

4 Management Direction

This chapter describes the management direction the Service designed—with public coordination—to achieve the vision for the Laramie Plains refuges as described in chapter 2. The chapter includes the following sections:

- management focus
- goals, objectives, strategies, and rationale
- staffing and funding
- step-down management plans
- monitoring and evaluation

The pages specified below contain the management direction designed to achieve the vision (chapter 2) for the Laramie Plains refuges. The shared direction for the three refuges is followed by individual plans for each refuges:

- The Laramie Plains Refuges, pages 46–47
- Bamforth NWR, pages 47–48
- Hutton Lake NWR, pages 48–52
- Mortenson Lake NWR, pages 52–54

MANAGEMENT FOCUS

For the past 40 years, the Laramie Plains refuges have received little to no active management due to the relatively small staff of the Arapaho NWR Complex and competing refuge priorities. Bird surveys are conducted and boundary fences and signs are maintained, but little to no proactive management, monitoring, or other activities have occurred.

Using data and information from other wetland-complex areas, some biological goals have been established for these refuges. Future studies may indicate whether these goals are appropriate or need to be revised. It is hoped that this plan will demonstrate the need to actively manage these refuges for the benefit of migratory bird species. An increase of one FTE, dedicated to the Laramie Plains refuges and Pathfinder NWR (located 50 miles southwest of Casper, Wyoming), will have a noticeable impact on the ability to conduct site-specific research; build and maintain partnerships; develop specific biologically based, goal-oriented, step-down habitat management plans; and guide future management direction for these stations.

The planning team developed objectives in support of goals identified in chapter 2 to carry out the proposed action for management of the Laramie Plains refuges. Strategies to achieve objectives are suggested. Rationale is included that supports goals, objectives, and strategies. In addition, assumptions are discussed.

Biological goals and objectives emphasize management of plant communities as habitat for wildlife, especially migratory birds, and are organized by major habitat types represented at the three refuges. Goals and objectives are habitat based rather than wildlife based, because wildlife often respond to factors beyond the control of local refuge management (for example, disease outbreaks or habitat conditions on important staging or wintering sites can affect populations of migratory birds). Furthermore, management practices (for example, prescribed fire, grazing, and water-level manipulation) usually benefit plant communities rather than wildlife populations. Habitat-based objectives emphasize monitoring of important vegetation attributes such as community composition and vegetation structure over time. In most cases, wildlife population responses to habitat changes are not monitored. Rather, site-specific inventories, applied research, and literature reviews allow for reasonable predictions of wildlife response to habitat management.



Black-crowned night-heron.

Additional goals, objectives, and strategies are developed for visitor services, cultural resources, research and science, and refuge operations.

The National Wildlife Refuge System Administration Act of 1966 required the Secretary of the Interior, before permitting uses, to ensure that those uses are compatible with the purposes

of the refuge. The CCP process requires a compatibility determination for all existing and proposed refuge uses. Compatibility determinations for the Laramie Plains refuges include wildlife observation and wildlife photography (appendix J), environmental education and interpretation (appendix K), and prescribed grazing (appendix L).

GOALS, OBJECTIVES, STRATEGIES, AND RATIONALE

The Laramie Plains Refuges Management Direction

The following goals, objectives, and strategies apply to all three Laramie Plains refuges and outline the actions needed to achieve the vision of the refuges. The Service intends to meet these objectives during the next 15 years.

Research and Science Goal

Conduct natural resource management using sound science and applied research to advance the understanding of natural resource function.

Objective 1

Within 2 years, identify and prioritize biological monitoring needs to meet the refuges' goals and objectives. Expand research activities for habitat and wildlife to evaluate the effects of management activities on species diversity and habitat conditions. Conduct applied research to direct management decisions.

Strategies

- Identify and prioritize habitat management research needs.
- Conduct research in collaboration with others on priority needs.
- Encourage research that focuses on the refuges' habitat management goals.
- In cooperation with others, develop step-down management plans.
- Form partnerships with universities and other entities to conduct specific research to identify refuge resources and obtain a better understanding of the effects of management activities.

Rationale and Assumptions

The lack of active management has resulted in sparse biological information regarding these refuges. It will be important to prioritize and plan active and long-term research programs to gather biological data.



Prairie dog.

USFWS

Objective 2

Within 6 years, actively utilize research data to guide management decision making.

