— Hire a full-time law enforcement officer to protect resources and manage the visiting public.
— Hire an administrative clerk to assist with additional administrative duties.
— Maintain 40% of equipment and facilities to Service standards within 5 years of CCP approval.
— Replace 25% of worn-out equipment within 5 years of CCP approval, as needed.

Rationale and Assumptions

There are limited resources (funds and staff) allocated yearly to the refuge. The priority for these resources is to manage upland and wetland habitats. If the target (minimum) staffing level and funding are not reached or only partially reached, fewer accomplishments would be achieved.

Objective 2

Within 15 years of CCP approval, secure additional funding necessary to complete habitat restoration on 100% of high-priority habitat units and 50% of moderate-priority habitat units. Include restoration with (1) native prairie reseeding; and (2) intensive management of existing native prairie including woody plant reduction, invasive species control, and increased prescribed fire and grazing activities.

Strategies

— Use additional funding to purchase native grass and forb seeds for reseeding former cropland and planted cover.
— Use additional funding to purchase herbicides to control invasive species and remove/control woody plant expansion.
— Continue to use maintenance management funding to maintain or replace equipment and facilities, as needed, to Service standards.
— Secure additional funding to enhance streamflow monitoring and water management and develop new area-capacity data for refuge marshes.
— Maintain existing facilities and equipment to Service standards, including necessary roads, dikes, water control structures, buildings, and fences (all of which are critical in habitat management and protection).

Rationale and Assumptions

There are limited resources (funds and staff) allocated yearly to the refuge. The priority for these resources is to protect and manage upland and wetland habitats for wildlife. Operational funding would be targeted to work on the highest priority habitats and habitat units at the refuge. Management intensity would be increased on those habitats and units and would require additional personnel and funding to restore native prairie.

DRAFT CCP—*UPPER SOURIS NWR*

The following goals, objectives, and strategies for Upper Souris NWR outline the actions needed to achieve the vision of the Souris River basin refuges.

USFWS

Upper Souris NWR

Drift Prairie Goal

Restore and maintain extensive examples of plant communities dominated by native flora characteristic of the mid-1800s drift prairie. Create the temporally and spatially dynamic habitat conditions that will attract most breeding bird species and other vertebrate fauna characteristic of that era.

Prairie Slope Goal

Restore representative examples of prairie slopes to preserve some of the most pristine plant communities that remain in the Souris River basin and promote appreciation and stewardship of prairie resources.

NOTE: For Upper Souris NWR, drift prairie and prairie slope habitats would be managed concurrently, with similar vegetation objectives in units that include both habitats. This is mainly because the contemporary vegetation composition is fairly similar between the two habitats, except that drift prairie has less pristine, native herbaceous plant life (mean frequency 4% versus 15% and 13% for southwest-facing and northwest- to southeast-facing slopes). In addition, most management units to be delineated that include drift prairie would also include adjoining prairie slope habitat.

Objective 1

By 1 year after CCP approval, delineate management units on uplands.

Strategies

— Divide refuge uplands into landscape units based on
  ❒ borders of native-sod prairie wherever clearly evident;

- ❒ management history (for example, the area that consistently encompasses a general grazing rotation or a prescribed burn);
- ❒ obvious boundaries such as permanent fence lines;anticipated future management actions.

— Assign a logical sequence of identifiers for units (for example, sequential numbering, north to south).

Rationale and Assumptions

Designation of individual management units is essential for establishing management objectives and priorities, for planning habitat treatments, and for basic communication including that of management history on a detailed, local level. Designation of management units needs to be done by Service management staff who have several years of on-the-ground experience on the refuge and who are familiar with its management history.

Objective 2

Use current vegetation inventory data and area and landscape considerations to characterize each habitat management unit with native sod prairie as either high or low management priority upland prairie units. Reevaluate prioritization of 15 years after CCP approval.

Strategy

— Apply multiple selection criteria.

CRITERIA FOR HIGH-PRIORITY UNITS

Floristic composition. Vegetation is characterized by ≥20% mean frequency of pristine, native herbaceous types (plant groups 41–43 and 46–48 [Grant et al. 2004b]; see appendix E), plus native herbaceous-dominated vegetation with Kentucky bluegrass as the main subdominant (plant group 53).

Floristic potential. Vegetation is characterized by <20% mean frequency of smooth brome-dominated vegetation (plant groups 54, 61, and 62).

Size and landscape context. The unit has ≥40 acres of prairie that is clearly native sod

and

is contiguous with other high-priority, native prairie units or with tracts of native prairie adjacent to the refuge under non-Service ownership.

CRITERIA FOR LOW-PRIORITY UNITS

Floristic composition. Vegetation is characterized by <20% mean frequency of pristine, native herbaceous types (plant groups 41–43 and 46–48 [Grant et al. 2004b]), plus native herbaceous-dominated vegetation with Kentucky bluegrass as the main subdominant (plant group 53).

Floristic potential. Vegetation is characterized by >20% mean frequency of smooth brome-dominated vegetation (plant groups 54, 61, and 62).

Size and landscape context. The unit has <40 acres of native sod prairie

and

is neither contiguous with high-priority, native prairie units nor adjacent to tracts of native prairie under non-Service ownership.

Rationale and Assumptions

Drift prairie occurs as small, gently sloping, isolated patches at Upper Souris NWR. Vegetation dominated by Kentucky bluegrass occurs frequently (42%), but smooth brome-dominated vegetation occurs infrequently (13%). Of the two introduced grass species, smooth brome is considered a greater hindrance to restoration of both vegetation composition and vegetation structure in northern mixed-grass prairie. Brome generally seems more difficult to control and more significantly alters the quality and structure of northern prairie habitats.

Drift prairie at Upper Souris NWR probably has the greatest restoration potential of any such prairie on publicly-owned lands in the Drift Plain physiographic region in North Dakota. Restoration management should focus on strategies to increase the competitive ability of native herbaceous plants, especially warm-season grasses, while reducing the vigor Kentucky bluegrass and keeping smooth brome in check. When managed by strategies that incorporate carefully timed fire and grazing disturbances, Kentucky bluegrass can occur as a codominant or subdominant species and emulate native grasses in structure.

Prairie slope is three times more prevalent than drift prairie at the refuge (figure 9). Vegetation on the more potentially pristine, southwest-facing slopes is relatively degraded, however (mean frequency of vegetation dominated by Kentucky bluegrass and by smooth brome is 33% and 14%, respectively).

Management of upland native prairie should simultaneously and equally target drift prairie and prairie slope because

— drift prairie is relatively limited in area yet not significantly invaded by smooth brome;

— Kentucky bluegrass is prevalent on both drift prairie and prairie slope; management to reduce this introduced grass and increase native herbaceous vegetation would logically target both site types simultaneously where both occur within a management unit.

Objective 3

On high-priority units of prairie slope or high-priority units of prairie slope and drift prairie, apply frequent and precisely timed disturbance (principally fire and grazing) to restore vegetation and provide habitat for most wildlife species, especially burrowing owl, horned lark, Baird's sparrow, Sprague's pipit, chestnut-collared longspur, northern pintail, and Richardson's ground squirrel. Vegetation should present the below characteristics within 15 years of CCP approval.

- Mean frequency composition on each unit includes (1) >40% pristine-native and native-dominated/bluegrass subdominant vegetation (plant groups 41–43, 46–48, and 53); (2) <10% smooth brome-dominated vegetation (plant groups 54, 61, and 62); and (3) <15% low shrub-dominated vegetation (plant groups 11–17) (based on percentage frequency of occurrence on belt transects, per Grant et al. 2004b).
- Native trees and tall shrubs are absent or nearly so, comprising ≤1% land cover on each unit, and no nonnative or planted native woody vegetation exists.
- Leafy spurge frequency is decreased by at least 50% and is maintained at 1% frequency on each unit (frequencies per belt transects); absinth wormwood is actively controlled; and yellow toadflax and other newly appearing species of noxious weeds that pose a threat to the drift prairie are eliminated within 5 years of initial detection.

Strategies

— Disturb the vegetation, typically by livestock grazing or fire, at least 2 of every 3 years. An ideal management sequence over 5 years might be BGGGR (B=prescribe burn the first year; G=graze in each of years 2, 3, and 4; then R=rest), then reinitiate the sequence. The area covered by trees, tall shrubs, and low shrubs would be incrementally reduced with this burning frequency.

— Primarily use prescribed fire when smooth brome plants are at least in the 4- to 5-leaf stage, but not yet showing an inflorescence; this generally occurs during a narrow mid-May through early June window. A less preferred option is to burn in fall in anticipation of a negative, winter drought impact on smooth brome and Kentucky bluegrass.

— Graze mainly during late May through August or September, via a rotation approach with many (7–10) relatively small grazing cells (for example, 40–60 acres) per unit and short grazing periods (4–7 days) per cell. Adjust stocking rates to facilitate regrazing of individual smooth brome plants at least once within a grazing period, but move livestock to the next cell before native plants are regrazed (be sure to note grazing of native upland sedges, an important forage base in some management units).

— Annually survey for noxious weeds. Continue widespread use of biological control by monitoring local areas for *Apthona* spp. beetles and redistributing beetles among leafy spurge patches as needed. Use herbicides as needed along boundaries with private lands.

Deb Parker/USFWS

— Establish native vegetation dominated by warm-season grasses on adjoining, high-priority old cropland (see objectives for old cropland). Manage these intensively, in concert with the high-priority prairie units they adjoin, to sustain a native-dominated flora and to reduce sources of introduced cool-season grasses and noxious weeds.

