

6 Implementation of the Proposed Action



Tim McCabe/USFWS

Mallards at Rest

The Service's proposed action (alternative 3) was identified after a determination that it does the following:

- best achieves the refuge's purposes, vision, and goals
- helps fulfill the Refuge System mission
- maintains and, where appropriate, restores the ecological integrity of the refuge and the Refuge System
- addresses the significant issues and mandates
- is consistent with principles of sound fish and wildlife management

The draft CCP described in this chapter presents the details of how the Service would carry out its proposed action (alternative 3) for management of Arrowwood NWR.

The implementation of the final CCP begins once the preferred management alternative has been selected and finalized, the CCP has been approved, and the Service has notified the public of its decision.

If alternative 3 were selected, the objectives and strategies presented in this chapter would be carried out over the next 15 years. The CCP would serve as the primary management document for the refuge until it is formally revised. The Service would carry out the final CCP with assistance from partner agencies, organizations, and the public.

The management direction in this chapter meets the purposes, vision, and goals of the refuge. Objectives and strategies to carry out the goals would provide for resource needs and public use.

- A goal is a descriptive, broad statement of desired future conditions that conveys a purpose, but does not define measurable units.
- An objective is a concise statement of what is to be achieved; how much is to be achieved; when and where it is to be achieved; who is responsible to achieve it.
- Rationale for each objective includes background information, assumptions, and technical details used to formulate the objective. The rationale

provides context to enhance comprehension and facilitate future evaluations.

- Strategies are way to achieve an objective.

NOTE: The overall guidance for use of prescribed fire and management of wildland fire is in the description of the fire management program (appendix E).

UPLAND GOAL

Provide a diversity of grassland types that emulate the range of natural variation characteristic of the Prairie Pothole Region to benefit trust resources including waterfowl, grassland birds, and songbirds.



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Sharp-tailed Grouse

NOTE: Arrowwood NWR contains about 11,340 acres of grassland, of which approximately 6,000 acres are native prairie. The potential natural vegetation of the area is cool-season, needlegrass-wheatgrass, mixed-grass prairie. Vegetation of the mixed-grass prairie is predominantly a mixture of western wheatgrass, needlegrasses, blue grama, little bluestem, and upland sedges. Interspersed within the grasses are numerous species of forbs and patches of shrubs comprised of western snowberry, Woods' rose, silverberry, or mixtures of these species (Kuchler 1964). Long-term management would be to provide pre-1870s vegetation composition and habitat characteristics of the grassland-dependent species currently exhibiting significant population declines. The remaining 5,340 acres are comprised of seeded natives, DNC, or other cool-season introduced grasses.

Upland Objective 1

Provide 4,000 acres of grasslands, on a 5-year average, in blocks of a minimum of 100 acres in size with less than 30% shrub cover and greater than 80% grass cover, located within 300 feet of brood water. Structural characteristics of these grasslands include

variable visual obstruction readings (VORs) greater than 4 inches and variable vegetation heights greater than 6 inches. This would primarily benefit nesting waterfowl such as mallard, gadwall, and blue-winged teal. In addition, these vegetation characteristics would provide the habitat needs for sharp-tailed grouse, dickcissel, sedge wren, and common yellowthroat.

Rationale

The location where this objective is met would change over time as burning, grazing, and mowing are used to manipulate the habitat. Structural characteristics such as litter, grass height, and density would be lowest the first one or two growing seasons following treatment and would increase each year after that. Since treatments would not be applied consistently over the entire landscape, this would result in a mosaic of vegetation structures.

Emphasis would be placed on DNC and other tame grass fields located within 300 feet of permanent and semipermanent water for nesting waterfowl. In addition to providing tall dense cover for nesting waterfowl, tame grass fields generally contain less than 10% shrub canopy. This is necessary for sedge wren habitat. Tracts of native prairie located within 300 feet of permanent water would also be managed to provide tall, dense cover. This tall dense cover also provides optimal habitat for nesting sharp-tailed grouse and common yellowthroat, as well as nesting waterfowl.

Strategies

a. DNC and other tame grass fields would periodically be treated using grazing, prescribed fire, haying, and mowing. Approximately 30% of the 4,000 acres would have periods of 3–5 years rest between treatments for undisturbed nesting habitat. Prescribed fire and grazing would be used to remove excessive litter that is suppressing growth of favorable species such as wheatgrasses and forbs in DNC and native grasses and forbs in native prairie. Burning and grazing would improve nutrient cycling and encourage new vegetation growth and seed production. Haying and mowing would be used primarily for invasive plant control and litter reduction. In native prairie, haying and mowing would be used to reduce or maintain shrub canopy.



