ENVIRONMENTAL ASSESSMENT

FOR THE PREPARATION OF THE

COMPREHENSIVE CONSERVATION PLAN

FOR THE MANAGEMENT OF

ARAPAHO NATIONAL WILDLIFE REFUGE

Walden, Colorado

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Purpose for Taking Action

To manage riparian, wetland, meadow, and upland habitats, for the benefit of their associated wildlife and plant resources and the availability of compatible public uses at Arapaho NWR for the present and future generations of Americans, in accordance with:

a) the establishing purposes of the Refuge, which are:

1. ". . . for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

2. ". . . for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . ." 16 U.S.C. 742f(a)(4) ". . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . . " 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

b) the goals of the National Wildlife Refuge System:

1. To fulfill our statutory duty to achieve Refuge purpose(s) and further the System mission;
2. Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered;
3. Perpetuate migratory bird, inter-jurisdictional fish and marine mammal populations;
4. Conserve a diversity of fish, wildlife, and plants;
5. Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems;
6. To foster understanding and instill appreciation of fish, wildlife and plants and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation, and photography, and environmental education and interpretation.

c) the goals set forth by the staff of the Arapaho NWR, which are:

Riparian Habitats Goal :"*Provide a riparian community representative of historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for migratory birds, mammals and river dependent species.*"

Meadow Habitats Goal: "*Provide and manage irrigated, grassland dominated meadows historically developed for hay production, to support sage grouse broods, waterfowl nesting, and meadow dependent migratory birds.*"

Wetland Habitats Goal: "*Provide and manage natural and man-made permanent and semipermanent wetlands (in three wetland complexes) to provide habitat for migratory waterfowl, shorebirds, wading birds and associated wetland-dependent wildlife.*"

Upland Habitats Goal: "*Provide a sagebrush/grassland upland community representative of the historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for sage grouse, large mammals and other shrub associated species.*"

Public Uses Goal: "*Through wildlife-dependent recreation and education, people of a range of abilities and interests are able to learn of and appreciate the natural resources of this unique high mountain park. Thereby, citizens become better stewards of nature in their own communities and stronger supporters of the Refuge specifically and National Wildlife Refuge System generally.*"

Cultural Resources Goal: "*The cultural resources of the Refuge are preserved, protected, and interpreted for the benefit of present and future generations.*"

Research Goal: "*The Refuge is a learning platform for compatible research that assists management and science of high mountain park sage-steppe communities.*"

Partnerships Goal: "*A wide range of partners join with the Fish and Wildlife Service in promoting and implementing the Refuge vision.*"

Need for Taking Action

Congress passed in 1997 the National Wildlife Refuge System Improvement Act (Public Law 105-57) amending the National Wildlife Refuge System Administration Act of 1966 to improve the management of the System and for other purposes. With the passage of this Act, Congress made it mandatory for each station of the System to prepare a Comprehensive Conservation Plan (CCP) and its associated Environmental Assessment (EA) and/or Environmental Impact Statement (EIS).

Passage of the 1997 Improvement Act created the need and opened the opportunity for the staff at Arapaho NWR to prepare a CCP with which to review its current management strategies, assess possible improvements to the management of the Refuge, and implement the new management plan.

Thus, Arapaho NWR is compelled, by the Improvement Act of 1997, to prepare a CCP and this EA to assess impacts to the environment as a result of the implementation of the preferred alternative (i.e., the CCP).

Decisions that Need to be Made

The Refuge Manager, in concert with the rest of the Refuge staff and the Refuge Supervisor, needs to choose the management alternative that best meets the goals of the Refuge and of the System, and helps to achieve the congressionally mandated purposes of the Refuge (preferred alternative) from among all the action alternatives developed. The Refuge Manager is also required to determine whether the preferred alternative could have a significant impact on the quality of the physical, biological, and human environment.

Issues Identified and Selected for Analysis During the Project Planning and Public Scoping

The Service, in collaboration with Colorado State University, prepared a stakeholder involvement plan to optimize public involvement in the CCP process, especially in the collection of preliminary public comments during the scoping process. Then the Service organized and publicized public scoping meetings in 2001. The first one took place in Walden (Colorado) on February 15 in Walden; the second was held in Fort Collins (Colorado) on February 16. Additionally, the Service held several meetings with the Colorado Division of Wildlife and the Bureau of Land Management at or in the area of the Refuge. Furthermore, the Service established contact with three Native American tribal governmental organizations with stake at the site where Arapaho NWR is located to solicit comments and request their participation in the CCP process. The following is a compilation of all the concerns raised as a result of the Service's effort to reach out to all possible stakeholders, which included the public in general, local landowners, local government agencies, conservation groups, and elected State and Federal representatives.

Habitat Management

Refuge staff, local Colorado Division of Wildlife (CDOW) representatives, and personnel from the Region 6 Planning Division, other Federal agencies (i.e., USGS-BRD, BLM) and local universities (i.e., CSU) agreed that the Refuge habitats should be managed to achieve their maximum biological potential, with their whole array of associated species, rather than emphasizing only the production of a certain number of target waterfowl species. They also felt that while fire is an important ecological management tool and component of a healthy ecosystem, it is really not readily applicable as a habitat management tool in Arapaho NWR given the prevalent climatological conditions in North Park. Further concerns of the Refuge and CDOW personnel included the increasing numbers of elk present at the Refuge, and North Park mainly in the winter, the impact these ungulates might be having on Refuge habitats and other wildlife, and possible ways of controlling their numbers and impacts on adjacent lands. Concerns were also expressed by Refuge personnel, local ranchers and locally elected officials, as well as by conservation groups, as to the future of the grazing program, as a habitat management tool, in Arapaho NWR if the habitats are to be managed to for a larger diversity of species by seeking to achieve a maximum biological potential. Finally, there were concerns from conservation groups regarding the level of management or manipulation of habitats by Refuge personnel and questioning how much management is good and necessary.

Wildlife and Fisheries

Refuge and CDOW expressed concern as to the status of sage grouse populations in North Park and the need to manage them more closely. Some groups expressed a need to enhance sage grouse habitats and stop hunting of this species to protect the populations. Several groups expressed interest in knowing how and if beavers, predators, and weeds are controlled in the Refuge and whether this control might continue in the future. Some groups also expressed interest in finding out what are the fisheries resources in the Refuge and whether there might be ways to preserve and improve this resource. Some people expressed that some kinds of wildlife (e.g, elk) should receive "sanctuary" from hunting pressure while on the Refuge. Some in the Refuge expressed that while the management emphasis of the Refuge had been waterfowl since the creation of the Refuge, in response to declining waterfowl numbers in the 1960s and 1970s, that the Refuge should now be managed to also provide necessary habitats and elements to other declining species, mainly neotropical migratory birds and shorebirds.

Public Uses

Refuge and CDOW personnel see the CCP as a good opportunity to analyze the full range hunting opportunities for the public. Some people want to know more about public uses and opportunities in the Refuge, how Refuge compatibility works, and why certain uses are not permitted on the Refuge. Some expressed disappointment at current fishing restrictions and others wanted to find out if the Refuge could provide more environmental education and interpretation, especially being so close to Walden and the Front Range of Colorado.

Socio-Economic Issues

Among local residents, considerable interest exists in finding out how the Refuge existence and activities contribute to the local (county and town) economy, and whether the CCP could be a vehicle to stimulate economic development in the area of the Refuge, especially for local entrepreneurs, such as developing infrastructure outside of the Refuge. Many concerns were expressed both with the Refuge staff and the local ranchers as to what economic and social impacts could occur as a result of modifications to the current grazing program in the Refuge. Local ranchers and other stakeholders expressed their support for grazing as a valuable habitat management tool, especially in light of the limited opportunities to use prescribed fire in North Park. Many stakeholders want to see the CCP address the Refuge's grazing program in detail to assess its role in habitat management for wildlife. Furthermore, many stakeholders also want to see the CCP address in detail the Refuge's water management and its impacts to the North Park sub-ecosystem, especially in light of current drought conditions in Colorado, and maybe explore the possibility of establishing another reservoir for water storage and wildlife use in the Refuge.

Miscellaneous Issues

Some stakeholders want to know if the Refuge is planning on expanding its boundaries and what the history is of the establishment of the Refuge. Some other stakeholders want the CCP to address issues such as: opportunities for research at the Refuge; federally-listed species or species of special concern occurring at the Refuge and their management/protection; historical management of the Refuge lands; use compatibility - what is it and how is it determined; what type of development is likely to occur in North Park and how the Refuge can contribute to the preservation of North Park's ranching heritage; interactions between Refuge personnel and North Park residents; historical and archaeological resources and studies at the Refuge - what is the current status.

II: Alternatives Evaluated, Including Preferred Alternative

Focus of Evaluated Alternatives

Alternative A: No Action

The No Action alternative would continue management of existing habitats, wildlife, programs, and facilities at current levels and would not include active management and restoration of riparian and upland habitats or extensive management of wetland habitats. Interpretive, educational, and administrative programs and facilities would not change.

Refuge management would continue at current levels. The main management tool for the meadows, riparian, and uplands would be grazing. Grazing would take between 8,000 to 9,500 Animal Unit Months (AUMs) used each year through various grazing practices including year rotational, high intensity, and rest. Fire would continue to play a very minimal part in habitat management. Noxious weed control would continue at the same level but would not be expanded. Water management would consist of flood irrigation of the meadows and filling of wetlands as early as possible in the spring.

The No Action alternative would not involve restoration of riparian habitats or expansion of existing dense cattail/bulrush habitat. Existing riparian habitat would support the nesting neotropical birds they have in the past. No new effort would be made to manage and improve riparian habitat for neotropical birds. River flows would continue to be diverted for wetlands without regard for possible improvements to existing riparian habitat if flow levels were altered.

Wetland management emphasis would continue to focus on waterfowl production. All wetlands would be filled each spring and kept full as long as water conditions allowed to create pair, brood, and molt water for waterfowl. No new actions would be planned to improve the water use, wetland submergent vegetation, or shorebird habitat.

Access roads would be managed as they currently are with minor upgrades and regular maintenance. Recreational opportunities would include current programs available under existing approved plans. Fishing would be allowed on the Illinois River from August 1 through June 1. Pronghorn antelope, sage grouse, small game, and waterfowl hunting would be allowed but no trapping.

Public use facilities would remain essentially the same and would be maintained. No new interpretive signs, exhibits or viewing opportunities would be developed. Refuge law enforcement would continue at existing levels. Environmental education and outreach would continue at the current level. No additional partners or funding would be pursued.

Complex funding would remain at the level needed to support current staffing and programs.

Alternative B

The focus of this alternative is Arapaho National Wildlife Refuge's role in the North Park "sub-ecosystem." This includes acknowledging Arapaho's role as not only a part of the natural systems of North Park, but also the social, cultural, recreational, and economic systems of the region. This means giving consideration to the idea that Arapaho NWR, in addition to providing quality habitat for migratory birds and other wildlife, can provide educational and recreational opportunities for local residents and other visitors, which could report an economic benefit to the local economy. This alternative never loses sight of the fact that Arapaho is a wildlife refuge first and foremost, meaning it cannot provide for every possible use. It can, however, take advantage of its distinction as a wildlife refuge to provide opportunities that may not be available elsewhere in the Park. Conversely, it may choose not to provide some opportunities that are available elsewhere.

Under this alternative, the habitat management decisions are made with the entire North Park landscape in mind. The Refuge cannot be all things to all wildlife. It can, however, determine its best role given habitat conditions and potential and management constraints on other lands within the Park, both public and private. With this landscape, or ecosystem approach, the management of some habitats on the Refuge may change in order to accommodate actions elsewhere in the Park that will improve the overall quality of wildlife habitat in North Park. These off-Refuge actions may take place through the Services' already established Private Lands program (Partners for Fish and Wildlife) or new and existing partnerships with Federal, State, and local agencies, organizations, and individuals. For instance, Service resources devoted to one habitat type on the Refuge may be reduced if it finds that same habitat type may be provided more efficiently and with higher quality elsewhere in the Park by working with a willing partner. Or, conversely, it may decide to invest more resources into a Refuge habitat if good opportunities for providing that habitat elsewhere in the Park are limited or impractical. In essence, this alternative looks to spread the 'biological good' across the North Park landscape instead of placing all the emphasis on Refuge lands only. The benefit to this approach is that wildlife habitat across the landscape is optimized as resources available to the Service and its partners will be directed to where they can do the most good for wildlife and habitat.

This alternative would also look for ways to contribute to North Park's "story" through activities that are compatible with the Refuge's purpose and mission. Wildlife and their habitats are, without doubt, the Refuge's primary management foci. Within this context are opportunities to help convey information about the historical and current uses of the Refuge, their impacts on the land and people of North Park, and how land management and uses elsewhere in the Park affect the Refuge.

Key to this alternative's success is partnering with other State and Federal agencies, private and public organizations, and individuals to achieve mutually beneficial goals for the Refuge and North Park. For instance, the Service may enter into a partnership with the Bureau of Land Management, the Forest Service, and area ranchers to determine a grazing strategy for North Park that meets both cattle production and wildlife habitat goals, acknowledging that grazing can be a beneficial habitat management tool if applied appropriately.

Alternative C

This alternative represents achieving the goals, vision, and purposes of the Refuge by manipulating Refuge habitats so that these habitats reach the apogee of biological potential, and thus support a well balanced and diverse flora and fauna representative of the North Park region. This alternative de-emphasizes the previous management emphasis on numbers of wildlife "produced" by the Refuge and expands the Refuge's biodiversity focus beyond waterfowl only.

Alternative D: Preferred Alternative

This alternative could be named the "modified B" alternative as it encompasses most of the objectives and strategies of Alternative B, with some additions from Alternatives A and C. The Preferred Alternative (proposed action) places great importance in the role that Arapaho NWR has in the North Park "sub-ecosystem," both for the environment and the residents of North Park. Under this alternative, wildlife and the habitats upon which they depend, come first in the management of the Refuge and all other uses are subordinate to the needs of wildlife. Under this alternative, the Refuge provides wildlife-dependent compatible public uses that are not available elsewhere in North Park. Under this alternative, many habitat management decisions take into account the entire North Park landscape and not only the lands within the Refuge boundaries. Under this alternative, the Refuge seeks to participate fully in the future of the entire North Park landscape and be a conservation force that promotes sound wildlife and habitat management as well as help in the preservation of the North Park historical heritage. In order for this alternative to be successfully implemented, the Refuge relies heavily on partnerships with State and Federal agencies, private and public organizations, and individuals.

Under this alternative, the focus of the Refuge is to achieve its congressionally designated purposes by devoting staff, equipment, and partnership resources solely within the Refuge boundaries. Compatible priority public uses continue and are moderately expanded where personnel and funding allow and where Refuge habitats, plants, and wildlife resources are not adversely impacted by public use. Cultural resources under this alternative will continue to be protected but no interpretation will occur beyond what is already in place. The environmental education programs under this alternative would focus solely on how and why the Refuge intensively manages its habitats to achieve Refuge goals.

Alternative A (No Action):

Riparian Habitats

Alternative A (No Action)

1. Objective: Protect foraging and roosting habitat for occasional use by peregrine falcons and bald eagles to ensure that these federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands.

   Strategies:
   - Protect existing cottonwoods along the Illinois River as perch poles for eagles.
   - Maintain diverse Refuge habitats to offer prey base for eagles and falcons.

   Rationale: Bald eagles and peregrine falcons utilize the Refuge on an occasional basis, with falcons typically seen in the spring through fall and eagles fall through spring. The Refuge has little tall woody vegetation, which makes the few cottonwoods along the Illinois River and utility poles the only high perches available on the Refuge. These birds do not nest on the Refuge, so their only use is for foraging. Maintaining a prey base allows for potential use when the animals pass through.

2. Objective: Develop and manage nesting and brood-rearing habitat contributing to the production of 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually.

   Strategies:
   - Utilize grazing, prescribed fire, and rest to invigorate and maintain adequate nesting habitat in riparian associated grasslands and for brood-rearing benefits along streambanks.
   - Develop a monitoring protocol to determine condition of grasslands within riparian zones.
   - Monitor waterfowl production annually and correlate to habitat conditions to help confirm or refute habitat objectives.
   - Utilize existing ditches to irrigate meadows within riparian zones to invigorate vegetative growth.

   Rationale: The Refuge was purchased with Duck Stamp funds to benefit migratory birds and has a goal of providing high quality breeding habitat for waterfowl. Most waterfowl require large expanses of grasses of medium to tall height with a component of dead vegetative material, or duff, mixed in. The hydrology, combined with irrigation in the riparian zones, produces vigorous grass and forb growth in good water years. These areas can become decadent with too much dead material and require periodic disturbance in the form of grazing or fire. Similarly, thick grasses and willows associated with streambanks are important as escape cover for waterfowl broods. Monitoring vegetative characteristics and waterfowl use and production will aid in deciding when manipulation is required. It is anticipated that on average ½ to 3/4 of the area will be grazed annually by cattle at an average rate of 1.0 AUM per acre resulting in removal of 2,475 to 3,700 AUMS of forage. Irrigation aids in producing grass and forb growth and maintaining higher water tables for streambank vegetation.

3. Objective: Manage predator populations to help ensure an annual Refuge-wide minimum of 40 percent Mayfield nesting success for waterfowl.

   Strategies:
   - Monitor waterfowl nest success by conducting nest searches and calculating nest success using the Mayfield method.
   - Monitor predator use of the Refuge with predator surveys.
   - Write a predator management plan outlining steps to take when Mayfield nest success is below 40 percent on the Refuge.

   Rationale: A 40 percent nest success using the Mayfield calculation method will indicate a general population increase of waterfowl on the Refuge. The only way to properly calculate this number is by monitoring nest success. A predator survey and management plan are necessary to work in-kind with nest studies to identify steps needed to address decreased nest success if causes are due to predation.

4. Objective: Improve, restore, and protect the Illinois River riparian habitat for the benefit of brown trout, mule deer, elk, moose, and various other species of wildlife that utilize the area.

   Strategies:
   - Utilize grazing, prescribed fire, and rest to maintain/enhance riparian areas.
   - Develop a riparian monitoring plan to identify condition of willows, streambanks, and hydrology issues associated with riparian zones.
   - Willow and cottonwood plantings may be used by themselves or in combination with fenced exclosures to reestablish or expand woody vegetation where needed.

   Rationale: Grasslands within riparian floodplains are used by a variety of wildlife including elk and various migratory birds. These areas can become decadent and require treatment to invigorate them. A healthy woody component in the riparian area is critical to maintaining diverse wildlife, serving as cover, food, streambank stability, and shade for the stream. Planting willows will help extend existing willow stands, and will likely require construction of 8 foot fences to exclude all large herbivore use for at least 3 to 5 years. Monitoring is important to identify condition of these habitats and management actions that may be necessary.

Wetland Habitats

Alternative A (No Action)

1. Objective: Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these and other federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands.

   Strategies:
   - Water level manipulation.
   - Rehabilitate and maintain existing dikes and infrastructures.
   - Develop and implement annual water management plan.

   Rationale: Refuge wetlands are managed to provide diverse habitats which offer a potential forage base for peregrine falcons and bald eagles.

2. Objective: Develop and manage approximately 839 acres of foraging, pairing, nesting, and brood-rearing habitat contributing to the production of 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, spring fillings, and maintaining water levels during summer and fall when possible.
   - Use tilling of dry wetlands as a habitat management tool.
   - Wetland construction.
   - Rehabilitate and maintain existing dikes and infrastructures.
   - Conduct brood counts of waterfowl and geese.
   - Maintain approximately 100 goose nesting structures within the wetlands.
   - Monthly surveys of waterfowl and goose use of wetlands.
   - Develop and implement a submergent/emergent vegetation monitoring plan.
   - Establish a wetland database including the surface acres and acre-feet of all Refuge wetlands.
   - Develop and implement an annual water management plan.
   - Acquire legal storage rights on all Refuge wetlands.

   Rationale: The Refuge is managing these wetlands primarily for waterfowl and goose production. Water management is key to providing the habitat needs for waterfowl foraging, escape cover, nesting, and brood-rearing. Filling wetlands in the spring attracts birds to the area and maintaining these levels with flowing water provides forage, brood, and molting habitat for waterfowl. Drawdowns are used to produce a variety of wetlands interspersed with open water and emergent vegetation. Tilling the wetland loosens the soil crust and combines the soil and vegetation to enhance the nutrient cycle. Drawdowns and tilling of the wetlands helps to stimulate submergent/emergent vegetation growth which provides seeds and the substrate necessary for invertebrate populations to grow for foraging waterfowl and geese. The emergent vegetation is also critical in raising broods, providing foraging habitat, and escape cover. Monitoring water birds and the vegetation is fundamental to understanding the affects of management practices. Legal storage water rights are essential in maintaining existing wetlands.

Alternative A (No Action)

3. Objective: Improve the condition, vigor, and productivity of Refuge wetlands for the benefit of shorebirds, wading birds, and other wetland dependent species.

   Strategies:
   - Water level manipulation, including partial and full drawdowns, and maintaining water levels in wetlands from spring to fall when possible.
   - Rehabilitate and maintain existing dikes and infrastructure.
   - Transplant cattail and hardstem bulrush into wetlands.
   - Monitor shorebird numbers to estimate use.
   - Conduct colonial nesting surveys.
   - Monthly wetland bird use surveys.
   - Develop and implement an annual water management plan.

   Rationale: Maintaining a diversity of habitats throughout the annual cycle will provide food, nesting, and brood-rearing for many wetland associated wildlife. A variety of water manipulation strategies are useful in this endeavor. Partial drawdowns provide nesting, foraging, and brood-rearing areas for shorebirds. Full drawdowns stimulate the emergent vegetation providing nesting substrate, brood-rearing, foraging, and cover for wetland dependent species such as eared grebes, pied-billed grebes, and American coots. Efforts to keep most wetlands full from spring to fall and maintaining the wetlands offers protection for nesting areas, the water levels needed for tall emergent vegetation to grow and other habitat needs for shorebirds, wading birds, and other wetland dependent species. To promote larger stands of tall emergent vegetation to enhance cover and nesting areas for black-crowned night herons, white-faced ibis, wrens, blackbirds and waterfowl, transplanting of hardstem bulrush and cattail can be used. Monitoring is used to estimate production, use and peaks of shorebirds, colonial nesting birds, and other wetland birds.

