

ROCKY MOUNTAIN ARSENAL NATIONAL WILDLIFE REFUGE



■ FINAL ENVIRONMENTAL IMPACT STATEMENT ■



U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR



Record of Decision

Rocky Mountain Arsenal National Wildlife Refuge Adams County, Colorado Final Environmental Impact Statement

I have selected and will implement Alternative 1, the Service's Preferred Alternative, as described in the *Rocky Mountain Arsenal National Wildlife Refuge Final Environmental Impact Statement (EIS)* (November 1995) for the management of the Rocky Mountain Arsenal National Wildlife Refuge. This alternative provides the best strategy for protection and management of the wildlife resources and habitats at the Arsenal, and best combination of public use and wildlife protection for now and the future.

This Record of Decision considers comments received from federal, state, and local agencies, private organizations, and the public during the public review period. The Final EIS describes five alternatives for management of the Rocky Mountain Arsenal National Wildlife Refuge, and the effects of implementing each of these alternatives. The No Action Alternative reflects minimal management by the U.S. Fish and Wildlife Service. The other alternatives reflect plans for different levels of management by the Service.

The selected alternative best meets the purpose of Refuge management—to manage wildlife resources and public use according to the Rocky Mountain Arsenal National Wildlife Refuge Act of 1992 (Public Law 102-402). Because of past human disturbance, large areas that historically were native grasslands now are dominated by non-native plant species. The Army will restore many of these degraded areas to native grassland during cleanup activities. Wildlife habitat will improve significantly as a result of the restoration of nearly 10,000 acres of grassland and shrub communities. The Service will manage restored grassland communities and existing native remnant grasslands to benefit the Refuge's wildlife. Restored grasslands will provide valuable habitat for prairie dogs, deer, small mammals, burrowing owls, and reintroduced species.

Increased habitat for prairie dogs also will benefit bald eagles. The bald eagle is the only threatened species that regularly uses the Refuge. Every winter between November and March, bald eagles come to the Refuge to roost and feed on prairie dogs. The selected alternative includes measures to protect and enhance habitat for the existing population of bald eagles on the Refuge. The Service will maintain an adequate prairie dog population and plant cottonwood trees along First Creek to ensure adequate roost sites. These management measures also will benefit hawks, owls and

songbirds currently using the Refuge. Seasonal restrictions on the use of trails, interpretive and environmental education areas, and tram routes will minimize potential adverse impacts to the bald eagle. The Service will closely monitor eagle use and manage the Refuge to limit potential adverse effects.

The endangered peregrine falcon, found infrequently on the Refuge, and the ferruginous hawk, which commonly winters on-site and is a candidate species for listing, will not be adversely affected by the selected alternative. Mountain plover, white-faced ibis, Baird's sparrow and black tern are candidate species that are uncommon on the Refuge, but may increase with habitat restoration.

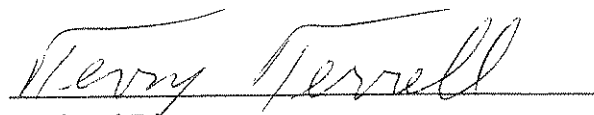
With the selected alternative, several species that historically have been associated with prairie grassland communities will be evaluated for reintroduction. These species include bison, pronghorn antelope, greater prairie chicken, and plains sharp-tailed grouse.

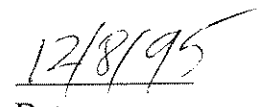
Closely regulated and supervised deer hunting will be allowed on the Refuge to control deer population. Consumption probably will not occur.

The water resources on the Refuge will continue to provide for wildlife habitat and public use. The selected alternative will not affect water resources significantly. First Creek will be returned to its pre-settlement drainage pattern. Channel alterations and reestablishment of riparian vegetation will improve wildlife habitat. Flood control will be improved slightly. As part of their cleanup responsibility, the Army will acquire sufficient water supplies to irrigate grasslands during revegetation and provide long-term maintenance of existing wetlands and lakes.

Public access to the Refuge will be provided from the visitors center, located in the western zone. Private vehicle access will be allowed as far as the visitors center, where trams and trails will provide access into the Refuge. Access via trams and trails will be limited in the winter when bald eagles are wintering on the Refuge. A perimeter trail outside the fence surrounding the Refuge will link the Refuge with other regional trails.

Based on the Final EIS and comments from the public and federal, state, and local agencies, I believe the selected alternative is the best choice for protecting wildlife and allowing public use of the Refuge.


Regional Director
Region 6
U.S.F.W.S.


Date

Type of Statement

Final Environmental Impact Statement

Proposed Action

Establishment and operation of the
Rocky Mountain Arsenal National Wildlife Refuge

Lead Agency

U.S. Fish and Wildlife Service
Department of Interior

Abstract

The U.S. Fish and Wildlife Service (Service), an agency of the Department of Interior, is proposing to establish the Rocky Mountain Arsenal National Wildlife Refuge (Refuge) in Adams County, Colorado. The Final Environmental Impact Statement describes the land, people and resources potentially affected by Refuge development and operation. Five alternatives are being considered. Alternative 1 is the Service's Preferred Alternative. It would provide for considerable public use, with a strong emphasis on environmental education while protecting existing natural resource values. Under the Preferred Alternative, a visitor center and associated facilities would be built off the Refuge on lands proposed for sale by the U.S. Government. No land acquisition would be involved in creating the Refuge. The four other alternatives considered are high, moderate and low public access, and the No Action Alternative.