— Experiment on old cropland areas within low-priority prairie units, with new or high-risk restoration methods that may have application for restoration of old cropland within high-priority prairie units. For example, attempt control of introduced cool-season grasses and release of native plants on a small, localized scale with selective herbicide treatment.

— Remove local, human disturbances and artifacts of twentieth-century origin (including the refuge era). This includes prominent plow furrows, old road grades, rock piles, and impoundment dams on intermittent drainages (except on those essential as livestock water sources). Restore such sites as close as possible to their original condition.

Rationale and Assumptions

Kentucky bluegrass is common among all topographic site types of upland native prairie at Upper Souris NWR. This grass tends to increase under prolonged rest or grazing, but decreases with fire especially when burning occurs during stem elongation or in dry years. Smooth brome, a less common introduced grass in drift prairie and prairie slope, also increases under rest. In contrast to Kentucky bluegrass, however, smooth brome appears sensitive to repeated grazing.

The upland native prairie has been treated regularly and extensively by livestock grazing, mostly via various rotation strategies. Conversely, little or no prescribed fire has been used to manage areas of upland native prairie, and most fire was applied only recently (2000–2005). Restoration management needs

to focus on reduction of Kentucky bluegrass while keeping smooth brome in check. This is a challenging task, however, as a reduction of one of these grass species often is accompanied by an increase in the other. Increased use of fire to better match the types, timing, and frequencies of disturbances under which native herbaceous plants evolved would improve the competitive abilities of native herbaceous plants in high-priority, upland prairie units. Use of fire needs to be carefully executed to simultaneously decrease competitive abilities of both bluegrass and brome.

Makeup of the contemporary breeding bird community on drift prairie and prairie slope at Upper Souris NWR is incompletely documented. However, bird species diversity may be greater than that on the drift prairie at Des Lacs NWR or at J. Clark Salyer NWR mainly because there is much less smooth brome and more topographic variation at Upper Souris NWR. The refuge's high-priority upland prairie probably can be improved for birds and other wildlife species that historically were characteristic of northern mixed-grass prairie by incorporating more prescribed fire disturbance. Thus, there would be increased area in early successional stages.

Trees and tall shrubs increased significantly in area at the refuge during the past century (chapter 3). This tall woody cover can diminish the survival of nests of grassland birds by harboring nest predators. This cover also provides perches from which brown-headed cowbirds can find other species' nests in which to lay eggs.

Furthermore, recent data from the Souris River basin refuges indicate that relatively small areas of tall woody vegetation can effectively fragment grassland habitats and cause many grassland bird species to avoid entire landscapes. Elimination of tall woody cover is a logical strategy for restoration of landscape structure and plant community makeup, and to improve the attractiveness and security of the habitat for a variety of grassland breeding bird species.

Objective 4

On low-priority units of prairie slope or prairie slope plus drift prairie, apply disturbance (principally fire) every 5–8 years to remove plant litter, restore plant vigor, reverse or stall woody plant expansion. Provide a mix of structural types that include (1) relatively short/sparse vegetation for species such as killdeer, horned lark, and Brewer's blackbird; (2) moderately short vegetation for species such as blue-winged teal and upland sandpiper; and (3) tall/dense vegetation for species such as mallard, short-eared owl, Le Conte's sparrow, and bobolink. Vegetation should present the below characteristics within 15 years of CCP approval.

NOTE: There likely would be no monitoring of vegetation on these units except for routine, cursory surveillance for noxious weeds. Tree and tall shrub cover can be coarsely monitored over decades via remote imagery. Knowledge of relationships between fire frequency and resulting, postfire vegetation structure is adequate to predict habitat conditions described below.

- One-fourth of the area is 0–1 year postdisturbance, one-fourth is 2–3 years postdisturbance, and one-half is 4–6+ years postdisturbance (corresponding roughly to a structure of <2 inches VOR, 2–4 inches VOR, and >4 inches VOR, respectively [mean VORs in early spring, per Robel et al. 1970]).
- Native trees and tall shrubs comprise <4% land cover on each unit, and all nonnative woody vegetation and planted native woody vegetation is eliminated from at least one-half of the units.
- Leafy spurge is maintained at <2% frequency; absinth wormwood is actively controlled; and yellow toadflax and other newly appearing species of noxious weeds that pose a threat to the drift prairie are eliminated within 5 years of initial detection.

Donna Dewhurst/USFWS

Mallard Hen

Strategies

— Apply prescribed fire on each unit at least every 5–8 years, increasing burn frequency during dry years when possible to more effectively reduce tall shrubs and trees. Rotate burns among units. Burn opportunistically, at any time, mainly to remove litter and control tall shrubs and trees.

— To increase structural diversity, occasionally introduce livestock grazing with wide latitude on timing, intensity, and duration, when doing so will not detract from management of high-priority units.

— Periodically survey for noxious weeds. Continue widespread use of biological control by monitoring local areas for *Apthona* spp. beetles and redistributing beetles among leafy spurge patches as needed. Use herbicides as needed along boundaries with private lands.

Rationale and Assumptions

Some upland prairie units at Upper Souris NWR have little intact, native herbaceous vegetation. From a practical standpoint, these areas probably cannot be restored to a state where such plants are a widely noticeable or an otherwise common vegetation component. However, with modest effort, the prevalent introduced cool-season grasses and scattered low shrubs can be managed to provide a mix of post-disturbance structural types attractive to a broad array of native grassland bird species.

The most appropriate management of these units is to provide structural variety and to use the units as a basis to create extensive areas of grassland that include off-refuge lands, to satisfy needs of several area-sensitive, native grassland bird species. This could reduce predation and nest (brood) parasitism incidence associated with edge-dominated, highly fragmented grassland.

The rationale for reducing tall shrubs and trees is the same as that for high-priority prairie slope or prairie slope plus drift prairie (see objective 3).

Objective 5

Help improve or maintain the habitat quality and economic sustainability of nonfederally owned, native prairie remnants adjacent to the refuge's drift prairie and slope prairie units within 15 years after CCP approval. Extend protection and stewardship to most other grasslands that adjoin these units. Seek opportunities to expand the total grassland area and create broad, contiguous blocks of open grassland, principally as habitat for breeding grassland birds.

Strategy

— Use grassland easements and extension agreements (for example, specialized livestock grazing systems on native prairie) for native grass establishment and management, or to remove "hostile" cover such as trees and tall shrubs that could harbor nest (brood) parasites and nest predators. Certain grazing systems can improve livestock carrying capacity and the condition of annually grazed prairie, to enhance the economic viability of native prairie and reduce chances of conversion to other land uses, especially cultivation.

Rationale and Assumptions

The quality of prairie as breeding habitat for grassland birds (in terms of average annual nest success and relative contribution to population recruitment) is directly related to its extent or, conversely, indirectly to the degree of its fragmentation.

Native prairie on the Drift Plain could be considered an endangered resource and much of what remains of North Dakota's Drift Plain prairie occurs in the Souris River valley. Conserving remnant tracts adjacent to the refuge, by whatever means possible, should be among the highest priorities for landscape conservation.

Old Cropland Goal

On high-priority old cropland areas, establish native-dominated, perennial herbaceous cover that, with modest management, resists invasion by introduced cool-season grasses and noxious weeds. This seeded cover will help form extensive, contiguous blocks of structurally diverse, open grassland for grassland-dependent, breeding bird species.

Objective 1

By 10 years after CCP approval, locate and determine boundaries of old cropland areas and record these in the refuge's GIS database.

Strategies

— Identify old cropland (considered DNC) areas that were seeded to introduced grasses and forbs and/or native grasses since the mid-1970s.

— Identify other old cropland areas, as evidenced by

- ❒ distinct field edges, especially deep furrows and linear piles of windborne topsoil that had been deposited along preexisting fence lines and subsequently vegetated;
- ❒ rock piles or rocks strewn linearly along what appears to be a field edge (although rock sometimes was cleared for native hay harvests);
- ❒ nearly monotypic stands of smooth brome, typically with some Kentucky bluegrass but with little native sedge in the understory (several native plant species often reinvade these stands, such as western snowberry, Wood's rose, white sage, western yarrow, several goldenrod species, and silver scurfpea);
- ❒ no partly buried rocks with profuse lichens;
- ❒ no clubmoss or cryptogamic crust.

— Use acquisition records, old refuge narratives, 1938–1939 aerial photographs, and U.S. Soil Conservation Service records for ancillary support.

— Flag the probable boundaries of areas verified as old cropland, record via GPS and attribute, and upload into the refuge's GIS database.

Rationale and Assumptions

Furrows and other linear disturbances caused by implements (for example, plows, disks, and seed drills) are much more evident after an area is treated with prescribed fire or heavily grazed. They are also more readily detected from horseback. Evidence of soil A-horizon disturbance due to cultivation may be determined by NRCS staff. Some areas with signs of farming disturbance (for example, furrows) may have been cropped only for a few years circa 1900–1930 or may have been broken during this period yet never cropped. Such areas often are successfully reinvaded by native plants, and may currently support native vegetation at levels approaching the most pristine areas on similar site types on the refuge that are considered native sod.

Objective 2

Within 15 years after CCP approval, convert DNC on at least 10 old cropland units to vegetation dominated by several species of native warm-season grasses that vary in stature and growth form, and that include several species of native forbs wherever possible. Give priority to units with stands of vegetation that have become decadent and overrun by undesirable, introduced cool-season grasses, especially where such units are adjacent to or within high-priority drift prairie units or high-priority prairie slope units.

Strategies

— Following multiple applications of a broad-spectrum herbicide, seed a native plant mixture that mainly consists of 80–90% warm-season grass species especially big bluestem, little bluestem, switchgrass, and sideoats grama.