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Unit G21, west Jim Lake, is treated with prescribed fire for brush reduction, litter removal, and grassland rejuvenation for ground-nesting wildlife.

b. Croplands would be eliminated except as a means of rejuvenating DNC and for invasive plant control. Existing cropland within areas designated primarily for waterfowl production management would be planted to a DNC mixture. Currently, approximately 130 acres of cropland are designated to be seeded to DNC. Reduction of cropland would provide larger contiguous grassland tracts. Some existing grassland tracts may need to be cultivated and reseeded or “interseeded” with various grass and forb species to increase the height and density of the cover and provide the necessary structural characteristics for the species of interest. Approximately 2,200 acres of tame grasses would need to be rejuvenated in the next 15 years.

c. Some fields of native prairie would require an aggressive, systematic use of prescribed fire, grazing, haying, and mowing to reduce the brush canopy cover under 30% for sedge wren, Savannah sparrow, grasshopper sparrow, Baird’s sparrow, bobolink and chestnut-collared longspur (Arnold and Higgins 1986, Bakker 2003). The common yellowthroat prefers tall dense cover, but with a higher brush composition of 30–60%. These thicker patches of brush are scattered throughout the fields and would continue to provide the habitat conditions necessary for breeding common yellowthroats.

d. Maintain the 38-acre predator exclosure to provide safe nesting habitat for waterfowl and other grassland-nesting species. The habitat within the fence would be maintained as DNC and periodically treated using prescribed fire or haying following the nesting season to maintain tall dense cover. The fence would be electrified from late March through July each year and the area trapped to ensure a predator-free nesting environment. The surrounding vegetation would be managed to minimize competing vegetation outside the fence and encourage nesting within the boundary of the fence. The fenced area would be monitored annually to determine the nesting success.

e. Invasive plant species such as leafy spurge, wormwood, and especially Canada thistle would continue to be controlled using an integrated approach. Control methods would include mechanical and chemical treatments, but priority would be given to current and emerging biological control methods. Research would be encouraged to investigate improved methods to control invasive plants and analyze the effect of grassland management treatments on invasive plants.

f. Selected planted tree rows (shelterbelts) would no longer be protected from prescribed fire. Decreasing the number of trees would reduce perching sights for predators such as red-tailed hawk and great horned owl. Tree removal would increase field size and eliminate the “hostile” habitat within select grassland tracts. The abandoned firebreaks around

the trees would be seeded to a vegetation mixture similar to the surrounding habitat.

g. Purchase of private inholdings to complete the legislated refuge boundary could provide an additional 3,200 acres of upland and wetland habitat that could be managed to provide the habitat required by many of the grassland-dependent species. The additional upland habitat could increase the field sizes and reduce the habitat fragmentation. In turn, this could increase the nesting success. Also, the addition of 260 acres of wetlands could increase the pair habitat to attract additional waterfowl pairs and other waterbirds.

Upland Objective 2

Provide 5,000 acres of grasslands, on a 5-year average, with less than 30% shrub cover and greater than 25% grass cover, in blocks of a minimum of 75 acres, but preferably greater than 150 acres. Structural characteristics include a variable VOR greater than 4 inches and a variable vegetation height from less than 6 inches to greater than 20 inches. This would benefit nesting grassland Neotropical migrants including Le Conte’s sparrow, clay-colored sparrow, Savannah sparrow, grasshopper sparrow, western meadowlark, and bobolink, in addition to other nesting species such as common snipe, willet, northern pintail, short-eared owl, and northern harrier. This grassland habitat would also support abundant small mammal populations that provide prey for numerous raptor species.



Bobolink

S. Maslowski/USFWS

Rationale

This objective would increase diversity of both flora and fauna and would be mainly applied to the native prairie areas, but also would apply to tame grass fields located away from permanent water. The emphasis would be to return the native prairie areas to conditions that existed prior to European settlement (pre-1870s), which provided the necessary habitat characteristics for many grassland-dependent species that are showing significant breeding

population declines today. This would include reducing brush and exotic, cool-season grasses such as smooth brome and Kentucky bluegrass; and increasing the composition of the native grasses and forbs.