For further information, please contact:

Dave Shaffer
Rocky Mountain Arsenal National Wildlife Refuge
Building 613
Commerce City, Colorado 80022-2180

January 1996

Contents

SUMMARY	S-1
CHAPTER 1: PURPOSE AND NEED FOR ACTION	1
THE ROCKY MOUNTAIN ARSENAL NATIONAL WILDLIFE REFUGE	1
Purpose of Refuge Management	1
Need for Refuge Management	3
The Comprehensive Management Plan	3
Goals	4
Compatibility of Uses on the Refuge	5
Funding	5
ACTIVITIES OUTSIDE THE SCOPE OF THIS EIS	7
CHAPTER 2: ALTERNATIVES AND REASONABLY FORESEEABLE ACTIVITIES	9
DEVELOPMENT OF ALTERNATIVES	9
Planning Zones	9
Significant Issues	11
Proposed Alternatives	11
ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES	12
Public Use	12
Management of Biological Communities	18
Water Use and Management	25
Management of Special Species	26
Species Reintroduction	29
Management of Cultural Resources	32
ALTERNATIVE 1—THE SERVICE'S PREFERRED	32
Access	32
Public Use	33
ALTERNATIVE 2—HIGH PUBLIC ACCESS	35
Access	35
Public Use	35
ALTERNATIVE 3—MODERATE PUBLIC ACCESS	37
Access	37
Public Use	37
ALTERNATIVE 4—LOW PUBLIC ACCESS	39
Access	39
Public Use	39
ALTERNATIVE 5—NO ACTION	39

REASONABLY FORESEEABLE ACTIVITIES	42
Stapleton Redevelopment	42
Gateway Development	43
New Lands in Commerce City	43
Adams County Development	45
Emerald Strands	45
CHAPTER 3: AFFECTED ENVIRONMENT	49
PHYSICAL ENVIRONMENT	49
Geology and Soils	49
Water Resources	51
Climate and Air Quality	58
Noise	59
BIOLOGICAL ENVIRONMENT	60
Vegetation	60
Wildlife and Fisheries	67
Threatened and Endangered Species	75
Candidate Species	76
SOCIAL AND ECONOMIC ENVIRONMENT	77
Land Use	77
Socioeconomics	80
Recreation	82
Cultural Resources	84
Transportation	86
Visual Resources	88
CHAPTER 4: ENVIRONMENTAL CONSEQUENCES	91
PHYSICAL ENVIRONMENT	91
Geology and Soils	91
Climate and Air Quality	93
Water Resources	96
Noise	100
BIOLOGICAL ENVIRONMENT	102
Effects Common to All Action Alternatives	102
Effects Associated With Specific Alternatives	110
Threatened and Endangered Species	117
SOCIAL AND ECONOMIC ENVIRONMENT	123
Land Use	123
Social and Economic Conditions	124
Environmental Justice	127
Recreation	128
Cultural Resources	130
Transportation	132
Visual Resources	137

RESOURCE COMMITMENTS COMMON TO ALL ACTION
ALTERNATIVES 137
 Short-term Uses of the Environment and Maintenance of Long-term
 Productivity..... 138
 Unavoidable Adverse Environmental Effects..... 138
CHAPTER 5: CONSULTATION AND COORDINATION 139
 PUBLIC PARTICIPATION 139
 Focus Groups..... 139
 Public Meetings..... 139
 Agency Coordination..... 140
 EIS Recipients..... 142
 EIS Preparers..... 145
LITERATURE CITED..... 147

Appendices

APPENDIX A: COMMENTS AND RESPONSES
APPENDIX B: BIOLOGICAL OPINION

Figures

Figure S-1. Regional location.....	S-3
Figure S-2. Preferred Alternative.....	S-8
Figure 1-1. Regional location.....	2
Figure 2-1. Planning zones.....	10
Figure 2-2. Examples of possible perimeter boundary fence design.....	16
Figure 2-3. Example of a tram.....	17
Figure 2-4. Remnant native vegetation, aquatic habitat and wetlands.....	21
Figure 2-5. Prairie dog and bald eagle management areas.....	28
Figure 2-6. Preferred Alternative.....	34
Figure 2-7. High Public Access Alternative.....	36
Figure 2-8. Moderate Public Access Alternative.....	38
Figure 2-9. Low Public Access Alternative.....	40
Figure 2-10. No Action Alternative.....	41
Figure 2-11. Regional trails and open space.....	47
Figure 3-1. Water resources.....	52
Figure 3-2. Vegetation types.....	61
Figure 3-3. Vegetation distribution.....	63
Figure 3-4. Selected wildlife habitats—spring, summer, fall.....	69
Figure 3-5. Selected wildlife habitats—winter.....	73
Figure 3-6. Adjacent land use.....	78
Figure 3-7. Current average daily traffic volumes.....	87
Figure 4-1. Preferred Alternative with selected winter wildlife habitats.....	109
Figure 4-2. Preferred Alternative with selected spring, summer, fall wildlife habitats.....	113
Figure 4-3. Projected 2015 daily traffic volumes.....	135
Figure 4-4. Projected 2015 Saturday traffic volumes.....	136

Tables

Table S-1. Comparison of alternatives.....	S-6
Table 1-1. Estimated capital costs for Preferred Alternative.....	6
Table 2-1. Comparison of alternative features.....	13
Table 2-2. Possible interpretive and environmental education areas.....	19
Table 2-3. Comparison of wildlife management, population and habitat by alternative.....	20
Table 3-1. Soil characteristics and limitations.....	50
Table 3-2. Current visitors at the Refuge.....	86
Table 3-3. Current visitor traffic volume at the Refuge.....	88
Table 4-1. Threatened, endangered and candidate species.....	118
Table 4-2. Employment and income.....	126
Table 4-3. Annual and daily visitation forecasts (upper range of visitation).....	132
Table 4-4. Traffic volume forecasts to the Refuge.....	133
Table 5-1. EIS preparers.....	145