Meadow Habitats

Alternative A (No Action)

1. Objective: Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands.

   Strategy:
   - Maintain diverse meadow habitat for the production of waterfowl and other grassland dependent species.

   Rationale: Bald eagles and peregrine falcons utilize the Refuge on an occasional basis, with falcons typically seen in the spring through fall and eagles fall through spring. Productive and diverse meadows will ensure an ample food source is available for falcons and eagles on these habitats and throughout the Refuge.

2. Objective: Develop and manage nesting habitat contributing to the production of 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually.

   Strategies:
   - Utilize grazing, prescribed fire, and rest to invigorate and maintain adequate nesting habitat in meadows for various waterfowl species.
   - Develop a monitoring protocol to determine condition of meadows.
   - Monitor waterfowl production annually and correlate to habitat conditions to help confirm or refute habitat objectives.
   - Utilize existing ditches to irrigate meadows to invigorate vegetative growth.
   - Use photo points and vegetative transects to document habitat changes over time.

   Rationale: The Refuge was purchased with Duck Stamp funds to benefit migratory birds and has a goal of providing high quality breeding habitat for waterfowl. Most waterfowl require large expanses of grasses of medium to tall height with a component of dead vegetative material, or duff, mixed in. The hydrology, combined with irrigation in the meadow zones, produces vigorous grass and forb growth in good water years. These areas can become decadent with too much dead material and require periodic disturbance in the form of grazing or fire. Monitoring vegetative characteristics and waterfowl use and production will aid in deciding when manipulation is required. Periodic grazing is anticipated to average 3,150 AUMs per year, at an average rate of 1.0 AUMs per acre. Prescribed fire may also be used at times, but is limited by extreme weather and fuel conditions common to the area. Irrigation aids in producing grass and forb growth on this otherwise arid landscape.

3. Objective: Manage predator populations to help ensure an annual Refuge-wide minimum of 40 percent Mayfield nesting success for waterfowl.

   Strategies:
   - Monitor waterfowl nest success by conducting nest searches and calculating nest success using the Mayfield method.
   - Monitor predator use of the Refuge with predator surveys.
   - Write a predator management plan outlining steps to take when Mayfield nest success is below 40 percent on the Refuge.

   Rationale: A 40 percent nest success using the Mayfield calculation method will indicate a general population increase of waterfowl on the Refuge. The only way to properly calculate this number is by monitoring nest success. A predator survey and management plan are necessary to work in-kind with nest studies to identify steps needed to address decreased nest success if causes are due to predation.

4. Objective: Improve the condition, vigor, and productivity of Refuge meadows for the benefit of phalarope, snipe, meadowlark, savannah sparrow, sage grouse broods, and other meadow-dependent species.

   Strategies:
   - Utilize irrigation, grazing, rest, and fire to maintain healthy and diverse meadows.
   - Monitor wildlife use and meadow conditions, and correlate the two to guide management decisions.

   Rationale: Irrigation, grazing, rest, and fire are the most reliable tools available for manipulation of the meadow areas on the Refuge. Monitoring the wildlife using the area, and how they adjust to changing habitat conditions, is critical to ensuring techniques are being properly applied.

Upland Habitats

Alternative A (No Action)

1. Objective: Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these, the North Park Phacelia (*Phacelia formosula*) and other federally-listed species are adequately monitored, protected, and remain relatively undisturbed on Refuge lands.

   Strategies:
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Monitor of North Park Phacelia populations on the Refuge.
   - Fund and initiate research of the life history of North Park Phacelia to facilitate future management.

   Rationale: Sagebrush/grassland uplands are an important source of food and cover for wildlife. Creating a mosaic of native plant communities across the landscape promotes habitat health. Livestock grazing can be an effective sagebrush/grassland upland management tool if used in moderation to foster habitat health. Noxious weeds pose a threat to sagebrush/grassland habitats by reducing the abundance and diversity of native forbs. Efforts to control or eliminate these weeds are important in the overall health of the habitat. The federally-listed endangered North Park Phacelia is found in only two locations on the Refuge. Little is known about the plants life history. Research and effective monitoring techniques are needed to adequately manage this species.

Alternative A (No Action)

2. Objective: Improve the condition, vigor, and productivity of approximately 14,000 acres of Refuge sagebrush/grassland uplands for the benefit of sage grouse, waterfowl, pronghorn antelope, song birds, and raptors.

   Strategies:
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use the Dixie harrow and monitoring as a management tool for uplands.
   - Install photo points at various locations to document changes over the years.
   - Install permanent upland transects in areas representing the main sagebrush/grassland upland soil types of the Refuge.

   Rationale: Uplands can provide nesting sites, cover, and forage for many wildlife species. Maintaining a mosaic of native plant communities across the landscape supplies these requirements. Livestock grazing can be an effective sagebrush/grassland upland management tool if used in moderation to foster habitat health. Grazing intensities to maintain the above objectives averaged 1,355 AUMs from 1996 to 2001. Rest, if used in moderation, can promote seed production, plant reproduction, and plant health and vigor (recovering lost stored food reserves and reestablishing root systems). Noxious weeds pose a threat to sagebrush/grassland habitats by reducing the abundance and diversity of native forbs; efforts to control or eliminate these weeds are important in the overall health of the habitat. Promoting the growth of grasses and forbs in a sagebrush dominate areas is beneficial for sage grouse, elk, and songbirds. Perennial grasses and forbs provide food and cover for these species. The Dixie harrow has been used to remove some sagebrush in a mosaic pattern and to prepare a good seedbed for revegetation. Monitoring flora response to land management treatments provides crucial information to determine effectiveness of the treatments.

Public Uses

Alternative A (No Action)

General Information

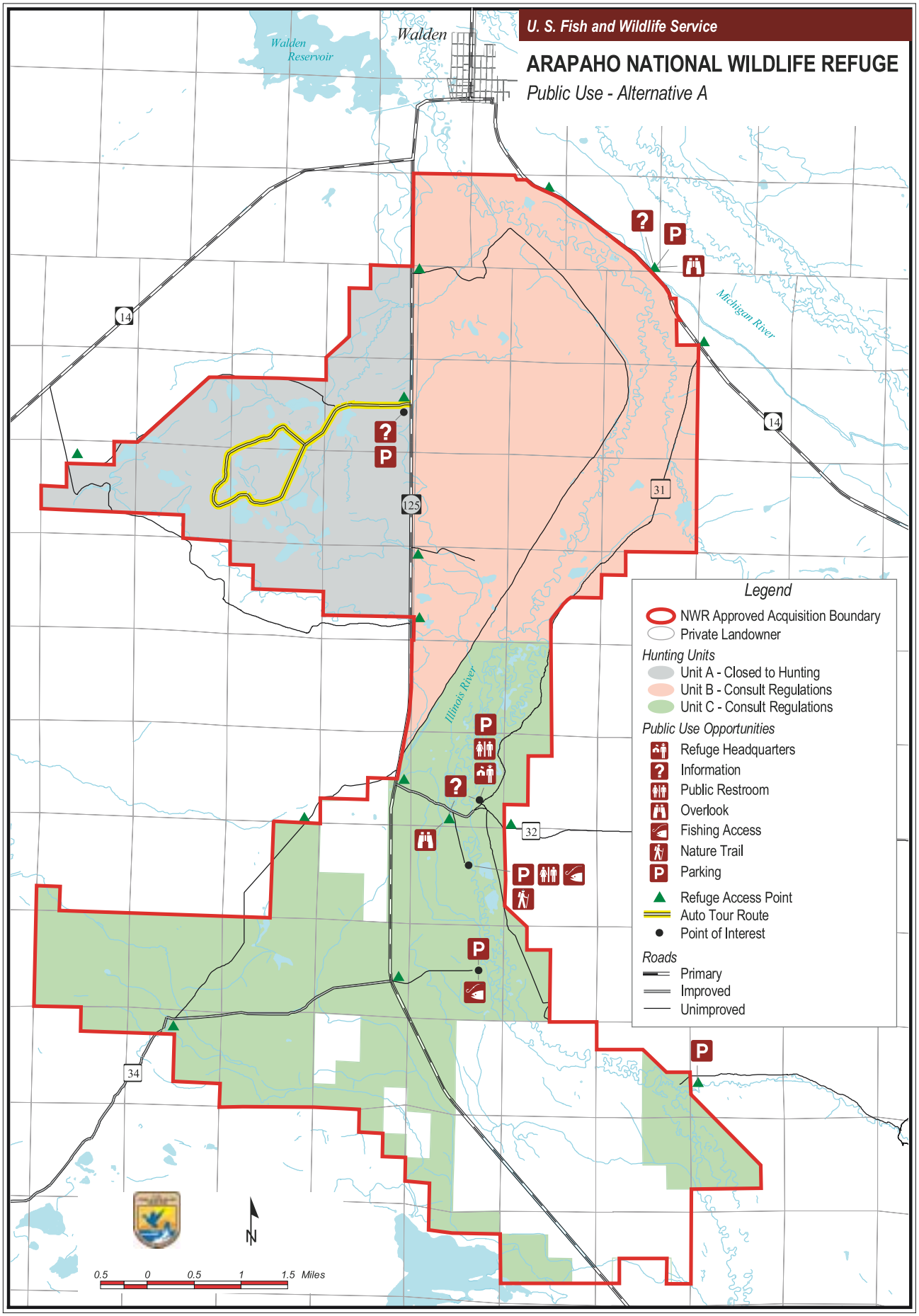
The 1997 National Wildlife Refuge System Improvement Act (P.L.105-57) requires that each Refuge be managed to fulfill the Refuge System mission as well as the specific purpose(s) for which the Refuge was established. The Act also declares that compatible wildlife-dependent recreational uses are legitimate and appropriate priority general public uses of the Refuge System. These six uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) are to receive enhanced consideration in planning and management over all other general public uses of the Refuge System. These activities receive a special focus because they help foster an appreciation and understanding of wildlife and the outdoors. Wildlife conservation is always the top obligation of National Wildlife Refuges. However, when compatible, these wildlife-dependent recreational uses are to be strongly encouraged on Refuges. Consequently, these six activities are first in line for the Refuge's available staff and financial resources. Although other public uses may be allowed on Refuges, the process for considering proposed uses other than priority uses is more stringent, and these uses must be reevaluated more frequently (Map 10 - Public Use - Alternative A).

A compatibility determination is required for a wildlife-dependent recreational use or any other public use of a Refuge. A compatible use is one which, in the sound professional judgement of the refuge manager, will not materially interfere with or detract from fulfillment of the Refuge System mission or Refuge purposes. Compatibility determinations for public uses that appear within the preferred alternative can be found in Appendix F.

Arapaho public use opportunities are combined into five categories and include:

1. hunting,
2. fishing,
3. wildlife observation and photography,
4. environmental education and interpretation, and
5. other uses.

Additionally, cultural resources, research, and partnerships are evaluated. Each public use evaluation contains a specific list of objectives, a list of strategies, and a supporting rationale statement.



Map 10 - Public Use - Alternative A

Hunting

Alternative A (No Action)

1. Objective: Provide high quality hunting recreational opportunities (1,972 hunting activity hours) on portions of the Refuge that are compatible with available natural resources.

   Strategies:
   - Continue working with the State to develop a hunting step-down management plan that provides hunting opportunities to meet North Park and Refuge objectives. Include Pole Mountain in the hunting plan and submit all hunting changes to the Code of Federal Regulations.
   - Continue to allow high quality recreational hunting opportunities (estimated number of hunter visits is 450 to 550 annually) of migratory birds, waterfowl, small game, and pronghorn antelope, in accordance with State seasons and regulations, on designated portions of the Refuge.
   - Continue to utilize habitat management units A, B, C to distribute hunters, provide resting areas for migratory birds, and to minimize conflicts between hunters and other visitors.

   Rationale: A public hunting plan and accompanying environmental assessment which authorized the opening of the Refuge to big game, upland game, and migratory birds was prepared and approved in 1977, with pertinent regulations published in the Code of Federal Regulations. Subsequently, a pronghorn antelope hunting program was initiated in the fall of 1977 and a sage grouse season the following year. During 1988 a hunting management plan was developed that specifies an objective of 1,972 hunting activity hours, and divided the Refuge into habitat management units known as A, B, and C. Management Unit A, 4,544 acres (20 percent of the Refuge) located on the Case tract, is closed to all hunting. Unit A contains the auto tour route which facilitates safe, undisturbed wildlife viewing for Refuge visitors, and provides resting areas for migratory birds. The migratory game bird hunting area (Habitat Management Unit B) consists of 8,242 acres (35 percent) of the Refuge and provides hunting opportunities for small game, migratory birds, and big game. Unit B is managed consistent with national policy allowing approximately 40 percent of the Refuge to be open for migratory bird hunting. The remaining 10,458 acres (45 percent) in habitat management Unit C is open to small and big game hunting activities. Predator hunting has not been authorized at the Refuge. The National Wildlife Refuge System Improvement Act encourages Refuges to provide recreational hunting opportunities where compatible with the Refuges establishing legislation. Therefore, Alternative A proposes to continue the existing recreational hunting program in its present form. The Service will continue to work closely with the State to determine season dates, regulations, and assist with law enforcement issues when requested. Additionally, the Service will work cooperatively to implement the Colorado Division of Wildlife's Strategic Plan of 2002. This may include offering limited elk and mule deer hunting opportunities on the Refuge. Details of future Refuge hunting opportunities will be addressed in a hunting step-down management plan. The isolated tract, Pole Mountain, will be included in hunting step-down plans and included in Title 50 Code of Federal Regulations to conform with Service policy.

Fishing

1. Objective: Provide high quality fishing recreational opportunities on portions of the Refuge that are compatible with available natural resources.

   Strategies:
   - Provide brown and rainbow trout fishing opportunities (estimate 50 to 100 angler visits currently) on the Illinois River from August 1 through May 31. Fishing is closed during June and July to protect nesting waterfowl.
   - Continue working with the State to develop a sport fish step-down management plan that provides fishing opportunities and meets Refuge objectives by 2007.
   - Monitor Illinois River gauges on the upstream and downstream end of the Refuge to evaluate river flows and effects on the fishery resources by 2003.

   Rationale: The Refuge fishery resource is limited to the Illinois River. Other aquatic sites, including Potter Creek, Spring Creek, and Refuge ponds, represent poor fishery habitat. The largest factor effecting the fishery resource is limited water quantity. In recent years, drought severely limited flows in the Illinois, and the stream channel at the Allard bridge was dry during August 2002. Stream gauges at the upstream and downstream ends of the Illinois River channel will assist the Refuge staff in monitoring Refuge water use, and enable the Refuge to maximize benefits of limited water resources. Fishing is viewed as a compatible use that will be encouraged during non-waterfowl nesting seasons. This alternative continues that philosophy and permits sport fishing as a recreational use of Arapaho NWR.

Wildlife Observation and Photography

1. Objective: Provide wildlife observation and photography opportunities on the Refuge especially along overlooks, auto tour route, and nature trail.

   Strategies:
   - Maintain existing Refuge facilities, such as overlooks, nature trail, and auto tour route.
   - Maintain Refuge Visitor Center for distribution of information.
   - Keep brochures current with updated information.
   - Participate in the preparation of a North Park wildlife viewing brochure.
   - Issue special use permits for professional photographers.
   - Rebuild the Brocker overlook by 2004.

   Rationale: Current visitation to the Refuge ranges from 7,000 to 9,000 visits (visit is defined as a person crossing the Refuge boundary). These visitors are looking for a variety of wildlife related opportunities. By providing wildlife observation, photography facilities, and information, the Refuge meets the visitors goals and promotes wildlife stewardship and Refuge support. Maps of the Refuge and a list of wildlife species help the visitor find the right viewing time, season, and place. Permits are issued with specific restrictions to limit wildlife harassment when a photographer requests access for close-up shots or use of a blind in areas that could potentially interfere with wildlife needs.

Environmental Education/Interpretation

Alternative A (No Action)

1. Objective: Provide an average of five environmental education opportunities annually, focusing on requested topics for a total of 150 to 250 participants.

   Strategy:
   - Conduct environmental education programs when requested and on the topics requested.

   Rationale: With one school system in the county, low local population and minimal visitation numbers, a reactionary approach to environmental education requests is appropriate at this time.

2. Objective: Provide interpretive opportunities to Refuge visitors - approximately 7,000 to 10,000 annually on the Refuge primarily at the visitor center and overlooks, and along the auto tour route and nature trail.

   Strategies:
   - Maintain existing facilities including visitor center, overlooks, and auto tour to disseminate interpretation message.
   - Replace and update all interpretive signs and brochures that are more than 5 years old or no longer provide an appropriate message.

   Rationale: It is estimated that less than 10 percent of Refuge visitors stop by the office for information, so it is important that our signs and brochures are accurate and up-to-date so that visitors receive the most pertinent information available about the Refuge and the Refuge System. Environmental Education will be a reactionary Refuge function and topics will be tailored to the needs of the requesting entity.

Other Uses

Alternative A (No Action)

1. Objective: Allow current non-wildlife-dependent uses to continue on Refuge lands.

   Strategies:
   - Continue to allow walking leashed dogs, picnicking, horseback riding, and bicycling along roads.
   - Continue operation of the rifle range to facilitate law enforcement firearms requalification for Refuge officers, Colorado Division of Wildlife officers, and other local law enforcement agencies on request.
   - Continue operation of the Allard gravel pit to support both Refuge and county roads (on-Refuge) requirements.
   - Continue to allow the Colorado Department of Transportation to plow snow windbreak along Highway 125, subject to a compatibility determination.

   Rationale: The existing non-wildlife-dependent public uses include walking leashed dogs, picnicking, horseback riding, and bicycling along roads would be allowed to continue. These uses are generally local individuals, and use is low and infrequent. Near the headquarters, the Refuge supports a rifle range used by Refuge officers, Colorado Division of Wildlife officers, and other local law enforcement agencies. The range is not open to the general public because the Bureau of Land Management provides a public range located 4 miles east of Walden. The Refuge range is uniquely designed to facilitate requalification of law enforcement officers. This action proposes to maintain the range in its current size, location, condition, and use. The Allard gravel pit supports Refuge, and county roads (on Refuge) and will remain active to support Refuge goals and objectives. The Refuge will continue to allow the Colorado Department of Transportation to plow snow breaks along Highway 125 to collect snow, prevent drifting across the highway, and increase safety of travelers.

1. Objective: Identify existing Refuge cultural resources and protect them from degradation.

   Strategies:
   - Prior to any Federal action, complete a cultural resources survey, in compliance with Section 106 of the NHPA, for those areas of the Refuge that have not been surveyed.
   - Request the State of Colorado to determine the historical status of the Hampton and Case barns by 2003.
   - Protect cultural resources found on the Refuge by minimizing disturbance in sensitive areas.
   - Apply for monies (grants, maintenance management funds) and develop partnerships to restore and preserve the Case barn by 2007.
   - Support provisions within the Archaeological Resources Protection Act by developing a plan for managing Refuge and archaeological resources.

   Rationale: This alternative describes the current level of management activity being conducted by the FWS since acquiring the Refuge in 1967. It represents status quo management and includes current management objectives and strategies. The philosophy of this alternative is to comply with existing cultural resource related laws and policies, and to protect Refuge cultural resources from degradation. Under this alternative, the Refuge does not plan to interpret cultural resources for the visiting public.

Research

1. Objective: When requested by investigators, allow natural resource related research opportunities on the Refuge.

   Strategies:
   - Evaluate submitted research proposals for conflicts with the current Refuge objectives, and with existing research efforts.
   - Issue special use permits to investigators working on the Refuge, outline limitations, techniques to minimize disturbance, and duration of the work.
   - Minimize damage to cultural resources and to sensitive wildlife habitats.

   Rationale: This alternative describes the current level of research management being conducted by the FWS. The philosophy of this alternative is to provide research opportunities and access to Refuge lands when requested by investigators. Preferably, the research study falls within the natural resource field, and will have some applicability to Refuge management needs. All studies are evaluated for conflicts with the current Refuge mission, with ongoing studies, and must be compatible with Refuge establishment purposes.

Partnerships

Alternative A (No Action)

1. Objective: The Refuge will participate in partnerships that promote sound wildlife management.

   Strategies:
   - Engage in partnerships that result in wildlife and/or land-health improvements.
   - Participate in Habitat Partnership Program, Owl Mountain Partnership, Sage Grouse Working Group, Colorado Wetlands Initiative, Platte/Kansas Rivers Ecosystem team, and others to protect enhance or restore wildlife habitats.

   Rationale: This alternative describes the current level of partnership activity being conducted by the Service. The Refuge will continue to participate in partnerships that promote sound wildlife management. Participating in partnerships will result in improvements to land health, and provide appropriate wildlife habitat on the Refuge and in North Park.

Alternative B

Riparian Habitats

1. Objective: Restore 50 to 100 acres of dense (40 to 100 percent) willow in patches >.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the island to the confluence with Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the lower third of the Illinois River to benefit nesting neotropical migrant songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver.

   Strategies:
   - Willow plantings along the stream corridor combined with 8 foot fences to exclude large herbivores.
   - Water manipulation Refuge-wide that may involve decreased diversions to maintain in-stream flows for willow establishment.
   - Construction of small artificial dams in the river to raise water tables locally to aid in willow establishment.
   - Establish a vegetation monitoring plan to assess health of established willow stands, and measure and document success or changes needed in reestablishment efforts. Plan should include herbivory and hydrology factors.
   - Wildlife monitoring will occur to document changes in wildlife use and possible correlations to changes in habitat.

   Rationale: Sections of the Illinois River on the Refuge had willows removed prior to acquisition by the FWS, probably in an effort to increase hay yields. These open stretches of river have: less bank stability resulting in potential for increased sedimentation; decreased shade over the stream resulting in increased water temperatures for trout; and sparse woody vegetation for use by songbirds or other wildlife. A section of river further downstream from the proposed reestablishment site has had livestock grazing removed for 8 years, but has shown little willow regeneration. Given the growth characteristics of willows, these results lead to the conclusions that there is either significant herbivory other than livestock restraining willow expansion, and/or hydrology has been altered enough with upstream diversions and recent drought conditions that lack of groundwater is keeping willow establishment from occurring. With this in mind, willow plantings will only be done in association with fencing, and consideration of hydrological needs will be used as well. Possible methods of increasing groundwater needs will be: to divert less water upstream for other Refuge purposes; locate willow plantings adjacent to existing beaver dams to take advantage of higher water tables near these ponds; and place logs and other natural materials in the stream to create simulated beaver dams and raise water tables adjacent to areas to be planted. Monitoring will be essential to document reestablishment efforts and to note any significant changes to existing willow communities.