Strategies

a. Brush would be reduced. Currently, approximately 40% of the native prairie acreage has a brush canopy cover greater than 50%. Woody vegetation within or bordering prairie fragments would be reduced because it attracts nest predators and consequently reduces nesting success (Johnson and Winter 1999). These fields would require an aggressive, systematic use of prescribed fire during mid-July to late August to reduce western snowberry stems and increase the composition of native grasses and forbs. Haying and mowing would be used on those areas not conducive to prescribed fire. An integrated approach would be carried out using fire; grazing; and mechanical, chemical, and biological control methods to maintain the brush canopy cover under 30% and encourage native species.

b. Native vegetation composition would be increased. Native prairie areas would be rejuvenated and enhanced using grazing, prescribed fire, haying, and mowing when the native grasses and forbs have less than 50% canopy cover. Prescribed burning and grazing would be carried out during different periods of vegetative growth or, in combination, to attain specific objectives: (1) to remove excessive litter suppressing favorable species such as native grasses and forbs; (2) to reduce the competition between the native and nonnative species; (3) to reduce exotic cool-season grasses when at the 3–5 leaf stage; (4) to increase the native forb composition; (5) to provide nutrient cycling; and (6) to encourage new vegetation growth and seed production. The presence of various native grasses and forbs would provide the structural characteristics required by most grassland nesting species and foraging habitat and habitat needs for various invertebrates such as butterflies and moths. Native prairie areas would be aggressively treated with multiple treatments to reduce brush and increase the native species composition of grasses and forbs.

c. Decrepit DNC stands would be rejuvenated and enhanced using grazing, prescribed fire, haying and mowing when the VORs and vegetation heights fall below 50% of the maximum values. Prescribed fire and grazing would be used to (1) remove excessive litter that is suppressing favorable species growth such as that of wheatgrasses and forbs in DNC, (2) to increase nutrient cycling, and (3) to encourage new vegetation growth and seed production. Haying and mowing would be used primarily in the tame grass fields for invasive plant control and litter reduction and in native prairie fields to reduce or maintain shrub canopy. Tame grass fields with very low

habitat value would require cropping for 2 or 3 years and reseeded with native grasses and forbs. As an alternative to farming, fields may be treated with a nonselective herbicide and then “no-till” seeded with native species.

d. The use of croplands would be eliminated except as a means of rejuvenating old DNC fields and for invasive plant control.



Leafy spurge, a noxious weed, infested this area of the refuge prior to release of flea beetles for biological control in 1995.

e. Invasive plant species such as leafy spurge, wormwood, and especially Canada thistle would continue to be controlled using an integrated approach. Control methods would include mechanical and chemical treatments, but priority would be given to current and emerging biological control methods. Research would be encouraged to investigate improved methods to control invasive plants and analyze the effect of grassland management treatments on invasive plants.

f. Selected planted tree rows (shelterbelts) would no longer be protected from prescribed fire. Decreasing the number of trees would reduce perching sights for predators such as red-tailed hawk and great horned owl. Tree removal would reduce habitat fragmentation and eliminate the “hostile” habitat within select grassland tracts. The abandoned firebreaks would be seeded to a vegetation mixture similar to the surrounding habitat.

g. Purchase of private inholdings to complete the legislated refuge boundary would increase the size of several fields to meet the minimum required habitat size of 25–100 acres for most species.

Upland Objective 3

Provide a minimum of 1,600 acres of grasslands in blocks of at least 75 acres with less than 30% shrub cover and 15–70% grass cover. Structural characteristics include less than 4 inches VOR and variable vegetation heights ranging from 6 to 20 inches to benefit Vesper sparrow, chestnut-collared

longspur, horned lark, upland sandpiper, and marbled godwit (Kantrud and Higgins 1992).

Rationale

This set of grassland habitat characteristics exists off the refuge and in abundance on private lands. Smaller areas are available on refuge hilltops and within the thin upland soil types. In addition, this habitat would be provided at the refuge for one or two growing seasons following management treatments applied to achieve upland objectives 1 and 2.

Strategies

- a. The development of mini-joint-venture grazing systems that encourage rest on adjacent private lands would continue.
- b. The potential for reintroduction of prairie dogs would be evaluated.
- c. Purchase of private inholdings to complete the legislated refuge boundary would increase the size of several fields to meet the minimum required habitat size of 25–100 acres for most species.

Upland Objective 4

Maintain existing wooded ravines and trees in riparian zones that historically supported woody vegetation.