Strategies

- Initiate highest-priority studies to enable time to conduct studies and evaluate data.
- Reach out to partners and others to conduct research in highest-need areas.
- Apply for grants, Science Support Program funding, and other funding initiatives to fund applicable research.

Rationale and Assumptions

Research will focus on providing baseline data and achieving identified habitat goals. Projects will be evaluated and limited to those that will answer questions needed for improved refuge management. The scope and impacts of individual and cumulative research projects will be evaluated to ensure minimal disturbance to wildlife. Projects may be delayed or denied if wildlife or habitat impacts are determined to be too great.

Partnerships Goal

Work with partners to determine the wildlife and habitat resources on the refuges, to maximize wildlife habitat protection, and to increase understanding of wildlife needs, as well as the benefits wildlife offer to individuals and communities, on and off the refuges.

Objective 1

Throughout the life of this plan, promote existing partnerships and develop new partnerships to achieve refuge goals and objectives.

Strategies

- Engage in partnerships that result in collecting baseline data for the refuges.

- Work with partners to evaluate mineral holdings, and where applicable, gain mineral rights to protect surface habitats.
- Work with partners to evaluate water rights, and where applicable, gain additional water rights to benefit refuge management for migratory bird species.

Rationale and Assumptions

Partnerships are important to the Service to achieve refuge management goals and objectives. If the Service does not cultivate partnerships, which take time and resources to develop and maintain, opportunities to work with others in conserving wildlife habitat will be missed.

Current partnerships include Albany County Weed and Pest, local landowners, and Wyoming Audubon. Efforts will be increased to focus research-based partnerships on collecting baseline data for the refuges.

Cultural Resources Goal

Identify and evaluate the cultural resources on the refuges and protect those that are determined to be significant.

Objective 1

Within the 15-year life of this plan, accomplish a complete cultural resource survey of those areas of the refuges with a moderate to high potential for cultural resources.

Strategies

- Create a sensitivity model that identifies areas as having a low, medium, or high potential for cultural resources.
- Complete a cultural resource survey, including evaluations and management recommendations, for the moderate and high potential areas.

Rationale and Assumptions

Survey is the best tool available to determine the location of cultural resources on the refuges. Through survey, both historic and prehistoric sites are identified and key information is gathered that promotes planning, research, and educational outreach. Although a few small surveys have been conducted, large-scale surveys are needed to better understand the distribution and nature of the resources. By concentrating on areas with a moderate or high potential for cultural resources, the Service can locate the greatest number of significant sites and work toward their protection and possible interpretation.

Refuge Operations Goal

Secure and demonstrate the effective use of funding, staffing, and partnerships for the benefit of all resources in support of the refuges and the Refuge System.

Objective 1

Within 2 years of plan approval, hire and assign to the Laramie Plains refuges and Pathfinder NWR one full-time Service employee to perform increased management activities on the refuge.

Strategies

- Hire a refuge manager or refuge operations specialist and assign to the Laramie Plains refuges and Pathfinder NWR.
- Increase funding to improve management activities at the refuges.

Rationale and Assumptions

The Laramie Plains refuges are administratively managed by the Arapaho NWR Complex. The complex includes Arapaho NWR, Bamforth NWR, Hutton Lake NWR, Mortenson Lake NWR, and Pathfinder NWR. The current staffing of the complex precludes a dedicated staff member for the three Laramie refuges, which has resulted in minimal management at these refuges.

The Laramie Plains refuges were managed by Service staff headquartered in Laramie until the Arapaho NWR was established in 1967, when headquarters and priorities shifted to Walden, Colorado. Since that time, management of the Wyoming refuges has been minimal.

Through discussions, the planning team determined that the addition of one full-time Service member assigned to the Laramie Plains refuges and Pathfinder NWR would provide adequate staff to actively manage the lands. Refuge management activities would be increased and enhanced, and refuge staff would strive to better understand the effects of management actions on the refuges. An emphasis on adaptive management, including monitoring the effects of habitat management practices and using research results to direct ongoing management, would be a priority.

Bamforth NWR Management Direction

The following goals, objectives, and strategies for Bamforth NWR outline the actions needed to achieve the vision of the Laramie Plains refuges. The Service intends to meet these objectives during the next 15 years.

Natural Resources Goal

Conduct baseline surveys to identify refuge resources and the role these resources serve in the Laramie Basin ecosystem and the Refuge System.

Objective 1

Within 5 years, identify and prioritize biological monitoring needs and gather baseline data to evaluate refuge management needs. Conduct applied research to direct management decisions.