Alternative B

2. Objective: Provide 3,630 to 3,845 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs), characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground, and less than 40 percent (canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat conditions.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 1,950 to 4,200 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are correct.

3. Objective: Provide 210 to 425 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily native species (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground, and less than 40 percent (canopy closure) willow from mid-April through August to benefit nesting waterfowl (mallard, gadwall, pintail, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, curlew, willet).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers identified, it is anticipated that rest will be utilized more for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 100 to 350 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are correct.

Alternative B

4. Objective: Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg, outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrants, and indirectly provide suitable habitat for native and nonnative fishes.

   Strategies:
   - Map river channel and identify problem areas. Prioritize stretches for rehabilitation.
   - Alter irrigation diversions as needed to assist in-stream restoration.
   - Install in-stream structures, as necessary, to adjust thalweg, create point bars, adjust depth ratios, increase sinuosity, and/or adjust pool spacing.
   - Monitor wildlife and vegetative response to these strategies.

   Rationale: Mapping the river to identify current characteristics is needed in order to define where restoration is needed. Increasing flows in the river by diverting less water on upstream Refuge water rights may assist in maintaining higher water tables, especially when used in conjunction with in-stream restoration projects. Documenting vegetative, fishery, and wildlife response is necessary to ensure that the projects are working.

5. Objective: Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park.

   Strategy:
   - Variations in water diversions and/or grazing regimes.

   Rationale: From time-to-time, projects may be proposed within the county by other agencies, non-government organizations, or private landowners that have a benefit to ecosystem health and wildlife outside of the Refuge boundary. In order to make an off-Refuge project succeed, resources normally reserved for Refuge purposes, such as water or vegetative cover, could occasionally be used to help make the off-Refuge project successful. These would not be long-term commitments of Refuge resources, but rather a management decision that a short-term diversion of these resources would better be served to benefit the ecosystem as a whole.

6. Objective: Establish a private lands program to encourage restoration of degraded riparian zones through funding and technical assistance to accomplish similar objectives as those defined for the Refuge. High priority areas are those that have immediate influence on the Refuge because of drainage or proximity.

   Strategies:
   - Add a full-time private lands position to the staff.
   - Work with local partners and willing landowners to identify, prioritize, and restore degraded areas in North Park .

Alternative B

7. Objective: Work with partners to address land health issues throughout the county.

   Strategy:

   - Continue active Refuge participation in Sage Grouse Working Group, North Park Wetlands Focus Group, Owl Mountain Partnership, North Park Habitat Partnership Program, and any other group formed with the goals of improving land health and/or stewardship in Jackson County.

   Rationale: The Refuge has the ability and resources available to restore and maintain a productive riparian area for the benefit of wildlife, fisheries, water quality, and a healthy landscape, while also utilizing local agriculture. The streams within the Refuge boundaries are a small fragment of those located within Jackson County, Colorado. By working with interested landowners and partners, the possibility exists of expanding the benefits of a healthy riparian zone throughout North Park.

Wetland Habitats

Alternative B

1. Objective: Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (>=60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night-heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, blackbirds).

   Strategies:
   - Water level manipulation, including drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Develop and implement a plan for transplanting of cattail and hardstem bulrush into specific wetlands.
   - Develop and use an over-water nesting bird monitoring plan.
   - Develop and implement an annual water management plan.

   Rationale: Wetlands with tall dense vegetation provide a litter layer for use by nesting water birds as well as a flooded emergent litter for macroinvertebrate production. Manipulation of water levels will contribute to maintaining the existing wetlands with tall emergent vegetation. Transplanting cattail and hardstem bulrush in wetlands with the highest potential for success will help increase the availability of this type of habitat. The criteria for such wetlands would be based on such things as water control abilities, evaporation rates, and distribution. Timing of needed drawdowns for expansion of the tall dense vegetation will be planned in such a way as to get maximum benefit for all Refuge wetland objectives such as during shorebird migration or to stimulate submerged aquatic vegetation beds. Monitoring water bird species will help assess how successful habitat management is.

2. Objective: Provide 10 percent of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading) emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dikes and infrastructures.
   - Conduct shorebird surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

Alternative B

3. Objective: Provide 20 percent of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80 percent of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dikes and infrastructures.
   - Conduct waterfowl surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and implement a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

   Rationale: The availability of a variety of wetland habitat conditions may benefit a greater diversity of wildlife species and/or support species for longer periods in their annual life cycle. The above two objectives contribute to habitats varying from shallowly flooded, short, sparse emergents to both shallow water and moderately dense cover. Water manipulation techniques, including drawdowns and back flooding, can be used to create these conditions. Using monitoring to evaluate the response of the flora and fauna will indicate success of management techniques. Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management to promote other important ecosystem projects within North Park.

4. Objective: Provide 10 to 20 percent of the wetland acres within each wetland complex, over a 5-year average, with a 70 percent coverage of submergent aquatic vegetation species (*Potomogeton*, *Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitate and maintain existing dikes and infrastructures.
   - Conduct waterfowl surveys and brood counts on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and implement a wetland submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

   Rationale: Submergent vegetation provides a complex structure for macroinvertebrate production and a seed source for foraging water birds. *Potamogeton* and *Ruppia* both produce a food resource (plant foods and invertebrates) for waterfowl and broods. These submergents are used by other wetland birds for nesting, foraging, and escape habitat. A variety of drawdown schedules and tillage are used to enhance the growth of these plants. Monitoring the responses of plant and wildlife will gauge the level of success in providing this habitat.

Alternative B

5. Objective: Enhance the existing private land programs to encourage creation and restoration of wetlands in North Park and surrounding areas through funding and technical assistance to accomplish the same objectives as on the Refuge.

   Strategies:
   - Obtain funding and full-time equivalency for a Partners for Fish and Wildlife position.
   - Working with willing stakeholders to create and restore wetlands in North Park.
   - Develop a plan to identify wetland habitats throughout North Park.
   - Consider wetland development opportunities as they become available.
   - Continue participation in the North Park Wetland Focus Group.

   Rationale: Since the Refuge is only part of the total North Park landscape, efforts to look beyond the boundaries are important in an ecosystem approach. Many wetland potentials exist in North Park, and working to restore or create these wetlands will benefit not only wildlife, but society too. To achieve the most positive results, priority projects will be close to existing wetland complexes or reasonably well functioning segment of rivers or near the larger reservoirs. Wetland management would mimic above Refuge objectives when possible. Work would be completed with the help of others to identify wetland habitats throughout North Park, partnering with willing stakeholders to restore, protect, and improve wetland habitats for wildlife use. Set up demonstration areas practicing sound wetland habitat management and improvement.

Meadow Habitats

Alternative B

1. Objective: Provide 20 to 50 acres, over a 5-year, average of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25 percent sage canopy cover), from early June to late July, to benefit sage grouse and snipe broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

2. Objective: Provide 1,650 to 1,850 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 950 to 2,100 AUMs of forage. Vegetative monitoring, combined with wildlife use data, will be needed to document that objective levels are achieved, and whether or not objectives are correct.

Alternative B

3. Objective: Provide 630 to 790 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground to benefit nesting waterfowl (mallard, gadwall, pintails, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers specified, it is anticipated that rest will be utilized more for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 350 to 700 AUMs of forage. Vegetative monitoring, combined with wildlife use data, will be needed to document that objective levels are achieved, and whether or not objectives are correct.

4. Objective: Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park.

   Strategies:
   - Work with partners to identify potential projects in the county.
   - Implement variations in water diversion, grazing regimes or other Refuge management strategies, as deemed appropriate.

   Rationale: From time-to-time, projects may be proposed within the county by other agencies, non-government organizations, or private landowners, that have a benefit to ecosystem health and wildlife outside of the Refuge boundary. In order to make an off-Refuge project succeed, resources normally reserved for Refuge purposes, such as water or vegetative cover, could occasionally be used to help make a project successful. These would not be long-term commitments of resources, but rather a cooperative management decision that a short-term diversion of these resources would better be served to benefit the ecosystem as a whole.

Alternative B

5. Objective: Establish a private lands program to provide funding and technical assistance to encourage wildlife-compatible land management practices in meadow habitats to accomplish objectives similar to those of the Refuge.

   Strategies:
   - Add a full-time private lands position to the staff.
   - Work with local partners and willing landowners to identify, prioritize, and restore degraded areas, and create new wildlife habitat in North Park .

6. Objective: Work with partners to address land health issues throughout Jackson County.

   Strategy:
   - Continue active Refuge participation in Sage Grouse Working Group, North Park Wetlands Focus Group, Owl Mountain Partnership, North Park Habitat Partnership Program, and any other group formed with the goals of improving land health and/or stewardship in Jackson County.

   Rationale: The Refuge has the ability and resources available to maintain productive meadows for the benefit of wildlife, water quality and a healthy landscape, while also utilizing local agriculture. The meadows within the Refuge boundary were used to produce hay prior to Refuge establishment, and proposed management practices vary little from thousands of similar acres throughout the county that are still in hay production. By working with interested landowners and partners, the possibility exists of expanding the wildlife benefits of Refuge meadows and/or maintaining the benefits that are occurring on these off-Refuge sites.

Upland Habitats

Alternative B

1. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sagebrush) >25 cm height and 20 to 30 percent canopy cover, >20 percent grass cover, and >10 percent forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, and elk.

   Strategies:
   - Complete a sagebrush/grassland upland habitat inventory of the Refuge by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

2. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sage) >40 cm height and >30 percent canopy cover, <20 percent grass cover, and >5 percent forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope.

   Strategies:
   - Complete upland habitat inventory by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

   Rationale: The Refuge has five primary range sites that support sagebrush/grassland uplands. The 2,000 acres of each of the above objectives are scattered within several of these range types and intermingled with meadow areas. A completed inventory of the uplands will assist in specifically defining these areas. Sagebrush/grassland uplands in a mosaic of patchy sagebrush with openings of grasses and forbs across the landscape reflect the needs of most wildlife species. Moderate livestock grazing, ranging from .05 AUM per acre to .15 AUM per acre in intensity, combined with rest will help maintain these acres. This rest rotational coverage will promote plant diversity, nutrient cycling, and cover. Controlling or eliminating noxious weeds that reduce the abundance and diversity of native forbs in the sagebrush/grassland habitats is important. Mechanical treatments will be considered in small areas to increase grass and forb components of the site. Monitoring the response of the flora and fauna will aid in assessing the success of the tools applied and help improve these methods.

Alternative B

3. Objective: Manage the remaining 10,000 acres of sagebrush/grassland uplands based on a better understanding of Refuge habitats, wildlife usages, and affected variables using best management practices.

Strategies:

- Complete upland habitat inventory by 2008.
- Conduct research and monitor outcomes of Refuge upland habitats over the next 15 years.
- Develop habitat based goals and objectives for the remaining Refuge upland acres (10,000) by 2017.
- Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
- Use 'rest' of varying lengths of time as a management tool for uplands.
- Develop and implement an integrated pest management plan.
- Use a variety of mechanical treatments of the habitat as a management tool for uplands.
- Develop and implement a prescribed burning program.
- Coordinate with existing projects and research and monitoring efforts in the area.
- Establish research plots to test strategies for habitat manipulations.
- Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park.

Rationale: In an effort to manage the sagebrush/grassland uplands, an inventory of what the Refuge has is essential. A variety of tools are available to provide a structurally diverse shrub community with a grass:forb component to support migratory birds and other wildlife species. Livestock grazing used in moderation at rates ranging from .05 to .15 AUMs per acre will be used. It is anticipated that approximately 1/3 to ½ of the upland areas will be grazed annually, resulting in 450 to 1,200 AUMs of forage being removed. Rest also needs to be used in moderation; too much rest can result in dominate brush communities that prevent herbaceous species from recovering. Grazing, used in conjunction with rest, can enhance the nutrient cycles, plant regrowth, and plant community diversity. Efforts to control and/or eradicate noxious weeds will help maintain the diversity of plant life required to provide wildlife habitat needs. Mechanical treatments break up the soil and remove a variable percent of the brush species, depending on the coverage, to promote grasses and forbs growth. Historically, frequencies of fire in the upland were low, and they were small, patchy fires. Prescribed burns may be beneficial in some upland sites to control dense stands of sagebrush so that herbaceous species can increase. The use of other upland habitat projects in the area, with range types similar to the Refuge, will help to identify successful methods for manipulating the habitat to reach the objectives. A portion of these sagebrush/grassland upland acres will be used to establish research plots to get a better understanding of how to increase sage height and grass:forb abundance to benefit nesting and wintering sage grouse, songbirds (vesper sparrow, sage thrasher, Brewer's sparrow, Swainson's hawk) and pronghorn antelope. This information will focus on the tools that might get more acres of uplands into the first two objectives. In working with the entire North Park landscape, some habitat objectives may change to accommodate actions deemed essential elsewhere in the upland habitats of the Park to improve the overall quality of wildlife habitat.

Alternative B

4. Objective: Manage North Park Phacelia (*Phacelia formosula*) populations currently known to exist on the Refuge to ensure its continued existence.

   Strategies:
   - Initiate research to understand the plant's life history and develop a management plan.
   - Protect and develop a monitoring plan for the existing and future new populations.
   - Work with other entities to preserve North Park Phacelia populations throughout North Park.

   Rationale: The North Park Phacelia is the only known federally-listed endangered plant species on the Refuge. The plant is only found in North Park with several populations scattered across the area. Only two known populations of the plant exists on Refuge lands. Little is known about its life history, so management is limited. Research on the life history of the plant is essential. As part of a partnership approach, information and management techniques will be shared to help ensure the continued existence of the Phacelia and eventually the down-listing of the species.

5. Objective: Establish a private lands program to encourage restoration of degraded upland habitats in North Park through funding and technical assistance to accomplish the same objectives as on the Refuge.

   Strategies:
   - Working with other stakeholders, search out funding sources for the program.
   - Develop a plan to identify upland habitats throughout North Park.
   - Partner with willing stakeholders to restore, protect, and improve upland habitats.
   - Initiate demonstration projects displaying various sound upland habitat management and improvement practices.
   - Continue participation in North Park Habitat Protection Partnership and Owl Mountain Partnership programs.

   Rationale: The Refuge plays a role in the natural systems of North Park landscape. The benefit of working with the entire North Park area is that wildlife habitat across this landscape is optimized. Resources available to the Refuge and its partners will be directed as to where they can do the most good for wildlife and habitat. Demonstrations are a good way to show how sound management can be beneficial for land stewards, wildlife, and the habitat.

Public Uses

Alternative B

Hunting

1. Objective: Provide recreational hunting opportunities consistent with Refuge goals and objectives, and that facilitate North Park wildlife management objectives.

   Strategies:
   - Working with the State, develop a hunting step-down management plan that provides hunting (big game, small game and waterfowl) opportunities to meet North Park and Refuge objectives.
   - Working with the State, provide limited small game and furbearer hunting opportunities depending on Refuge habitat objectives and/or population objectives North Park-wide.

2. Objective: The Refuge will work with the State in promoting sound hunting practices as a wildlife management tool.

   Strategies:
   - The Refuge will partner with the State and North Park Chamber of Commerce for the dissemination of information about hunting opportunities on the Refuge and throughout North Park.
   - Hunting brochures and hunting information will be provided to hunters at the headquarters building.
   - Assist Colorado Division of Wildlife off-Refuge with law enforcement, hunter recruitment, and hunter education when requested.

Alternative B

3. Objective: Facilities will be maintained, and improved as necessary, to provide a quality recreational hunting experience while minimizing resource damage.

   Strategies:
   - Develop five parking areas (Map 9 - Public Use - Alternative B) using post and cable methods and minimize resource damage caused by vehicles. Parking areas also provide opportunities to inform the hunting public about rules and regulations.
   - Develop three permanent gates that can be locked to minimize resource damage caused by vehicles (Map 9 - Public Use - Alternative B).
   - Develop a travel management plan that will revegetate two track roads (Map 9 - Public Use - Alternative B) not needed for maintenance, law enforcement, hunting access or other management purposes.
   - Develop a signage plan that facilitates the public use, enhances the public's understanding of Refuge management, and the Refuge System.

   Rationale: This alternative recognizes that the Refuge is part of a larger system of lands known as North Park. Given that many wildlife species in North Park migrate on and off the Refuge (waterfowl, elk, mule deer, pronghorn antelope, sage grouse), the Refuge hunting program effects more than just Refuge lands. The key to success is a strong working relationship with sportsman, the State, and incorporation of Refuge hunting goals and objectives into a hunting step-down management plan. Additional Refuge hunting opportunities (i.e. moose, elk, mule deer) will be determined in conjunction with the community and the State. The Refuge will continue to work with the State in promoting sound hunting practices as a wildlife management tool. Additionally, this alternative suggests we modify and possibly expand existing public use facilities to include emphasis on hunting both on the Refuge and in North Park. The Refuge will engage in partnerships to disseminate information on hunting opportunities throughout North Park. The Refuge would continue to utilize habitat management units A, B, C to distribute hunters, provide resting areas for migratory birds, and to minimize conflicts between hunters and other visitors.

Fishing

Alternative B

1. Objective: Where compatible, opportunities for fishing will be provided based on Refuge goals and objectives.

   Strategies:
   - Encourage brown and rainbow trout fishing opportunities on the Refuge in accordance with State seasons and regulations and Refuge management objectives.
   - Evaluate angler impacts to Refuge goals and objectives by 2008.
   - Work with the State to develop a sport fish management plan by 2008.

2. Objective: Where possible, expand fishing opportunities throughout North Park and help promote fishing as a recreational activity.

   Strategies:
   - Provide fishing information and fishing regulations to Refuge visitors when requested.
   - Utilize the Service Partners for Fish and Wildlife program to improve fishery habitats on public and private lands when requested.
   - When requested, assist the State on fisheries planning issues.
   - Assist the State with law enforcement, fishery management, fisheries sampling, fisheries habitat projects, and spawning throughout North Park when requested.
   - Partner with others to enhance fishery habitats in North Park.

   Rationale: Alternative B encourages the Refuge to not only provide sport fishing opportunities on the Illinois River, but also to partner with the State and others to improve fishery habitats and promote sport fishing opportunities throughout North Park. The Illinois River fishery is influenced by management actions that occur upstream of the Refuge. Logically, it is important that the Refuge assist, when requested, with habitat projects that impact the Illinois River upstream of the Refuge. Similarly, habitats throughout North Park are connected through a system of waterways. Refuge efforts to improve aquatic habitats, when requested, benefit all in North Park. The downside to this strategy involves using very limited personnel and resources on areas other than strictly Refuge grounds that may result in Refuge goals and objectives being delayed or not being met. Partnerships are the key to success when funds and personnel are limited. This alterative strives to include the Refuge as a partner on fishery related habitat improvement projects in North Park.

Wildlife Observation and Photography

Alternative B

1. Objective: Enhance Refuge opportunities for wildlife observation and photography based on Refuge habitat goals and objectives by 2017.

   Strategies:
   - Rebuild Brocker Overlook by 2004.
   - Construct Brocker trail to homestead site by 2006.
   - Construct hiking trail from Walden to Brocker overlook by 2008.
   - Enhance auto tour route road.
   - Maintain Refuge Visitor Center for distribution of information.
   - Keep brochures current with updated information.
   - Complete and maintain boardwalk section of interpretive nature trail.
   - Build moose observation platform by 2005.
   - Construct wildlife photography blinds on the auto tour route by 2006.
   - Establish use limitations for wildlife observation and photography based on habitat goals and objectives.
   - Maintain and potentially modify existing facilities to reflect new management strategies.

   Rationale: Current visitation to the Refuge ranges from 7,000 to 9,000 visits (visit is defined as a person crossing the Refuge boundary). Many opportunities to enhance viewing and photography of wildlife while maintaining habitat goals are available. Each strategy should be designed to facilitate a quality experience for the visitor while fulfilling Refuge goals and objectives.

2. Objective: Assist with funding, construction, and program development to enhance wildlife photography and observation in North Park.

   Strategies:
   - Develop and disseminate information on the best wildlife observation and photography opportunities throughout North Park.
   - Partner with the State and others to construct and provide observation facilities for moose and other desirable species.
   - Pursue funding and partners to assist with the construction of viewing/photography blinds at Walden Reservoir.
   - Assist partners with revising the “Watching Wildlife in North Park” guide by 2006.
   - Create partnership with other wildlife-oriented organizations and individuals.

   Rationale: Recreation plays a major role in the economy of North Park. Wildlife viewing and photography are key factors in the recreational opportunities available. Enhancing these uses will be beneficial to the economy as well as creating a better understanding of wildlife and its habitats.

Environmental Education/Interpretation

Alternative B

1. Objective: Work with partners, including the North Park School District, to provide opportunities and facilities to conduct 5 environmental education programs a year, based on Refuge habitat goals and objectives.

   Strategies:
   - Work with partners to develop specific environmental education programs covering: habitat management practices and principles; the natural history of North Park; agricultural and wildlife; the life history of various local species including waterfowl, sage grouse, elk and moose; North Park and its importance to Colorado waterfowl; how a Refuge comes into existence and what its role is; water issues and needs.
   - Use existing environmental education opportunities as they occur, such as the water carnival, bird banding, Refuge field trips, and Day in the Woods.
   - Create programs for students and volunteers to assist in management tasks for service learning.

2. Objective: Incorporate the Refuge and its niche in the North Park landscape in other environmental education messages developed in the county.

   Strategies:
   - Partner with other land management agencies, non-government organizations, local schools, and private individuals to expand the network of environmental education programs and facilities in North Park.
   - Hire an outdoor recreation planner to conduct outreach and education activities on the Refuge and North park.

3. Objective: Update Refuge interpretive message to reflect recent wildlife issues and concerns (elk, sage grouse), habitat based decision-making, local agricultural uses and how they are not mutually exclusive on or off the Refuge.