Rationale

The 660 acres of riparian floodplain and wooded ravines are primarily associated with the James River valley and lakeshores within the refuge. These native woodlands provide habitat for many woodland-dependent species. Although these habitats cover less than 1% of the northern Great Plains, wooded ravines can attract a disproportionately rich number of bird species compared to other plains habitats (Dobkin 1992.) These woody habitats increase species diversity by providing the migration and breeding habitats for many migratory land birds. Some of the bird species that use these habitats include Cooper's hawk, black-billed cuckoo, least flycatcher, willow flycatcher, great-crested flycatcher, red-eyed vireo, yellow warbler, and northern oriole.

Strategies

- a. The woody ravines would not be intentionally burned; however, they would not be protected from prescribed fire treatments. Fires historically kept the ravines in early successional plant species, which benefited many birds.
- b. Management treatments to increase bur oak germination in the riparian zones would be investigated.

WETLAND GOAL

Provide a diversity of wetland types that emulate the range of natural variation characteristic of the Prairie Pothole Region to benefit threatened and endangered species, waterfowl, shorebirds, wading birds, and other wetland birds.

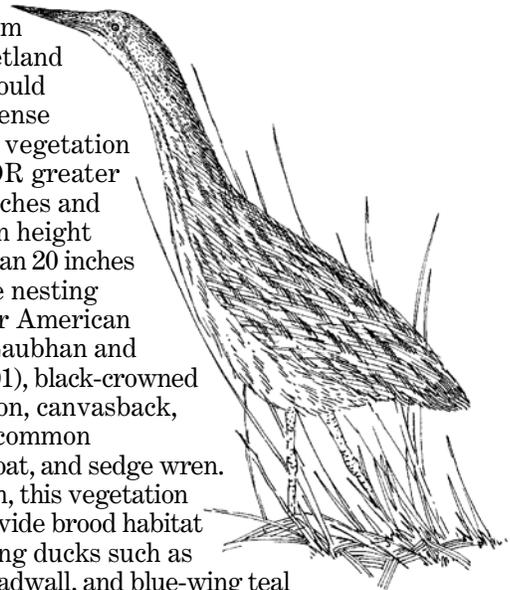
Wetland Objective 1

Provide 1,250 acres (50%) consisting of 30–60% emergent vegetation, primarily bulrushes and cattail, interspersed with 40–70% open water that supports beds of aquatic vegetation, preferably sago pondweed, with water depths of 8–20 inches (stable or slightly declining) between May 1 and August 1.

Rationale

The beds of aquatic vegetation provide foraging habitat for breeding dabbling ducks, herons, egrets, grebes, canvasback, and tundra swan (Earnst 1994, Kantrud 1990) in the fall. This objective would be applied to Arrowwood and Jim lakes.

A minimum of 25% wetland habitat would support dense emergent vegetation with a VOR greater than 12 inches and vegetation height greater than 20 inches to provide nesting habitat for American bittern (Laubhan and Roelle 2001), black-crowned night-heron, canvasback, redhead, common yellowthroat, and sedge wren. In addition, this vegetation would provide brood habitat for dabbling ducks such as mallard, gadwall, and blue-wing teal and foraging habitat for migrating diving ducks and tundra swan.



American Bittern
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A minimum of 25% wetland habitat would support sparse emergent vegetation with a VOR ranging from 4 to 12 inches and vegetation height ranging from 6 to 20 inches to provide nesting habitat for black tern (Bergman 1970, Naugle et al. 2000), Franklin's gull (Du Mont 1940), and pied-billed grebe (Naugle et al. 1999).

Strategies

- a. After ice out, maintain or raise water depths to 3–5 feet, with clear water for adequate light penetration during the critical sago pondweed-germination period, March through April.

Slowly raise the water level from mid-June through September, and then slowly draw down the water level through October, to develop 3- to 5-foot bands of seasonally flooded emergent vegetation. Emergent vegetation establishment may take several years of low water levels. A fringe of emergent vegetation around the shoreline would reduce wind erosion and re-suspension of sediments. Reflood the emergent vegetation the following spring to provide nesting and brood cover.

b. Reduce sedimentation rates by working with other federal and state programs to improve the upper James River watershed. Conserve, restore, enhance, and create habitat resources in watersheds to influence the quality and quantity of water flowing into rivers and streams.

c. Control rough fish by reducing water levels enough to result in fish kills during winter months, as conditions dictate.

d. Use Arrowwood Lake to store water for management of other pools as long as sago production is unimpeded.

Wetland Objective 2

Provide 300 acres consisting of greater than 80% emergent vegetation (such as bulrushes and cattail) and 0–20% open water with depths ranging from moist to 8 inches, between May 1 and August 1, in patches greater than 25 acres.