Strategies

- Identify and prioritize habitat management research needs.
- Conduct research in collaboration with others on priority needs.
- Encourage research that focuses on developing plans for the future of this refuge.
- In cooperation with others, evaluate the role Bamforth NWR plays in the Refuge System.

Rationale and Assumptions

The Laramie Plains refuges are primarily native grasslands. The decline of grassland nesting birds has been attributed to habitat loss and conversion, fragmentation, and the disruption of ecological factors, such as fire, which created a mosaic of habitat types across the landscape. As a result, many grassland bird species are now considered species of biological concern (USFWS 2002). Managing natural areas for these bird species involves providing the nesting habitat requirements and food resources essential for their reproduction and survival. These requirements include large, treeless patches containing within them diversity in vegetation structure.

Though these birds have been identified in the area, the Service has no data on the effects of current grazing, condition of uplands, or other biological information due to inactive management. The lack of site-specific biological information on these species' use of refuge lands and personnel dedicated to guide management practices (grazing, rest, prescribed fire) needs to be corrected by gathering data and evaluating such management practices for the benefits they offer to wildlife resources. Baseline information on vegetative structure, composition, and quality as well as water quality are imperative to guide proper management decisions.

Objective 2

Within 6 years of hiring an FTE assigned to Arapaho NWR but responsible for managing the Laramie Plains refuges and the Pathfinder NWR, actively use research data to guide management decision making.

Strategies

- Initiate highest-priority studies to enable time to conduct studies and evaluate data.
- Reach out to partners and others to conduct research in highest-need areas.
- Apply for grants, Science Support Program funding, and other funding initiatives to fund applicable research.

Rationale and Assumptions

A lack of information is hampering management direction. Detailed step-down plans will be developed and implemented as information is gathered. Projects will be evaluated and limited to those that will effectively address the need for improved refuge management. The scope and impacts of individual and cumulative research projects will be evaluated to ensure minimal disturbance to wildlife. Projects may be delayed or denied if wildlife or habitat impacts are determined to be too great.

Hutton Lake NWR Management Direction

The following goals, objectives, and strategies for Hutton Lake NWR outline the actions needed to achieve the vision of the Laramie Plains refuges. The Service intends to meet these objectives during the next 15 years.

Wetlands Goal

Manage refuge impoundments and other wetlands to create diverse habitat for wetland-dependent wildlife.

Objective 1

Over a 5-year average, manage Rush Lake at approximately 60–80 percent emergent vegetation and 20–40 percent open water during the waterfowl breeding season (May–June) for the benefit of colonial nesting birds (white-faced ibis, black-crowned night-herons), as well as other emergent-dependent species (yellow-headed blackbirds, marsh wrens, ruddy ducks, Wilson's phalaropes).

Strategies

- Graze cattle to stimulate or maintain habitat conditions.
- Use prescribed fire to stimulate or maintain habitat conditions.
- Use mechanical manipulation (mow) to stimulate or maintain habitat conditions.

- Manipulate water (flood and drawdown) to stimulate or maintain habitat conditions.
- Develop vegetative monitoring protocol.

Rationale and Assumptions

Previous research has indicated that wetlands with an approximate 50:50 ratio of open water and emergent vegetation (cattails, bulrushes), often termed “hemi-marshes,” attract the highest densities and diversities of wetland birds (Weller and Spatcher 1965). The Wyoming Partners in Flight, Wyoming Bird Conservation Plan (Nicholoff 2003) notes that depending on the situation, cover:water ratios of 65:35 to 35:65 might be considered optimum as well. A good interspersion of vegetation and open water is probably more important than the ratio of the two. Key species of concern on the refuge include white-faced ibis and other birds that require dense emergent cover. White-faced ibis require high amounts of emergent vegetation, such as bulrushes, in their breeding habitat (Dark-Smiley and Keinath 2003).

A habitat model for marsh wrens describes optimum conditions as occurring when there is >80 percent emergent cover (Gutzwiller and Anderson 1987). The emergent vegetation/open water objective for Rush Lake calls for 60–80 percent emergent vegetation to better provide for the habitat needs of the key birds of concern. Wilson’s phalarope will use both fresh and alkali wetlands with three characteristics: open water, emergent vegetation, and open shoreline (Dechant et al. 2003). Though Wilson’s phalarope have been observed, a lack of on-site data concerning water quality and other parameters hamper management actions. From the more freshwater Rush Lake to the more alkaline Creighton Lake, Hutton Lake NWR can provide life-cycle requirements for these bird species, but site-specific information is needed to guide management direction.