   Strategies:
   - Replace signs on the kiosks, overlooks, trails and visitor center, and pamphlets, and update the Refuge website to reflect a message of the Refuge working for wildlife and county-wide environmental interests.
   - Rehabilitate the Case Barn and develop an interpretive site there presenting the relationship between the county's ranching history and wildlife.

Alternative B

4. Objective: Incorporate the Refuge and its niche in the North Park landscape in other interpretive messages developed in the county.

   Strategy:
   - Partner with other entities in the development of interpretive material involving the land management of North Park to identify the role of the Refuge.

   Rationale: Arapaho National Wildlife Refuge is located almost in the geographic center of North Park. It is known to most residents as a major part of the county landscape, but exactly what the Refuge does and how it contributes to that landscape is not fully understood. Similarly, most out-of-county visitors do not understand how the lands surrounding the Refuge compliment its wildlife-oriented goals. An outdoor recreation planner position will facilitate integration of environmental education at the Refuge and in Jackson County schools. Articulating the story of history of North Park and how the Refuge and the surrounding lands benefit each other will be beneficial to all interests.

Other Uses

Alternative B

1. Objective: Compatible, non-wildlife-dependent uses will be allowed, but limited to less sensitive areas based on habitat goals and objectives.

   Strategies:
   - Continue operation of the rifle range to facilitate law enforcement firearms requalification for Refuge officers, Colorado Division of Wildlife officers, and other local law enforcement agencies on request.
   - Prepare and implement a travel management plan to minimize vehicle impacts to Refuge habitats by 2006.
   - Use law enforcement, signs, information, and brochures to minimize impacts of non-wildlife-dependent public uses.
   - Identify and prioritize non-Refuge mineral rights within Refuge boundaries by January 2005.
   - Acquire, on a willing-seller basis, priority mineral rights by 2010.
   - With Partners, design and construct the Brocker overlook site (Phase 1) by 2004; incorporate Refuge goals and objectives.
   - Continue operation of the Allard gravel pit to support both Refuge and county roads (on-Refuge) requirements.

2. Objective: Consider non-wildlife-dependent public uses and their benefits to North Park and its residents.

   Strategies:
   - With Partners, design and construct the Case Barn interpretive loop by 2008. Incorporate North Park and Refuge history and the preservation of wildlife habitats as a theme in the interpretation.
   - Encourage partners to be sensitive to wildlife needs when developing recreational opportunities in North Park.

   Rationale: Alternative B encourages compatible, non-wildlife-dependent uses be limited to less sensitive areas based on habitat goals and objectives. Mineral resource development impacts wildlife habitat. This alternative seeks to identify non-federally owned minerals within the Refuge boundary and purchase those rights on a willing seller basis to minimize future resource damage. The rifle range will continue to operate as it already facilitates Refuge and North Park law enforcement needs. The travel management plan must meet Refuge compatibility determination, facilitate management, and public use requirements. The Allard gravel pit supports Refuge and county roads (on Refuge) and will remain active to support Refuge goals and objectives.

Cultural Resources

Alternative B

1. Objective: Identify existing Refuge cultural resources and protect from degradation.

   Strategies:
   - Prior to any Federal action, complete a cultural resources survey, in compliance with Section 106 of the NHPA, for those areas of the Refuge that have not been surveyed.
   - Request the State of Colorado determine the historical status of the Hampton and Case Barns by 2003.
   - Protect cultural resources found on the Refuge by minimizing disturbance in sensitive areas.
   - When possible, preserve historical records by conducting oral interviews with local historians.
   - Apply for monies (grants, maintenance management funds, etc.) to restore and preserve the Case Barn by 2007.
   - Support provisions within the Archaeological Resources Protection Act by developing a plan for managing Refuge and archaeological resources.

2. Objective: Encourage interpretation and protection of cultural resources and their importance to North Park wildlife resources.

   Strategies:
   - Interpret the Case Barn by extending the tour route to include the barn. Develop an interpretive area adjacent to the Case Barn that discusses its regional significance by 2007.
   - Protect the Hampton Barn with fencing, and develop a single interpretive sign that discusses the barn's significance as the first dairy barn in North Park by 2007.
   - Interpret history of North Park at the Brocker overlook site by 2004.
   - By 2004, develop an interpretive area within the headquarters building that demonstrates connectivity of the Refuge with the remainder of North Park.
   - When requested, and dependent on available funding, partner with other individuals and agencies to protect and preserve cultural resources that relate to wildlife throughout North Park.

   Rationale: This alternative describes a broader cultural resource role for the Refuge. The philosophy of this alternative is to comply with existing cultural resource related laws and policies, and to protect Refuge cultural resources from degradation. Additionally, this alternative encourages protection and interpretation of cultural resources that relate to North Park wildlife. Interpreting the role of ranches in the preservation of habitat can serve as an example for visitors to learn and gain a greater appreciation for wildlife and their habitats.

Research

Alternative B

1. Objective: Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives.

   Strategies:
   - Identify and prioritize habitat management research needs by 2004.
   - Conduct in-house research on priority needs.
   - Promote the Refuge research needs within the scientific community. Encourage research that focuses directly on the Refuge's habitat management goals.

2. Objective: Identify and promote research in other disciplines (e.g. how to lessen the impacts of public uses) as it relates and contributes to achieving habitat goals and objectives on the Refuge and within North Park.

   Strategies:
   - Identify and prioritize research related to the Refuge and North Park wildlife in other disciplines needs by 2004.
   - Encourage research in other disciplines that facilitates the Refuge and achieve goals and objectives.
   - Allow and encourage research that focuses on natural resource management goals throughout North Park.

   Rationale: This alternative focuses on identifying and implementing the biological research needs of the Refuge and North Park. Research will focus on achieving the habitat goals and objectives outlined in this plan. Identified research needs can then be promoted within the scientific community and actively encouraged by Refuge staff. Proposed research, not falling within the categories identified, would generally not be allowed. Conversely, research meeting identified Refuge needs could be supported with funding, lodging, equipment sharing, etc. Disturbance to resident wildlife and habitat is the primary concern. Limiting non-Refuge identified projects will minimize unnecessary disturbance and habitat damage.

Partnerships

Alternative B

1. Objective: The Refuge will participate in partnerships that promote sound wildlife management.

   Strategies:
   - Engage in partnerships that result in wildlife and/or land-health improvements.
   - Participate in Habitat Partnership Program, Owl Mountain Partnership, Sage Grouse Working Group, Colorado Wetlands Initiative, Platte/Kansas Rivers Ecosystem team, and others to protect enhance or restore wildlife habitats.
   - Work with partners to achieve the Refuge goals and objectives.
   - Work with Colorado Land Trust and others to help acquire lands and mineral rights within the Refuge's approved boundaries. Minerals extraction may cause habitat disturbance within the Refuge.

2. Objective: Maintain or form partnerships to achieve the wildlife related goals and objectives on the Refuge and within North Park.

   Strategies:
   - Promote new partnerships (consider partnering with Ducks Unlimited, Trout Unlimited, Safari Club International, Audubon, Sierra Club, and others) to assist with achieving the Refuge and North Park natural resource goals.
   - Establish a full-time Private Lands Coordinator position to be stationed at the Refuge to assist in wildlife habitat enhancement throughout North Park.

   Rationale: This alternative describes the potential level of partnership activity that will improve wildlife habitats throughout North Park. The Refuge will form partnerships to promote sound wildlife management within and outside the Refuge. The Refuge staff will actively participate in partnerships that result in improvements to land health and provide appropriate wildlife habitat in North Park. The Refuge will collaborate with partners on management of critical wildlife habitats in North Park. The private lands position will enable the Service to contribute its biological expertise and resources to private and public landowners when requested.

Alternative C

Riparian Habitats

1. Objective: Restore 50 to 100 acres of dense (40 to 100 percent) willow in patches >0.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the Island to the confluence of Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the upper third of the Illinois River to benefit nesting neotropical migratory songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver.

   Strategies:
   - Willow plantings along the stream corridor combined with 8 foot fences to exclude large herbivores.
   - Water manipulation Refuge-wide that may involve decreased diversions to maintain in-stream flows for willow establishment.
   - Construction of small artificial dams in the river to raise water tables locally to aid in willow establishment.
   - Establish a vegetation monitoring plan to assess health of established willow stands, and measure and document success or changes needed in reestablishment efforts. Plan should include herbivory and hydrology factors.
   - Wildlife monitoring will occur to document changes in wildlife use and possible correlations to changes in habitat.

   Rationale: Sections of the Illinois River on the Refuge had willows removed prior to acquisition by the FWS, probably in an effort to increase hay yields. These open stretches of river have: less bank stability resulting in potential for increased sedimentation; decreased shade over the stream resulting in increased water temperatures for trout; and sparse woody vegetation for use by songbirds or other wildlife. A section of river further downstream from the proposed reestablishment site has had livestock grazing removed for 8 years, but has shown little willow regeneration. Given the growth characteristics of willows, these results lead to the conclusions that there is either significant herbivory other than livestock restraining willow expansion, and/or hydrology has been altered enough with upstream diversions that lack of groundwater is keeping willow establishment from occurring. With this in mind, willow plantings will only be done in association with fencing, and consideration of hydrological needs will be used as well. Possible methods of increasing groundwater needs will be: to divert less water upstream for other Refuge purposes; locate willow plantings adjacent to existing beaver dams to take advantage of higher water tables near these ponds; place logs in the stream to create simulated beaver dams and raise water tables adjacent to areas to be planted. Monitoring will be essential to document reestablishment efforts and to note any significant changes to existing willow communities.

Alternative C

2. Objective: Provide 3,630 to 3,845 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground and less than 40 percent (canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat conditions.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 1,950 to 4,200 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are correct.

3. Objective: Provide 210 to 425 acres, over a 5-year average, of a grass:forb (75:25) plant community composed of primarily native species (grasses, sedges, forbs, rushes) characterized by <30 com visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground, and less than 40 percent (canopy closure) willow from mid-April though August to benefit nesting waterfowl (mallard, pintail, gadwall, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, long-billed curlew, willet).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat conditions.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers identified, it is anticipated that rest will be the primary tool for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 100 to 350 AUMs of forage. Vegetative monitoring, combined with wildlife use data, will be needed to document that objective levels are correct.

Alternative C

4. Objective: Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg, outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrant, and indirectly provide suitable habitat for native and nonnative fishes.

   Strategies:
   - Map river channel and identify problem areas. Prioritize stretches for rehabilitation.
   - Alter irrigation diversions, as needed, to assist in-stream restoration.
   - Install in-stream structures, as necessary, to adjust thalweg, create point bars, adjust depth ratios, increase sinuosity, and/or adjust pool spacing.
   - Monitor wildlife and vegetative response to these strategies.

   Rationale: Mapping the river to identify current characteristics is needed in order to define where restoration is needed. Increasing flows in the river by diverting less water on upstream Refuge water rights may assist in maintaining higher water tables, especially when used in conjunction with in-stream restoration projects. Documenting vegetative, fishery, and wildlife response is necessary to ensure that the improvements are supplying the sought after benefits.

Wetland Habitats

Alternative C

1. Objective: Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (≥60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, blackbirds).

   Strategies:
   - Water level manipulation including drawdowns and maintaining water levels in specific wetlands from spring to fall when possible.
   - Develop and apply a plan for transplanting of cattail and hardstem bulrush into specific wetlands.
   - Develop and implement an over-water nesting bird monitoring plan.
   - Develop and use an annual water management plan.

   Rationale: Wetlands with tall dense vegetation provide a litter layer for use by nesting water birds as well as a flooded emergent litter for macroinvertebrate production. Manipulation of water levels will contribute to maintaining the existing wetlands with tall emergent vegetation. Transplanting cattail and hardstem bulrush in wetlands with the highest potential for success will help increase the availability of this type of habitat. The criteria for such wetlands would be based on such things as water control abilities, evaporation rates, and distribution. Timing of needed drawdowns for expansion of the tall dense vegetation will be planned in such a way as to get maximum benefit for all Refuge wetland objectives such as during shorebird migration or to stimulate submerged aquatic vegetation beds. Monitoring water bird species will help rate how successful habitat management is.

2. Objective: Provide 10 percent of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading), emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dike and infrastructures.
   - Conduct shorebird surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

Alternative C

2. Objective: Provide 20 percent of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80 percent of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dike and infrastructures.
   - Conduct shorebird surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

   Rationale: The availability of a variety of wetland habitat conditions may benefit a greater diversity of wildlife species and/or support species for longer periods in their annual life cycle. The above two objectives contribute to habitats varying from shallowly flooded, short, sparse emergents to both shallow water and moderately dense cover. Water manipulation techniques, including drawdowns and back flooding, can be used to create these conditions. The use of monitoring to evaluate the response of the flora and fauna will indicate success of management techniques.

3. Objective: Provide 10 to 20 percent of the wetland acres within each wetland complex, over a 5-year average, with a 70 percent coverage of submergent aquatic vegetation species (*Potomogeton, Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitate and maintain existing dikes and infrastructures.
   - Conduct waterfowl surveys and brood counts on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan.

   Rationale: Submergent vegetation provides a complex structure for macroinvertebrate production and a seed source for foraging water birds. *Potamogeton* and *Ruppia* both produce a food resource (plant foods and invertebrates) for waterfowl and broods. These submergents are used by other wetland birds for nesting, foraging, and escape habitat. A variety of drawdown schedules and tillage are used to enhance the growth of these plants. Monitoring the responses of plant and wildlife will gauge the level of success in providing this habitat.

Meadow Habitats

Alternative C

1. Objective: Provide 20 to 50 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25 percent sage canopy cover), from early June to late July, to benefit sage grouse and snipe broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

2. Objective: Provide 1,650 to 1,850 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, along with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 950 to 2,100 AUMs of forage. Vegetative monitoring, combined with wildlife use data, will be needed to document that objective levels are correct.

Alternative C

3. Objective: Provide 630 to 790 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground to benefit nesting waterfowl (mallard, gadwall, pintails, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, along with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers specified, it is anticipate that rest will be the utilized more for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 350 to 700 AUMs of forage. Vegetative monitoring, combined with wildlife use data, will be needed to document that objective levels are correct.

Upland Habitats

Alternative C

1. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sage) >25 cm height and 20 to 30 percent canopy cover, >20 percent grass cover, and >10 percent forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, elk, and pronghorn antelope.

   Strategies:
   - Complete a sagebrush/grassland upland habitat inventory of the Refuge by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

2. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sage) >40 cm height and >30 percent canopy cover, <20 percent grass cover, and >5 percent forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope.

   Strategies:
   - Complete upland habitat inventory by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

   Rationale: The Refuge has five primary range sites that support sagebrush/grassland uplands. The 2,000 acres of each of the above objectives are scattered within several of these range types and intermingled with meadow areas. A completed inventory of the uplands will assist in specifically defining these areas. Sagebrush/grassland uplands in a mosaic of patchy sagebrush with openings of grasses and forbs across the landscape reflect the needs of most wildlife species. Moderate livestock grazing, ranging from .05 AUM per acre to .15 AUM per acre in intensity, combined with rest will help maintain these acres. This rest rotational coverage will promote plant diversity, nutrient cycling, and cover. Controlling or eliminating noxious weeds that reduce the abundance and diversity of native forbs in the sagebrush/grassland habitats is important. Mechanical treatments will be considered in small areas to increase grass and forb components of the site. Monitoring the response of the flora and fauna will aid in assessing the success of the tools applied and help improve these methods.

Alternative C

3. Objective: Manage the remaining 10,000 acres of sagebrush/grassland uplands based on a better understanding of Refuge habitats, wildlife uses, and affected variables using best management practices.

   Strategies:
   - Complete upland habitat inventory by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a prescribed burning program.
   - Coordinate with existing projects and research and monitoring efforts in the area.
   - Establish research plots to test strategies for habitat manipulations.

   Rationale: In an effort to manage the sagebrush/grassland uplands, an inventory of what the Refuge has is essential. A variety of tools are available to provide a structurally diverse shrub community, with a grass:forb component to support migratory birds and other wildlife species. Periodic grazing by livestock is the main tool anticipated to maintain these acres but this may vary annually from complete rest to high intensity to using another tool. The rates used to obtain desired results will most likely range from .05 to .15 AUMs per acre. Rest will be used in moderation as too much rest can result in dominate brush communities that prevent herbaceous species from recovering. Moderate grazing used in conjunction with rest can enhance the nutrient cycles, plant regrowth, and plant community diversity. Efforts to control and/or eradicate noxious weeds will help maintain the diversity of plant life required to provide wildlife habitat needs. Mechanical treatments break up the soil and remove a variable percent of the brush species, depending on the coverage, to promote grasses and forbs growth. Historically, frequencies of fire in the upland were low, and they were small, patchy fires. Prescribed burns may be beneficial in some upland sites to control dense stands of sagebrush so that herbaceous species can increase. The use of other upland habitat projects in the area, with range types similar to the Refuge, will help to identify successful methods for manipulation the habitat to reach the objectives. A portion of these sagebrush/grassland upland acres will be used to establish research plots to get a better understanding of how to increase sage height and grass:forb abundance to benefit nesting and wintering sage grouse, songbirds (vesper sparrow, sage thrasher, Brewer's sparrow, Swainson's hawk) and pronghorn antelope. This information will focus on the tools that might get more acres of uplands into the first two objectives.

Alternative C

4. Objective: Manage North Park Phacelia populations currently known to exist on the Refuge to ensure its continued existence.

   Strategies:
   - Initiate research to understand the plant's life history and develop a management plan.
   - Protect and develop a monitoring plan for the existing and future new populations.

   Rationale: The North Park Phacelia is the only known federally-listed endangered plant species on the Refuge. Two known populations of the plant exist on Refuge lands, but little is known about its life history. To properly manage the North Park Phacelia, research on its life history is essential. Monitoring the plant will aid in evaluating management techniques and help ensure the continued existence of the Phacelia and eventually the down-listing of the species.

Public Uses

Alternative C

(See Map 11 - Public Use - Alternative C)

Hunting

1. Objective: Working with the State, provide hunting opportunities to meet the Refuges habitat goals and objectives.

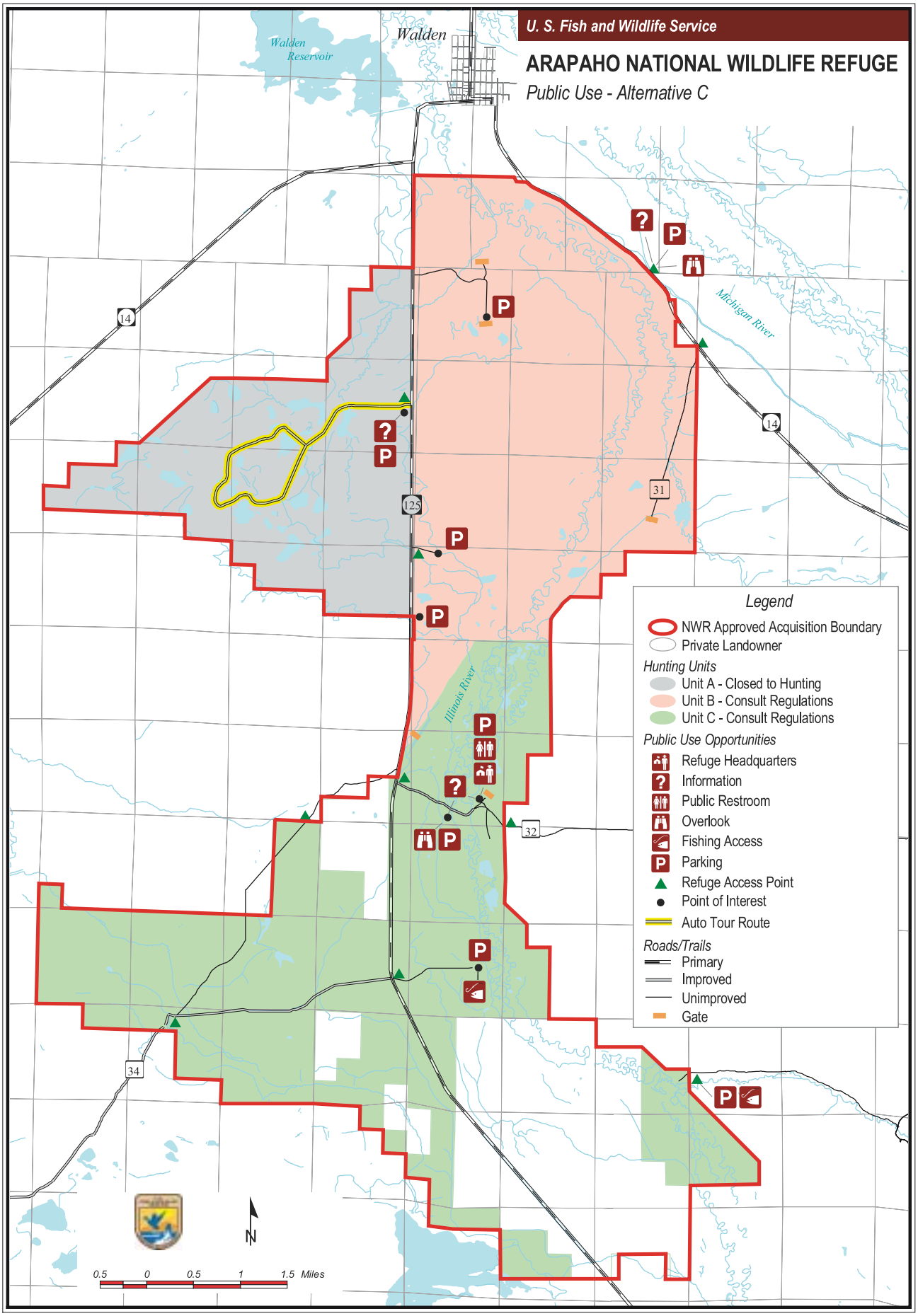
   Strategies:
   - If huntable populations are not impacting goals, continue to promote existing recreational hunting program (450 to 550 hunter visits annually) of migratory birds, waterfowl, small game, and pronghorn antelope, in accordance with State seasons and regulations.
   - Develop a hunting step-down management plan that provides limited small and big game hunting opportunities. Include Pole Mountain in the plan, and submit a Notice of Change to the Federal Register by 2006.

2. Objective: Use hunting as a tool to minimize impacts of herbivory (elk, moose, cattle) on habitat based goals and objectives.