Tim McCabe/USFWS

Western Grebe

Rationale

Thick stands of bulrushes and cattails provide nesting habitat for black tern, eared grebe, western grebe, Franklin's gull, sora, and Virginia rail. This objective would target Arrowwood and Jim lakes.

Strategies

a. Control rough fish by reducing the water level enough to result in fish kills during winter months.

b. Raise water levels slowly until late summer, to depths of 1–4 feet, then maintained at stable or slightly declining levels between May 1 and August 1 to favor emergent vegetation growth along edges. Emergent vegetation establishment may take several years of low water levels. A fringe of emergent vegetation around the shoreline would reduce wind fetch and re-suspension of sediments. Reflood the emergent vegetation the following spring to provide nesting and brood cover.

c. Reduce sedimentation rates by working with other federal and state programs to improve the upper James River watershed. Conserve, restore, enhance, and create habitat resources in watersheds to influence the quality and quantity of water flowing into rivers and streams.

d. Use Arrowwood Lake to store water for management of other pools as long as sago production is unimpeded.

e. When expanses of emergent vegetation exceed 150 acres, draw down the lake and disturb with prescribed fire or disking to set back plant succession.

Wetland Objective 3

Provide 500 acres of open-water habitats consisting of 20–100% submergent aquatic vegetation (such as pondweed, bladderwort, and coon's tail) in patches greater than 8 acres, with depths ranging from moist to 8 inches, between May 1 and August 1.

Rationale

Patches of submergent aquatic vegetation provide habitat conditions for nesting black tern, eared grebe, western grebe, Franklin's gull, sora, and Virginia rail. In addition, this vegetation provides foraging habitat for breeding dabbling ducks, herons, egrets, grebes, canvasback, and tundra swan in the fall. This objective would target Arrowwood and Jim lakes.

Strategies

a. After ice out, maintain or raise water depths to 3–5 feet, with clear water for adequate light penetration during the critical submergent vegetation germination period, March through April.

b. Beginning in July, slowly draw down water levels in selected pools to 8 inches, through July.

Wetland Objective 4

Provide 300–600 acres of less than 12 inches tall emergent vegetation (such as rushes, sedges, and spikerush) that is flooded with less than 8 inches between April 1 through June 1, and between July 15 through November 30 with a VOR of less than 4 inches (or approximately less than 1.4 stems per square foot).

Rationale

This objective would provide nesting habitat to benefit foraging waterfowl and migrating shorebirds. This objective would target the Mud Lake and Depuy Marsh subimpoundments and Stony Brook. Approximately one-third of the units would be managed to achieve this objective on an annual basis.

Strategies

- a. In the early spring, draw down selected ponds to initiate new growth of spikerushes and expose old clumps of rushes, bulrushes, grasses, and sedges for rail habitat (Fredrickson and Taylor 1982).
- b. In the fall, slowly draw down selected ponds to concentrate foods for migrating waterfowl and other waterbirds.

Wetland Objective 5

Provide annually approximately 300–600 acres of greater than 80% cover of seed-producing vegetation (such as smartweeds, millet, beggarticks, and sedges) flooded to depths less than 8 inches, between April 1 and November 30.

Rationale

Annual seed-producing vegetation would provide habitat for foraging waterfowl and shorebirds. This objective would target the subimpoundments; approximately one-third of the units would be managed to achieve this objective on an annual basis.

Strategies

- a. Periodically flood nine moist soil units to depths less than 12 inches. Every third year or as conditions dictate, completely draw down the units in the spring and early summer, then dry, and disturb and reseed the soil surface to increase the sprouting of seeds within the soil.

Use early drawdowns to stimulate germination of smartweeds. Mid-season drawdowns would result in millets and late-season drawdowns would produce beggarticks. Once plants reach 6–8 inches in height,

shallowly (1–2 inches) flood them. As the perennials increase, so do the invertebrates that provide foraging habitat for waterfowl, rails, and herons. The uneven topography of pools would provide foraging habitat for the various wildlife groups migrating through the area.

Shorebirds

would use

the mud flats and shallow water

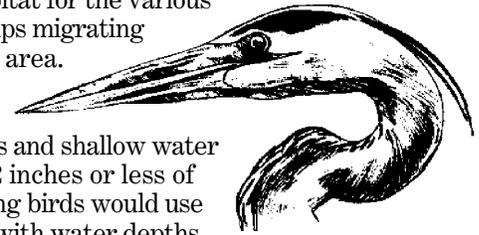
areas with 2 inches or less of

water, wading birds would use

those areas with water depths

from 3 to 5 inches deep, and

waterfowl would have areas available with water depths ranging from 5 to 10 inches deep.