— During the first 3–4 years after seeding, annually mow the stand with a hay conditioner and harvest the hay. Substitute grazing or prescribed fire treatments in the subsequent 3–4 years. Use herbicide spot spraying or "interseeding" where necessary.

Rationale and Assumptions

Although initially expensive, native warm-season grasses are economically and ecologically superior to seeded stands of introduced plants in old croplands because

— permanent, perennial cover eliminates regular (every 12–14 years) replacement of seeded, introduced species cover via a farming cycle and thus nearly eliminates potential for soil erosion;

— native grasses reduce local habitat fragmentation and eliminate "edge" associated with the farming cycle;

— a warm-season growth strategy for plants vastly improves the capacity for an assemblage of plants to outcompete smooth brome, mainly by affording broader and more effectively timed management opportunities;

— there is improved opportunity for prescribed burning in late spring compared to high-priority drift prairie units because the warm-season-dominated cover has relatively high fuel value through early June (versus mostly green vegetation on cool-season-dominated cover on the drift prairie by late May);

— there is a broader window (later in summer) for harvest of hay that still has forage value;

— native grasses are in compliance with policy that discourages planting of introduced species on Service lands and encourages planting of native species (National Wildlife Refuge System Biological Integrity, Diversity, and Environmental Health, 601 FW 3, 2001);

— native grasses reduce "source sites" from which introduced and weedy plants invade adjoining native prairie;

— native grasses have improved and longer-lasting structural diversity within stands.

Objective 3

By 10 years after CCP approval, identify other old cropland areas (those not known to have been seeded since the mid-1970s) that are high management priority (areas most important to convert to native warm-season grasses). Develop a detailed plan to convert these during the subsequent 10–15 years to vegetation dominated by several species of native forbs wherever possible.

Darla Leslie/USFWS

Rainbow over Upper Souris NWR

NOTE: There are no goals and objectives for remaining old cropland areas in uplands. They are low priority and would be managed with adjoining habitats.

Strategy

— Apply multiple selection criteria.

CRITERIA FOR HIGH MANAGEMENT PRIORITY OLD CROPLAND IN UPLANDS (excluding DNC and other old cropland known to have been seeded since the mid-1970s)

Floristic Composition. Vegetation is characterized by <20% mean frequency of pristine, native herbaceous types (plant groups 41–43 and 46–48 [Grant et al. 2004b]) plus native herbaceous-dominated vegetation with Kentucky bluegrass as the main subdominant (plant group 53).

Floristic Potential. Vegetation is characterized by >20% mean frequency of smooth brome-dominated types (plant groups 54, 61, and 62).

Landscape Context. The unit has no size criterion

and

bears clear evidence of a farming history

and

is contiguous with high-priority prairie units or tracts of native prairie adjacent to the refuge under non-Service ownership.

Rationale and Assumptions

Native grass and forb seed is very costly, as is the time and expense of materials needed to prepare seedbeds, plant seed, and annually manage newly seeded areas, per strategies and rationale listed under objective 2.

Old cropland that adjoins high-priority drift prairie or prairie slope and supports little native herbaceous vegetation likely is a source of invasion by undesirable, introduced grasses and weedy forbs. Without attempts to establish native vegetation through seeding, such areas are unpromising candidates for restoration to grassland in which native herbaceous plants are evident, much less an important codominant component. This includes areas that were farmed for 5–10 years before refuge establishment—presumably, before smooth brome and Kentucky bluegrass were widely distributed—that may have been reinvaded by native plants. These areas may have restoration potential that at least equals that of adjoining, high-quality drift prairie or prairie slope.

Objective 4

After seeding and establishing native warm-season plants in an old cropland unit, maintain dominance by native plants as the most dominant vegetation cover per qualitative estimation.

NOTE: There are no goals and objectives for other old cropland units (those not yet converted to warm-season-dominated communities); they are low priority.

Strategies

— Disturb less frequently (every 2–3 years) the seeded warm-season stands, which should be well established 5–8 years after seeding. They probably can be disturbed more flexibly with regard to phenology, mainly to discourage smooth brome invasion.

— Use grazing as an alternate management treatment and take advantage of the wide, spring-grazing window afforded by the warm-season-dominated community.

— Integrate management with that of surrounding prairie slope and drift prairie while focusing on treatment approaches that promote native warm-season plant species.

— In the interim between prescribed burns, possibly harvest hay every 2–3 years from old cropland units, alternating among July, August, and September to favor warm-season grasses.

— If and where occasionally needed along unit boundaries, use herbicides to reduce encroaching, introduced cool-season grasses and release native warm-season plants. Use integrated pest management to treat local infestations of noxious weeds as needed.

Rationale and Assumptions

The warm-season growth strategy for plants vastly improves the capacity for an assemblage of grassland plants to outcompete smooth brome (which typically degrades seeded introduced stands), mainly by affording broader and more effectively timed management opportunities.

Objective 5

Within 25 years of CCP approval, eliminate planted tall shrubs and trees and any naturalized, nonnative woody vegetation that occurs within or adjacent to high-priority old cropland areas as they are being restored to native-dominated vegetation.

Strategy

— Remove tree–shrub plantings by mechanical means (for example, cutting ash trees by hand; shearing caragana shrubs with a tractor blade or bucket during winter); follow by herbicide treatment of stumps; or follow by herbicide treatment, rotary mowing, and/or prescribed burning of resprouting vegetation wherever necessary.

Rationale and Assumptions

Trees and tall shrubs can diminish the survival of nests of grassland birds by harboring potential nest predators. They also provide perches from which brown-headed cowbirds can find other species' nests in which to lay eggs. Furthermore, recent data from the Souris River basin refuges indicate that relatively small areas of tall woody vegetation can effectively fragment grassland habitats and cause many grassland bird species to avoid entire landscapes. Elimination of tall woody cover is a logical strategy for restoration of landscape structure and plant community makeup, and to improve the attractiveness and security of the habitat for a variety of grassland breeding bird species.

Objective 6

By 2 years after CCP approval, develop and implement an effective, practical comprehensive plan for integrated control of noxious weeds in DNC and other old cropland areas in the riparian zone. In these areas, continue to maintain perennial herbaceous cover comprised of introduced species and native plant species or both, and the vegetation should present the following characteristics.

- About one-half of the area in 0- to 1-year postdisturbance and one-half in 2–3 years postdisturbance; corresponds roughly to a structure of 0–3.9 inches VOR and >3.9 inches VOR, respectively (mean VORs in early spring, per Robel et al. 1970).
- Native trees and tall shrubs compose <0.2% land cover on each old cropland area.
- Leafy spurge frequency is maintained at <2% frequency, absinth wormwood is actively controlled, and yellow toadflax and other newly appearing species of noxious weed that pose a threat to the drift prairie are eliminated within 5 years of initial detection. Canada thistle control is a low-priority weed control issue (mean frequency <25%).

Strategies

— Use hay harvest or fire at least every third year to maintain plant species vigor and vegetation structure and to control plant litter accumulation.

— Annually survey for noxious weeds. Continue widespread use of biological control by monitoring local areas for *Apthona* spp. beetles and redistributing beetles among leafy spurge patches as needed. Use herbicides as needed, especially along boundaries with private lands.

— Review and update the weed management plan, detailing specific methods and timetables for managing noxious weeds in old cropland areas of the riparian zone.

Rationale and Assumptions

Smooth brome, quackgrass, and Kentucky bluegrass dominate old cropland in riparian areas. These areas have relatively moist, deep silty loams that are particularly suitable for these introduced grass species and allow them to outcompete nearly all native herbaceous species. There currently are no practical avenues for sustainably converting these areas to more desirable stands of native herbaceous vegetation. There are, however, practical methods for simultaneously controlling most species of noxious weeds and providing vegetation structure that is attractive to grassland bird species native to the region. These birds prefer relatively dense, tall grassland vegetation and include mallard, northern harrier, Le Conte's sparrow, and bobolink.

S. Maslowski/USFWS

Bobolink

In addition to removing litter, periodic prescribed fire would slow or reverse invasion by woody vegetation such as western snowberry and willow.

Canada thistle is a noxious weed that tends to pervade and persist in disturbed soils of the riparian zone at Upper Souris NWR. This thistle is variably common across the region's cultivated lands, mainly due to its prolific production of highly mobile, wind-borne seed. This weed species cannot be controlled consistently by available means within most of the refuge's riparian zone. This is mainly because the soils typically are too damp in late spring and early summer to support wheeled vehicles that would apply herbicides at an appropriate time for effective control. Aerial application is possible in some areas, but tends to be more costly and controversial. Aerial application is more difficult to administer than ground-spraying and adjacent areas of habitat or privately owned land may be subjected to overspray.

Regular monitoring and control of other noxious weed species such as leafy spurge and wormwood are more crucial than control of Canada thistle, and are far more gratifying (in terms of available methods of biological and other nonchemical controls, and overall costs versus benefits).

Coulee Woodland and Coulee Woodland Edge Goal

Acknowledge a nearly irreversible, localized establishment of mature, contiguous woodland and minimally manage these areas as breeding and migration habitat principally for forest-interior, migratory bird species such as veery and ovenbird. Strive to eliminate remaining, noncontiguous, edge-dominated tree and tall shrub cover, particularly near high-priority drift prairie and the largest, most contiguous grassland tracts.

Objective 1

By 2 years after CCP approval, use GIS vegetation data and topographic considerations to classify management units with significant (>20% cover) tree and tall shrub cover as either "coulee woodland units" or "coulee woodland edge units."

Strategies

— *Use this criteria for identifying units with significant tree and tall shrub cover as coulee woodland units:* The uppermost vegetation strata of a unit comprises >50% tree cover with some tall shrub, forming woodland patches that generally are contiguous (minimum woodland width × length = 330 × 660 feet, about 5 acres).