Objective 2

Manage Hoge Lake and Lake George to have approximately 70–90 percent open water and 10–30



Wilson’s snipe.

percent emergent vegetation to benefit migratory birds (lesser scaup, gadwall, black tern) for migration habitat needs and brood rearing.

Strategies

Same as objective 1.

Rationale and Assumptions

From the Service’s 1975 “Annual Report” to current day, the lack of good water rights for Hutton Lake NWR and the inability to do more than just fill ponds when possible and watch them evaporate when conditions are dry are constant themes. In the semiarid Laramie Basin, water is a key resource. Because the Service does not own senior water rights, the refuge wetlands are at the mercy of nature and the generosity of adjoining landowners who hold the rights to the water in Sand Creek. Since the 1980s, the water control structures at Hutton Lake NWR have remained in place with no active water management other than the water commissioner opening or closing the headgate on Sand Creek. From Rush Lake water can flow to Lake George or Hoge Lake, or both. Lake George connects to the largest lake, Creighton Lake, and Hoge Lake connects to Hutton Lake. From Creighton Lake to Hutton Lake the area is a closed basin. The closed basin affects water quality, with Creighton Lake exhibiting some alkali characteristics such as white sediments ringing the dry lakeshore. For these reasons, Hutton Lake NWR is primarily an important resting area for migratory birds and a brood-rearing area of local importance.

A habitat model for lesser scaup notes that broods tend to use expansive areas of open water as security and escape cover, and highly suitable conditions are described as having large amounts of open water and as little as 0–50 percent emergent cover (Allen 1986).

During the postbreeding season, gadwalls are found with diving ducks in deeper water habitats; northern shovelers prefer more open permanent water bodies (Murkin et al. 1997). Ruddy ducks’ fall habitat use patterns show a preference for deeper, more open habitats, as they require large open areas to become airborne. Open lake marshes serve as roosting sites during migration for a wide range of species.

Objective 3

Inspect impoundments annually for tamarisk and eradicate any plants found as part of the effort for a zero tolerance of this invasive species on the refuge.

Strategies

- Improve and rehabilitate water control structures on all wetlands.

- Continue to partner with Albany County Weed and Pest for monitoring and control of invasive species.



Open-water wetlands.

Rationale and Assumptions

Tamarisk, in low concentrations, has been found on all lakes on the refuge. Plants have been pulled or sprayed in cooperation with Albany County Weed and Pest. The county surveys the refuge and controls tamarisk annually, and found plants are either pulled or sprayed with herbicides.

Tamarisk effectively displaces native vegetation through competition for available resources and germination sites, offering little suitable habitat for native wildlife (Sudbrock 1993, Lovich 1996).

Objective 4

Within 5 years, evaluate refuge water rights and investigate opportunities for acquiring more water rights. Initiate acquisition of additional water rights where feasible.

Strategy

- Work with USFWS region 6, division of water resources, to evaluate existing water rights, pursue additional water rights, and seek adjudication of existing storage rights.

Rationale and Assumptions

Water rights on the refuge are limited. If water rights were available for purchase, refuge wetlands could be managed to increase the benefit to migratory bird species.

Uplands Goal

Evaluate shrub- and grass-dominated uplands for the benefit of migratory birds (willet, horned lark, vesper sparrow), white-tailed prairie dogs, pronghorn, and other wildlife.

Objective 1

Within 3 years, initiate baseline inventories to identify flora and fauna species composition and distribution, as well as habitat types and their distribution on the refuge. After initial evaluation, develop quantitative objectives and use potential tools (prescribed fire, grazing, rest, invasive species control) as appropriate and supported by sound science and objectives.

Strategies

- Partner with U.S. Geological Survey (USGS), the University of Wyoming, and Colorado State University to develop and implement research objectives.
- Explore grants and other funding sources to provide for research needs.

Rationale and Assumptions

The Laramie Plains refuges are primarily native grasslands. The decline of grassland nesting birds has been attributed to habitat loss and conversion, fragmentation, and the disruption of ecological factors, such as fire, which created a mosaic of habitat types across the landscape. As a result, many grassland bird species are now considered species of biological concern (USFWS 2002). Managing natural areas for these bird species involves providing the nesting habitat requirements and food resources essential for their reproduction and survival. These requirements include large, treeless patches containing within them diversity in vegetation structure.