Great Blue Heron

Time to shorebird migration the early spring drawdowns with shallow water zones interspersed with mud flats. The new growth of spikerushes and old clumps of rushes, bulrushes, grasses, and sedges provide concealment for rails (Fredrickson and Taylor 1982).

Wetland Objective 6

During years of severe drought in the region, maintain low water levels in Jim Lake to provide exposed gravel islands and shoreline habitat during piping plover nesting season.

Rationale

The piping plover has been recorded nesting at the refuge during years of low water that exposed the gravel islands and shoreline habitat the bird prefers for nesting. Because the refuge has a history of piping plover use, it has designated critical habitat for piping plovers. Piping plovers are not expected to nest regularly at the refuge. However, in years of severe drought when habitat is limited across the state, Jim Lake would be managed to provide access to the gravel islands and gravel side slopes of the dike along the eastern edge of the lake.

Strategies

- a. Draw down Jim Lake to maintain exposed gravel islands and shorelines from mid-May through mid-July.
- b. Participate in the International Piping Plover Breeding Census at the refuge every 5 years.

Wetland Objective 7

Improve water quality in the watershed upstream of the refuge and also water leaving the refuge. Reduce peak flows entering the refuge during spring snowmelt and summer rainfall events to reduce flooding and improve water management capability.

Rationale

During high-water events, most water entering the refuge would be diverted into the bypass channel at the southern end of Arrowwood Lake. This practice would limit opportunities to improve the quality of water leaving the refuge. However, managing water levels in Arrowwood Lake to promote emergent vegetation growth along the shoreline and other shallow areas would improve water quality by increasing plant uptake of nitrogen and phosphorous.

Another water quality problem that has existed for many years is lack of dissolved oxygen during periods of low flow and under ice (Reclamation 1992). To help alleviate this problem, water released from Arrowwood Lake into other impoundments and the bypass channel would be from the top of the water column, which usually has higher dissolved oxygen levels. Furthermore, as water drops over the water control structure and mixes with air, dissolved oxygen levels would be increased.

When water is diverted from Arrowwood Lake or the bypass channel into other wetland units, there would be additional opportunities for improving water quality. Sedimentation rates would increase as water levels are maintained to provide migratory bird habitat. Water levels would be managed to promote growth of desirable aquatic vegetation, which would greatly increase plant uptake of organic nutrients. Wetland units would be periodically drawn down and burned or disked to recycle nutrients and set back succession. As part of the Arrowwood NWR mitigation project, fish barriers were installed to prevent carp from entering the bypass channel and the wetland units. Excluding carp would also benefit water quality by reducing turbidity. As with Arrowwood Lake, water released from these units would be from the top of the water column and dissolved oxygen levels would be increased when the water drops over the structure.

Strategies

- a. Use stream-gauging data in conjunction with water quality models to calculate a mass nutrient balance for the refuge. The Water Resources Division of the USGS maintains stream gauging stations on the James River, both upstream and downstream of the refuge. Data collected at these gauging stations include streamflow and water chemistry. This data, when combined with water quality models, can be used to calculate a mass nutrient balance for the refuge. A mass nutrient balance assesses nutrient load entering and leaving the refuge, providing insight into the refuge's role as a nutrient source or nutrient "sink" for downstream water users.
- b. Work with the watershed managers from county soil conservation districts to use the agricultural nonpoint source (AGNPS) model. The AGNPS

model predicts soil erosion and nutrient transport and loadings from agricultural watersheds for real or hypothetical storms. It can be used in evaluating the effect of management decisions impacting a watershed. It can also be used to target areas in the upper watershed for "best management practices" such as minimum tillage, grass waterways, filter strips, green belts, and grazing systems that would provide the greatest water quality benefit to the refuge.

- c. Achieve the goals of the Federal Water Pollution Control Act by developing partnerships with county, state, and federal agencies. In cooperation with the state health department and the EPA, identify potential projects in the upper watershed that qualify for Clean Water Act funding.

- d. Use "thunderstorm maps" to determine priority areas within 1 mile of the James River and significant tributaries to protect and restore wetlands and to prevent further loss of native or naturalized cover. In these same priority areas, the proportion of perennial cover would be increased; where permanent cover restoration was not possible, annual cover such as winter cereals for nesting waterfowl would be increased.