— *Use this criteria for identifying units with significant tree and tall shrub cover as coulee woodland edge units:* The uppermost vegetation strata of a unit comprises 5–50% tree and tall shrub cover, generally occurring in narrow bands and is not contiguous.

Rationale and Assumptions

Distinguishing between management units with considerable woodland cover versus those with much woodland edge is critical to the refuge's vision and to a triage management approach. Coulee woodland at Upper Souris NWR is difficult to restore back to prairie, mainly because understory and ground fuels are too few to carry fires of sufficient extent and intensity to kill overstory trees.

Such areas probably do not have native prairie, grass–forb seed banks. However, coulee woodland could continue to provide modest habitat for forest-interior bird species, such as veery and ovenbird, without slowing widespread improvement in grassland bird habitat elsewhere at the refuge.

In contrast, coulee woodland edge is a widespread habitat type that, in the absence of fire, would continue to fragment drift prairie and prairie slope. None of the breeding bird species that are common in this edge habitat is of management concern. However, 11 grassland bird species that occur or used to occur at Upper Souris NWR are species of concern.

Conversion of woodland edge habitat to open prairie at the refuge could be achieved through repeated use of prescribed fire. This conversion would insignificantly influence continental population trends of woodland bird species, while helping reverse population declines of grassland bird species. Reduction of woodland edge may also reduce cowbird parasitism rates among grassland bird nests.

Objective 2

Within 5 years after CCP approval, analyze and summarize data that were collected during 2001–2003 on the composition and structure of a sample of coulee woodland at Upper Souris NWR.

Strategy

— Rank the summary and reporting of coulee woodland vegetation attributes among the highest priorities for a biologist who oversees the refuge's biological program.

Rationale and Assumptions

Available inventory data would provide critical insight on the status of American elm recruitment and the occurrence of noxious weed species. These data would provide a base for quantifying habitat relationships of bird species that breed in the refuge's woodland.

Objective 3

Minimally manage green ash-dominated, contiguous coulee woodland that, within 15 years of CCP approval, covers a total of about 1,500 acres (slightly less than the current level of 1,600 acres); and in which noxious weeds are controlled as follows: (1) common buckthorn, leafy spurge, common burdock, and other noxious weed species are each reduced and maintained at <3% frequency; and (2) newly discovered species of noxious weeds are eliminated.

Strategies

— Apply prescribed fire to halt further expansion of coulee woodland within and adjacent to high-priority upland prairie areas. Use frequent (for example, every 5 years) prescribed fire to reduce the area occupied by the smallest coulee woodlands that are adjacent to high-priority prairie areas.

— In open areas around woodland, continue to reduce leafy spurge by occasional redistribution of *Apthona* spp. beetles, plus limited use of herbicides at refuge boundaries if necessary.

— To assess the status of buckthorn and other noxious weeds in coulee woodland, complete the data summary and reporting in previous objective 2 and, if necessary, seek ways to extend the sampling and help direct control efforts. Common buckthorn may be invading coulee woodland at Upper Souris NWR and, if so, would threaten habitat values for forest-

interior bird species such as veery and ovenbird, in addition to other undesirable impacts.

Rationale and Assumptions

The area covered by coulee woodland at Upper Souris NWR has been increasing steadily during the past century (Grant and Murphy 2005). Coulee woodland continues to replace or indirectly diminish habitat values of the refuge's native upland prairie. Most areas covered by coulee woodland on the refuge may be difficult to restore back to prairie, but probably could continue to provide modest habitat for forest-interior bird species without hindering widespread improvement in grassland bird habitat elsewhere on the refuge.

Objective 4

On each coulee woodland edge unit, apply disturbance (principally fire) every 5–6 years to restore the vegetation to the following standards within 15 years:

- Tree and tall shrub cover are reduced by >50% (measured via remote imagery).
- Plant litter is removed and herbaceous plant vigor and structural diversity are restored by management treatment applied every 5–6 years (these responses would be unmeasured and instead would be assumed to coincide with disturbance events).
- At any given time, about one-fourth of the area of all woodland edge units is in 0–1 year postdisturbance; one-fourth is in 2–3 years postdisturbance; and one-half is in 4–6+ years postdisturbance. This corresponds roughly to VOR height–density classes of 0–2.0 inches, 2.0–3.9 inches, and 3.9–5.9 inches, respectively, to contribute to the variety of grassland structural types across the landscape.

  NOTE: There likely would be no monitoring of vegetation on nearly all of these units except for routine, cursory surveillance for noxious weeds. Tree and tall shrub cover could be coarsely monitored over decades via remote imagery. Knowledge of relationships between fire frequency and resulting, postfire vegetation structure is adequate to predict habitat conditions under this objective.
- Noxious weeds are controlled: (1) buckthorn, caragana, and other introduced species of tall shrubs or trees are nearly eliminated; (2) leafy spurge is reduced by >50%, to <5% frequency; (3) absinth wormwood and Canada thistle are actively controlled at the refuge boundary; and (4) infestations of yellow toadflax and any other, newly appearing species of noxious weed are detected and eliminated.

Strategies

— Apply prescribed fire every 5–6 years, varying the timing of burns within a given unit, to halt or reduce invasion by introduced cool-season grasses.

— So long as critical needs of priority management units (especially high-priority upland prairie) are not compromised, seek opportunities for occasional grazing by livestock during years between prescribed burns, to improve structural heterogeneity and slow litter accumulation. Grazing prescriptions can be very flexible, even allowing occasional, relatively severe defoliations, although such events may result in local increases in weeds such as Canada thistle and yellow sweetclover.

Rationale and Assumptions

Coulee woodland edge appears to be a widespread habitat type at Upper Souris NWR that, in the absence of fire, probably fragments significant areas of drift and prairie slope. None of the breeding bird species that are common in this edge habitat are of management concern, whereas 11 grassland bird species that occur or used to occur at the refuge are considered species of concern. Conversion of woodland edge habitat to open prairie, through repeated prescribed fire, probably would negligibly influence continental population trends of woodland bird species while helping reverse population declines of grassland bird species.

Riparian Woodland Goal

Maintain the approximate presettlement extent of green ash–American elm riparian woodland within the floodplain of the Souris River to benefit a broad suite of woodland-associated, breeding bird species.

Objective 1

By 10 years after CCP approval, complete a baseline floristic inventory of riparian woodland.

Strategy

— Use a modified James and Shugart (1970) method to inventory floristic composition and stand structure of all riparian woodland.

Rationale and Assumptions

Vegetation composition and structure of some riparian woodland has been inventoried, and breeding bird communities have also been inventoried. However, the data has not been analyzed and summarized. Qualitative observations suggest that most American elm has been lost to Dutch elm disease.

Objective 2

Maintain, in perpetuity, the riparian woodland present today. Explore methods that restore American elm as a codominant tree species of riparian woodland communities.

Strategies

— Use aerial photos and satellite imagery to periodically assess changes in the extent of riparian woodland.

— Assess methods to control Dutch elm disease including (1) biological control of the fungus or of native and introduced elm-bark beetles that spread the disease, and (2) development of disease-resistant cultivars (cultivated varieties of a plant) of American elm adapted to survive severe North Dakota winters.

— Because ash–elm riparian woodland is fire intolerant, suppress and control fires. Since the potential long-term effects of alterations in the hydrology (especially hydroperiod) of the Souris River are unknown; carefully investigate even minor changes in woodland.

Lee Karney/USFWS

Great Blue Heron

Rationale and Assumptions

The extent of riparian woodland has changed little since the presettlement period. However, some meadows have been invaded by aspen woodland and willow woodland, which may succeed to ash–elm woodland.

Contemporary riparian woodland forms large, extensive patches of mature, closed-canopy woodland. These woodlands are important habitat for forest-interior migratory birds such as northern waterthrush, red-eyed vireo, and American redstart. Great blue heron and black-crowned night-heron colonies also are found in riparian woodland.

Meadow Goal

Restore and maintain extensive examples of plant communities dominated by native flora characteristic of seasonally flooded meadows within the Souris River floodplain to attract grassland- and wetland-dependent bird species and other wildlife.

Objective 1

Manage meadows composed variously of nonnative and native plants to provide a mosaic of relatively short–sparse and tall–dense herbaceous-dominated cover. By 15 years after CCP approval, reduce tall shrub and tree cover to <10%.

Strategies

— Use cooperators to periodically clip (hay) meadow vegetation to control trees, shrubs, and noxious weeds, especially Canada thistle. Meadows may be clipped every year (for several years) following extensive flooding.

— Experiment with control of leafy spurge using Plateau® herbicide. Release flea beetles (*Apthona* spp.) in patches of leafy spurge growing on various microsites. Once flea beetles become locally adapted to meadow sites, begin wide-scale releases to control leafy spurge.

Rationale and Assumptions

Meadow is a transitional habitat on the Souris River basin refuges, where it supports some hydrophilic (water-loving) plants and is sometimes temporarily flooded. Meadow also supports vegetation characteristic of mesic (relatively moist) uplands. Quackgrass, reed canarygrass, Canada thistle, and leafy spurge degrade native grass–sedgerush communities. Meadow vegetation evolved with periodic disturbances including flooding, grazing by elk and bison, and fire.

Meadows at Upper Souris NWR are mostly invaded by cool-season introduced plants (especially quackgrass and reed canarygrass), such that full

restoration of native plant assemblages is unlikely. This objective focuses on maintenance of open, treeless meadows. Reduction in tall woody plants should benefit grassland and wetland birds intolerant of woody plants. Meadows invaded by introduced grasses will benefit these species despite being floristically simple in composition. Such benefits have been noted for sites seeded to introduced grasses, most notably in the CRP (Johnson and Igl 1995).