Many shorebirds also use the refuges. Willet, a breeding shorebird common on the refuges, requires large expanses of short, sparse grasslands for nesting and foraging and wetland complexes for foraging (Stewart 1975, Kantrud and Higgins 1992, Dechant et al. 2003). In both upland and wetland habitats, adults with broods use somewhat taller, denser grass cover than do breeding pairs during nesting (Ryan and Renken 1987). Willets also prefer native grass to tame vegetation (Stewart 1975, Kantrud and Higgins 1992, Dechant et al. 2003) and shallow-water wetlands with short, sparse shoreline vegetation. Suitable wetlands range from fresh to saline and vary widely in size and permanence (Dechant et al. 2003).

A common upland bird to the area is the horned lark. Horned larks have been observed on the refuge, but most surveys of the area have concentrated on

wetland areas. A lack of data on upland birds' use of the refuge hampers upland management decisions.

Though horned larks have been identified in the area, the Service does not have any data on the effects of current grazing, condition of uplands, or other biological information due to a lack of monitoring. The lack of site-specific biological information on these species' use of refuge lands and personnel dedicated to guide management practices (prescribed fire, grazing, haying, and mowing) needs to be corrected by gathering data and evaluating such management practices for the benefits they offer to wildlife resources. Baseline information on vegetative structure, composition, and quality as well as water quality are imperative to guide proper management decisions.

Objective 2

Within 10 years, identify and map invasive plant infestations (other than tamarisk) and initiate control procedures. Determine target percent control following this process.

Strategies

- Continue and improve partnership with Albany County Weed and Pest for noxious weed management using all appropriate known strategies such as chemical, biological, cultural, and mechanical controls.
- Use prescribed fire to reduce and control invasive species.

Rationale and Assumptions

For native birds to be retained, invasive plants must be controlled (Marzluff and Ewing 2001). Invasive species pose a serious threat to existing fish and wildlife resources. Once invasive plants are present, it is important to maximize efforts to gain control of them. Currently, there are no large infestations. Continued monitoring, improved by hiring a dedicated Service employee for the Laramie Plains refuges, will ensure that any noted invasive plants will be mapped and control procedures will be initiated.



Pronghorn.

USFWS

Visitor Services Goal

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

Objective 1

Within 5 years of plan approval, enhance nonconsumptive wildlife-dependent recreation by developing a visitor services plan and supporting facilities to address refuge activities, access, and circulation.

Strategies

- Develop visitor services plan.
- Establish a formal parking area with informational kiosks and brochures.
- Provide walk-in access and accessible trails with markers to designate walking trails to the best wildlife-viewing areas.
- Close roads where necessary to facilitate implementation of visitor services plan and decrease disturbance to wildlife, discourage illegal hunting, and improve maintenance.
- Update refuge informational brochures and wildlife list to Service standards.
- Construct accessible photography blinds on Lake George and Rush and Hutton lakes.
- Provide educational materials on wildlife photography techniques.
- Provide an annual educational opportunity with experienced wildlife photographers sharing their expertise.

Rationale and Assumptions

The lakes provide wildlife-viewing and wildlife photography opportunities. The public can observe and enjoy a variety of wildlife including white-tailed prairie dogs, raptors, waterfowl, shorebirds, and other migratory species.

Currently roads consist mainly of two tracks randomly traversing the refuge in an undefined pattern. Vehicles traveling on the two tracks create new roads and trails when conditions are muddy or when pursuing a wildlife-viewing opportunity not near a roadway. Conducting a site circulation assessment and closing refuge roads where needed would reduce law enforcement issues and foster a quiet, quality wildlife-dependent recreational opportunity.

Objective 2

Within 10 years of plan approval, improve wildlife educational opportunities.

Strategies

- In cooperation with University of Wyoming, Wyoming Audubon, and others, offer scheduled environmental education opportunities at Hutton Lake NWR.
- Create programs for students and volunteers to assist in refuge management activities.
- Provide educational opportunities to local youth organizations such as Boy Scouts and Girl Scouts.

Rationale and Assumptions

The public should be made aware of the Refuge System in general and this refuge in particular, as well as the benefits refuges provide to wildlife and the community. The refuge's proximity to Laramie makes it accessible for environmental education opportunities from kindergarten through college.

