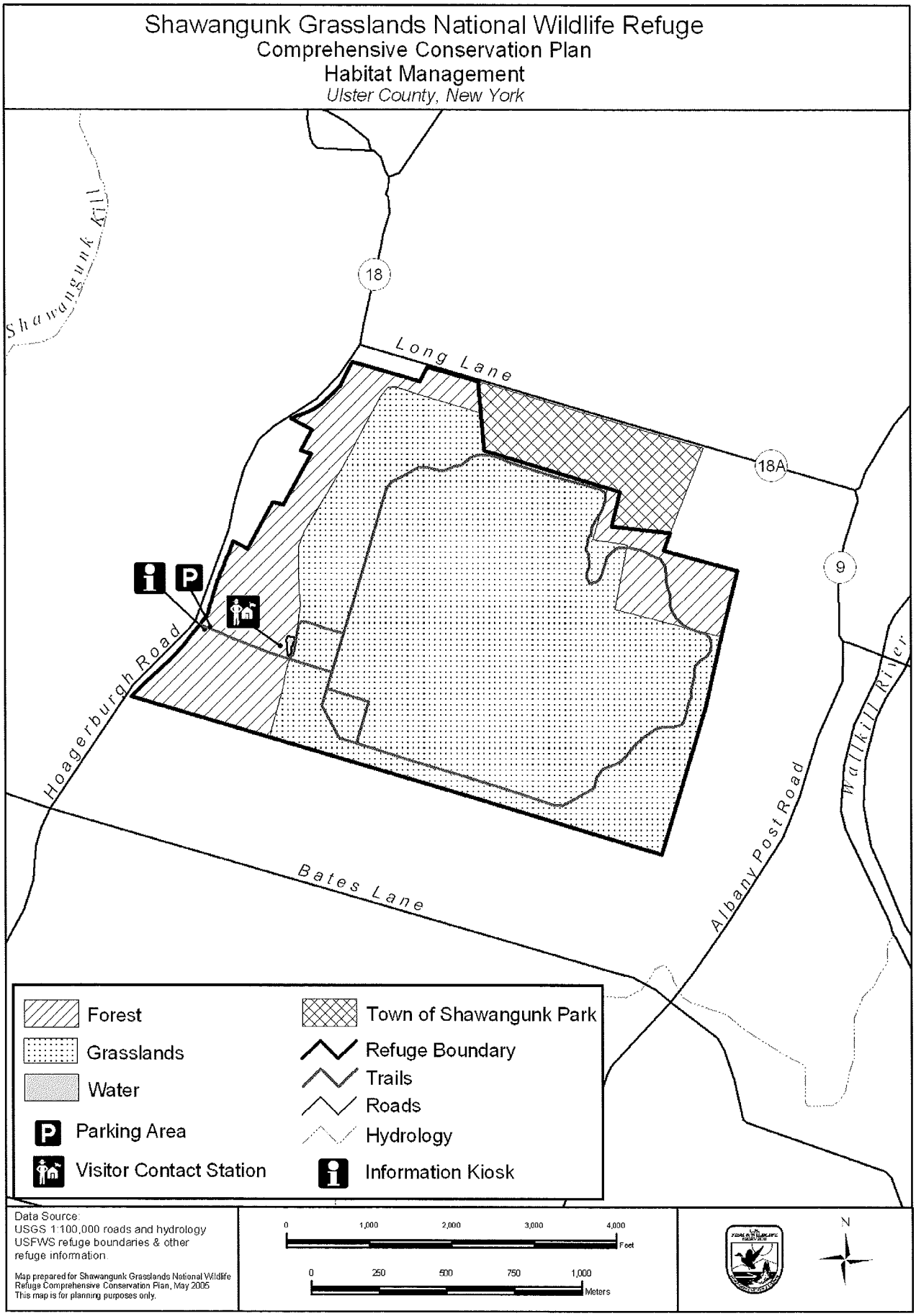
In the visitor services program, we will increase priority wildlife-dependent public uses, especially in wildlife observation, photography and environmental interpretation. We will develop an interpretive trail that affords great opportunities for viewing, photographing, and interpreting the refuge grasslands 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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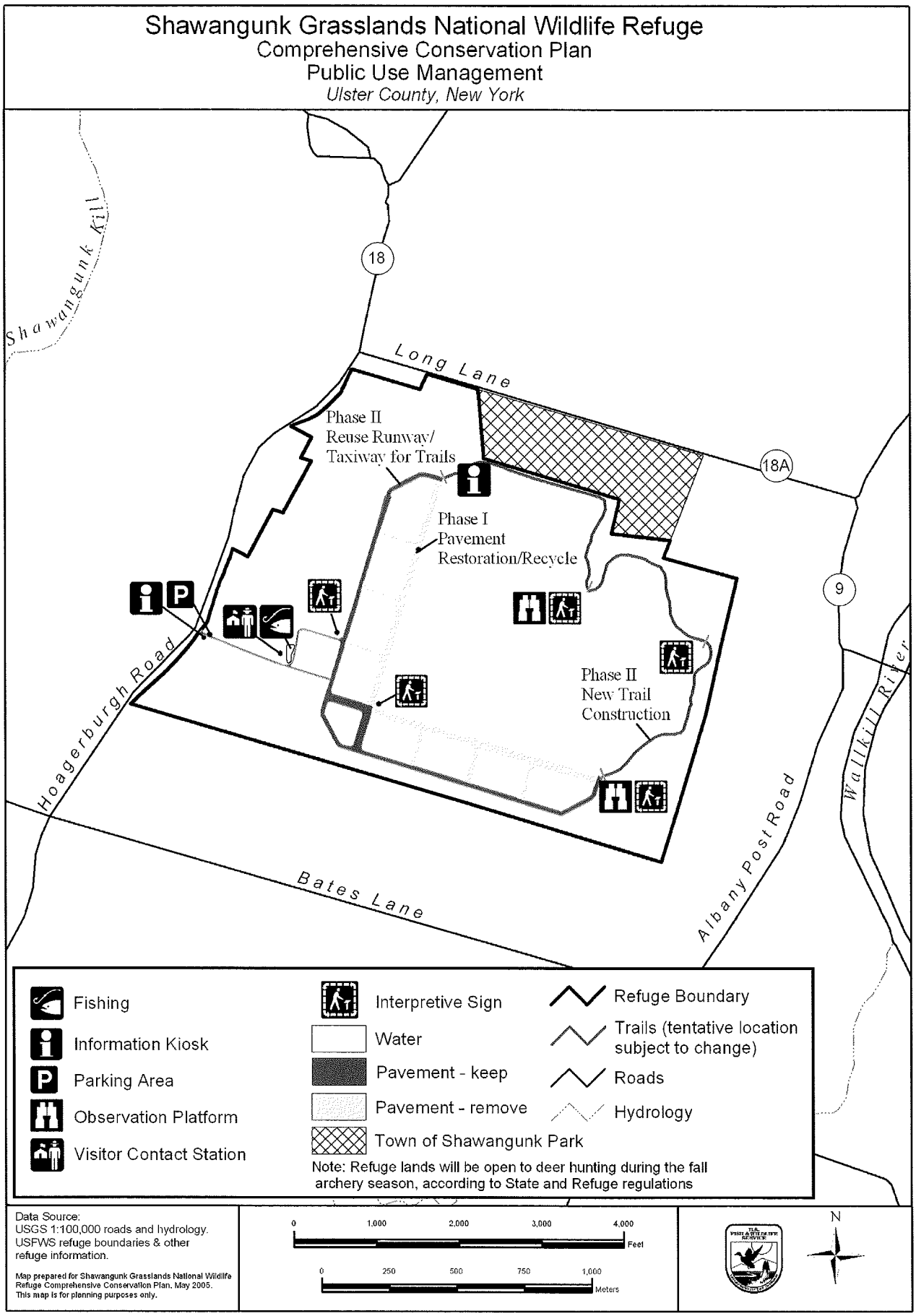
Shawangunk Grasslands National Wildlife Refuge
Comprehensive Conservation Plan
Public Use Management
Ulster County, New York
Shawangunk Kill
18
Long Lane
Phase II
Reuse Runway/
Taxiway for Trails
18A
Phase I
Pavement
Restoration/Recycle
9
Hoagerburgh Road
Phase II
New Trail
Construction
Wallkill River
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.
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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.