Wetland Goal

Manage riverine wetlands, including marshes and lakes, to sustain the long-term capacity of riverine wetlands to support diverse plant and wildlife communities. Restore ecological processes that sustain long-term productivity of wetlands.

USFWS

Waterfowl congregate at an Upper Souris NWR wetland.

Objective 1

Within 5 years of CCP approval, synthesize available information on the effects of physical alterations, altered hydrology and hydroperiod, increased sedimentation, and changes in water quality of the riverine system, past and present: (1) develop a report to describe consequences of these alterations on long-term viability of riverine marshes, (2) determine biological potentials and constraints for each wetland impoundment, and (3) develop criteria to prioritize impoundments with the greatest potential for sustained productivity.

Strategies

— Use past narratives, aerial photographs, unpublished refuge files, and scientific literature to evaluate the biological potential of wetland impoundments and prioritize units for management.

— Map physical areas within each impoundment that are expected to respond to management.

— Develop and prioritize a list of knowledge gaps and research needs.

— In cooperation with USGS's Northern Prairie Wildlife Research Center, complete sediment accretion study and contaminants studies.

— Monitor groundwater and soil moisture levels in impoundments and within the adjacent meadow zone.

Rationale and Assumptions

This objective focuses on compiling past and current data regarding development and management of the Souris River wetlands. Although riverine wetlands form one of the most extensive and important habitats at Upper Souris NWR, site-specific information is limited regarding effects of habitat management (especially water level management) on vegetation structure and composition, density of aquatic invertebrates, and wetland-dependent bird species. Models for managing northern prairie wetlands exist, but their utility is limited for managing riverine marshes at the Souris River basin refuges, primarily because three impoundments include flow-through of the Souris River (which limits wetland management capabilities).

This objective requires compilation of existing wetland management records along with a clear, succinct treatment of threats, management limitations, and management potentials for riverine wetlands. A biological assessment of wetland conditions for the Souris River basin refuges was completed recently by Laubhan and others (2003); this report provides a basic start in meeting this objective and those that follow.

Existing models may be applicable to seven smaller impoundments that are physically located next to the Souris River, but are not totally affected by fluctuations in river flows. These impoundments all have water supplies taken from the Souris River that are independent of the fluctuations in river flows. However, most of the impoundments can only be drained when the in-stream riverine marshes are drawn down, which is readily accomplished most years.

Objective 2

Within 15 years of CCP approval, evaluate and comprehend crucial ecological processes that maintain long-term wetland productivity. Develop a range of biological indicators (for example, decline of important wetland plant or invertebrate species, shifts in extent and juxtaposition of emergent or submerged aquatic emergent vegetation) useful in the implementation of management strategies (for example, water level management, prescribed fire) intended to maintain long-term wetland productivity.

Strategies

— Complete development of a USGS computer application that uses long-term flow data from gauging stations to assess effects associated

with long-term alterations in river hydrology and hydroperiod on wetland plants, wildlife, and (ultimately) the potential to sustain long-term wetland productivity. Particularly important is monitoring flows that cross international boundaries. Additionally, monitor inflows at major tributaries as necessary.

— Through USGS's Northern Prairie Wildlife Research Center, complete a study of sediment accretion and its implications for long-term management of riverine marshes.

— In cooperation with USGS and others, assess available contour maps for wetlands; where inadequate, develop detailed contour maps of marsh bottoms for all impoundments to help construct models that predict vegetation response to water level management.

— Develop a method to inventory contemporary vegetation communities in managed wetlands. Develop methods for long-term monitoring of wetland vegetation.

— In cooperation with the USGS and others, use information derived above to develop predictive models that determine effects of water management (especially hydroperiod) on wetland plants, invertebrates, and migratory birds.

— Since few on-site data are available, use relevant information from a broad spectrum of scientific publications and literature syntheses to address effects of Lake Darling water quality and water management. Reference documents may include, for example, a sediment accretion study completed through USGS's Northern Prairie Wildlife Research Center and an assessment of wetland conditions for the Souris River system by Laubhan et al. (2003).

Rationale and Assumptions

This objective focuses on synthesizing existing scientific research on wetland function and cycles in northern prairie wetlands and impounded riverine wetlands. It also prompts site-specific inventory, monitoring, and research to support management of riverine marshes.

A biological assessment of wetland conditions for the Souris River basin refuges was completed recently (Laubhan et al. 2003). This report provides context for the original construction and subsequent physical and operational modifications to the managed wetland system at the Souris River basin refuges. Additionally, long-term threats to the system are discussed. However, riverine wetlands have been managed mainly through opportunity, flood control objectives, and politics rather than sound science. Site-specific data are lacking regarding effects of wetland management on vegetation structure and composition, aquatic invertebrate densities, and wetland-dependent wildlife species.

Relative to upland habitats, managers have less effective control over wetland systems, due in part to the following:

— misunderstandings about the biological significance of drought and of complete drawdown, dating back to the original construction of wetland impoundments;

— limited understanding of long-term impacts of low-head dams constructed in rivers in the northern Great Plains;

— significant physical limitations of constructed impoundments, especially the lack of independence among adjacent wetland units when manipulating water levels;

— inherent difficulties in conducting basic inventory, long-term monitoring, or applied research in wetlands relative to upland sites.

Objective 3

During the 15 years after CCP approval, develop and implement a new management philosophy that emphasizes long-term wetland productivity over older models based on (1) political management based on 5-year cycles, (2) "oasis" management, where wet acres are maximized especially during extreme drought, or (3) maximizing years of "hemi-marsh" conditions.

In high-priority impoundments, use periodic disturbance to provide the full spectrum of wetland conditions—for example, (1) dry marsh, (2) densely vegetated marsh (regenerative phase), (3) hemi-marsh, (4) open marsh (degenerative phase), and (5) open water—to benefit wetland-dependent species of wildlife.

Strategies

— Re-create, where possible, the natural hydrology and hydroperiod of the Souris River. In most areas, physical disruptions and conflicts among water users compromise the degree to which this strategy can be carried out. Focus management on units that have the greatest potential for sustained productivity (from objective 1).

— Use natural climatic fluctuations to increase wetland management opportunities. Periodic drought may hasten full or partial drawdowns in some units. Although such drawdowns maximize the long-term viability of wetlands, the availability of wetlands with water is reduced during drought. In contrast, previous management emphasized retaining as much water as possible to offset landscape-level drought effects on migratory birds at the expense of long-term capacity to sustain wetland productivity in refuge impoundments.

— Use periodic, growing-season drawdown over multiple seasons if required to (1) stimulate production of seed-bearing annual plants,

(2) increase invertebrate biomass, and (3) stimulate establishment and expansion of emergent and submergent plant species.

— During the drawdown phase, use additional disturbance, especially prescribed fire, mechanical soil treatment (for example, disking and sheepfoot packer), and defoliation (haying or grazing) to (1) increase vegetation and invertebrate response during the regenerative phase, and (2) to control robust emergent vegetation.

— Use water level management and muskrat herbivory to reduce robust emergent vegetation, especially cattail and common reed.

— Periodically use aerially applied herbicides to reduce the extent of monotypic emergent vegetation in portions of impoundments that, historically, do not respond to water level management (cannot hold >3 feet of water during the growing season).

— Confine major releases from upstream reservoirs to September through May, reducing extended inundation during the growing season when most wetland birds are nesting. Ideally, spring releases from Canada to the United States would occur according to the natural hydroperiod as identified in the international agreement for the Souris River basin (United States and Canadian Negotiating Delegation 1989).

— Use water stored in Lake Darling to supplement spring and summer flows at J. Clark Salyer NWR: (1) during extended or extreme drought, or (2) during the regenerative marsh phase following drawdown of priority impoundments.

Rationale and Assumptions

This objective focuses on implementation and management, using the best available science. Since establishment of the refuge, conflicts in uses of Souris River water, and in objectives for wetland management, have occurred among various water users. Past management goals and objectives rarely addressed or incorporated unforeseen impacts related to the physical disruptions of the Souris River (original construction of dikes and dams), or changes in habitat (biotic and abiotic) resulting from these events. Inevitable decreases in water quality and in marsh management capabilities—especially because of accretion of sediments—are assumed, based on current knowledge of this and similar impounded riverine marshes in the northern Great Plains.

Productivity of northern prairie wetlands historically was maintained by periodic wet and dry cycles. Productivity is particularly enhanced during reflooding following natural drought or drawdown (in managed wetlands). Riverine marshes have an inherent reduced capacity to be dewatered during the growing season because the river flows through each impoundment. Departures from the normal hydroperiod, ill-timed upstream water releases, or significant summer rains can render prescriptive drawdowns ineffective because marsh sediments never dry sufficiently to (1) oxidize soils, (2) establish annual wetland plants (important waterfowl foods and a substrate for invertebrate production), or (3) establish perennial emergent and submergent vegetation (food cover and invertebrate substrate). Furthermore, control of robust emergent plants (cattail, common reed, and bulrush) becomes difficult because of continued anoxic (absence of oxygen) conditions, resulting in little reduction in organic material in marsh soils. Consequently, wetlands often cycle rapidly between open water and a dense-vegetated marsh phase, both of which are less productive than intervening stages. Because attainment of the periodic dry marsh phase is a significant factor limiting long-term wetland function, periodic drawdowns are emphasized under this objective. By necessity, wetland management would become more opportunistic, often working in conjunction with periodic wet-to-dry cycles to achieve management objectives.

Objective 4

Over the course of the CCP, introduce efforts on a watershed level that reduce sedimentation and nonpoint source pollution and/or their effects on riverine marshes.