   Strategies:
   - Evaluate impacts of herbivory on habitat based goals and objectives.
   - Install exclosures in uplands, riparian, and meadow habitat types; evaluate herbivory impacts to each habitat.
   - Work with partners (see Partnership Section) to investigate the impacts of herbivory on goals and objectives. Develop methods to minimize or mitigate herbivory impacts.
   - Develop a wintering elk carrying capacity for the Refuge by 2006.

3. Objective: Facilities (parking areas, roads, signs) will be improved to accommodate hunting and minimize impacts on the Refuge.

   Strategies:
   - Infrastructure will be limited to minimize habitat impacts.
   - Develop parking areas, close roads, promote walk-in access, improve information signs to better inform hunters, and minimize hunter impacts.
   - Continue to utilize habitat management units A, B, C to distribute hunters, provide resting areas for migratory birds, and to minimize conflicts between hunters and other visitors.



Map 11 - Public Use - Alternative C

Alternative C

4. Objective: Working with the State, provide big game hunting opportunities on the Refuge to meet Refuge habitat goals and objectives.

   Strategies:
   - When the elk numbers exceed 1,500 animals for a period of 10 or more days, utilize limited elk hunting to remove and distribute elk to minimize impacts to Refuge habitats.
   - Additional huntable species (i.e. moose, elk, mule deer) will be determined in conjunction with the State and guided by Refuge goals and objectives.
   - Conduct public outreach to explain the Refuge hunting program and habitat based goals and objectives.

   Rationale: Alternative C utilizes hunting simply as a tool to achieve Refuge goals and objectives. Existing hunting programs will be evaluated and impacts minimized or mitigated. Refuge facilities will be modified to provide information on the Refuge hunt program. Parking areas and roads will be evaluated and reconstructed to minimize hunter impacts to Refuge habitats. Walk-in hunts will be promoted provided hunters can still accomplish hunting goals. The Refuge will eliminate interior roads, facilities, and other infrastructure not needed for habitat management purpose. A wintering elk carrying capacity will be developed by 2006. Prior to 2006, and working with the State, the Refuge will consider elk hunting when elk numbers exceed 1,500 animals for a period of 10 or more days. This tool will be used to reduce elk numbers and distribute elk away from sensitive Refuge habitats.

Alternative C

Fishing

1. Objective: Allow recreational fishing only when it does not conflict with habitat based goals and objectives.

   Strategies:
   - By 2005, evaluate angler numbers and impacts to nesting waterfowl and riparian-dependent species.
   - Limit fishing opportunities to smaller areas of the Refuge, and focus on efforts of fishery habitat restoration.
   - Fishing is closed during June and July to protect nesting waterfowl and other riparian nesting species.
   - Sport fishing opportunities will only be allowed in the Refuge on areas where habitat restoration has been completed and where determined to be compatible with Refuge goals and objectives.
   - Modify Refuge signs to reflect any new fishing regulations.
   - Promote fishing in other parts of North Park to minimize impacts to Refuge resources.
   - Encourage brown and rainbow trout fishing opportunities on the Refuge in accordance with State seasons and regulations and Refuge management objectives.
   - Work with the State to develop a Refuge sport fishery management plan by 2006.

   Rationale: Alternative C focuses Refuge resources on improving Refuge fishery habitats and evaluating angler impacts. Thorough evaluation of angler impacts, and minimizing those impacts to nesting waterfowl and riparian species is critical to successful implementation of this alternative. Limited brown and rainbow trout fishing opportunities on the Refuge would be authorized, in accordance with State seasons and regulations, only if compatible with current goals and objectives. At a minimum, fishing is closed during June and July to protect nesting waterfowl. Habitat improvement projects are focused on Refuge lands, thus, achieving goals will be realized much faster than Alternative B.

Wildlife Observation and Photography

1. Objective: Encourage wildlife observation and photography from Refuge edge only by 2010.

   Strategies:
   - Eliminate existing public facilities, or move them to the Refuge edge, to minimize impacts of public use by 2015.
   - Provide information on wildlife observation and photography opportunities elsewhere in North Park by 2004.
   - Cooperatively develop wildlife observation and photography brochures with Colorado Division of Wildlife, Chamber of Commerce, and other interested parties.

   Rationale: Refuge objectives under this alternative are strictly addressing the habitat needs of wildlife. Roads, trails, and blinds have the potential to interfere with meeting these objectives. If all public use facilities are moved to the edge of the Refuge, this potential is removed.

Environmental Education/Interpretation

Alternative C

1. Objective: Modify environmental education and interpretation programs to focus on how and why the Refuge intensively manages habitats to achieve Refuge goals and purposes by 2005.

   Strategies:
   - Work with the North Park School District, Colorado Division of Wildlife, and other interested entities to design and provide two environmental education programs per year.
   - Modify signs and printed material to reflect intensive habitat management efforts and minimal visitor use.

2. Objective: Redesign Refuge interpretation and environmental education programs to minimize disturbance to Refuge lands.

   Strategies:
   - Concentrate messages/signage to perimeter of Refuge.
   - Environmental education programs will emphasize classroom work. Any on-the-ground environmental education will be in designated areas only to limit impact to habitat.
   - Eliminate public use facilities not immediately adjacent to highways, county roads, or primary Refuge roads.
   - Create virtual access to many parts of the Refuge using cameras and the Internet, and also at the visitor facility.
   - Close the auto tour route by 2003 and revegetate by 2010.
   - Any proposed additions or changes to facilities used for environmental education or interpretation will only be completed if they are within Refuge habitat goals and objectives.

   Rationale: This alternative stresses the idea that wildlife comes first on the Refuge and that even minimal disturbances must be minimized. To this end, environmental education and interpretation efforts will be designed to take place either off-Refuge or in predesignated areas where it has been determined by management that the potential habitat impact is negligible. Messages developed will emphasize habitat management, and the importance of keeping human impact to the habitat as low as possible.

Alternative C

Other Uses

1. Objective: Eliminate all non-wildlife-dependent public uses that could have a negative impact on wildlife and their habitat. Eliminate or prevent natural resource damaging uses by 2010. If not possible to eliminate or prevent, then minimize or mitigate.

   Strategies:
   - Eliminate walking leashed dogs, picnicking, horseback riding, and bicycling along roads.
   - Close, remediate, regrade, and revegetate the rifle range by 2006.
   - Identify and prioritize non-Refuge mineral rights within Refuge boundaries by January 2005.
   - Acquire, on a willing-seller basis, priority mineral rights by 2010.
   - Eliminate the Allard gravel pit, and use strictly off-site mineral resources.
   - Keep new and existing facilities near Refuge edge to minimize impact to Refuge resources.
   - Prepare and implement a travel management plan to minimize impacts to habitat by 2005.
   - Eliminate all roads or parking areas not needed for habitat management.

   Rationale: Alternative C will eliminate all non-wildlife-dependent public uses that could have a negative impact on wildlife and their habitat. Mineral resource development impacts wildlife habitat. This alternative seeks to identify non-federally owned minerals within the Refuge boundary, and purchase those rights on a willing-seller, willing-buyer basis to minimize future resource damage. The rifle range will be closed or moved to an off-site location by 2006. The Allard gravel pit will be eliminated, and all mineral needs would be purchased from off-site sources. The existing Brocker Overlook will be redesigned and constructed focusing on Refuge goals and objectives. No additional public use facilities or opportunities will be planned.

Cultural Resources

1. Objective: Identify and protect existing Refuge cultural resources from degradation.

   Strategies:
   - Prior to any Federal action, complete a cultural resources survey, in compliance with Section 106 of the NHPA, for those areas of the Refuge that have not been surveyed.
   - Protect cultural resources found on the Refuge by minimizing disturbance in sensitive areas.
   - Support provisions within the Archaeological Resources Protection Act by developing a plan for managing Refuge archaeological resources.

   Rationale: Cultural resource activities under Alternative C will be limited to actions required by law or Service policy. The philosophy of this alternative is to maintain existing cultural resources and protect them from degradation. No additional funds or effort will be expended to protect or interpret Refuge sites.

Research

Alternative C

1. Objective: Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives.

   Strategies:
   - Identify and prioritize habitat management research needs by 2004.
   - Conduct in-house research on priority needs.
   - Promote the Refuge research needs within the scientific community. Encourage research that focuses directly on the Refuge's habitat management goals.

2. Objective: Identify and promote research in other disciplines as it relates and contributes to achieving habitat goals and objectives (e.g. how to lessen the impacts of public uses).

   Strategies:
   - Identify and prioritize research related to Refuge wildlife in other discipline needs by 2004.
   - Encourage research in other disciplines that facilitates the Refuge and achieve goals and objectives.

   Rationale: This alternative focuses on identifying and implementing the biological research needs of the Refuge. Research will focus on achieving the habitat goals and objectives outlined in this Plan. Identified research needs can then be promoted within the scientific community, and actively encouraged by Refuge staff. Proposed research, not falling within the categories identified, would generally not be allowed. Conversely, research meeting identified Refuge needs could be supported with funding, lodging, equipment sharing, etc. Disturbance to resident wildlife and habitat is the primary concern. Limiting non-Refuge identified projects will minimize unnecessary disturbance and habitat damage.

Partnerships

Alternative C

1. Objective: The Refuge will participate in partnerships that promote sound wildlife management.

   Strategies:
   - Engage in partnerships that result in wildlife and/or land-health improvements on the Refuge.
   - Work with partners to achieve the Refuge goals and objectives.
   - Participate in Habitat Partnership Program, Owl Mountain Partnership, Sage Grouse Working Group, Colorado Wetlands Initiative, Platte/Kansas Rivers Ecosystem team, and others to protect enhance or restore wildlife habitats.

2. Objective: Maintain or form partnerships to assist with achieving the Refuge's habitats goals and objectives.

   Strategy:
   - Work with Colorado Land Trust and others to help acquire lands and mineral rights within the Refuge's approved boundaries. Mineral extraction may cause habitat disturbance within the Refuge.

   Rationale: This alternative describes a level of partnership activity that would focus on fulfilling Refuge habitat goals and objectives. The Refuge will form partnerships to promote sound wildlife management within the Refuge. The Refuge will actively participate in partnerships that result in improvements to land health and provide appropriate wildlife habitat on the Refuge.

Alternative D: Preferred Alternative

Riparian Habitats

Detailed biological justification for the preferred alternative is discussed in Appendix H.

1. Objective: Restore 50 to 100 acres of dense (40 to 100 percent) willow in patches >.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the island to the confluence with Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the lower third of the Illinois River to benefit nesting neotropical migrant songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver.

   Strategies:
   - Willow plantings along the stream corridor combined with 8 foot fences to exclude large herbivores.
   - Water manipulation Refuge-wide that may involve decreased diversions to maintain in-stream flows for willow establishment.
   - Construction of small artificial dams in the river to raise water tables locally to aid in willow establishment.
   - Establish a vegetation monitoring plan to assess health of established willow stands, and measure and document success or changes needed in reestablishment efforts. Plan should include herbivory and hydrology factors.
   - Wildlife monitoring will occur to document changes in wildlife use and possible correlations to changes in habitat.
   - Experiment with alternative willow restoration strategies.
   - Consider hunting as a management tool.

   Rationale: Sections of the Illinois River on the Refuge had willows removed prior to acquisition by the FWS, probably in an effort to increase hay yields. These open stretches of river have: less bank stability, resulting in potential for increased sedimentation; decreased shade over the stream, resulting in increased water temperatures for trout; and sparse woody vegetation for use by songbirds or other wildlife. A section of river further downstream from the proposed reestablishment site has had livestock grazing removed for 8 years, but has shown little willow regeneration. Given the growth characteristics of willows, these results lead to the conclusions that there is either significant herbivory other than livestock restraining willow expansion, and/or hydrology has been altered enough with upstream diversions and recent drought conditions that lack of groundwater is keeping willow establishment from occurring. With this in mind, willow plantings will only be done in association with fencing, and consideration of hydrological needs will be used as well. Possible methods of increasing groundwater needs will be: to divert less water upstream for other Refuge purposes; locate willow plantings adjacent to existing beaver dams to take advantage of higher water tables near these ponds; and place logs and other natural materials in the stream to create simulated beaver dams and raise water tables adjacent to areas to be planted. Monitoring will be essential to document reestablishment efforts, and to note any significant changes to existing willow communities.

Alternative D: Preferred Alternative

2. Objective: Provide 3,630 to 3,845 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground and less than 40 percent (canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.
   - Consider hunting as a management tool.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 1,950 to 4,200 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are correct.

3. Objective: Provide 210 to 425 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, and rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground, and less than 40 percent (canopy closure) willow from mid-April through August to benefit nesting waterfowl (mallard, gadwall, pintail, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, curlew, willet).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Develop a vegetation monitoring protocol.
   - Develop a wildlife monitoring plan that correlates wildlife use and habitat condition.
   - Consider hunting as a management tool.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers identified, it is anticipated that rest will be utilized more for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 100 to 350 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are correct.

Alternative D: Preferred Alternative

4. Objective: Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg (deepest point in the river channel), outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrants, and indirectly provide suitable habitat for native and nonnative fishes.

   Strategies:
   - Map river channel and identify problem areas. Prioritize stretches for rehabilitation.
   - Alter irrigation diversions as needed to assist in-stream restoration.
   - Install in-stream structures as necessary to adjust thalweg, create point bars, adjust depth ratios, increase sinuosity, and/or adjust pool spacing.
   - Monitor wildlife and vegetative response to these strategies.

   Rationale: Mapping the river to identify current characteristics is needed in order to define where restoration is needed. Increasing flows in the river by diverting less water on upstream Refuge water rights may assist in maintaining higher water tables, especially when used in conjunction with in-stream restoration projects. Documenting vegetative, fishery, and wildlife response is necessary to ensure that the projects are working.

5. Objective: Establish a private lands program to encourage restoration of degraded riparian zones through funding and technical assistance to accomplish similar objectives as those defined for the Refuge. High priority areas are those that have immediate influence on the Refuge because of drainage or proximity.

   Strategies:
   - Add a full-time private lands position to the staff.
   - Work with local partners and willing landowners to identify, prioritize, and restore degraded areas in North Park.

Alternative D: Preferred Alternative

6. Objective: Work with partners to address land health issues throughout Jackson County.

   Strategy:
   - Continue active Refuge participation in Sage Grouse Working Group, North Park Wetlands Focus Group, Owl Mountain Partnership, North Park Habitat Partnership Program, and any other group formed with the goals of improving land health and/or stewardship in Jackson County.
   - Variations in water diversions and/or grazing regimes.
   - Partner with Jackson County weed coordinator to manage and minimize noxious weeds on the Refuge.
   - Use adaptive management techniques to implement new management ideas.

   Rationale: The Refuge has the ability and resources available to restore and maintain a productive riparian area for the benefit of wildlife, fisheries, water quality, and a healthy landscape, while also utilizing local agriculture. The streams within the Refuge boundaries are a small fragment of those located within Jackson County, Colorado. By working with interested landowners and partners, the possibility exists of expanding the benefits of a healthy riparian zone throughout North Park.

   From time-to-time, projects may be proposed within the county by other agencies, non-government organizations, or private landowners, that have a benefit to ecosystem health and wildlife outside of the Refuge boundary. There may be an occasion that in order to make an off-Refuge project succeed, resources normally reserved for Refuge purposes, such as water or vegetative cover, could be used to help make the off-Refuge project successful. These would not be long-term commitments of Refuge resources, but rather a management decision that a short-term diversion of these resources would better be served to benefit the ecosystem as a whole.

Wetland Habitats

Alternative D: Preferred Alternative

1. Objective: Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (>=60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night-heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, and blackbirds).

   Strategies:
   - Water level manipulation, including drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Develop and apply a plan for transplanting of cattail and hardstem bulrush into specific wetlands.
   - Develop and use an over-water nesting bird monitoring plan.
   - Develop and implement an annual water management plan as a component of an overall habitat management plan.

   Rationale: Wetlands with tall dense vegetation provide a litter layer for use by nesting water birds as well as a flooded emergent litter for macroinvertebrate production. Manipulation of water levels will contribute to maintaining the existing wetlands with tall emergent vegetation. Transplanting cattail and hardstem bulrush in wetlands with the highest potential for success will help increase the availability of this type of habitat. The criteria for such wetlands would be based on such things as water control abilities, evaporation rates, and distribution. Timing of needed drawdowns for expansion of the tall dense vegetation will be planned in such a way as to get maximum benefit for all Refuge wetland objectives such as during shorebird migration or to stimulate submergent aquatic vegetation beds. Monitoring water bird species will help assess how successful habitat management is.

2. Objective: Provide 10 percent of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading) emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in specific wetlands from spring to fall when possible.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dikes and infrastructures.
   - Conduct shorebird surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan as a component of an overall habitat management plan.

Alternative D: Preferred Alternative

3. Objective: Provide 20 percent of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80 percent of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in wetlands from spring to fall when water is available and conditions are appropriate.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitation and maintenance of existing dikes and infrastructures.
   - Conduct waterfowl surveys on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland emergent/submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan as a component of an overall habitat management plan.

   Rationale: The availability of a variety of wetland habitat conditions may benefit a greater diversity of wildlife species and/or support species for longer periods in their annual life cycle. The above two objectives contribute to habitats varying from shallowly flooded, short, sparse emergents to both shallow water and moderately dense cover. Water manipulation techniques including drawdowns and back flooding can be used to create these conditions. Using monitoring to evaluate the response of the flora and fauna will indicate success of management techniques. Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management to promote other important ecosystem projects within North Park.

4. Objective: Provide 10 to 20 percent of the wetland acres within each wetland complex, over a 5-year average, with a 70 percent coverage of submergent aquatic vegetation species (*Potomogeton, Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks.

   Strategies:
   - Water level manipulation, including full and partial drawdowns, and maintaining water levels in wetlands from spring to fall when water is available and conditions are appropriate.
   - Tillage of dry wetlands as a management tool.
   - Rehabilitate and maintain existing dikes and infrastructures.
   - Conduct waterfowl surveys and brood counts on the Refuge.
   - Monitor monthly wetland bird use.
   - Develop and apply a wetland submergent vegetation monitoring plan.
   - Develop and implement an annual water management plan as a component of an overall habitat management plan.

   Rationale: Submergent vegetation provides a complex structure for macroinvertebrate production and a seed source for foraging water birds. *Potamogeton* and *Ruppia* both produce a food resource (plant foods and invertebrates) for waterfowl and broods. These submergents are used by other wetland birds for nesting, foraging, and escape habitat. A variety of drawdown schedules and tillage are used to enhance the growth of these plants. Monitoring the responses of plant and wildlife will gauge the level of success in providing this habitat.

Alternative D: Preferred Alternative

5. Objective: Enhance the existing private lands program to encourage creation and restoration of wetlands in North Park and surrounding areas through funding and technical assistance to accomplish the same objectives as on the Refuge.

   Strategies:
   - Obtain funding and full-time equivalency for a Partners for Fish and Wildlife position.
   - Work with willing stakeholders to create and restore wetlands in North Park.
   - Develop a plan to identify wetland habitats throughout North Park.
   - Consider wetland development opportunities as they become available.
   - Continue participation in the North Park Wetland Focus Group.
   - Establish a monitoring plan for created habitats to ensure benefits are realized.

   Rationale: Since the Refuge is only part of the total North Park landscape efforts, to look beyond the boundaries are important in an ecosystem approach. Many wetland potentials exist in North Park, and working to restore or create these wetlands will benefit not only wildlife but society as well. To achieve the most positive results, priority projects will be close to existing wetland complexes or reasonably well functioning segment of rivers or near the larger reservoirs. Wetland management would mimic above Refuge objectives when possible. Work would be completed with the help of others to identify wetland habitats throughout North Park, partnering with willing stakeholders to restore, protect, and improve wetland habitats for wildlife use. Set up demonstration areas practicing sound wetland habitat management, and improve water levels in wetlands from spring to fall when possible.

Meadow Habitats

Alternative D: Preferred Alternative

Detailed biological justification for the preferred alternative is discussed in Appendix H.

1. Objective: Provide 20 to 50 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25 percent sage canopy cover), from early-June to late-July, to benefit sage grouse and snipe broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.
   - Consider hunting as a management tool.

2. Objective: Provide 1,650 to 1,850 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5 percent) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas as water is available to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.
   - Consider hunting as a management tool.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. It is anticipated that on average, 1/3 to 2/3 of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 950 to 2,100 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are achieved, and whether or not objectives are correct.

Alternative D: Preferred Alternative

3. Objective: Provide 630 to 790 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5 percent) bare ground to benefit nesting waterfowl (mallard, gadwall, pintail, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora).

   Strategies:
   - Utilize grazing, resting, and burning practices to stimulate or maintain meadow conditions.
   - Irrigate areas, as water is available, to help stimulate vegetative growth.
   - Working with partners, develop a vegetation monitoring protocol.
   - Working with partners, develop a wildlife monitoring plan that correlates wildlife use and habitat condition.
   - Consider hunting as a management tool.

   Rationale: The grass:forb mix identified in the objective requires periodic manipulation of some sort to achieve the stated ranges of the objective. The combination of resting, grazing, and burning, combined with irrigation, where available and practical, are the best tools to accomplish this. To meet and maintain the taller vegetation and duff layers specified, it is anticipated that rest will be utilized more for this objective. It is anticipated that on average, 1/3 to ½ of this area will require grazing at an average rate of 0.4 to 1.0 AUMs per acre resulting in the removal of approximately 350 to 700 AUMs of forage. Vegetative monitoring combined with wildlife use data will be needed to document that objective levels are achieved, and whether results support species requirements.

4. Objective: Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park.

   Strategies:
   - Work with partners to identify potential projects in the county.
   - Implement variations in water diversion, grazing regimes or other Refuge management strategies as deemed appropriate.

   Rationale: From time-to-time, projects may be proposed within the county by other agencies, non-government organizations, or private landowners, that have a benefit to ecosystem health and wildlife outside of the Refuge boundary. In order to make an off-Refuge project succeed, resources normally reserved for Refuge purposes, such as water or vegetative cover, could be used occasionally to help make a project successful. These would not be long-term commitments of resources, but rather a cooperative management decision that a short-term diversion of these resources would better be served to benefit the ecosystem as a whole.