Summary

THE ROCKY MOUNTAIN ARSENAL NATIONAL WILDLIFE REFUGE

Purpose of Refuge Management

The Rocky Mountain Arsenal is a 27-square mile area northeast of Denver, Colorado and adjacent to Commerce City, Colorado (Figure S-1). In 1942, the Department of the Army (Army) developed the area to produce chemical munitions for World War II. The area was used for the production of pesticides from 1947 to 1982. Currently, it is undergoing cleanup by the Army and Shell Oil Company.

The Rocky Mountain Arsenal National Wildlife Refuge Act of 1992 (Public Law 102-402) established the Rocky Mountain Arsenal as a National Wildlife Refuge (Refuge) following environmental cleanup, and provided authority for the U.S. Fish and Wildlife Service (Service) to manage the area as if it were a National Wildlife Refuge during the cleanup process. This Act defines the roles of the Service in managing the area before cleanup is completed, and the property transfer that will occur between the Army and the Service once the cleanup is completed. A portion of the Arsenal will be sold and will not become part of the Refuge.

The purpose of the proposed management is to manage wildlife resources and public use of the Refuge in accordance with the eight purposes of the Refuge as specified by Refuge Act of 1992. These purposes are:

- Conserve and enhance populations of fish, wildlife and plants within the Refuge, including populations of waterfowl, raptors, passerines, and marsh and water birds.
- Conserve species listed as threatened and endangered under the Endangered Species Act and species that are candidates for such listing.
- Provide maximum fish- and wildlife-oriented public uses at levels compatible with the conservation and enhancement of wildlife and wildlife habitat.
- Provide opportunities for compatible scientific research.
- Provide opportunities for compatible environmental and land use education.




- Conserve and enhance the land and water of the Refuge in a manner that will conserve and enhance the natural diversity of fish, wildlife, plants and their habitats.
- Protect and enhance the quality of aquatic habitat within the Refuge.
- Fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats.

Need for Refuge Management

Refuge management is needed to:

- Ensure that the breeding, nesting, feeding and space needs of a diversity of species are maintained and protected.
- Offer special opportunities in an urban setting for the public to observe, learn about and enjoy plants and animals in their natural habitats.
- Conduct scientific research.
- Preserve the resources and associated values found at the Refuge for future generations.
- Fulfill the Refuge's purposes described in the Refuge Act of 1992.

The Service began preparing a Comprehensive Management Plan (Management Plan) for the Rocky Mountain Arsenal Wildlife Refuge (Refuge) in early 1994. The Management Plan would guide management of wildlife and habitat, and development of public use facilities and programs at the Refuge for 10 to 15 years. The Service has prepared an Environmental Impact Statement (EIS) to document the possible environmental effects of various Management Plan alternatives and the No Action Alternative on the natural, social and economic environment. This EIS is intended to comply with the provisions of the National Environmental Policy Act and the Service's policy on new Refuge development. The Management Plan provides a framework for future management. It is not a detailed site plan and does not have exact locations for facilities or precise descriptions of programs. Additional planning will be necessary before facilities are built. The analysis of environmental impacts associated with implementation of the Management Plan is addressed at the conceptual planning level.