Mortenson Lake NWR Management Direction

The following goals, objectives, and strategies for Mortenson Lake NWR outline the actions needed to achieve the vision of the Laramie Plains refuges. The Service intends to meet these objectives during the next 15 years.

Wetlands Goal

Following considerations for Wyoming toad needs, manage refuge impoundments and other wetlands to create diverse habitat for wetland-dependent wildlife.



American avocet.

USFWS

Objective 1

Within 8 years, develop and implement protocols for increased water management and monitoring of water quality on Garber, Gibbs, and Soda lakes for the benefit of migrating waterfowl and for the

nesting and feeding benefits of shorebirds and other water-dependent birds.

Strategies

- Work with the USFWS region 6, divisions of water resources and ecological services, to resolve water-quality issues.
- Develop an infrastructure improvement plan for dikes, water-control structures, and ditches.

Rationale and Assumptions

High alkalinity in Garber, Gibbs, and Soda lakes reduces habitat suitable for the toad. These lakes are known to have alkalinity problems, but no specific data is available. Gibbs Lake is surrounded by short-grass prairie with little wetland vegetation, which also limits habitat for the toad.

In 1993, a flow-through system was installed on Garber Lake in an attempt to reduce the alkalinity to improve habitat for the Wyoming toad. Waterfowl, shorebirds, and other wetland-dependent birds currently use the three lakes, but increased water management (water-level control, flushing water through the system) and water quality could improve the lakes for a greater benefit to these birds as well as the Wyoming toad.

Objective 2

Within 5 years, investigate the opportunities for acquiring more water rights and initiate the acquisition on any feasible possibility.

Strategies

- Work with USFWS region 6, division of water resources, to pursue additional water rights and seek adjudication of existing storage rights.
- Purchase upgradient irrigated acreage, which supplies runoff and seepage to the refuge before it is dried up and subdivided.

Rationale and Assumptions

Water rights on the refuge are limited, with water sources being runoff from melting snow, natural springs, and water from return flows off land irrigated by the Pioneer ditch. The refuge does not own any A or B shares on the Pioneer ditch (USFWS 1992). A refuge neighbor owns some of these shares and uses them to help the refuge irrigate some lands around Soda Lake. This irrigation water also helps water flow through Soda Lake into Gibbs Lake. The refuge does have storage rights on Soda, Harmon, and Mortenson lakes, but none of the rights are adjudicated. If water rights

were available for purchase, the refuge wetlands and irrigation lands would benefit greatly if the Service could acquire them.

Uplands Goal

Following consideration for Wyoming toad needs, manage shrub- and grass-dominated uplands for the benefit of migratory birds (willet, horned lark, vesper sparrow), white-tailed prairie dogs, pronghorn, and other wildlife.

Objective 1

Within 3 years, initiate baseline data studies to identify flora and fauna species composition and distribution, as well as habitat types and their distribution on the refuge. Conduct adaptive management over the life of the plan.

Strategies

Same strategies as Hutton Lake NWR Uplands objective 1.

Rationale and Assumptions

Same rationale and assumptions as Hutton Lake NWR Uplands objective 1.

Objective 2

Within 5 years, identify and map invasive plant infestations and initiate control procedures. Determine target percent control following this process.

Strategies

Same strategies as Hutton Lake NWR Uplands objective 2.

Rationale and Assumptions

Same rationale and assumptions as Hutton Lake NWR Uplands objective 2.

Wyoming Toad Goal

In conjunction with the Wyoming Toad Recovery Team, manage refuge lands around Mortenson Lake and other areas on the refuge as necessary to protect, create, and manage habitat suitable for Wyoming toad recovery from endangered status.

Objective 1

Maintain 40 percent of the habitat over a 5-year average in the moist margin of Mortenson Lake proper with 35–39 percent horizontal vegetative cover (dominant species: American bulrush and creeping spike, or species with similar morphology)

and 20 percent open areas in mosaic conditions for metamorphs and juvenile (<2-year-olds) Wyoming toads.

Strategies

- Graze cattle to stimulate or maintain habitat conditions.
- Use prescribed fire to stimulate or maintain habitat conditions.
- Use mechanical manipulation (mow) to stimulate or maintain habitat conditions.
- Manipulate water (flood and drawdown) to stimulate habitat conditions.
- Develop vegetative monitoring protocol.