Alternative D: Preferred Alternative

5. Objective: Establish a private lands program to provide funding and technical assistance to encourage wildlife-compatible land management practices in meadow habitats to accomplish objectives similar to those of the Refuge.

   Strategies:
   - Add a full-time private lands position to the staff.
   - Work with local partners and willing landowners to identify, prioritize, and restore degraded areas and create new wildlife habitat in North Park.

6. Objective: Work with partners to address land health issues throughout the county.

   Strategy:
   - Continue active Refuge participation in Sage Grouse Working Group, North Park Wetlands Focus Group, Owl Mountain Partnership, North Park Habitat Partnership Program, and any other group formed with the goals of improving land health and/or stewardship in Jackson County.
   - Partner with Jackson County weed coordinator to manage and minimize noxious weeds on the Refuge.

   Rationale: The Refuge has the ability and resources available to maintain productive meadows for the benefit of wildlife, water quality and a healthy landscape, while also utilizing local agriculture. The meadows within the Refuge boundary were used to produce hay prior to Refuge establishment, and proposed management practices vary little from thousands of similar acres throughout the county that are still in hay production. By working with interested landowners and partners, the possibility exists of expanding the wildlife benefits of Refuge meadows and/or maintaining the benefits that are occurring on these off-Refuge sites.

Upland Habitats

Alternative D: Preferred Alternative

Detailed biological justification for the preferred alternative is discussed in Appendix H.

1. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sage) >25 cm height and 20 to 30 percent canopy cover, >20 percent grass cover, and >10 percent forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, elk, and pronghorn antelope.

   Strategies:
   - Complete a sagebrush/grassland upland habitat inventory of the Refuge by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' (free from biological, mechanical, or chemical manipulation) of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

Alternative D: Preferred Alternative

2. Objective: Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70 percent sage) >40 cm height and >30 percent canopy cover, <20 percent grass cover, and >5 percent forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope.

   Strategies:
   - Complete a sagebrush/grassland upland habitat inventory of the Refuge by 2008.
   - Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
   - Use 'rest' of varying lengths of time as a management tool for uplands.
   - Develop and implement an integrated pest management plan.
   - Use a variety of mechanical treatments of the habitat as a management tool for uplands.
   - Develop and implement a vegetation monitoring plan.
   - Develop and implement a wildlife monitoring program.

   Rationale: The Refuge has five primary range sites that support sagebrush/grassland uplands. The 2,000 acres of each of the above objectives are scattered within several of these range types and intermingled with meadow areas. A completed inventory of the uplands will assist in specifically defining these areas. Sagebrush/grassland uplands in a mosaic of patchy sagebrush with openings of grasses and forbs across the landscape reflect the needs of most wildlife species. Moderate livestock grazing, ranging from .05 AUM per acre to .15 AUM per acre in intensity, combined with rest will help maintain these acres. This rest rotational coverage will promote plant diversity, nutrient cycling, and cover. Controlling or eliminating noxious weeds that reduce the abundance and diversity of native forbs in the sagebrush/grassland habitats is important. Mechanical treatments will be considered in small areas to increase grass and forb components of the site. Monitoring the response of the flora and fauna will aid in assessing the success of the tools applied and help improve these methods.

Alternative D: Preferred Alternative

3. Objective: Manage the remaining 10,225 acres of sagebrush/grassland uplands based on a better understanding of Refuge habitats, wildlife usages, and affected variables using best management practices.

Strategies:

- Complete upland habitat inventory by 2008 if financial resources are available.
- Conduct research and monitor outcomes of Refuge upland habitats over the next 15 years.
- Develop habitat based goals and objectives for the remaining Refuge upland acres (10,000) by 2017.
- Establish upland research plots by 2012 to investigate and monitor upland habitats on the Refuge.
- Use cattle grazing at varying stock rates, seasons, and intensities as a management tool for uplands.
- Use 'rest' of varying lengths of time as a management tool for uplands.
- Develop and implement an integrated pest management plan.
- Use a variety of mechanical treatments of the habitat as a management tool for uplands.
- Develop and implement a prescribed burning program.
- Coordinate with existing projects and research and monitoring efforts in the area.
- Establish research plots to test strategies for habitat manipulations.
- Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park.

Rationale: In an effort to manage the sagebrush/grassland uplands, an inventory of what the Refuge has is essential. A variety of tools are available to provide a structurally diverse shrub community, with a grass:forb component to support migratory birds and other wildlife species. Livestock grazing, used in moderation, at rates ranging from .05 to .15 AUMs per acre will be used. It is anticipated that approximately 1/3 to ½ of the upland areas will be grazed annually, resulting in 450 to 1,200 AUMs of forage being removed. Rest also needs to be used in moderation; too much rest can result in dominate brush communities that prevent herbaceous species from recovering. Grazing used in conjunction with rest can enhance the nutrient cycles, plant regrowth, and plant community diversity. Efforts to control and/or eradicate noxious weeds will help maintain the diversity of plant life required to provide wildlife habitat needs. Mechanical treatments break up the soil and remove a variable percent of the brush species, depending on the coverage, to promote grasses and forbs growth. Historically, frequencies of fire in the upland were low, and they were small, patchy fires. Prescribed burns may be beneficial in some upland sites to control dense stands of sagebrush so that herbaceous species can increase. The use of other upland habitat projects in the area, with range types similar to the Refuge, will help to identify successful methods for manipulation the habitat to reach the objectives. A portion of these sagebrush/grassland upland acres will be used to establish research plots to get a better understanding of how to increase sage height and grass:forb abundance to benefit nesting and wintering sage grouse, songbirds (vesper sparrow, sage thrasher, brewer's sparrow, swainson's hawk) and pronghorn antelope. This information will focus on the tools that might get more acres of uplands into the first two objectives. In working with the entire North Park landscape, some habitat objectives may change to accommodate actions deemed essential elsewhere in the upland habitats of the Park to improve the overall quality of wildlife habitat.

Alternative D: Preferred Alternative

4. Objective: Manage North Park Phacelia (*Phacelia formosula*) populations currently known to exist on the Refuge to ensure its continued existence.

   Strategies:
   - Initiate research to understand the plant's life history and develop a management plan.
   - Protect and develop a monitoring plan for the existing and future new populations.
   - Work with other entities to preserve North Park Phacelia populations throughout North Park.

   Rationale: The North Park Phacelia is the only known federally-listed endangered plant species on the Refuge. The plant is only found in North Park with several populations scattered across the area. Only two known populations of the plant exist on Refuge lands. Little is known about its life history, so management is limited. Research on the life history of the plant is essential. As part of a partnership approach, information and management techniques will be shared to help ensure the continued existence of the Phacelia and eventually the down listing of the species.

Public Use

Alternative D: Preferred Alternative

Hunting

1. Objective: Provide recreational hunting opportunities consistent with Refuge goals and objectives, and that facilitate North Park wildlife management objectives.

   Strategies:
   - Working with the State, develop a hunting step-down management plan that provides hunting (big game, small game, and waterfowl) opportunities to meet North Park and Refuge objectives.
   - Working with the State, provide limited small game and furbearer hunting opportunities depending on Refuge habitat objectives and/or population objectives North Park-wide.
   - Hunting of predators will not be authorized in order to minimize disturbance to wildlife. The hunting step-down management plan will reevaluate the role of predator hunting on the Refuge.

2. Objective: The Refuge will work with the State in promoting sound hunting practices as a wildlife management tool.

   Strategies:
   - The Refuge will partner with the State and North Park Chamber of Commerce for the dissemination of information about hunting opportunities on the Refuge and throughout North Park.
   - Hunting brochures and hunting information will be provided to hunters at the headquarters building.
   - Assist Colorado Division of Wildlife off-Refuge with law enforcement, hunter recruitment, and hunter education when requested.

Alternative D: Preferred Alternative

3. Objective: Facilities will be maintained, and improved as necessary, to provide a quality recreational hunting experience while minimizing resource damage.

   Strategies:
   - Develop five parking areas [Map 9 - Public Use - Alternative B and D (Preferred)] using post and cable methods and minimize resource damage caused by vehicles. Parking areas also provide opportunities to inform the hunting public about rules and regulations.
   - Develop two permanent gates that can be locked to minimize resource damage caused by vehicles [Map 9 - Public Use - Alternative B and D (Preferred)].
   - Develop a travel management plan that will revegetate two track roads [Map 9 - Public Use - Alternative B and D (Preferred)] not needed for maintenance, law enforcement, hunting access, or other management purposes.
   - Develop a signage plan that facilitates the public use, enhances the public's understanding of Refuge management, provides public information and safety, and the Refuge System.

   Rationale: This alternative recognizes that the Refuge is part of a larger system of lands known as North Park. Given that many wildlife species in North Park migrate on and off the Refuge (waterfowl, elk, mule deer, pronghorn antelope, sage grouse), the Refuge hunting program effects more than just Refuge lands. The key to success is a strong working relationship with sportsman and with the State, and incorporation of Refuge hunting goals and objectives into a hunting step-down management plan. Additional Refuge hunting opportunities (i.e. moose, elk, mule deer) will be determined in conjunction with the community and the State. The Refuge will continue to work with the State in promoting sound hunting practices as a wildlife management tool. Additionally, this alternative suggests we modify and possibly expand existing public use facilities to include emphasis on hunting both on the Refuge and in North Park. The Refuge will engage in partnerships to disseminate information on hunting opportunities throughout North Park. The Refuge may continue to utilize habitat management units A, B, C to provide resting areas for migratory birds and to minimize conflicts between hunters and visitors, and to distribute hunting pressure. However, the A, B, C system may be modified during the development of a hunting step-down management plan.

Fishing

Alternative D: Preferred Alternative

1. Objective: Where compatible, opportunities for fishing will be provided based on Refuge goals and objectives.

   Strategies:
   - Encourage brown and rainbow trout fishing opportunities on the Refuge in accordance with State seasons and regulations and Refuge management objectives. Fishing is closed during June and July to protect nesting waterfowl and other riparian nesting species.
   - Evaluate angler impacts to Refuge goals and objectives by 2008.
   - Work with the State to develop a sport fish step-down management plan by 2008.

2. Objective: Where possible, expand fishing opportunities throughout North Park and help promote fishing as a recreational activity.

   Strategies:
   - Provide fishing information and fishing regulations to Refuge visitors when requested.
   - Utilize the Service Partners for Fish and Wildlife Program to improve fishery habitats on public and private lands when requested.
   - When requested, assist the State with fisheries planning issues in North Park.
   - Assist the State with law enforcement, fishery management, fisheries sampling, fisheries habitat projects, and spawning throughout North Park when requested.
   - Partner with others to enhance fishery habitats in North Park.
   - Install and monitor Illinois River gauges on the upstream and downstream end of the Refuge to evaluate river flows.

   Rationale: The above objectives encourage the Refuge staff to not only provide sport fishing opportunities on the Illinois river, but also to partner with the State and others to improve fishery habitats and promote sport fishing opportunities throughout North Park. The Illinois River fishery is influenced by management actions that occur upstream of the Refuge. Logically, it is important that the Refuge assist, when requested, with habitat projects that impact the Illinois River upstream of the Refuge, and when deemed valuable to Refuge wildlife resources. Similarly, habitats throughout North Park are connected through a system of waterways. Refuge efforts to improve aquatic habitats, when requested, benefit all in North Park. The downside to this strategy involves using very limited personnel and resources on areas other than strictly Refuge grounds that may result in Refuge goals and objectives being delayed or not being met. Partnerships are the key to success when funds and personnel are limited. The Refuge strives to be included as a partner on fishery related habitat improvement projects in North Park.

Wildlife Photography and Observation

Alternative D: Preferred Alternative

1. Objective: Enhance opportunities for wildlife observation and photography based on Refuge habitat goals and objectives by 2017.

   Strategies:
   - Rebuild Brocker Overlook by 2004.
   - Construct multi-use trail from Walden to Brocker overlook by 2008.
   - Enhance auto tour route road.
   - Maintain Refuge Visitor Center for distribution of information.
   - Keep brochures current with updated information.
   - Complete and maintain boardwalk section of interpretive nature trail.
   - Build moose observation platform by 2005.
   - Construct wildlife photography blinds on the auto tour route by 2006.
   - Establish use limitations for wildlife observation and photography based on habitat goals and objectives.
   - Maintain and potentially modify existing facilities to reflect new management strategies.

   Rationale: Current visitation to the Refuge ranges from 7,000 to 9,000 visits (visit is defined as a person crossing the Refuge boundary). Many opportunities to enhance viewing and photography of wildlife while maintaining habitat goals are available. Each strategy should be designed to facilitate a quality experience for the visitor while fulfilling Refuge goals and objectives.

2. Objective: Assist with funding, construction, and program development to enhance wildlife photography and observation in North Park.

   Strategies:
   - Develop and disseminate information on the best wildlife observation and photography opportunities throughout North Park.
   - Partner with the CDOW plus others to construct and provide observation facilities for moose and other desirable species.
   - Pursue funding and partners to assist with the construction of viewing/photography blinds at various other locations in North Park.
   - Assist partners with revising the "Watching Wildlife in North Park" guide by 2006.
   - Create partnerships with other wildlife-oriented organizations and individuals.

   Rationale: Recreation plays a major role in the economy of North Park. Wildlife viewing and photography are key factors in the recreational opportunities available. Enhancing these uses will be beneficial to the economy as well as creating a better understanding of wildlife and its habitats.

Environmental Education/Interpretation

Alternative D: Preferred Alternative

1. Objective: Work with partners, including the North Park School District, to provide opportunities and facilities to conduct five environmental education programs a year, based on Refuge habitat goals and objectives.

   Strategies:
   - Work with partners to develop specific environmental education programs covering:
     - ✓ habitat management practices and principles;
     - ✓ the natural history of North Park;
     - ✓ agricultural and wildlife;
     - ✓ the life history of various local species including waterfowl, sage grouse, elk, and moose;
     - ✓ North Park and its importance to Colorado waterfowl;
     - ✓ how a Refuge comes into existence and what its role is;
     - ✓ water issues and needs.
   - Use existing environmental education opportunities as they occur, such as the water carnival, bird banding, Refuge field trips, and Day in the Woods.
   - Create programs for students and volunteers to assist in management tasks for service learning.

2. Objective: Incorporate the Refuge and its niche in the North Park landscape in other environmental education messages developed in the county.

   Strategies:
   - Partner with other land management agencies, non-government organizations, local schools and private individuals to expand the network of environmental education programs and facilities in North Park.
   - Hire an outdoor recreation planner to conduct outreach and education activities on the Refuge and North park.

3. Objective: Update Refuge interpretive message to reflect recent wildlife issues and concerns (elk, sage grouse), habitat based decision-making, local agricultural uses and how they are not mutually exclusive on or off the Refuge.

   Strategies:
   - Replace signs on the kiosks, overlooks, trails and visitor center, and pamphlets, and update the Refuge website to reflect a message of the Refuge working for wildlife and county-wide environmental interests.
   - Rehabilitate the Case Barn and develop an interpretive site there presenting the relationship between the county's ranching history and wildlife.
   - Interpret prehistoric cultural resources of the Refuge in relation to natural resources found in North Park.

Alternative D: Preferred Alternative

4. Objective: Incorporate the Refuge and its niche in the North Park landscape in other interpretive messages developed in the county.

   Strategy:
   - Partner with other entities in the development of interpretive material involving the land management of North Park to identify the role of the Refuge.

   Rationale: Arapaho National Wildlife Refuge is located almost in the geographic center of North Park. It is known to most residents as a major part of the county landscape, but exactly what the Refuge does and how it contributes to that landscape is not fully understood. Similarly, most out-of-county visitors do not understand how the lands surrounding the Refuge compliment its wildlife-oriented goals. An outdoor recreation planner position will facilitate integration of environmental education at the Refuge and in Jackson County schools. Articulating the story of history of North Park and how the Refuge and the surrounding lands benefit each other will be beneficial to all interests.

Other Uses

Alternative D: Preferred Alternative

1. Objective: Compatible, non-wildlife-dependent uses will be allowed, but limited to less sensitive areas based on habitat goals and objectives.

   Strategies:
   - Eliminate walking leashed dogs, picnicking, horseback riding, and bicycling along roads.
   - Use law enforcement, signs, information, and brochures to minimize impacts of other non-wildlife-dependent public uses.
   - Prepare and implement a travel management plan to minimize vehicle impacts to Refuge habitats by 2006.

2. Objective: Consider non-wildlife-dependent public uses and their benefits to North Park and its residents.

   Strategies:
   - With Partners, design and construct the Case Barn interpretive loop by 2008. Incorporate North Park and Refuge history and the preservation of wildlife habitats as a theme in the interpretation.
   - Encourage partners to be sensitive to wildlife needs when developing recreational opportunities in North Park.
   - Continue to allow the Colorado Department of Transportation to plow snow windbreak along Highway 125, subject to a compatibility determination.

3. Objective: Allow compatible, non-wildlife-dependent uses that support the Refuge mission.

   Strategies:
   - Continue operation of the rifle range to facilitate law enforcement firearms requalification for Refuge officers, Colorado Division of Wildlife officers, and other local law enforcement agencies on request.
   - Identify and prioritize non-Refuge mineral rights within Refuge boundaries by January 2005.
   - Acquire, on a willing-seller basis, priority mineral rights by 2010.
   - Continue operation of the Allard gravel pit to support both Refuge and county roads (on-Refuge) requirements.

   Rationale: Alternative D encourages compatible, non-wildlife-dependent uses should be limited to less sensitive areas based on habitat goals and objectives. The Refuge views mineral resource development as having negative impacts on wildlife habitat. Non-federally owned minerals within the Refuge boundary must be identified and purchased on a willing-seller basis, to minimize future resource damage. The rifle range will continue to operate as it already facilitates Refuge and North Park law enforcement needs. The travel management plan must meet Refuge compatibility determination standards, facilitate management and public use requirements. The Allard gravel pit supports Refuge and county roads (on Refuge) and will remain active to support Refuge goals and objectives.

Cultural Resources

Alternative D: Preferred Alternative

1. Objective: Identify existing Refuge cultural resources and protect from degradation.

   Strategies:
   - Complete a cultural resources survey, as needed, for management purposes.
   - Determine National Register of Historic Places status for the Hampton, Allard, and Case Barns by 2003.
   - Protect cultural resources located on the Refuge by minimizing disturbance in sensitive areas.
   - When possible, preserve historical records by conducting oral interviews with local residents.
   - Apply for monies (grants, maintenance management funds, etc.) to restore and preserve the Case Barn by 2007.
   - Support provisions within the Archaeological Resources Protection Act by developing a plan for managing Refuge archaeological resources.

2. Objective: Encourage interpretation and protection of cultural resources and their importance to North Park wildlife resources.

   Strategies:
   - Interpret the Case Barn by extending the tour route to include the barn. Develop an interpretive area adjacent to the Case Barn that discusses its regional significance by 2007. Consider adaptive re-use of the Case Barn in fulfilling the mission of the Refuge.
   - Determine historic status of Hampton Barn; make decision to keep or eliminate barn by 2005.
   - Interpret history of North Park at the Brocker overlook site by 2004.
   - By 2004, develop an interpretive area within the headquarters building that demonstrates connectivity of the Refuge with the remainder of North Park.
   - When requested, and dependent on available funding, partner with other individuals and agencies to protect and preserve cultural resources that relate to wildlife throughout North Park.

   Rationale: A broader cultural resource role needs to be described for the Refuge. The philosophy is to comply with existing cultural resource related laws and policies and to protect Refuge cultural resources from degradation. Additionally, protection and interpretation of cultural resources that relate to North Park wildlife is encouraged. Interpreting the role of ranches in the preservation of habitat can serve as an example for visitors to learn and gain a greater appreciation for wildlife and their habitats.

Research

Alternative D: Preferred Alternative

1. Objective: Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives.

   Strategies:
   - Identify and prioritize habitat management research needs by 2004.
   - Conduct in-house research on priority needs.
   - Promote the Refuge research needs within the scientific community. Encourage research that focuses directly on the Refuge's habitat management goals.

2. Objective: Identify and promote non-biological research as it relates and contributes to achieving habitat goals and objectives on the Refuge and within North Park.

   Strategies:
   - Identify and prioritize research related to Refuge and North Park wildlife in other disciplines needs by 2004.
   - Encourage research in non-biological disciplines that facilitates the Refuge and achieve goals and objectives.
   - Allow and encourage research that focuses on natural resource management goals throughout North Park.

   Rationale: These objectives and strategies focus on identifying and implementing the biological research needs of the Refuge and North Park. Research will focus on achieving the habitat goals and objectives outlined in this Plan. Identified research needs can then be promoted within the scientific community and actively encouraged by Refuge staff. Proposed research, not falling within the categories identified, would generally not be allowed. Conversely, research meeting identified Refuge needs could be supported with funding, lodging, equipment sharing, etc. Disturbance to resident wildlife and habitat is the primary concern. Limiting non-Refuge identified projects will minimize unnecessary disturbance and habitat damage.

Partnerships

Alternative D: Preferred Alternative

1. Objective: The Refuge will participate in partnerships that promote sound wildlife management.

   Strategies:
   - Engage in partnerships that result in wildlife and/or land-health improvements.
   - Participate in Habitat Partnership Program, Owl Mountain Partnership, Sage Grouse Working Group, Colorado Wetlands Initiative, Platte/Kansas Rivers Ecosystem team, and others to protect, enhance, or restore wildlife habitats.
   - Work with partners to achieve the Refuge goals and objectives.
   - Work with the Colorado Historical Society and other partners to restore / rehabilitate the Case Barn Interpretive Site.
   - Develop a conservation easement on Pole Mountain property.
   - Work with Colorado Land Trust and others to help acquire lands and mineral rights within the Refuge's approved boundaries. Minerals extraction may cause habitat disturbance within the Refuge.

2. Objective: Maintain or form partnerships to achieve the wildlife related goals and objectives on the Refuge and within North Park.

   Strategies:
   - Promote new partnerships (consider partnering with Ducks Unlimited, Trout Unlimited, Safari Club International, Audubon, Sierra Club, and others) to assist with achieving the Refuge and North Park natural resource goals.
   - Strive to develop a Refuge Friends group over the next 15 years.
   - Establish a full-time Private Lands Coordinator position to be stationed at the Refuge to assist in wildlife habitat enhancement throughout North Park.