-  Urban Development
-  State/Federal Institution
-  Open Space/Parks

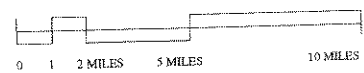
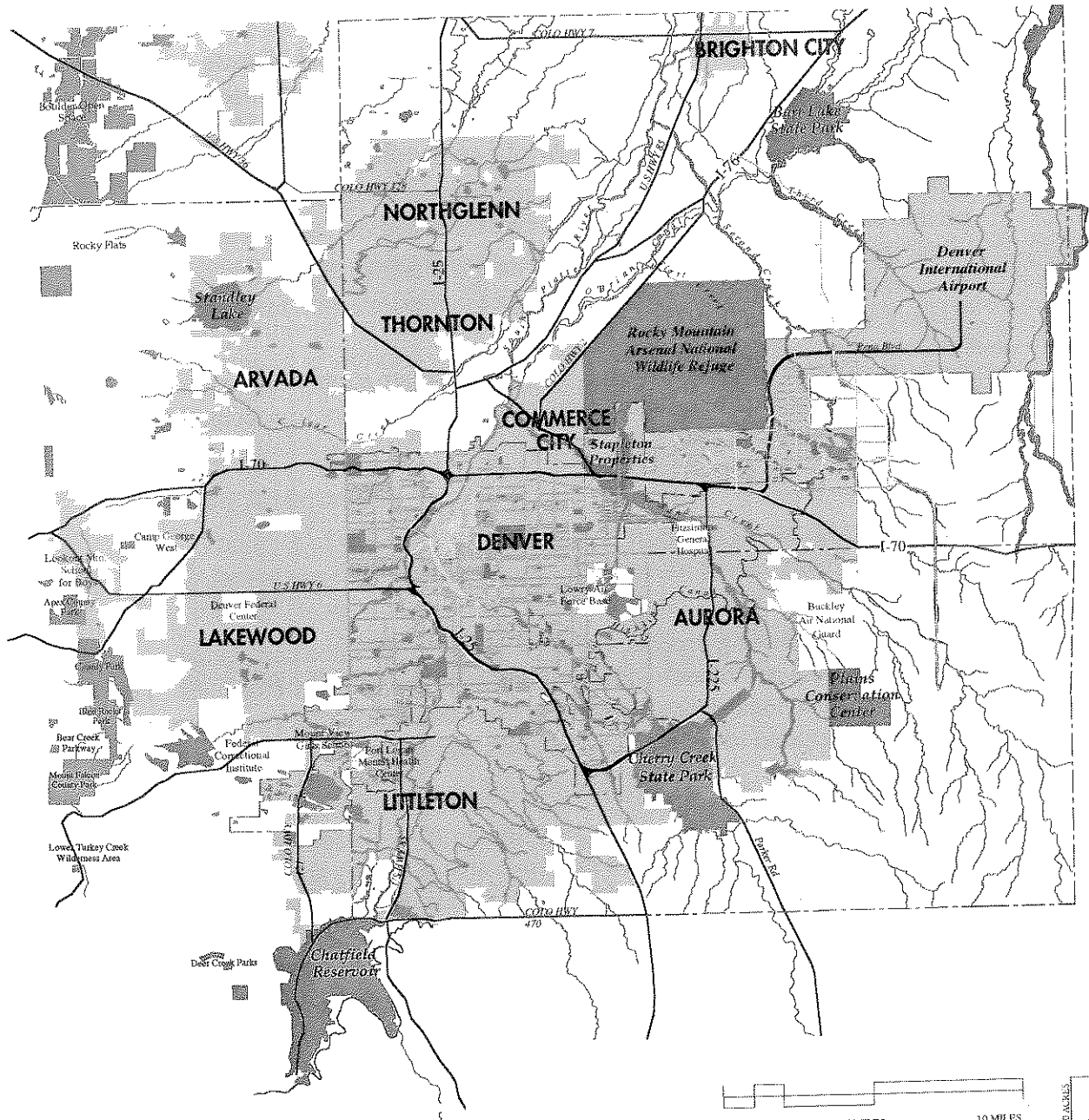
REGIONAL LOCATION

Rocky Mountain Arsenal National Wildlife Refuge

U.S. Fish & Wildlife Service — Commerce City, Colorado



Source:
DESIGNWORKSHOP Inc. *Denver Parks Study, 1993*



DESIGNWORKSHOP Inc.

January 1996



Fig S-1

Goals

The Service developed a set of goals based on the enabling legislation (Refuge Act of 1992) and information developed during project planning. Six goals were identified:

- *Wildlife and Habitat Management Goal.* Manage wildlife and habitat to contribute to ecosystem management using strategies that recognize the Refuge's different resource types and the varying purposes specified in the legislation.
- *Community Cooperation Goal.* Interact with communities and organizations through outreach, partnerships, and other cooperative efforts to create mutually beneficial relationships.
- *Environmental Education and Interpretation Goal.* Create environmental education and outreach programs for urban populations that will nurture an appreciation of nature and will help instill an attitude of environmental responsibility.
- *Recreational Goal.* Provide opportunities for enjoyable experiences through compatible wildlife-oriented recreation.
- *Research Goal.* Use the site's unique qualities to provide opportunities for research activities compatible with management of the Refuge.
- *Program Support Goal.* Develop a program support system to provide facilities, funding and resources necessary to accomplish Refuge purposes.

DEVELOPMENT OF ALTERNATIVES

Planning Zones

Early in the planning process, the Service developed three conceptual planning areas or "zones"—the northern, southern and western zones. The Refuge can be logically managed with these three distinct zones, since the zones correspond to different topographic and ecological conditions on the site.

The northern zone would be an extensive area of mostly shortgrass prairie. It would include many of the plants and animals native to the pre-settlement grassland ecosystem. The management goal of the northern zone would be the development of a self-sustaining prairie with minimal management. Public access and use would be more limited in the northern zone than the other two zones.

Wildlife use in the southern part of the Refuge is more diverse because of the presence of lakes, wetlands, former homesteads, and a variety of vegetation communities. The southern zone has been altered to a greater degree than the northern zone, and would require more management to sustain its habitat components. The goal of the southern zone is to maintain and enhance the current diversity of wildlife, and support environmental education and recreation opportunities for the public.

First Creek is the only well defined stream on the Refuge. It supports riparian vegetation and a variety of wildlife. It crosses both the northern and southern zones, and would be managed separately, but in conjunction with each zone.

The southwestern area of the Refuge is defined as the western zone. Under the law establishing the Refuge, about 815 acres of land in the southwest corner of the Refuge, and along the western edge, will be sold by the federal government to pay for a Refuge visitor facility. The area would be within the political boundaries of Commerce City and Adams County. Under Alternatives 1 through 4, the action alternatives, the Service would strive to develop partnerships with various entities supportive of the Refuge's goals in the western zone. The Service is interested in working with future occupants of these lands to promote land uses that are compatible with Refuge purposes.

Proposed Alternatives

A number of issues were identified during the public scoping process. Alternatives then were developed in response to identified environmental issues. These alternatives are intended to provide a range of uses and access, and respond to the significant issues. Five alternatives are described and evaluated in the EIS:

- Alternative 1—the Service's Preferred;
- Alternative 2—High Public Access;
- Alternative 3—Moderate Public Access;
- Alternative 4—Low Public Access; and
- Alternative 5—No Action.

These alternatives are summarized in Table S-1.

Table S-1. Comparison of alternatives.