Strategies

— Develop models similar to the "mallard model" developed by the HAPET that target areas within the watershed (for example, adjacent to major tributaries or drainage systems) that have the highest potential for sediment transport, especially during extreme rainfall or snowmelt events.

— Use models to target areas for conversion from cropland to grassland via USDA's Conservation Reserve Program, Wetland Reserve Program, or other USDA conservation initiatives. Identify drained wetlands within targeted areas for restoration. Initiate and develop additional conservation or legal measures, or both, that reduce or mitigate impacts from sedimentation and pollution.

— Work with the NRCS to ensure compliance with "Sodbuster," "Swampbuster," and other provisions in the Farm Bill (current and future) that reduce soil erosion.

— Explore construction of sediment traps to reduce the extent of sediment accumulations. Where management capability has already been reduced, explore the feasibility of dredging to reduce accumulated sediment in certain impoundments.

— Protect native prairie and prairie wetlands within target areas or adjacent to the refuge, using perpetual easements.

— In cooperation with the USGS, the state of North Dakota, and the USACE, monitor and document sediment loads and water quality associated with various flows. Consider passing flows that contain high sediment loads or that significantly reduce water quality.

Rationale and Assumptions

Initial samples collected at the Souris River basin refuges document only slightly elevated levels of sediment accretion for most impoundments. However, over many decades, sedimentation is expected to continue to the point where storage capacity (water depth) of pools would decline. This would result in reduced capability to manage wetland vegetation, especially robust emergent plants, using water level manipulations. Results from an ongoing sedimentation study at the Souris River refuges are expected to confirm this assumption.

Sedimentation and pollution mainly originate within the watershed, but outside refuge boundaries. Sediment is transported via agricultural runoff carried in the Souris River and its tributaries. Flows that contain high sediment loads or that significantly reduce water quality above Lake Darling are associated with runoff originating from rapidly melting snow or significant rainfall events.

Objective 5

Annually review and adhere to refuge mandates and laws plus pertinent federal, state, and international legal obligations, agreements, and policies when managing or planning to manage water levels of the Lake Darling impoundment, or when attempting to prevent or reduce threats to the impoundment presented by water management practices elsewhere in the Souris River system.

Darla Leslie/USFWS

Lake Darling from the Fire Lookout Tower

Strategies

— By late summer each year, coordinate with the North Dakota State Water Commission, J. Clark Salyer NWR, and Saskatchewan Watershed Authority to determine a fall water release schedule for impoundments on the Souris River in Saskatchewan and Lake Darling.

— Annually reduce the water level in Lake Darling to 1,595.85 feet by October 15 and release no water thereafter.

— Annually reduce the water level in Lake Darling to 1,596.0 feet by February 1 for spring flood control purposes.

— By June 1 each year, store water in Lake Darling up to the interim summer level of 1,596.0 feet for refuge management purposes. This strategy is a proposal to alter the summer storage elevation from 1,597.0 to 1,596.0 feet; implementation would require modification of the International Agreement.

— During spring runoff or after unusually heavy summer rains, release water as needed to avoid exceeding an elevation of 1596.5 feet and to permit storage of an additional 5,000 acre-feet of water beyond that provided by the interim summer level.

— Release no more than 500 cfs, measured at Minot, after June 1.

— Communicate with the North Dakota State Water Commission when planning to release water from Lake Darling to benefit wildlife resources downstream at J. Clark Salyer NWR.

— Pass water from Saskatchewan through Lake Darling to senior water right holders whenever possible. Coordinate with the North Dakota State Water Commission and J. Clark Salyer NWR when releasing such water. Reserve no water stored in Lake Darling for later use by senior or junior water permit holders.

— Routinely scrutinize the USACE operation and maintenance of the Souris River Flood Control Project to verify that it is "operated and maintained in a manner compatible with the migratory waterfowl refuge purpose of the project," per section 21 of the Flood Control Act of 1965.

— Regularly communicate with the USACE, North Dakota State Water Commission, Saskatchewan Watershed Authority, and other agencies and downstream water users that have an interest in runoff releases. Coordination with the North Dakota State Water Commission and J. Clark Salyer NWR is prudent when discussing water management issues with the Saskatchewan Watershed Authority.

— Work with the USACE and North Dakota State Water Commission to protect Minot from 10-year flood events, per the operating plan of the international agreement for the Souris River basin (United States and Canadian Negotiating Delegation 1989). Alert the North Dakota State Water Commission and other members of the U.S. International Souris River Board when 10-year flood conditions do not occur: when runoff is less than a 10% (1 in 10 years) event and water

allocated to the United States does not reach North Dakota to facilitate a natural hydrograph, as required in the international agreement. During such years, pass and/or store runoff water in Lake Darling according to the original intent of Upper Souris NWR as a refuge for migratory waterfowl.

— Publicize releases to describe their purpose and to stop users from removing water not allocated to them.

Rationale and Assumptions

This objectives focuses on legal and policy mandates for management of Lake Darling. Lake Darling contributes to the long-term capacity of riverine wetlands to support diverse plant and wildlife communities, within constraints of legal obligations. The main purpose of Lake Darling is to store a 2-year supply of water for managing downstream marshes at J. Clark Salyer NWR. This often has been incorrectly interpreted that Lake Darling should be kept as full as possible to maintain a lake-like character, except during extreme drought periods. This interpretation drove a decision to raise the summer operating level from 1,596.0 feet to 1,597.0 feet after the Souris River Flood Control Project was completed. This increased elevation and newly constructed dams in Saskatchewan have reduced the ability to appropriately manage wetland habitats at Upper Souris NWR and J. Clark Salyer NWR.

There are two reasons to keep the water elevation below 1,596.0 feet: (1) shoreline erosion, the incidence of botulism, and upstream flooding of riparian woodland are reduced, and (2) water clarity, availability of shoreline for shorebirds and other wildlife, and the extent of wetland vegetation for waterfowl food and cover are improved. Additionally, this elevation limit provides better water level management capability for pool 41.

Relatively low water levels can occur on the Lake Darling impoundment in late summer due to evaporation, low precipitation levels, or water releases to J. Clark Salyer NWR. Low water levels can be ecologically beneficial and, on Lake Darling, can provide storage for unusually heavy summer rains, reducing the untimely flooding of downstream marshes. At times, water that enters Lake Darling may contribute downstream flows that are greater than the legally permitted levels. The impoundment's elevation during such periods may exceed 1,596.5 feet. Such runoff could be stored temporarily in the impoundment as long as the elevation does not exceed 1,598.0 feet. Beyond this level, water could be released at the rate of its flow into the reservoir. Water stored below 1,596.5 feet can either be released slowly over time or allowed to evaporate to an elevation of 1,596.0 feet by February 1. Releases are coordinated with the North Dakota State Water Commission to avoid negative downstream effects.

The 1965 legislative act that authorizes the Souris River Flood Control Project states that flood control is to be "operated and maintained in a manner compatible with the migratory waterfowl refuge purpose of the project."

The act requires the government of Saskatchewan, the U.S. Army, and the Service to appoint a contact person with whom states, provinces, and agencies may consult about project operations. Representatives of the U.S. Army, the Saskatchewan Water Corporation (now the Saskatchewan Watershed Authority), the Service, and the North Dakota State Engineer's office must regularly monitor the project plan.

For flood control purposes, each impoundment designated under the Souris River Flood Control Project must not exceed a stipulated water elevation by February 1. During some years, however, water still flows in the Souris River from Saskatchewan into North Dakota after October 15; water may still need to be released from Lake Darling to reach the impoundment's elevation goal for that date. When this occurs, much of the water may not reach Manitoba before freeze-up, making it difficult to manage downstream water at J. Clark Salyer NWR and in Manitoba. However, water releases up to 500 cfs at Minot during September 1–October 15 should allow the extra water to enter Manitoba by November.

Operating Lake Darling at a summer elevation of 1,596.0 feet would, under normal evaporation rates, allow some water released from Saskatchewan to be stored in Lake Darling (up to 1,595.85 feet). This may result in less water being passed through Lake Darling—water that otherwise might negatively affect the management of downstream resources. Saskatchewan must end releases by October to allow the Souris River to regain flows. For about 15 days after the flows end, excess water drains from river pools and bank storage until most water has passed into Lake Darling. This additional water must be passed through Lake Darling if the impoundment is to be staged at 1,595.85 feet for winter.

Water stored in Lake Darling can be released to supplement spring and summer flows at J. Clark Salyer NWR during extended or extreme drought, or during a regenerative marsh phase that follows drawdown of high-priority wetland impoundments. Water released from Lake Darling is legally owned by the Service and cannot be withdrawn without the agency's written permission. If unauthorized withdrawals are not prevented by the North Dakota State Water Commission, less water arrives at J. Clark Salyer NWR. According to past experience, only 50% of the water that is released into a nearly dry riverbed eventually is delivered to J. Clark Salyer NWR; the remainder replenishes bank storage and fills deep river holes.

The following excerpt from the international agreement describes when water should be released to North Dakota from reservoirs in Saskatchewan.

> "Flow releases to the United States should occur (except in flood years) in the pattern which would have occurred in a state of nature. To the extent possible and in consideration of potential channel losses and operating efficiencies, releases from the Canadian dams will be scheduled to coincide with periods of beneficial use in North Dakota. Normally, the period of beneficial use in North Dakota coincides with the timing of the natural hydrograph, and that timing should be a guide to releases of the United States portion of the natural flows.
>
> Water must be delivered in the spring according to the historical hydrograph to be beneficially used by water permit holders on the Souris River. Delaying the water release from Saskatchewan means that senior water right holders may not be able to benefit from the later release. Late releases can have detrimental effects on fish spawning, waterfowl marsh filling, fishing, and reproduction of over-water-nesting migratory birds."