   Rationale: These objectives and strategies describe the potential level of partnership activity that will improve wildlife habitats throughout North Park. The Refuge staff will form partnerships to promote sound wildlife management within and outside the Refuge. The Refuge will actively participate in partnerships that result in improvements to land health and provide appropriate wildlife habitat in North Park. The Refuge will collaborate with partners on management of critical wildlife habitats in North Park. The private lands position will enable the Service to contribute its biological expertise and resources to private and public landowners when requested.

Section III: Affected Environment and Environmental Consequences

Affected Environment

For a description of the affected environment, please refer to the Summary Refuge and Resource Descriptions Section in the CCP.

Environmental Consequences

This section will describe how the biological, social, economic, and cultural resources in the area of the Refuge are likely to be affected by the implementation of the Arapaho NWR CCP.

Alternative A (No Action): Continuation of Current Management

Refuge Habitats and Wildlife

The No Action alternative does not include active management and restoration of riparian and upland habitats or extensive management of wetland habitats. The main management tool for the meadows, riparian, and uplands would be grazing. Grazing would take between 8,000 to 9,500 AUMs used each year through various grazing practices including year rotational, high intensity, and rest. Fire would continue to play a very minimal part in habitat management. Noxious weed control would continue at the same level but would not be expanded. Water management would consist of flood irrigation of the meadows and filling of wetlands as early as possible in the spring. Existing riparian habitat would support the nesting neotropical birds they have in the past. No new effort would made to manage and improve riparian habitat for neotropical birds. River flows would continue to be diverted for wetlands without regard for possible improvements to existing riparian habitat if flow levels were altered. Wetland management emphasis would continue to focus on waterfowl production. All wetlands would be filled each spring and kept full as long as water conditions allowed to create pair, brood, and molt water for waterfowl. No new actions would be planned to improve the water use, wetland submergent vegetation, or shorebird habitat.

Public Uses

Interpretive, educational, and administrative programs and facilities would not change. Levels of public use would not vary as access roads would be managed as they currently are with minor upgrades and regular maintenance. Recreational opportunities would include current programs available under existing approved plans. Fishing would be allowed on the Illinois River from August 1 through June 1. Pronghorn antelope, sage grouse, small game, and waterfowl hunting would be allowed but no trapping. Public use facilities would remain essentially the same and would be maintained. No new interpretive signs, exhibits, or viewing opportunities would be developed. Refuge law enforcement would continue at existing levels. Environmental education and outreach would continue at the current level. No additional partners or funding would be pursued.

Cultural Resources

Under this alternative, the cultural resources of the Refuge would be identified and evaluated under section 106 of the National Historic Preservation Act. No interpretation of these resources would occur under this alternative.

Air and Water Quality

Air quality in the area of the Refuge would continue to be excellent and no changes in quality would occur as a result of implementing existing management activities. Water quality would continue to be good, and there would be no improvement to siltation and channel cutting to the Illinois River as a result of the continuation of current management strategies.

Socio-Economic Conditions

The North Park, and specifically the City of Walden, would not experience any changes in their current socio-economic structure as the Service would continue managing the Refuge as it has for many years. Complex funding would remain at the level needed to support current staffing and programs.

Alternative B

Refuge Habitats and Wildlife

Under this alternative, the Refuge would directly manipulate its habitats: restoring riparian habitats, studying uplands, and instituting more natural regimes to the meadow and wetland habitats, and would promote sound habitat and wildlife management throughout North Park. This manipulation would directly impact the Refuge's wildlife by providing them with all the requirements of their life cycles and improving habitats that had undergone degradation. The rest of North Park would also benefit from partnerships with the Refuge that promote sound habitat and wildlife management. The Refuge's riparian and meadow habitats would be managed in such a way as to provide a wide variety of structures, densities, and vegetative diversity so as to benefit a wider range of wildlife species as the Refuge currently benefits. Not only will waterfowl benefit under this alternative, but also neotropical migratory birds and shorebirds, together with a large variety of insects, mammals, and large ungulates.

Public Uses

Under this alternative, the Refuge would continue to promote hunting of many species in the Refuge as a sound wildlife management activity to achieve the Refuge goals, and would improve some of the facilities necessary for this activity. The Refuge would attempt to improve fisheries resources and promote fishing activities throughout the Refuge. The Refuge would actively participate with local schools to develop and implement a diverse environmental education program at the Refuge that not only focuses on the ecology of the Refuge, but of the entire North Park "sub-ecosystem." The Refuge would utilize its interpretive facilities to promote sound wildlife management and to exemplify the role that agriculture and ranching have had in the conservation of habitats and wildlife. The Refuge will participate and encourage the development of resources to improve wildlife photography and observation not only within the Refuge but throughout North Park. The Refuge would look at other compatible, wildlife-dependent uses and allow them in areas of the Refuge where these activities do not detract from the goals and objectives of the Refuge.

Cultural Resources

Under this alternative, the cultural resources would be identified and evaluated under sections 106 and 110 of the National Historic Preservation Act, the Archaeological Resources Protection Act, and Executive Order 13287: Preserve America. The Refuge would also encourage interpretation and protection of cultural resources and their relationship to North Park wildlife resources.

Air and Water Quality

Under this alternative, a noticeable increase would occur in the quality of the water of the Illinois River as it crosses the Refuge as the riparian and meadow habitats of the Refuge are improved, and, consequently, are able to better trap sediments and provide shade to the stream. The improvement of the riparian corridor would also arrest, or at least slow down, the stream cutting action of the stream on its banks, thus providing for an improved fisheries resource. The air quality under this alternative would continue to be excellent as prescribed fires would rarely be used to manage the habitats, given the prevailing climatological conditions in North Park. The increase in visitation and its associated increase in use of Refuge roads is not expected to adversely impact in the long run the quality of the air in North Park.

Socio-Economic Conditions

Under this alternative, the Refuge would expect that the current socio-economic conditions of North Park (especially in the City of Walden) would improve as the different activities that the Refuge promotes within the Refuge and throughout North Park would increase visitation to and recreation in North Park. The different public uses that would be promoted under this alternative would not only educate and promote appreciation of wildlife with the residents and visitors to North Park, but would encourage visitors to return to North Park and, thus, contribute to the North Park economy through sales of various types of equipment, lodging, meals, etc. This alternative also seeks to contribute to non-economic well-being factors, such as the preservation of the open landscape of North Park and its historical and rich agricultural and ranching way of life. Furthermore, this alternative would contribute to the well-being of many entrepreneurial activities in North Park as this alternative relies heavily in the creation of partnerships to accomplish the Refuge goals.

Further positive socio-economic effects (direct and indirect) from implementation of this alternative would come from creation of new jobs within Jackson County (11) translating into gains to the local economy from new salaries (over $400,000 per year). Adverse impacts to the local socio-economic conditions from implementing this alternative would come from a decrease in cattle grazing opportunities in order to meet habitat goals and objectives. It is estimated that this reduction in current cattle grazing levels would be as low as 10 percent but could go as high 64 percent, depending on habitat requirements and response to the strategies applied to reach the objectives of the Refuge. These reductions would be achieved gradually (5 to 10 percent per year), mainly through attrition in current grazing permit numbers from retiring cattlemen, until habitat goals are met. A maximum (64 percent) reduction from current grazing levels on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of approximately $43,373 per year. It is estimated that the total effects (direct and indirect) of a 64 percent reduction in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441 per year.

Alternative C

Refuge Habitats and Wildlife

Under this alternative, the Refuge would directly manipulate its habitats: restoring riparian habitats, studying uplands, and instituting more natural regimes to the meadow and wetland habitats, and would promote sound habitat and wildlife management throughout North Park. The aim of this alternative is, through intense habitat manipulation, to bring forth the fullness of the biological potential for the habitats of the Refuge. Manipulation would directly impact the Refuge's wildlife by providing them with all the requirements of their life cycles and improving habitats that had undergone degradation. The Refuge's riparian and meadow habitats would be managed in such a way as to provide a wide variety of structures, densities, and vegetative diversity so as to benefit a wider range of wildlife species as the Refuge currently benefits. Not only will waterfowl benefit under this alternative, but also neotropical migratory birds and shorebirds, together with a large variety of insects, mammals, and large ungulates. The Refuge would no longer be constrained by desired numbers of target-species to be produced per unit, but would let the natural carrying capacity of the habitats dictate the kinds and levels of wildlife use. Under this alternative, the current use and level of habitat management tools, as well as public uses, would be modified so as to achieve the maximum biological potential of the habitats to benefit wildlife, and all other uses would be subordinate to this need to reach the maximum biological potential.

Public Uses

Under this alternative, hunting activities would be provided not only as a legitimate wildlife-dependent public use, but also to reduce herbivory that might preclude attaining the goals of the Refuge. Fishing opportunities would only be available where they do not conflict with habitat management goals. The focus of the environmental education and interpretation would be on the techniques utilized by the Refuge to attain its habitat goals and how to avoid adversely impacting these habitats. Under this alternative, all non-wildlife-dependent public uses in the Refuge would be prohibited and wildlife observation would be limited at observations made from the edge of the Refuge to minimize disturbance to habitats and to wildlife. This alternative would be the one that would impact most seriously the availability of public uses in the Refuge by placing substantial restrictions on public uses, times, and areas of the Refuge where public uses could occur.

Cultural Resources

Under this alternative, cultural resources would be identified and protected fulfilling Federal requirements that seek to protect these valuable resources for future generations from impacts resulting from human activities. No interpretation would occur.

Air and Water Quality

Under this alternative, a noticeable increase would occur in the quality of the water of the Illinois River as it crosses the Refuge as the riparian and meadow habitats of the Refuge are improved, and, consequently, are able to better trap sediments and provide shade to the stream. The improvement of the riparian corridor would also arrest, or at least slow down, the stream cutting action of the stream on its banks, thus providing for an improved fisheries resource. The air quality under this alternative would continue to be excellent as prescribed fires would rarely be used to manage the habitats given the prevailing climatological conditions in North Park.

Socio-Economic Conditions

This alternative has the highest potential to adversely impact the current socio-economic conditions of North Park (especially in the City of Walden) as it would discourage many currently existing public uses and has a high potential to substantially reduce the levels of grazing as a habitat management tool.

Further positive socio-economic effects (direct and indirect) from implementation of this alternative would come from creation of new jobs within Jackson County (8.5) translating into gains to the local economy from new salaries (over $310,000 per year). Adverse impacts to the local socio-economic conditions from implementing this alternative would come from a decrease in cattle grazing opportunities in order to meet habitat goals and objectives. It is estimated that this reduction in current cattle grazing levels would be as low as 10 percent but could go as high 64 percent. depending on habitat requirements and response to the strategies applied to reach the objectives of the Refuge. These reductions would be achieved gradually (5 to 10 percent per year), mainly through attrition in current grazing permit numbers from retiring cattlemen, until habitat goals are met. A maximum (64 percent) reduction from current grazing levels on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of approximately $43,373 per year. It is estimated that the total effects (direct and indirect) of a 64 percent reduction in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441 per year.

This alternative has a high possibility of disrupting current visitation levels at the Refuge, except for hunting activity numbers that could potentially go up as the hunting plan of the Refuge is expanded to accommodate for further harvest of large ungulates that impact the habitats through herbivory.

Alternative D (Preferred Alternative)

Refuge Habitats and Wildlife

Under this alternative, the Refuge would directly manipulate its habitats: restoring riparian habitats, studying uplands, and instituting more natural regimes to the meadow and wetland habitats, and would promote sound habitat and wildlife management throughout North Park. This manipulation (i.e., adjusting grazing and prescribed fire levels where needed, water manipulation, etc.) would directly impact the Refuge's wildlife by providing them with all the requirements of their life cycles and improving habitats that had undergone degradation. The rest of North Park would also benefit from partnerships with the Refuge that promote sound habitat and wildlife management. The Refuge's riparian and meadow habitats would be managed in such a way as to provide a wide variety of structures, densities, and vegetative diversity so as to benefit a wider range of wildlife species as the Refuge currently benefits. Not only will waterfowl benefit under this alternative, but also neotropical migratory birds and shorebirds, together with a large variety of insects, mammals, and large ungulates.

Public Uses

Under this alternative, the Refuge would continue to promote hunting of many species in the Refuge as a sound wildlife management activity to achieve the Refuge goals, and would improve some of the facilities necessary for this activity. The Refuge would attempt to improve fisheries resources and promote fishing activities throughout the Refuge. The Refuge would actively participate with local schools to develop and implement a diverse environmental education program at the Refuge that not only focuses on the ecology of the Refuge, but of the entire North Park "sub-ecosystem." The Refuge would utilize its interpretive facilities to promote sound wildlife management and to exemplify the role that agriculture and ranching have had in the conservation of habitats and wildlife. The Refuge will participate and encourage the development of resources to improve wildlife photography and observation not only within the Refuge but throughout North Park. The Refuge would look at other compatible, wildlife-dependent uses and allow them in areas of the Refuge where these activities do not detract from the goals and objectives of the Refuge.

Cultural Resources

Under this alternative, the Service would identify and evaluate the cultural resources and protect them from degradation. The Refuge would also encourage interpretation and protection of cultural resources and their importance to North Park wildlife resources.

Air and Water Quality

Under this alternative, a noticeable increase would occur in the quality of the water of the Illinois River as it crosses the Refuge as the riparian and meadow habitats of the Refuge are improved, and, consequently, are able to better trap sediments and provide shade to the stream. The improvement of the riparian corridor would also arrest, or at least slow down, the stream cutting action of the stream on its banks, thus providing for an improved fisheries resource. The air quality under this alternative would continue to be excellent as prescribed fires would rarely be used to manage the habitats, given the prevailing climatological conditions in North Park. The increase in visitation and its associated increase in use of Refuge roads is not expected to adversely impact in the long run the quality of the air in North Park.

Socio-Economic Conditions

Under this alternative, the Refuge would expect that the current socio-economic conditions of North Park (especially in the City of Walden) would improve as the different activities that the Refuge promotes within the Refuge and throughout North Park would increase visitation to and recreation in North Park. The different public uses that would be promoted under this alternative would not only educate and promote appreciation of wildlife with the residents and visitors to North Park, but would encourage visitors to return to North Park and, thus, contribute to the North Park economy through sales of various types of equipment, lodging, meals, etc. This alternative also seeks to contribute to non-economic well-being factors, such as the preservation of the open landscape of North Park and its historical and rich agricultural and ranching way of life. Furthermore, this alternative would contribute to the well-being of many entrepreneurial activities in North Park as this alternative relies heavily in the creation of partnerships to accomplish the Refuge goals.

Further positive socio-economic effects (direct and indirect) from implementation of this alternative would come from creation of new jobs within Jackson County (11) translating into gains to the local economy from new salaries (over $400,000 per year). Adverse impacts to the local socio-economic conditions from implementing this alternative would come from a decrease in cattle grazing opportunities in order to meet habitat goals and objectives. It is estimated that this reduction in current cattle grazing levels would be as low as 10 percent but could go as high 64 percent, depending on habitat requirements and response to the strategies applied to reach the objectives of the Refuge. These reductions would be achieved gradually (5 to 10 percent per year), mainly through attrition in current grazing permit numbers from retiring cattlemen, until habitat goals are met. A maximum (64 percent) reduction from current grazing levels on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of approximately $43,373 per year. It is estimated that the total effects (direct and indirect) of a 64 percent reduction in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441 per year.

Table 1. Impacts Associated with Implementing Alternatives A-D				
Issues	**Alternative A (No Action)**	**Alternative B**	**Alternative C**	**Alternative D (Preferred)**
Wildlife and Habitats	• maintain current upland, riparian, wetland, and meadow habitats management strategies using water levels, flooding, and cattle grazing as the main tools • provide for existing wildlife with an emphasis on waterfowl production	• Refuge will shift from wildlife species-specific and production-oriented management toward habitat-enhancement and natural carrying-capacity management • Refuge management emphasis will be on restoring, to the highest possible degree, the natural processes and functions of meadows, riparian corridor, wetlands, and uplands to provide for the life cycle needs of all resident and migratory species	• Refuge will shift from wildlife species-specific and production-oriented management toward habitat-enhancement and natural carrying-capacity management • Refuge management emphasis will be on achieving maximum biological potential of the Refuge habitats to provide for the life cycle needs of all resident and migratory species	• Refuge will shift from wildlife species-specific and production-oriented management toward habitat-enhancement and natural carrying-capacity management • Refuge management emphasis will be on restoring, to the highest possible degree, the natural processes and functions of meadows, riparian corridor, wetlands, and uplands to provide for the life cycle needs of all resident and migratory species
Public Uses	• provide for existing public uses • no addition to educational activities and/or interpretation	• Great emphasis on EE/Interpretation to promote sound habitat and wildlife management techniques; this is done in collaboration with local educational institutions and may also take place outside of the Refuge • Hunting and fishing are highly encouraged given the improved habitats and wildlife using the Refuge • Other public uses are studied and permitted as long as they are compatible and do not detract from goals of the Refuge	• Hunting would continue to be encouraged and hunter numbers could increase to control herbivory • Fishing would only occur in limited numbers • EE/Interpretation would serve to inform the public on Refuge management and how to protect wildlife • Other public uses disappear and observation is very limited	• Great emphasis on EE/Interpretation to promote sound habitat and wildlife management techniques; this is done in collaboration with local educational institutions and may also take place outside of the Refuge • Hunting and fishing are highly encouraged given the improved habitats and wildlife using the Refuge • Other public uses are studied and permitted as long as they are compatible and do not detract from goals of the Refuge

Table 1. Impacts Associated with Implementing Alternatives A-D				
Issues	**Alternative A (No Action)**	**Alternative B**	**Alternative C**	**Alternative D (Preferred)**
Cultural Resources	• maintain current level of identification and protection	• identify and evaluate cultural resources during systematic inventories • interpretation of resources to show the history of the Refuge and North Park	• identify and evaluate cultural resources during systematic inventories	• identify and evaluate cultural resources during systematic inventories • interpretation of resources to show the history of the Refuge and North Park
Air and Water Quality	• No changes to current air and water quality	• no changes in air quality but marked improvements in water quality from restored habitats	• no changes in air quality but marked improvements in water quality from restored habitats	• no changes in air quality but marked improvements in water quality from restored habitats
Species of Special Concern (including federally-listed)	• maintain current levels of protection of resident as well as migratory species of special concern	same as Alternative A	same as Alternative A	same as Alternative A
Land Acquisition, Leases, and Boundary Consolidation	• maintain current status of purchasing inholdings on a willing-seller basis only • Obtain leases to access Refuge lands	same as Alternative A	same as Alternative A	same as Alternative A

Table 1. Impacts Associated with Implementing Alternatives A-D				
Issues	**Alternative A (No Action)**	**Alternative B**	**Alternative C**	**Alternative D (Preferred)**
Socio-Economic Conditions **(for further information please see Appendix G., specifically Table 21)**	• No changes; maintain current economic involvement in the local community and economy	• Direct and indirect effects from increased Refuge-related and other jobs throughout Jackson County (+11.1) as a result of implementation of this alternative result positive gains to the local economy from increased salaries (+413,044/year) • Grazing pressure on Refuge habitats may be reduced from 10% to 64% depending on habitat conditions, goals and objectives. If this reduction occurs, it would be achieved gradually (5% to 10% per year) until habitat goals are met. A 64% reduction in grazing on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of $43,373/year. The total effects (direct and indirect) of a 64% in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441/year. • Socio-Economic conditions improve throughout North Park from increased visitation	• Direct and indirect effects from increased Refuge-related and other jobs throughout Jackson County (+8.5) as a result of implementation of this alternative result positive gains to the local economy from increased salaries (+311,435/year) • Grazing pressure on Refuge habitats may be reduced from 10% to 64% depending on habitat conditions, goals and objectives. If this reduction occurs, it would be achieved gradually (5% to 10% per year) until habitat goals are met. A 64% reduction in grazing on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of $43,373/year. The total effects (direct and indirect) of a 64% in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441/year. • Socio-Economic conditions may worsen from decreased public visitation to the Refuge • Increased hunting could ameliorate negative impacts from decreased visitation from the public	• Direct and indirect effects from increased Refuge-related and other jobs throughout Jackson County (+11.1) as a result of implementation of this alternative result positive gains to the local economy from increased salaries (+413,044/year) • Grazing pressure on Refuge habitats may be reduced from 10% to 64% depending on habitat conditions, goals and objectives. If this reduction occurs, it would be achieved gradually (5% to 10% per year) until habitat goals are met. A 64% reduction in grazing on Refuge lands would result in a loss of 2.2 grazing-related jobs with a total income of $43,373/year. The total effects (direct and indirect) of a 64% in grazing pressure would result in a loss of 4.4 jobs, for a total income of $84,441/year. • Socio-Economic conditions improve throughout North Park from increased visitation

Cumulative Impacts

Cumulative impacts include impacts on the environment which result from incremental effects of the preferred alternative (proposed action) when these are added to additional past, present, and future actions (that are foreseeable). These cumulative impacts can be the result of individually minor impacts which can become significant when added over a period of time. The implementation of the preferred alternative (Alternative D) would reduce the likelihood for cumulative impacts because of the approach (incremental) in which the habitats and other programs in the Refuge will be implemented.

The new approach (proposed action) that the Refuge seeks to implement will change from the waterfowl-production scheme to a more ecologically-oriented, habitat based management. This new approach will alleviate some of the impacts caused by target-specific species.

The National Environmental Policy Act requires mitigation measures when the NEPA process detects possible significant impacts to habitats, wildlife, or the human environment. All the activities proposed under Alternative D are not expected nor intended to produce significant levels of environmental impacts that would require mitigation measures. Nevertheless, the CCP contains measures that would preclude significant environmental impacts from occurring:

1) federally-listed species will be protected from intentional or unintended impacts by having activities banned where these species occur;
2) hunting safety regulations are closely coordinated with and enforced by Refuge and CDOW personnel;
3) the Refuge will regulate all proposed activities so as to lessen potential impacts to wildlife and plant species, especially during the sensitive reproductive cycles;
4) monitoring protocols will be established to determine goal achievement levels and possible unforseen impacts to Refuge resources, so that adaptive management may be applied to ensure wildlife and habitat resources, as well as the human environment, are preserved;
5) the CCP can be revised and amended after 5 years of implementation so that, if unforeseen impacts showed up during the first years of the plan, adaptive management can correct the impacts.