Features	Alternative 1 Preferred	Alternative 2 High Public Access	Alternative 3 Moderate Public Access	Alternative 4 Low Public Access	Alternative 5 No Action
<i>Facilities and Structures</i>					
Visitor Center, EEC Administration, EEC	Western Zone	3 options	3 options	3 options	No
Interpretive and Environmental Education Areas	5 year-round, 1 seasonal, 4 temporary	6 year-round, 3 seasonal, 4 temporary	4 year-round, 2 seasonal, 4 temporary	4 year-round, 4 temporary	No
Pedestrian Gates	No	Yes: Montibello	No	No	No
Tram route	5 miles year-round southern zone 10 miles optional northern zone 1 additional optional extension	5 miles year-round southern zone 10 miles year-round northern zone 1 additional optional extension	5 miles year-round southern zone 10 miles optional northern zone 1 additional optional extension	5 miles year-round southern zone	No
Refuge Trails (number, type)	5 year-round trails, 5 miles; 4 seasonal trails, 6 miles; 3 connector trails, 3 miles	4 year-round trails, 6 miles; 4 seasonal trails, 7 miles; 3 connector trails, 4 miles	2 year-round trails, 3 miles; 3 seasonal trails, 6 miles	1 year-round trail, 1 mile	No
Perimeter Trails/Barrier	← ————— Same, but several options ————— →				
Number of Perimeter Overlooks	2	4	1	0	No perimeter trail/ existing fence
Major Events Area	Yes	Yes	Yes	No	No
Water Use (lakes, wetlands and stormwater)	Same	Same	Same	Same	Same
<i>Visitation Levels</i>					
Estimated Numbers	100,000 to 150,000	200,000 to 250,000	75,000 to 100,000	50,000 to 75,000	0
Staffing	75	90	50	25	10
<i>Public Use</i>					
Hunting	Yes	Yes	Yes	Yes	No
Fishing	Yes	Yes	Yes	No	No
Trail Access	Extensive	Extensive	Moderate	No	No
Bicycles (southern tram route only)	Yes — Seasonal	Yes — Seasonal	No	No	No

Alternative 1—the Service's Preferred

Access

The Service's Preferred Alternative would provide access to the Refuge from the visitor center (Figure S-2). The visitor center would be located in the western zone. Private vehicle access would be allowed as far as the visitor center, where trams and trails would provide access into the Refuge. The preferred alternative anticipates 100,000 to 150,000 annual visitors. Two private vehicle access overlooks would be constructed under this alternative as part of the regional trail/buffer zone at the Refuge perimeter. One would be along 96th Avenue on the north side of the Refuge and the second along 56th Avenue near the current location of the south gate. The Bald Eagle Watch Area also would provide access for eagle viewing. In addition, two viewing areas (without parking access) off the perimeter trail and along the southern boundary would provide for additional wildlife viewing opportunities. Neither area would be accessible by car.

Public Use

Two tram routes would be built to provide access into the Refuge and associated trails. The tram route would leave from the visitor center and connect to a route that would circle the lakes in the southern zone (Figure S-2). The southern tram route would provide access to several year-round and seasonal trails in the area; a northern tram route would provide access to several interpretive and environmental education areas as well as seasonally to the Bald Eagle Watch Area.

Most of the trails would be associated with interpretive and environmental education areas. There would be five year-round and one seasonal interpretive and environmental education areas. Year-round trails would be built on the north side of the lakes (Figure S-2). These year-round trails would connect with seasonal trails closer to the lakes. Guided access for environmental education would be provided in winter since the trails would be in the area used by wintering bald eagles. Unguided public access would be provided on these trails during the summer and early fall before the wintering eagles arrive. The perimeter trail also would have interpretive and environmental education sites for self-guided use.

Lower Derby Lake, Lake Ladora and Lake Mary would continue to be managed for catch-and-release fishing. The Service would issue as many as 700 fishing permits each year. Between 30 and 50 people would be permitted to fish each day. Other self-guided uses, such as wildlife viewing