Rationale and Assumptions

Two master's theses (Withers 1992 and Parker 2000), background information, and the Wyoming Toad Recovery Team indicate that the habitat conditions detailed above are beneficial to the growth and survival of the Wyoming toad. Vegetative type and percent cover for metamorphs and juveniles are based on Withers's study, with the lower percentage used more by the metamorphs and the higher percentage used more by the juveniles. The vegetative percentage cover for adults is based on Parker's study. The vegetative cover percentages are based on the habitat as a whole, with each cover fulfilling a part of the habitat for a total of 100 percent. The lake's moist margin is defined as the area of ample soil moisture favored by the Wyoming toad at Mortenson Lake. On a 4-point moisture scale (1 = dry, 2 = moist, 3 = saturated, 4 = standing water), Wyoming toads use moist 2.0 to supersaturated 3.6 soils (Withers 1992).

One report questions Parker's habitat-use data because none of the toads in his study were wild: "The determination of habitat use and preference is fraught with difficulties such as spatial and serial autocorrelation, nonindependence of proportions, and definitions of habitat availability" (Drietz 2006). Parker also questions Withers's claim of habitat cover needs for adult Wyoming toads in an article in the "Journal of Wildlife Management." He states that adult toads used habitat with more vegetation cover than was documented in the past (Parker and Anderson 2003).

The objectives for the Wyoming toad are based on the best available science. As research becomes available, the objectives will change to reflect new data and knowledge.

Objective 2

Maintain 40 percent of the habitat over a 5-year average in the moist margin of Mortenson Lake

proper with a mean of 55 percent horizontal vegetative cover (dominant species: American bulrush and creeping spike, or species with similar morphology) and 20 percent open areas in mosaic conditions for adult Wyoming toads.

Strategies

Same as objective 1.

Rationale and Assumptions

Same as objective 1.

Objective 3

Manage water levels on Mortenson Lake to mimic conditions prior to refuge establishment with drawdowns starting in early May. Maintain water levels in late May or early June for egg masses. Prior to initiating another drawdown, conduct surveys for egg masses to determine if hatching has occurred. Once hatching is completed, begin another drawdown and continue to draw down until about mid-July to provide basking areas for adults and shallow warm water for tadpoles.

Strategies

- Conduct egg mass surveys.
- Conduct breeding calling surveys.



Damselflies mating.

USFWS

- Develop monitoring protocols.
- Monitor water quality.

Rationale and Assumptions

Two master's theses (Withers 1992 and Parker 2000), background information, and the Wyoming Toad Recovery Team indicate that the water-level manipulation described above should enhance Wyoming toad habitat. This drawdown effort is an attempt to mimic prerefuge management of Mortenson Lake. The Recovery Team believes that the management practice over the past 15 years of keeping the lake full throughout the spring and into the summer may be a factor in the perceived decline of Wyoming toads at Mortenson Lake. Prerefuge water manipulations would create shallow stable water 3.5–6.3 centimeters deep for egg development, warm shallow water for tadpoles, and eventually dry moist areas for adult toads to bask in (Withers 1992). Draw down of Mortenson Lake would be approximately 1.6 feet over the 3-month time frame.

Objective 4

Continue to work with the Recovery Team following their recommendations for habitat conditions for the Wyoming toad as new science emerges.

Strategy

- Continue to have a Service staff member participate as a member of the Recovery Team.

Rationale and Assumptions

The Recovery Team is on the forefront of all new science concerning the toad. The team's recommendations will reflect the most up-to-date science and on-the-ground experience.

STAFFING AND FUNDING

Currently, the Arapaho NWR Complex has a staff of five full-time employees. All five employees work in the complex with duties at Arapaho NWR, the three Laramie Plains refuges, and Pathfinder NWR near Casper, Wyoming. Table 4 lists these positions, along with one new position (specifically assigned to the Laramie Plains refuges and Pathfinder NWR) that is needed for full implementation of the CCP. Projects required to carry out the CCP are funded through two separate systems, as follows:

- The refuge operations needs system (RONS) is used to document requests to Congress for funding and staffing needed to carry out projects above the existing base budget.

Table 4. Current and proposed staff for the Arapaho NWR Complex, including Arapaho NWR, Colorado, and Bamforth NWR, Hutton Lake NWR, Mortenson Lake NWR, and Pathfinder NWR, Wyoming.