- e. Calculate a mass nutrient balance to determine if the refuge is functioning as a nutrient source or nutrient "sink."

VISITOR SERVICES GOAL

Visitors of all abilities would enjoy a refuge visit and increase their knowledge and appreciation of the prairie ecosystem and the refuge's history by participating in compatible wildlife-dependent activities.

NOTE: Appendixes K–R contain draft compatibility determinations for the public uses at Arrowwood NWR.

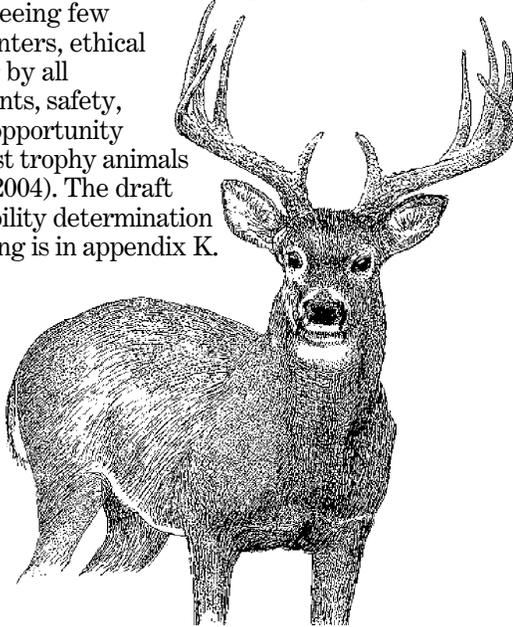
Visitor Services Objective 1—Hunting

Continue to provide and increase opportunities as compatible and appropriate for accessible hunting of big game, upland birds, small game, and fox.

Rationale

Current refuge-specific regulations are designed to provide opportunities for a quality hunt within the laws imposed by the state. The definition of a quality hunt is completely determined by the individual participating in the activity. In a survey of 10,000 hunters conducted by the Wisconsin Department of Natural Resources in 2000, hunters were asked to rate the factors having the most influence on their perception of a quality hunt. The most important factor indicated by the respondents was seeing game. The second most frequent answer

was spending time with friends and family, and the least important factor in determining a quality hunt was the weather. Successful hunters (harvest of game pursued) rated their hunt quality as very high or fairly high 22% of the time, while unsuccessful hunters (no game harvested) rated their hunt quality as very high or fairly high only 7% of the time. Other factors determined to be integral to a quality hunt include seeing few other hunters, ethical behavior by all participants, safety, and the opportunity to harvest trophy animals (Dhuey 2004). The draft compatibility determination for hunting is in appendix K.



White-tailed Deer

Strategies

- a. Revise the current hunting brochures and “tear sheets” that provide information on refuge hunting regulations, and access.
- b. Continue to work cooperatively with the NDGF to conduct law enforcement patrols to ensure compliance with regulations.
- c. Increase opportunities accessible hunting on the refuge.
- d. Continue to limit hunting to walk-in-only access.

Visitor Services Objective 2—Fishing

Continue to provide public opportunity for accessible fishing, including bow fishing for rough fish during high-water years and ice fishing when conditions permit.

Rationale

Fishing is a compatible priority public use and would continue to be supported. See the draft compatibility determination in appendix L.

Strategies

- a. Update and revise brochures that provide information on refuge fishing opportunities, regulations, and access.

- b. Use local media to promote fishing opportunities during high-water years when the fishery is active.
- c. Permit fishing, in accordance with state regulations, year-round except during the deer gun and muzzleloader seasons.
- d. Allow boats from May 1 through August 31.
- e. Allow, on Arrowwood and Jim lakes, boats with less than 25 horsepower motors.

Visitor Services Objective 3—Wildlife Observation and Wildlife Photography

Provide the public opportunities for accessible wildlife/wildland observation and photography for at least 10,000 visitors per year.

Rationale

The refuge’s auto tour route and locations around Jim Lake and the Depuy pools provide excellent opportunities for viewing and photographing wildlife. These are compatible priority public uses (see the draft compatibility determination in appendix N).