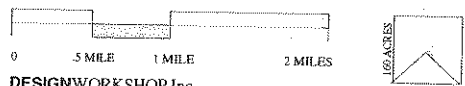
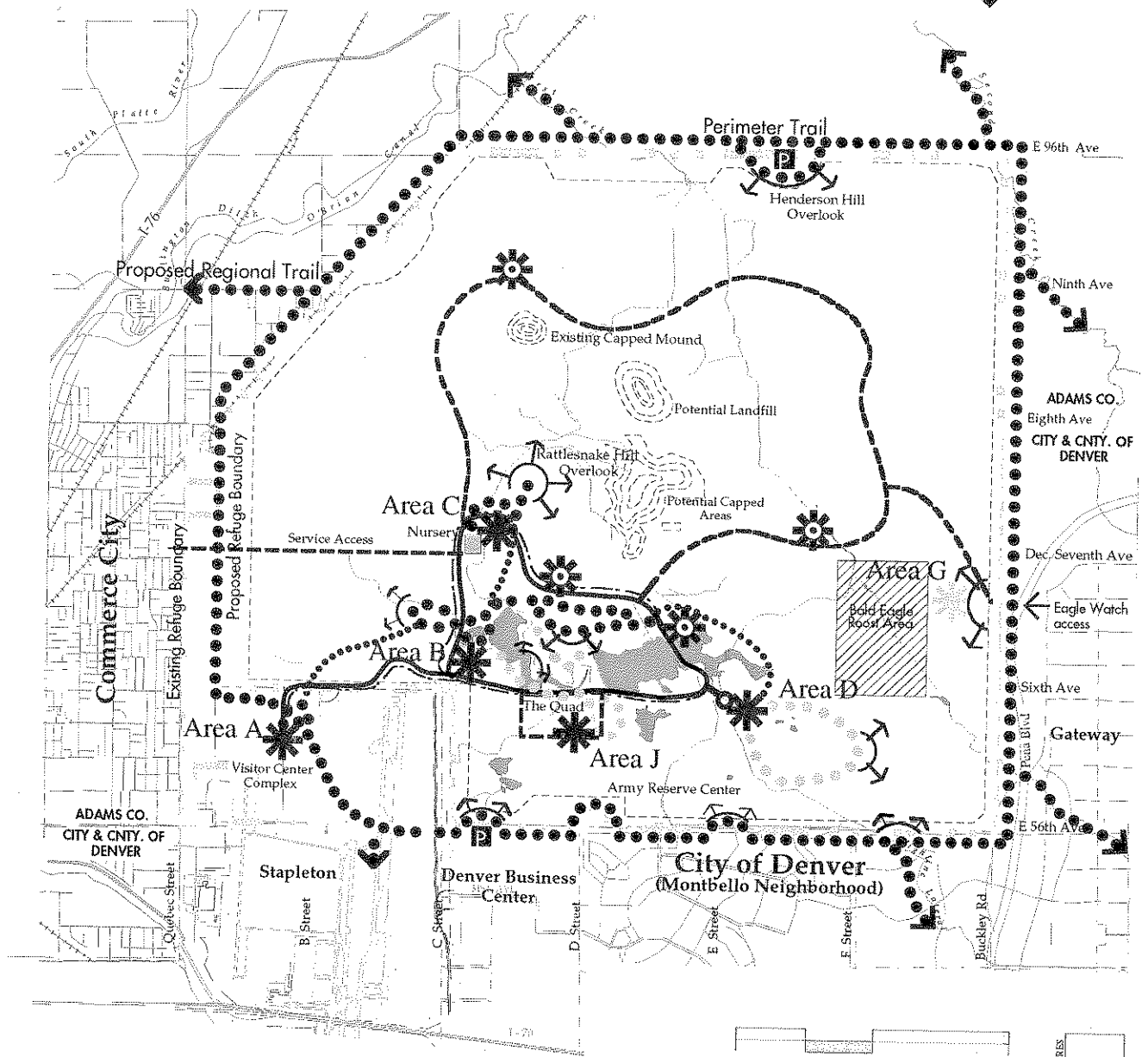
PREFERRED ALTERNATIVE

Alternative 1

- Refuge Boundary
- Perimeter Regional Trail
- Proposed Regional Trail
- Tram Route
- Optional Tram Route
- Perimeter Maintenance Road
- Year Round Interpretation & Environmental Education Area
- Seasonal Interpretation & Environmental Education Area
- Year Round Loop Trail
- Seasonal Loop Trail
- Perimeter Trail Overlook
- Temporary Interpretation & Environmental Education Area
- Overlook
- Loop Connector Hiking Trail
- Bike Route

Rocky Mountain Arsenal National Wildlife Refuge

U.S. Fish & Wildlife Service — Commerce City, Colorado



and photography, would be allowed. Public hunting for population control of various wildlife species also could be allowed.

Alternative 2—High Public Access

Access

This alternative is similar to Alternative 1. Along with the access described under Alternative 1, Alternative 2 would provide pedestrian access along 56th Avenue from the Montbello neighborhood. Two overlooks located in the same places as Alternative 1 would be constructed. Two additional overlooks, along 56th Avenue and Quebec Street, also would be built. Annual visitors for this alternative are estimated at 200,000 to 250,000.

Public Use

This alternative differs from Alternative 1 by having more miles of trails and additional interpretive and environmental education areas. Thirteen interpretive and environmental education areas, some year-round, seasonal, and temporary, would be part of this alternative and a trail would be associated with each interpretive and environmental education area. A year-round tram loop in the northern zone would be approximately 10 miles long. Greater visitor use would be allowed in the northern zone and along First Creek than for Alternative 1. Public use activities would be similar to Alternative 1.

Alternative 3—Moderate Public Access

Access

Two points of access would be provided—one at the visitor center and one at the Bald Eagle Watch Area. One perimeter overlook would be built on the Refuge's northern border. It is estimated there would be 75,000 to 100,000 annual visitors.

Public Use

A tram route in the southern zone as proposed under the other alternatives would be developed. The tram route in the northern zone would be used seasonally. There would be 9 miles of year-round and seasonal trails. These trails would be connected with the visitor center, wetlands interpretive and environmental education area, and Eagle Watch. Self-guided trail use would be permitted. Fishing at the Refuge's lakes would

be the same as Alternative 1. Other self-guided uses, such as wildlife viewing and photography, would be allowed. Hunting for population control of various wildlife species could be allowed.

Alternative 4—Low Public Access

Access

This alternative would provide public use and access comparable to or slightly above current levels. Approximately 50,000 to 75,000 visitors would be expected annually for this alternative. All public activities would be located in the southern zone. Two points of access would be provided—one at the visitor center and one at the Eagle Watch. There would be no overlooks as discussed under the other three alternatives.

Public Use

A tram route in the southern zone as proposed under the other alternatives would be developed. The tram route in the northern zone would not be developed. There would be one trail developed near the visitor center. No other trails would be constructed on the Refuge, but a perimeter trail outside the fence would be developed. No fishing would be allowed and no major events would be held on the Refuge. Hunting could be allowed to control deer populations.