Island Goal

Manage islands to attract waterfowl and increase nest survival, especially during drought years when wetland habitat outside of the Souris River basin refuges is limited.

Objective 1

By 10 years after CCP approval, prioritize nesting islands based on waterfowl nest densities, nest survival, and maintenance costs.

Strategies

- Use data from nest studies conducted at other sites in North Dakota to evaluate nesting islands for waterfowl production.
- Identify islands that are high maintenance, especially those that are prone to extensive erosion.
- Map island locations and evaluate vegetation cover.

Rationale and Assumptions

Island management would be lower priority than restoration of other, more extensive, habitat types. Therefore, limited resources expended on island management should target islands with the greatest potential to produce waterfowl. Use of nesting islands by waterfowl has not been studied at Upper Souris NWR. Nesting islands have been sufficiently studied at other sites in North Dakota, particularly J. Clark Salyer NWR to provide a basis for evaluations.

Objective 2

During drought conditions, maintain 70% apparent nest survival on priority islands. Within all pools below Lake Darling, island objectives remain secondary to marsh management objectives that enhance long-term wetland productivity.

Strategies

- Manage islands for the following characteristics: (1) large open-water barrier surrounding an island; (2) open shoreline without tall emergent vegetation; (3) far from the mainland; and (4) cover dominated by shrubs, grasses, or tall forbs. Achieve this with the following strategies: water level management, herbicide application to reduce emergent cover surrounding an island, and cover manipulation using plantings and prescribed fire.
- Trap predators such as skunk, raccoon, and mink soon after ice-out in the spring, during drought years or when funding and staff are available. The spring window for effectively capturing mink is narrow; capture is unlikely once nesting has begun.
- Additionally, control mink populations by reducing muskrat populations (the major winter food source of mink). Use partial winter drawdowns to control muskrat populations.
- Remove nesting islands with a history of low nest densities and/or low nest survival. Some islands with low nest survival can be burned in late-April or May to discourage waterfowl nesting.

Dave Menke/USFWS

Muskrat

Rationale and Assumptions

The Upper Souris NWR has approximately 28 nesting islands that probably vary in attractiveness to nesting waterfowl. The two largest islands are only 2 acres apiece; most of the islands are no more than 0.1 acre in size. These islands may be marginally attractive to nesting waterfowl. Many islands are located in shallowly flooded pools, are spaced close together, are located close to shore, or are surrounded by emergent vegetation.

Island objectives remain secondary to marsh management objectives that maintain long-term wetland productivity. Periodic water management, for example, holding water level high to facilitate muskrat herbivory, may conflict with maintenance of predator-free nesting islands (mink numbers are mainly influenced by winter muskrat populations). Summer drawdowns limit the utility of nesting, especially during drought years.

Cultural Resource Goal

Discover and protect cultural resources and interpret sites when the interpretation does not adversely affect habitat management.

Objective 1

Within 15 years of CCP approval, identify refuge cultural resources and protect them from degradation.

Strategies

— Conduct government-to-government consultation with Native American nations—who lived, hunted, or used other resources in the Souris River basin—to identify which cultural or spiritually significant archaeological sites and traditional cultural properties are associated with them.

— Complete cultural resource surveys as needed for management purposes.

— Identify known cultural resource sites on a secure GIS database layer that can be used during management planning.

— Secure funding to survey the remainder of the refuge for cultural resource sites.

— Protect sites by using law enforcement patrol, special use permits, signing, and placement of physical barriers.

Rationale and Assumptions

There are limited resources (funding and staff) that would be allocated yearly to the refuge. The priority for these funding and staffing resources is to protect and manage upland and wetland habitats for wildlife. Protection of cultural resources is an integral part of the purpose. All cultural resource laws and policies would be complied with to prevent the destruction of known and unknown sites.

Objective 2

Within 7 years of CCP approval, develop an interpretive program that will convey the cultural history of the Souris River valley to refuge visitors.

Strategies

— Develop an interpretive area within the headquarters building that gives a visitor an appreciation of the development of the Souris River valley and how it contributes to the visitor's quality of life.

— Develop an interpretive brochure depicting the cultural history of the Souris River valley.

— Develop an interpretive program that can be geared to several ages of visitors.

Rationale and Assumptions

The interpretation of cultural resources is encouraged if sufficient funding and staff are available (so that habitat management will not be negatively affected). Interpretation of the Souris River basin culture would enhance visitors' appreciation and knowledge of the role of refuges to protect native habitats and wildlife. In addition, visitors would be taught to respect, value, and protect cultural resources.

Visitor Service Goal

Provide wildlife-dependent recreational opportunities to a diverse audience when the administration of these programs does not adversely affect wildlife and habitat management.

Hunting Objective

Within 5 years of CCP approval, provide hunting opportunities for 2,500 visitors when resources needed to administer these programs do not adversely affect the refuge's ability to implement habitat management. Continue to provide hunters with safe, reasonable harvest opportunities; uncrowded conditions; minimal conflicts with other users; and satisfaction with their overall experiences.

Strategies

— Annually determine whether resources (funding and staff) would be available to provide hunting opportunities at the current level.

— Add turkey, moose, or other species to the hunted list if compatible.

— Provide hunting opportunities and access for hunters with disabilities, on request, when determined to be compatible.

— Continue to work with the NDGF to provide quality hunting opportunities where possible.

— Continue providing the public with information on refuge hunting opportunities by regularly updating hunting brochures, signs, and the refuge website, on an as-needed basis.

— Continue to provide visibility of refuge law enforcement officers to seek adherence to regulations.

Rationale and Assumptions

"Hunting is clearly an important activity with visitors making multiple trips to the refuge to do so. These visitors feel that hunting at the refuge provides a unique experience they cannot find elsewhere,"

(Sexton et al. 2005). However, there are limited resources (funding and staff) that would be allocated yearly to the refuge. The priority for these resources is to manage upland and wetland habitat. Hunting programs would be allowed if resources needed to administer hunting would not materially detract from habitat management. The Service intends to keep the present level of programs, unless funding or staffing shortfalls increase. The greatest expenses for the hunting program are for law enforcement, sign development and maintenance, development and printing of hunting brochures, answering questions, and updating the refuge website.

The draft compatibility determination for recreational hunting is in appendix P.

Fishing Objective

Within 5 years of CCP approval, provide fishing opportunities for 50,000 to 75,000 anglers when resources needed to administer these programs do not adversely affect the refuge's ability to implement habitat management. Continue to provide anglers with safe, reasonable harvest opportunities; minimal conflicts with others; and satisfaction with their overall experiences.

Strategies

— Annually determine whether resources (funding and staffing) would be available and make adjustments as needed.

— Provide anglers with disabilities and elderly anglers with at least the current level of fishing opportunities and explore ways to expand access.

— Discuss enhancement of fishing opportunities with the NDGF.

— Continue providing the public with information on refuge fishing opportunities by regularly updating fishing brochures, signs, and the refuge website, on an as-needed basis.

— Continue to provide visibility of refuge law enforcement to seek adherence to regulations.

— Develop cost-effective partnerships to increase and improve shore-angler access to the water.

Rationale and Assumptions

The majority of visitors to the refuge are anglers. "Almost unanimously, fishing was identified as the most cited experience that would bring respondents back to the refuge. Angler visitors appear to be motivated to fish there simply for the enjoyment of the activity, being less concerned about catching large trophy fish. The majority of respondents who fish at the refuge would continue to do so even if they thought they would not catch any fish. This says much about the experience that the refuge provides for this activity, indicating they are likely gaining more from the experience than simple catching fish," (Sexton et al. 2005).

USFWS

Fishing is popular on the refuge.

All boat ramps and fishing access piers were replaced with quality facilities in 2005 and should need only minimal maintenance during the next 15 years. A request for "additional fishing access" areas such as piers and docks was the most frequent comment when asked, "What would enhance your experience at Upper Souris National Wildlife Refuge?" Included in this request was access that accommodated handicapped or elderly anglers (Sexton et al. 2005). Partnerships with local sporting groups could be explored to expand access for shore anglers.

There are limited resources (funding and staff) allocated yearly to the refuge. The priority for these resources is to manage upland and wetland habitat. Fishing programs would be allowed if resources needed to administer them do not materially detract from habitat management. Program expenses include (1) law enforcement, (2) brochure development and printing, (3) annual access and facility maintenance, (4) sign development and maintenance, (5) answering questions, and (6) website development and updating. The Service does not intend (1) to add additional areas for boat or shore fishing, or (2) to increase the hours in a day that anglers can fish at the refuge. The Service intends to keep the present level of fishing access, unless funding and staffing shortfalls require fishing access to be reduced.

The draft compatibility determination for recreational fishing is in appendix R.

Wildlife Observation and Photography Objective

Within 5 years of CCP approval, provide wildlife observation and photography opportunities for no less than 6,000 visitors as a result of improved habitat and wildlife diversity.

Strategies

— Develop a short brochure describing opportunities.

— Develop partnerships with wildlife groups and organizations to market available birding and wildlife opportunities at the refuge.

— Update the refuge website on a regular basis to provide details of current wildlife sightings.

Rationale and Assumptions

Nonconsumptive users most found wildlife observation, driving the Prairie–Marsh Scenic Drive, walking the interpretive trails, and wildlife photography to be important activities. Wildlife observation was ranked the third-largest use by visitors, behind fishing and hunting (Sexton et al. 2005). Visitors tend to observe and photograph wildlife collaterally at the same time they participate in other wildlife-dependent activities. Forty-nine to sixty percent of consumptive users rated viewing waterbirds and other wildlife as important. Sixty-eight percent of nonconsumptive users rated wildlife photography important and approximately 76–93% of nonconsumptive users rated wildlife observation as important (viewing songbirds, waterbirds, and other wildlife) (Sexton et al. 2005).