Consultation and Coordination

The Refuge Manager of Arapaho NWR was assigned primary responsibility for planning in the summer of 2000. Several meetings and workshops have been conducted to date with personnel of CDOW and BLM (whose lands adjoin the Refuge) to ensure that proposed management activities not only benefit the Refuge's habitats and wildlife, but complement efforts by these agencies and to solicit their input in crucial habitat and wildlife management decisions. The Refuge, with the help of a consultant, prepared a Stakeholder Involvement Plan to ensure all interested parties and stakeholders could have opportunities to express their concerns and raise issues that would be addressed in the CCP. Public meetings were held in the City of Walden (adjacent to the Refuge) and Fort Collins (in the Front Range of Colorado) in February 2001 to try to reach out to as many stakeholders as possible. During these open house, meetings Refuge personnel gave a succinct audio-visual presentation (PowerPoint) of the history and resources of the Refuge as well as the need for the CCP and NEPA process, followed by a question-answer session, and request for comments and issues. The issues raised were inscribed on easel paper and the attendees were invited to submit further issues or questions in writing to the Refuge. Besides the CDOW, the Refuge Manager contacted the Jackson County Commissioners and invited them to a tour of the Refuge on January 22, 2001, where he provided them with briefing packets and gave them an overview of the CCP process and purpose. This meeting served also to obtain comments from the attending commissioners and answer their questions on the Refuge and the CCP process.

Arapaho NWR Draft Comprehensive Conservation Plan Alternatives (Goals and Objectives) Matrix

PUBLIC USE GOAL: *"Through wildlife-dependent recreation and education, people of a range of abilities and interests are able to learn of and appreciate the natural resources of this unique high mountain park. Thereby, citizens become better stewards of nature in their own communities and stronger supporters of the Refuge specifically and National Wildlife Refuge System generally."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
HUNTING • Provide high quality hunting recreational opportunities (1,972 hunting activity hours) on portions of the Refuge that are compatible with available natural resources.	HUNTING • Provide recreational hunting opportunities consistent with Refuge goals and objectives, and that facilitate North Park wildlife management objectives. • The Refuge will work with the State in promoting sound hunting practices as a wildlife management tool. • Facilities will be maintained, and improved as necessary, to provide a quality recreational hunting experience while minimizing resource damage.	HUNTING • Working with the State, provide hunting opportunities to meet the Refuges habitat goals and objectives. • Use hunting as a tool to minimize impacts of herbivory on habitat based goals and objectives. • Facilities (parking areas, roads, signs) will be improved to accommodate hunting and minimize impacts on Refuge. • Working with the State, provide big game hunting opportunities on the Refuge to meet Refuge habitat goals and objectives.	HUNTING • Provide recreational hunting opportunities consistent with Refuge goals and objectives, and that facilitate North Park wildlife management objectives. • The Refuge will work with the State in promoting sound hunting practices as a wildlife management tool. • Facilities will be maintained, and improved as necessary, to provide a quality recreational hunting experience while minimizing resource damage.
FISHING • Provide high quality fishing recreational opportunities on portions of the Refuge that are compatible with available natural resources.	FISHING • Where compatible, opportunities for fishing will be provided based on and Refuge goals and objectives. • Where possible, expand fishing opportunities throughout North Park, and help promote fishing as a recreational activity.	FISHING • Allow recreational fishing only when it does not conflict with habitat based goals and objectives.	FISHING • Where compatible, opportunities for fishing will be provided based on and Refuge goals and objectives. • Where possible, expand fishing opportunities throughout North Park, and help promote fishing as a recreational activity.

PUBLIC USE GOAL: *"Through wildlife-dependent recreation and education, people of a range of abilities and interests are able to learn of and appreciate the natural resources of this unique high mountain park. Thereby, citizens become better stewards of nature in their own communities and stronger supporters of the Refuge specifically and National Wildlife Refuge System generally."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
ENVIRONMENTAL EDUCATION and INTERPRETATION • Provide an average of 5 environmental education opportunities annually, focusing on requested topics, for 150 to 250 participants. • Provide interpretive opportunities to Refuge visitors - approximately 7,000 to 10,000 annually on the Refuge primarily at the visitor center and overlooks, and along the auto tour route and nature trail.	ENVIRONMENTAL EDUCATION and INTERPRETATION • Work with partners, including the North Park School District, to provide opportunities and facilities to conduct 5 environmental education programs a year, based on Refuge habitat goals and objectives. • Incorporate the Refuge and its niche in the North Park landscape in other environmental education messages developed in the county. • Update Refuge interpretive message to reflect recent wildlife issues and concerns (elk, sage grouse), habitat based decision-making, local agricultural uses, and how they are not mutually exclusive on or off the Refuge. • Incorporate the Refuge and its niche in the North Park landscape in other interpretive messages developed in the county.	ENVIRONMENTAL EDUCATION and INTERPRETATION • Modify environmental education and interpretation programs to focus on how and why the Refuge intensively manages habitats to achieve Refuge goals and purposes by 2005. • Redesign Refuge interpretation and environmental education programs to minimize disturbance to Refuge lands.	ENVIRONMENTAL EDUCATION and INTERPRETATION • Work with partners, including the North Park School District, to provide opportunities and facilities to conduct 5 environmental education programs a year, based on Refuge habitat goals and objectives. • Incorporate the Refuge and its niche in the North Park landscape in other environmental education messages developed in the county. • Update Refuge interpretive message to reflect recent wildlife issues and concerns (elk, sage grouse), habitat based decision-making, local agricultural uses, and how they are not mutually exclusive on or off the Refuge. • Incorporate the Refuge and its niche in the North Park landscape in other interpretive messages developed in the county.
WILDLIFE OBSERVATION and PHOTOGRAPHY • Provide wildlife observation and photography opportunities on the Refuge especially along overlooks, auto tour route, and nature trail.	WILDLIFE OBSERVATION and PHOTOGRAPHY • Enhance opportunities for wildlife observation and photography based on Refuge habitat goals and objectives by 2017. • Assist with funding, construction, and program development to enhance wildlife photography and observation in North Park.	WILDLIFE OBSERVATION and PHOTOGRAPHY • Encourage wildlife observation and photography from Refuge edge only by 2010.	WILDLIFE OBSERVATION and PHOTOGRAPHY • Enhance opportunities for wildlife observation and photography based on Refuge habitat goals and objectives by 2017. • Assist with funding, construction, and program development to enhance wildlife photography and observation in North Park.

PUBLIC USES GOAL: *"Through wildlife-dependent recreation and education, people of a range of abilities and interests are able to learn of and appreciate the natural resources of this unique high mountain park. Thereby, citizens become better stewards of nature in their own communities and stronger supporters of the Refuge specifically and National Wildlife Refuge System generally."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
OTHER USES • Allow current non-wildlife-dependent uses to continue on Refuge lands.	OTHER USES • Compatible, non-wildlife-dependent uses will be allowed, but limited to less sensitive areas based on habitat goals and objectives. • Consider non-wildlife-dependent public uses and their benefits to North Park and its residents.	OTHER USES • Eliminate all non-wildlife-dependent public uses that could have a negative impact on wildlife and their habitat. Eliminate or prevent natural resource damaging uses by 2010. If not possible to eliminate or prevent, then minimize or mitigate.	OTHER USES • Compatible, non-wildlife-dependent uses will be allowed, but limited to less sensitive areas based on habitat goals and objectives. • Consider non-wildlife-dependent public uses and their benefits to North Park and its residents.

PARTNERSHIPS GOAL: *"A wide range of partners join with the Fish and Wildlife Service in promoting and implementing the Refuge vision."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
• The Refuge will participate in partnerships that promote sound wildlife management.	• The Refuge will participate in partnerships that promote sound wildlife management. • Maintain or form partnerships to achieve the wildlife related goals and objectives on the Refuge and within North Park.	• The Refuge will participate in partnerships that promote sound wildlife management. • Maintain or form partnerships to assist with achieving the Refuge's habitats goals and objectives.	• The Refuge will participate in partnerships that promote sound wildlife management. • Maintain or form partnerships to achieve the wildlife related goals and objectives on the Refuge and within North Park.

CULTURAL RESOURCES GOAL: *"The cultural resources of the Refuge are preserved, protected, and interpreted for the benefit of present and future generations."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
• Limit cultural resources surveys and protection of cultural resources on Refuge lands to those tracts that will undergo a Federal action.	• Identify existing Refuge cultural resources and protect from degradation. • Encourage interpretation and protection of cultural resources and their importance to North Park wildlife resources.	• Identify and protect existing Refuge cultural resources from degradation.	• Identify existing Refuge cultural resources and protect from degradation. • Encourage interpretation and protection of cultural resources and their importance to North Park wildlife resources.

RESEARCH GOAL: *"The Refuge is a learning platform for compatible research that assists management and science of high mountain park sage-steppe communities."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
• When requested by investigators, allow natural resource related research opportunities on the Refuge.	• Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives. • Identify and promote research in other disciplines (e.g. how to lessen the impacts of public uses) as it relates and contributes to achieving habitat goals and objectives on the Refuge and within North Park.	• Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives. • Identify and promote research in other disciplines as it relates and contributes to achieving habitat goals and objectives (e.g. how to lessen the impacts of public uses.).	• Identify and promote the biological research needed to help achieve the Refuge's habitat goals and objectives. • Identify and promote research in other disciplines (e.g. how to lessen the impacts of public uses) as it relates and contributes to achieving habitat goals and objectives on the Refuge and within North Park.

RIPARIAN HABITATS GOAL: *"Provide a riparian community representative of historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for migratory birds, mammals and river dependent species."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
• Protect foraging and roosting habitat for occasional use by peregrine falcons and bald eagles to ensure that these federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands. • Develop and manage nesting and brood-rearing habitat contributing to the production o 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually. • Manage predator populations to help ensure an annual Refuge-wide minimum of 40% Mayfield nesting success for waterfowl. • Improve, restore, and protect the Illinois River riparian habitat for the benefit of brown trout, mule deer, elk, moose, and various other species of wildlife that utilize the area.	• Restore 50 to 100 acres of dense (40 to 100%) willow in patches >.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the island to the confluence with Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the lower third of the Illinois River to benefit nesting neotropical migrant songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver. • Provide 5,919 to 6,269 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%) bare ground and less than 40% (canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.	• Restore 50 to 100 acres of dense (40 to 100%) willow in patches >0.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the Island to the confluence of Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the upper third of the Illinois River to benefit nesting neotropical migratory songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver. • Provide 5,919 to 6,269 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%)bare ground and less than 40%(canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.	• Restore 50 to 100 acres of dense (40 to 100%) willow in patches >.2 ha and 20 m wide in the central third of the Illinois River (from the north end of the island to the confluence with Spring Creek) to connect existing willow patches and maintain 535 acres of dense willow in patches in the lower third of the Illinois River to benefit nesting neotropical migrant songbirds (yellow warbler, willow flycatcher) and resident moose, river otter, and beaver. • Provide 5,919 to 6,269 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%) bare ground and less than 40% (canopy closure) willow to benefit nesting waterfowl (pintail, shoveler, gadwall, green-winged teal) and sage grouse broods.

RIPARIAN HABITATS GOAL: *"Provide a riparian community representative of historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for migratory birds, mammals and river dependent species."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
	• Provide 350 to 700 acres, over a 5-year average, of a grass:forb (75:25) plant community composed of primarily native species (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground, and less than 40% (canopy closure) willow from mid-April through August to benefit nesting waterfowl (mallard, gadwall, pintail, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, curlew, willet). • Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg, outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrants, and indirectly provide suitable habitat for native and nonnative fishes.	• Provide 350 to 700 acres, over a 5-year average, of a grass:forb (75:25) plant community composed of primarily native species (grasses, sedges, forbs, rushes) characterized by <30 com visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground, and less than 40% (canopy closure) willow from mid-April though August to benefit nesting waterfowl (mallard, pintail, gadwall, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, long-billed curlew, willet). • Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg, outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrant, and indirectly provide suitable habitat for native and nonnative fishes.	• Provide 350 to 700 acres, over a 5-year average, of a grass:forb (75:25) plant community composed of primarily native species (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground, and less than 40% (canopy closure) willow from mid-April through August to benefit nesting waterfowl (mallard, gadwall, pintail, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, sora, curlew, willet). • Given the altered river flow regime, provide a properly functioning river channel characterized by a well defined thalweg, outside river edges that are deeper than inside edges, a river sinuosity of 2.0 to 2.5, pool spacing every 7 to 9 channel widths, active point bar formation, and gradients in riffles that are higher than in pools to benefit willow establishment for neotropical migrants, and indirectly provide suitable habitat for native and nonnative fishes.

RIPARIAN HABITATS GOAL: *"Provide a riparian community representative of historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for migratory birds, mammals and river dependent species."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
	• Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park. • Establish a private lands program to encourage restoration of degraded riparian zones through funding and technical assistance to accomplish similar objectives as those defined for the Refuge. High priority areas are those that have immediate influence on the Refuge because of drainage or proximity. • Work with partners to address land health issues throughout Jackson County.		• Short-term variations of habitat objectives may be considered, on a case-by-case basis, by Refuge management for important ecosystem projects within North Park. • Establish a private lands program to encourage restoration of degraded riparian zones through funding and technical assistance to accomplish similar objectives as those defined for the Refuge. High priority areas are those that have immediate influence on the Refuge because of drainage or proximity. • Work with partners to address land health issues throughout Jackson County.

MEADOW HABITATS GOAL: *"Provide and manage irrigated, grassland dominated meadows historically developed for hay production, to support sage grouse broods, waterfowl nesting, and meadow dependent migratory birds."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
• Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands. • Develop and manage nesting habitat contributing to the production of 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually. • Manage predator populations to help ensure an annual Refuge-wide minimum of 40% Mayfield nesting success for waterfowl. • Improve the condition, vigor and productivity of Refuge meadows for the benefit of phalarope, snipe, meadowlark, Savannah sparrow, sage grouse broods, and other meadow-dependent species.	• Provide 20 to 50 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25% sage canopy cover), from early June to late July, to benefit sage grouse and snipe broods. • Provide 2,830 to 3,120 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.	• Provide 20 to 50 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25% sage canopy cover), from early June to late July, to benefit sage grouse and snipe broods. • Provide 2,830 to 3,120 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.	• Provide 20 to 50 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (rushes, sedges, grasses, forbs) characterized by <20 cm height, <10 cm visual obstruction reading, with dry to moist soils (no standing water), adjacent to (within 50 m) or intermingled with sagebrush (10 to 25% sage canopy cover), from early June to late July, to benefit sage grouse and snipe broods. • Provide 2,830 to 3,120 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native species (grasses, sedges, forbs, rushes) characterized by 10 to 30 cm visual obstruction reading, 0 to 10 cm duff layer and minimal (<5%) bare ground from mid-April to the end of July to benefit nesting waterfowl (gadwall, shoveler, pintail, green-winged teal) and sage grouse broods.

MEADOW HABITATS GOAL: *"Provide and manage irrigated, grassland dominated meadows historically developed for hay production, to support sage grouse broods, waterfowl nesting, and meadow dependent migratory birds."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
	• Provide 1,100 to 1,400 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground to benefit nesting waterfowl (mallard, gadwall, pintails, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora). • Short-term variations of habitat objectives may be considered, on a case-by-case basis, by refuge management for important ecosystem projects within North Park. • Establish a private lands program to provide funding and technical assistance to encourage wildlife-compatible land management practices in meadow habitats to accomplish objectives similar to those of the Refuge. • Work with partners to address land health issues throughout Jackson County.	• Provide 1,100 to 1,400 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground to benefit nesting waterfowl (mallard, gadwall, pintails, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora).	• Provide 1,100 to 1,400 acres, over a 5-year average, of a grass:forb (75:25) plant community composed primarily of native plants (grasses, sedges, forbs, rushes) characterized by >30 cm visual obstruction reading, 10 to 20 cm duff layer and minimal (<5%) bare ground to benefit nesting waterfowl (mallard, gadwall, pintails, scaup), songbirds (savannah sparrow, meadowlark), and foraging shorebirds if flooded (snipe, phalarope, white-faced ibis, curlew, willet, sora). • Short-term variations of habitat objectives may be considered, on a case-by-case basis, by refuge management for important ecosystem projects within North Park. • Establish a private lands program to provide funding and technical assistance to encourage wildlife-compatible land management practices in meadow habitats to accomplish objectives similar to those of the Refuge. • Work with partners to address land health issues throughout Jackson County.

WETLAND HABITATS GOAL: *"Provide and manage natural and man-made permanent and semipermanent wetlands (in three wetland complexes) to provide habitat for migratory waterfowl, shorebirds, wading birds and associated wetland-dependent wildlife."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
• Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these and other federally-listed species are adequately protected and remain relatively undisturbed on Refuge lands. • Develop and manage approximately 839 acres of foraging, pairing, nesting, and brood-rearing habitat contributing to the production of 11,000 to 12,000 ducks and 500 Canada geese throughout the Refuge annually. • Improve the condition, vigor, and productivity of Refuge wetlands for the benefit of shorebirds, wading birds, and other wetland-dependent species.	• Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (>=60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night-heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, blackbirds). • Provide 10% of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading) emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds. • Provide 20% of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80% of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.	• Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (≥60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, blackbirds). • Provide 10% of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading), emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds. • Provide 20% of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80% of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.	• Maintain 10 acres of, and attempt to establish in one other wetland basin, tall (>=60 cm visual obstruction reading) emergent vegetation in water depths >4 cm over a 5-year period to provide nesting habitat for over-water nesting birds (black-crowned night-heron, white-faced ibis, waterfowl, marsh wrens, coots, rails, blackbirds). • Provide 10% of the wetland acres, over a 5-year average, in short (<10 cm), sparse (<10 cm visual obstruction reading) emergent vegetation in water depths <4 cm from April to August to provide foraging habitat for shorebirds and waterfowl, as well as nesting and brood-rearing habitat for shorebirds. • Provide 20% of the wetland acres, over a 5-year average, of emergent vegetation >25 cm tall with visual obstruction reading >80% of vegetation height in water depths 4 to 18 cm to provide escape cover and foraging habitat for dabbling duck broods and molting ducks and foraging habitat for water birds.

WETLAND HABITATS GOAL: *"Provide and manage natural and man-made permanent and semipermanent wetlands (in three wetland complexes) to provide habitat for migratory waterfowl, shorebirds, wading birds and associated wetland-dependent wildlife."*			
Alternative A (No Action Alternative)	**Alternative B**	**Alternative C**	**Alternative D (Preferred Alternative)**
	• Provide 10 to 20% of the wetland acres within each wetland complex, over a 5-year average, with a 70% coverage of submergent aquatic vegetation species (*Potomogeton*, *Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks. • Enhance the existing private land programs to encourage creation and restoration of wetlands in North Park and surrounding areas through funding and technical assistance to accomplish the same objectives as on the Refuge.	Provide 10 to 20% of the wetland acres within each wetland complex, over a 5-year average, with a 70% coverage of submergent aquatic vegetation species (*Potomogeton*, *Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks.	• Provide 10 to 20% of the wetland acres within each wetland complex, over a 5-year average, with a 70% coverage of submergent aquatic vegetation species (*Potomogeton*, *Ruppia*) in wetlands of >18 cm water depth to provide invertebrates and seed sources for foraging water birds, especially waterfowl broods, and escape cover for diving ducks. • Enhance the existing private land programs to encourage creation and restoration of wetlands in North Park and surrounding areas through funding and technical assistance to accomplish the same objectives as on the Refuge.

UPLAND HABITATS GOAL: *"Provide a sagebrush/grassland upland community representative of the historic flora and fauna in a high valley of the southern Rocky Mountains to provide habitat for sage grouse, large mammals and other shrub associated species."*

Alternative A (No Action Alternative)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
• Protect foraging habitat for occasional use by peregrine falcons and bald eagles to ensure that these, the North Park Phacelia (*Phacelia formosula*) and other federally-listed species are adequately monitored, protected, and remain relatively undisturbed on Refuge lands. • Improve the condition, vigor, and productivity of approximately 14,000 acres of Refuge sagebrush / grassland uplands for the benefit of sage grouse, waterfowl, pronghorn antelope, song birds, and raptors.	• Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >25 cm height and 20 to 30% canopy cover, >20% grass cover, and >10% forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, elk, and pronghorn antelope. • Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >40 cm height and >30% canopy cover, <20% grass cover, and >5% forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope. • Manage the remaining 10,000 acres of sagebrush / grassland uplands based on a better understanding of Refuge habitats, wildlife uses, and affected variables using best management practices. • Manage North Park Phacelia (*Phacelia formosula*) populations currently known to exist on the Refuge to ensure its continued existence. • Establish a private lands program to encourage restoration of degraded upland habitats in North Park through funding and technical assistance to accomplish the same objectives as on the Refuge.	• Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >25 cm height and 20 to 30% canopy cover, >20% grass cover, and >10% forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, elk, and pronghorn antelope. • Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >40 cm height and >30% canopy cover, <20% grass cover, and >5% forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope. • Manage the remaining 10,000 acres of sagebrush / grassland uplands based on a better understanding of refuge habitats, wildlife uses, and affected variables using best management practices. • Manage North Park Phacelia (*Phacelia formosula*) populations currently known to exist on the Refuge to ensure its continued existence.	• Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >25 cm height and 20 to 30% canopy cover, >20% grass cover, and >10% forbs (native species preferred) to benefit sage grouse, vesper sparrow, brewers sparrow, elk, and pronghorn antelope. • Provide 2,000 acres, over a 5-year average, of uplands composed of shrubs (>70% sage) >40 cm height and >30% canopy cover, <20% grass cover, and >5% forbs (native species preferred) to benefit brewer's sparrow, sage thrasher, and pronghorn antelope. • Manage the remaining 10,000 acres of sagebrush / grassland uplands based on a better understanding of Refuge habitats, wildlife uses, and affected variables using best management practices. • Manage North Park Phacelia (*Phacelia formosula*) populations currently known to exist on the Refuge to ensure its continued existence. • Establish a private lands program to encourage restoration of degraded upland habitats in North Park through funding and technical assistance to accomplish the same objectives as on the Refuge.