Alternative 5—No Action

Under the No Action Alternative, the Service would provide minimal management at the Refuge. There would be no public access or use allowed. Existing programs, including wildlife tours, the Eagle Watch, environmental education, interpretive activities, special events, nature walks, and fishing and scout programs, would be eliminated because the Army no longer would provide funding for public use programs. The general public would not be allowed to hunt or fish on the Refuge. Existing structures and utilities would remain. No public use facilities or interpretive and environmental education areas would be constructed. Existing roads would remain, and no others would be constructed. No trails, including the proposed perimeter trail, would be built. The 815-acre surplus property in the southwest portion of the Refuge would be sold. The Army would continue to use the area to complete cleanup activities.

Activities Common to All Action Alternatives

There are a number of aspects in the proposed Management Plan that are common to each of the action alternatives. Environmental education would be one of the primary goals of the Refuge. Year-round programs would focus on the history, wildlife, habitat, endangered species and remediation activities. The Service would offer these programs to community and special interest groups, schools and to the public by hosting special events.

Various facilities would be needed to house Service staff, visitors and researchers. Detailed designs for these facilities are not included in the Management Plan. Primary facilities are those necessary to accommodate Refuge operations and visitors. These facilities include a visitor center, administration offices, an environmental education center, a research facility and a maintenance complex. A major events area and outdoor amphitheater would be built under all alternatives except Alternatives 4 and 5. Support facilities would consist of those facilities necessary to accommodate Refuge visitors. These facilities would include perimeter fencing, roads, trails, a major events area (outdoor amphitheater and open area) and environmental education sites.

The Service has identified three possible locations for the main facilities. One location would be in the western zone off the Refuge. Another possible location would be on the Refuge in the southern zone. A third possible location would be to reuse existing buildings to the extent possible. Any of these locations for facilities would work with any of the four action alternative plans.

Under all alternatives, private vehicles would not be allowed on the Refuge. If the visitor center is on the Refuge, a tram would provide public access. If the visitor center is in the western zone, an entry road would provide public access to the center. Under all action alternatives, a bald eagle viewing area would provide the opportunity to view bald eagles during the winter roosting season.

Trails would provide educational and recreational opportunities on the Refuge. The number of trails would vary by alternative. A regional trail outside of the relocated Refuge fence would be built around the perimeter of the Refuge under all the action alternatives.

Management of the biological communities would be similar under each action alternative. Grassland communities form the largest biological

community on the Refuge. Because of past disturbances, large areas that were historically native grasslands are now comprised of non-native plant species. The Army will restore a portion of these degraded grassland areas to native grass during cleanup. The various grassland communities would be managed to benefit existing wildlife use by prairie dogs, burrowing owls and raptors. The Service may reintroduce some wildlife species, such as pronghorn antelope or bison, that would use the grassland communities and compete with present wildlife. Maintenance of the prairie ecosystem would require different degrees of management depending on factors such as competition from weedy species, native species composition, location, and management impact on key wildlife species. The Army will need adequate surface water to direct plumes of contaminated ground water toward existing containment systems, as well as for irrigation, dust suppression and contaminant remediation.

Much of the area was used historically as farm and rangeland. About 100 homesteads existed throughout the Refuge. Native and non-native trees and shrubs typically are near these homesteads. The Service's goal would be to maintain the vegetation diversity associated with these sites.

Several types of aquatic communities currently exist on the Refuge. The Service's goal for aquatic communities would be to maintain and enhance habitat for fish, waterfowl and shorebirds.

First Creek flows northwest from the southeastern corner of the Refuge, and exits the Refuge at the northern boundary. The First Creek community consists of First Creek, an intermittent stream, associated wetlands and riparian areas. The Service's goal for First Creek would be to reestablish the natural drainage pattern of the creek and maintain the cottonwood trees to provide roost trees for bald eagles.

A variety of prehistoric and historic cultural resources exist on the Refuge. The goal of cultural resource management is to protect, study, and expand the interpretation of prehistoric and historic values. Conservation of archaeological and historic sites, information for research and public interpretation, and use by future generations would be emphasized. Several prehistoric sites on the Refuge would be protected from disturbance. The Service would work with the State Historic Preservation Office to avoid, minimize or mitigate impacts to prehistoric and historical resources on the Refuge.

EXISTING ENVIRONMENT

Much of the Refuge has been disturbed or altered by human activities. The Refuge is located on the western edge of the High Plains that extends through the midwest United States. Before settlement, the area was covered with shortgrass prairie vegetation types. Blue grama and buffalo grass were the dominant native grass species. In wetter locations, green needle grass, side-oats grama, little bluestem and Sandberg bluegrass were common. The present vegetation is dominated by weedy grass and forb species. There are native and non-native tree species along First Creek and near the former homesteads. There are small areas with remnant native vegetation throughout the Refuge.

The Refuge supports a variety of wildlife and fish common to the plains, as well as introduced or exotic species that were not historically found in the area. The Refuge currently provides habitat for the largest concentration of prairie dogs, bald eagles (a threatened species) and other wintering raptors (hawks and eagles) in the region. Black-tailed prairie dogs currently occupy colonies on about 500 acres, although numbers fluctuate annually depending upon plague outbreak. Prairie dogs provide an important prey base for a number of predators, including bald eagle, ferruginous hawk, other raptors and coyotes. Bald eagles winter on the Refuge primarily from November to March. They roost in large cottonwood trees along First Creek.