Strategies

- a. Continue to maintain the refuge’s 5.5-mile auto tour route to provide a safe and enjoyable experience for visitors.
- b. Update and revise the interpretive brochure. Clarify and revise regulations regarding access into the refuge for walk-in access, biking on refuge trails, and horseback riding.
- c. Upgrade the access road to the Warbler Woodland Watchable Wildlife Area.
- d. Improve and maintain the nature trail in the Warbler Woodland Watchable Wildlife Area by adding directional signs to the trailhead and replacing the interpretive signs.
- e. Maintain at least one observation blind located near an active sharp-tailed grouse lek. Locate a suitable site for installation of a permanent, accessible blind.
- f. Investigate new opportunities for compatible wildlife viewing, with the possible development of additional trails and overlooks.
- g. Develop and upgrade wildlife and bird lists as new information becomes available.
- h. Allow boats from May 1 through August 31.
- i. Allow, on Arrowwood and Jim lakes, boats with less than 25 horsepower motors.

Visitor Services Objective 4—Interpretation

Increase public awareness and advocacy by reaching 10,000 people annually using accessible programs, exhibits, signs, and pamphlets that interpret refuge management activities, and the natural, cultural, and historic resources.

Rationale

By expanding the interpretive and public outreach activities at the refuge, the public would be made aware of the Refuge System and Arrowwood NWR and the benefits it provides to wildlife and the local community. This is a compatible priority public use (see the draft compatibility determination in appendix O).

Strategies

- a. Remodel the office entrance to include a visitor contact station containing interpretive exhibits and a cooperative association store.
- b. Develop permanent exhibits at local community locations to increase awareness of national wildlife refuges in North Dakota.
- c. Widely disseminate informational leaflets to libraries, local businesses, chambers of commerce, recreational groups, local lodging, and designated rest areas along interstates.
- d. Develop a portable travel exhibit interpreting the refuge and its key resources.
- e. Develop a professional-quality presentation on Arrowwood NWR and the Refuge System.
- f. Create a native grass and forb demonstration plot, complete with interpretive signs and identification markers for each species.
- g. Work with tourism division of the North Dakota Commerce Department, and North Dakota



Prairie Lily

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Department of Transportation to install directional signs off Interstate 94 and state highways.

- h. Maintain existing interpretive panels.
- i. Develop and place new entrance signs at each main refuge access road.
- j. Interpret the cultural history including the Fort Totten Trail, the story of Limpy Jack, and the legend of Grasshopper Hills.
- k. Interpret the geology of the refuge and surrounding area.

Visitor Services Objective 5—Partnerships and Other Public Outreach

Foster advocacy and develop public awareness of refuge resource issues and management practices through accessible public outreach.

Rationale

Fostering relationships within the community would help the refuge open the lines of communication, build support for the refuge, and provide an avenue for discussion. The Service recognizes that communication is vital to the Service mission. Refuge staff would continue to seek out new opportunities and foster existing relationships to help with achieving mutually beneficial goals and objectives.

Strategies

- a. Pursue development of a “friends group.”
- b. Develop partnerships to increase volunteer opportunities at the refuge.
- c. Annually update the refuge website.
- d. Send out monthly news releases to communities regarding refuge events and management activities. Conduct radio and television spots on request.
- e. Attend local wildlife and community group meetings on a regular basis to provide information on refuge activities, management, and other issues.
- f. Continue to work with the nonprofit organization, Birding Drives Dakota, on the annual “Potholes & Prairie Birding Festival” and visits to the refuge.
- g. Annually participate in at least five outreach programs such as holding events for National Wildlife Refuge Week and International Migratory Bird Day, or staffing a booth at a local event.
- h. Work with congressional offices and external affairs to keep them informed of refuge activities and management issues. Build and maintain relationships with county officials.

Visitor Services Objective 6— Environmental Education

Promote the Refuge System and Arrowwood NWR by conducting or hosting at least 10 environmental education programs per year to local schools and groups on the wetlands and grasslands within the Prairie Pothole Region.

Rationale

By expanding the environmental education activities at the refuge, the public would be made aware of the Refuge System and Arrowwood NWR and the benefits it provides to wildlife and the local community. This is a compatible priority public use (see the draft compatibility determination in appendix O).

Strategies

- a. Enhance the OWLS, located at the Kensal Public School, with interpretive signs or a brochure describing the native vegetation.
- b. Develop environmental education trunks complete with hands-on items such as mammal skins and skulls, to be used during presentations and tours with various school groups and organizations.
- c. Develop field study equipment kits to be checked out by visitors or organized groups. Include a

backpack with binoculars, field guides, hand lenses, dip nets, tweezers, ruler, pen, vials, and other supplies.

d. Construct an environmental education “learning pavilion” in the Warbler Woodland Watchable Wildlife Area.

e. Involve local schools to develop an education program that can be used to explain the refuge management practices, and the wildlife and habitats found at the refuge.



Prairie Smoke in Winter

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