The Prairie–Marsh Scenic Drive, nature trails, and grouse-dancing photo blinds are the only facilities developed for wildlife observation and photography. However, every place that visitors walk or drive there is wildlife to be seen. Wildlife observation and photography go hand-in-hand with interpretation and environmental education programs. Although the Service does not plan to expand these facilities, a greater diversity of wildlife would be available for watching and photographing as the habitat improves.

Deb Parker/USFWS

Entry Point to the Prairie–Marsh Scenic Drive

The draft compatibility determination for wildlife observation and wildlife photography is in appendix Q.

Environmental Education and Interpretation Objective

Within 5 years of CCP approval, provide environmental education programming to no less than 100 students per year. Provide interpretive exhibits that will be viewed by 15 percent of visitors per year. Emphasize learning about natural plant and animal communities, ecological processes, refuge management, and restoration of upland and wetlands.

Strategies

— Build a learning center and hire an environmental education coordinator that would provide programs on and off the refuge to diverse citizens of all ages.

— Build an interactive education and interpretive website.

— Write an education and interpretive plan that focuses on enhancing awareness of prairie and wetland ecology and management. Ensure the curriculum is fresh and dynamic and meets the needs of all students and adults.

— Develop strong educational partnerships with schools and other government entities to efficiently tell the refuge story.

— Educate students and families of a transient Air Force workforce so they can advocate protecting fish and wildlife habitat and support refuges after they move.

— Complete two new kiosks and interpretive panels.

— Complete reconstruction of the Prairie–Marsh Scenic Drive and development of interpretive panels in conjunction with the Federal Highway Administration.

— Apply for Scenic Byway designation to attract visitors.

— Upgrade and replace interpretive and information panels that are consistent with the refuge theme.

— Build an elevated platform overlooking pools B and C to enhance the visitor's experience of marsh wildlife by interpreting the marsh ecosystem.

— Upgrade the audiovisual equipment and the refuge orientation slide show.

— In cooperation with partners, participate in at least two special events annually to increase visitors' knowledge and understanding of wildlife conservation and related issues.

— Construct additional interpreted hiking/walking trails or improve existing trails.

Rationale and Assumptions

Within commuting distance of Upper Souris NWR there is a population of at least 60,000 people, including Minot Air Force Base located 14 miles east. Survey results show that 93% of visitors reside within the state (Sexton et al. 2005). There are unlimited opportunities to educate youth about wildlife and habitat; most of these youth will leave the state when they graduate and take the message elsewhere.

During the public scoping meeting process, most participants asked for more environmental education opportunities at the refuge.

Refuge visitor survey results (Sexton et al. 2005) indicate the following:

- kiosks or signs with information about the refuge and its wildlife and self-guided interpretive trails and auto tours are important or very important to approximately 64% of visitors;
- environmental education programs, interpretive exhibits, and interpretive trails are important to 46–75% of visitors drawn to the refuge for nonconsumptive activities;
- 56% of visitors surveyed stated that special events (environmental education, open houses, Migratory Bird Day) at the refuge are important to their decision to visit the refuge;
- 33% of respondents indicated that having more education and interpretive programs would maximize their experience while visiting the refuge;
- 76% of nonconsumptive users stated they would like to see more hiking/walking trails.

Unfortunately, the Upper Souris NWR does not have educational facilities or staff to provide this valuable service. The refuge's priority is to manage upland and wetland habitats to prevent degradation. As the habitat improves and more is learned about refuge biology, there would likely be more ability to create increased environmental education opportunities for visitors to learn about, appreciate, and become supporters of refuge management efforts.

The draft compatibility determination for environmental education and interpretation is in appendix Q.

Non-wildlife-dependent Public Use

Objectives and strategies would not be developed for non-wildlife-dependent public use activities. Examples of these activities are canoeing, boating, berry picking, horseback riding, walking, hiking, bicycling, cross-country skiing, snowshoeing, four-wheeling, swimming, water skiing, sailing, and snowmobiling.

These types of activities may be compatible when associated with wildlife-dependent public use. For example, berry picking along a trail might be allowed as a compatible activity incidental to the wildlife-dependent public use of wildlife observation. Compatibility of activities would be determined on an individual basis by the refuge manager as needed in the future.

Research and Science Goal

Conduct innovative natural resource management using sound science and applied research to advance the understanding of natural resource function and management within the northern Great Plains.

Objective 1

During the 15 years following CCP approval, identify and prioritize research needs required to meet the refuge's goals and objectives; promote investigations that reliably address these needs.

Strategies

- Conduct vegetation and wildlife inventories of all plant communities within major habitats identified in chapter 3. Use initial inventories as baseline data to assess past and future changes in plant and animal community composition.
- Use periodic surveys (for example, every 5 years) to assess vegetation composition and structure of high-priority refuge habitats.
- Focus wildlife population research on assessments of species–habitat relationships. Develop models that predict wildlife response to habitat management or restoration.
- Design and conduct issue-driven research unlikely to be reliably addressed using long-term monitoring. Develop predictive models of habitat management and restoration.
- Promote refuge research and science priorities within the broader scientific community. Ensure that cooperative research focuses on meeting information needs identified in habitat management goals and objectives.

Rationale and Assumptions

Habitat-based goals and objectives form the basis for setting research and monitoring priorities for Upper Souris NWR. Investigations must be sufficiently designed, funded, and carried out to reliably address proposed hypotheses or questions.

Partnerships are integral to meeting the research and science goal and objectives. Cooperative efforts are supported with shared funding, lodging, vehicles, equipment, knowledge, and expertise.

Operations Goal

Efficiently use funding and staffing for the benefit of all natural and cultural resources, the National Wildlife Refuge System, and present and future generations. Effectively manage visitor service programs that complement habitat management.

Objective 1

Within 15 years of CCP approval, hire five additional personnel to protect current resources; assist with administrative duties; and assist the rest of the staff to properly handle public use and restore native prairie habitat and manage wetland resources on 100% of high-priority habitat units and 50% of moderate-priority habitat units.

Strategies

— Hire a public use specialist with to plan and carry out an intensive public awareness program to educate the public about habitat restoration efforts.

— Hire one full-time wildlife biologist and two permanent seasonal technicians to monitor wildlife and habitat responses to habitat protection, management, and restoration efforts.

— Hire a full-time fire management specialist to manage the fire program necessary for habitat restoration.

— Hire an administrative clerk to assist with additional administrative duties.

— Maintain 40% of equipment and facilities to Service standards within 5 years of CCP approval.

— Replace 25% of worn-out equipment within 5 years of CCP approval, as needed.

Rationale and Assumptions

There are limited resources (funds and staff) allocated yearly to the refuge. The priority for these resources is to manage upland and wetland habitats. If the target (minimum) staffing level and funding are not reached or only partially reached, fewer accomplishments would be achieved.

Objective 2

Within 15 years of CCP approval, secure additional funding necessary to complete habitat restoration on 100% of high-priority habitat units and 50% of moderate-priority habitat units. Include restoration with (1) native prairie reseeding; and (2) intensive management of existing native prairie including woody plant reduction, invasive species control, and increased prescribed fire and grazing activities.

Strategies

— Use additional funding to purchase native grass and forb seeds for reseeding former cropland and planted cover.

— Use additional funding to purchase herbicides to control invasive species and remove/control woody plant expansion.

— Continue to use maintenance management funding to maintain or replace equipment and facilities, as needed, to Service standards.

— Secure additional funding to enhance streamflow monitoring and water management and develop new area-capacity data for refuge marshes.

— Use additional funding to purchase facilities to increase the environmental education program and expand outreach activities.

— Maintain existing facilities and equipment to Service standards, including necessary roads, dikes, water control structures, buildings, and fences (all of which are critical in habitat management and protection).

Rationale and Assumptions

There are limited resources (funds and staff) allocated yearly to the refuge. The priority for these resources is to protect and manage upland and wetland habitats for wildlife. Operational funding would be targeted to work on the highest priority habitats and habitat units at the refuge. Management intensity would be increased on those habitats and units and would require additional personnel and funding to restore native prairie.

STEP-DOWN MANAGEMENT PLANS

The CCP for the Souris River basin refuges is intended to be a broad umbrella plan (1) that outlines general concepts and objectives for habitat, wildlife, visitor services, cultural resources, and partnerships; and (2) that guides refuge management for the next 15 years. Step-down management plans provide greater detail for carrying out specific actions authorized by the CCP. Tables 21–23 present step-down management plans for each refuge that are anticipated to be needed, along with their current status and next revision date.

PERSONNEL

Currently, the Des Lacs NWR has a staff of 13 full-time employees. Two employees are directly assigned to Des Lacs NWR, and the remaining 11 employees work in the Des Lacs NWR Complex with duties at Des Lacs NWR in addition to duties at three other stations in the refuge complex. Table 24 lists these positions along with six new positions (three specifically assigned to Des Lacs NWR) that are needed for full implementation of the CCP.

Currently, the J. Clark Salyer NWR Complex has a staff of 16 full-time employees to manage the refuge, seven easement refuges, and the J. Clark Salyer WMD. Table 25 lists these positions along with six new positions that are needed for full implementation of the CCP (those positions needed only for the refuge).

Currently, the Upper Souris NWR has a staff of seven full-time employees. Table 26 lists these positions along with four new positions that are needed for full implementation of the CCP.