Two deer species are present—mule deer and white-tailed deer. Mule deer are the most common with a current population of about 550. These deer are found throughout the Refuge. White-tailed deer prefer riparian and wooded areas. Their current population estimate is 200.

Four reservoirs or artificial "lakes" are found in the southern zone—Lake Mary, Lake Ladora, Lower Derby Lake, and Upper Derby Lake. Upper Derby Lake currently is kept empty. Wetlands are found surrounding the lakes, along First Creek, and in small ponds and drainages elsewhere on the Refuge.

ENVIRONMENTAL IMPACTS

Wildlife

Wildlife Use and Habitat

Wildlife habitat would improve significantly under all alternatives. The Army would revegetate nearly 10,000 acres of grassland and shrub

communities affected by cleanup and past activities. Establishment of native vegetation would restore native plant communities on the Refuge. The restored communities would provide valuable habitat for prairie dogs, deer, small mammals, burrowing owls and reintroduced species.

Between 3,500 and 5,000 acres of land would be managed as prairie dog habitat under the action alternatives. Successful implementation of the Service's Management Plan would ensure that an adequate prey base for wintering bald eagles and other raptors is available. Various methods would be used to manage prairie dogs, minimize the spread of sylvatic plague, and control off-Refuge migration. There would minimal management of prairie dogs under the No Action Alternative.

All action alternatives would include measures to protect and enhance habitat for the existing population of bald eagles on the Refuge. Maintaining an adequate prairie dog population would be a key component to the Service's proposed management. Cottonwood trees would be planted along First Creek periodically to ensure adequate roost sites in the future. These management measures would benefit other hawks, owls and songbirds currently using the Refuge. There would be habitat management to First Creek for bald eagles under the No Action Alternative because the bald eagle is a federally-listed species.

Reintroduction of four species—bison, pronghorn antelope, greater prairie chicken, and plains sharp-tailed grouse—may occur under all action alternatives. Introduction of these species would increase wildlife diversity. Bison and pronghorn antelope would compete with other wildlife species that use the same habitat, primarily deer. These reintroductions would increase wildlife viewing opportunities. No species reintroductions are planned under the No Action Alternative.

Alternatives 1 and 2 would have the greatest effect on wildlife use and habitat due to the amount of facility development and anticipated number of visitors. Some wildlife displacement and habitat fragmentation is possible for these alternatives. Alternatives 3 and 4 would have less effect on wildlife use and habitat.

Under Alternative 5, the beneficial long-term effects of biological resources anticipated under the Management Plan alternatives, including reintroduction of native wildlife species and management of special species, would not occur. No fragmentation of habitat or disturbance of biological species would occur from construction activities on the Refuge. The only

changes in the Refuge landscape would result from cleanup activities. The Army would revegetate cleanup areas with native grasslands species. Existing biological communities would remain in areas unimpacted by cleanup activities.

Threatened and Endangered Species

The bald eagle is the only threatened species that regularly uses the Refuge. Every winter between November and March, bald eagles come to the Refuge to roost and feed on the abundant supply of prairie dogs. Alternatives 1 and 2, which have the most visitors and facility development, may result in an increase in eagle use of off-Refuge areas. Seasonal restrictions on the use of trails, interpretive and environmental education areas and tram routes would likely minimize potential adverse impacts to eagles. Eagle use would be closely monitored and managed to limit any potential effects. Alternatives 3 and 4 are less likely to affect bald eagles. Service management activities to enhance prey base diversity and abundance and efforts to protect bald eagles from human disturbance would result in a significant beneficial effect on this species for all action alternatives.

The endangered peregrine falcon is an infrequent visitor to the Refuge. The ferruginous hawk, which commonly winters on-site, is a candidate species for listing. Neither species would be adversely affected by any alternative. Mountain plover, white-faced ibis, Baird's sparrow and black tern are candidate species that are uncommon on the Refuge, but may increase with habitat restoration.

Under Alternative 5, the Service would no longer actively manage the Refuge as wintering habitat for bald eagles. Management of prairie dog populations, an important prey for bald eagles, would be minimal. This may result in fluctuating prairie dog populations that could affect the prey base available for bald eagles. Deterioration of the eagle roost area is possible if improvements to First Creek are not made, which could adversely affect bald eagle use on the Refuge.

Water Resources

None of the alternatives would affect water resources significantly. First Creek would be returned to its pre-settlement drainage pattern under all action alternatives. Channel alterations and reestablishment of riparian vegetation would improve wildlife habitat. Flood control would be improved slightly.

Water on the Refuge would be used primarily for maintaining lakes and wetlands. As part of their cleanup responsibility, the Army will acquire sufficient water supplies to irrigate grasslands during revegetation and provide long-term maintenance of existing wetlands and lakes.

Recreation

Recreational opportunity would increase significantly under all action alternatives. Recreational uses would include wildlife viewing, fishing and hiking. Environmental education would be a key component of all the alternatives. Recreation use would be the highest under Alternatives 1 and 2, and the lowest under Alternatives 3 and 4 for the action alternatives. There would be no recreational use of the Refuge under the No Action Alternative. Fishing would be allowed only under Alternatives 1, 2 and 3. Hunting to control wildlife populations would be permitted under all action alternatives.

Socioeconomics

Staffing levels under the Service's Preferred Alternative would be 75 and generate \$2.8 million in direct income. A maximum of 45 indirect jobs would be created under this Alternative. Staffing levels would be highest under Alternative 2 (90 staff positions) and generate about \$3.4 million in salaries. Staffing, direct income and indirect jobs would be lowest under the No Action Alternative.