	<i>Current Positions</i> GS=General Schedule Positions WG=Wage Grade Positions	<i>Additional Proposed Positions</i> (Unfunded staffing)
<i>Management Staff</i>	refuge project leader, GS-12* refuge operations specialist, GS-11*	refuge operations specialist, GS-9
<i>Biological Staff</i>	wildlife biologist, GS-9*	no additional positions
<i>Visitor Services Staff</i>	None	none
<i>Administrative Staff</i>	administrative assistant, GS-8*	no additional positions
<i>Maintenance Staff</i>	maintenance worker, WG-8*	no additional positions
<i>Law Enforcement Staff</i>	none	none
<i>Fire Management Staff</i>	none	none

*This position supports the Laramie Plains refuges but is assigned to the Arapaho NWR Complex and works at all five stations.

- The Service asset maintenance management system (SAMMS) is used to document the equipment, buildings, and other existing properties that require repair or replacement.

STEP-DOWN MANAGEMENT PLANS

The CCP for the Laramie Plains refuges is intended to be a broad umbrella plan that (1) outlines general concepts and objectives for habitat, wildlife, visitor services, cultural resources, and partnerships; and (2) guides refuge management for the next 15 years. Step-down management plans provide greater detail for carrying out specific actions authorized by the CCP. Table 5 presents step-down management plans for the refuges that are anticipated to be needed, along with their current status and next revision date.

MONITORING AND EVALUATION

Adaptive management is a flexible approach to long-term management of biotic resources. Adaptive management is directed, over time, by the results of ongoing monitoring activities and other information.

More specifically, adaptive management is a process by which projects are carried out within a framework of scientifically driven experiments to test the predictions and assumptions outlined with a CCP (figure 18).

To apply adaptive management, specific survey, inventory, and monitoring protocols will be adopted for the Laramie Plains refuges. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and determine how effectively the objectives are being accomplished. If monitoring and evaluation indicate undesirable effects for target and

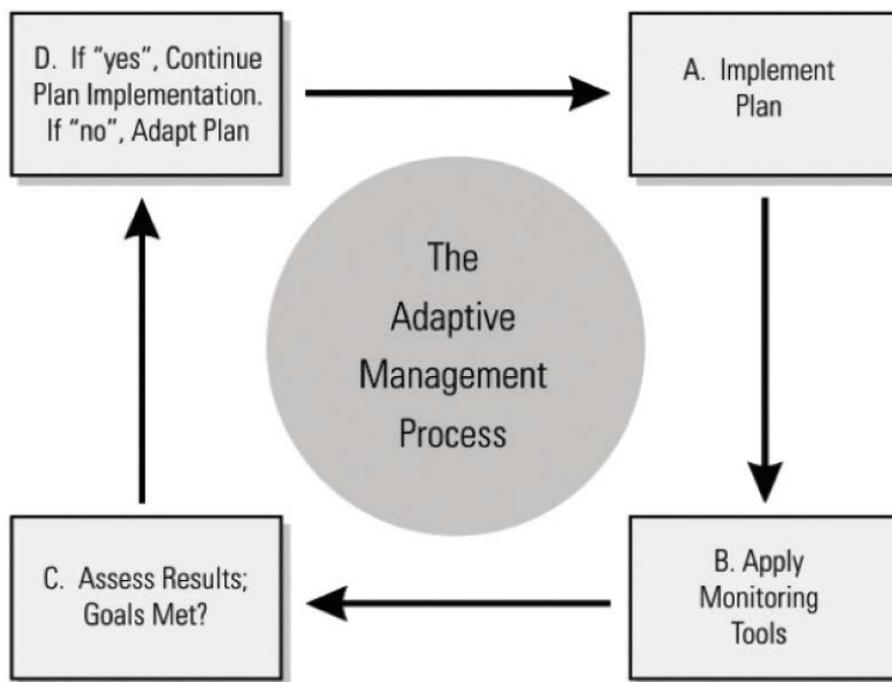


Figure 18. The adaptive management process.

Table 5. Step-down management plans for the Laramie Plains refuges, Wyoming.

<i>Step-down Management Plan</i>	<i>Completed Plan, Year Approved</i>	<i>New or Revised Plan, Completion Year</i>
Fire management plan	2001	2009
Habitat management plan	—	2012
Habitat management plan (annual)	—	2009
Integrated pest management plan	2007	N/A
Law enforcement plan	—	2017
Safety plan	Under plan for Arapaho NWR Complex	2008
Visitor services plan (applies only to Hutton Lake NWR)	—	2010
Water management plan	2007	N/A

