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**INTEGRATED NATURAL
RESOURCES MANAGEMENT
PLAN, *ENVIRONMENTAL
ASSESSMENT and Finding Of No
Significant Impacts*
for
ROCK CREEK RESERVE**

2001-Closure

DOE/EA - 1371

**Department of Energy Rocky Flats Environmental
Technology Site and The U.S. Fish & Wildlife
Service**

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PREFACE

This Integrated Natural Resources Management Plan for Rock Creek Reserve (Plan) combines U.S. Fish and Wildlife Service (USFWS or Service) goals and management philosophies with those of the Department of Energy (DOE) in management of the natural resources of the Rock Creek Reserve, located within the Rocky Flats Environmental Technology Site's (Rocky Flats or Site) Buffer Zone. The Buffer Zone has been described in many public forums as a "crown jewel" for its importance as an area relatively unimpacted by agricultural use and development for many decades, and as an important link in the region's efforts to maintain an open space corridor in a rapidly developing area (Fig. 1). A federally-listed, threatened species, the Preble's meadow jumping mouse, resides in all three drainages located on the Site, including Rock Creek.

Implementation of this Plan will not impact the cleanup and closure of Rocky Flats. All other agreements, plans, and policies dealing with cleanup, and existing easements take precedence over this Plan. No funds from cleanup are used for preparation or implementation of this Plan, except where already designated for Buffer Zone activities. Although the term "reserve" carries no legal designations or requirements, it does connote an intention of natural resource-based land use. This may or may not carry over into the final decision for use of Rocky Flats. The Plan will maintain the integrity of this "crown jewel" for the use(s) that will ultimately be decided. Finally, while this Plan is intended specifically to address the management needs of Rock Creek Reserve, both DOE and the Service believe that the actions described herein will have applicability to other undisturbed areas of the Rocky Flats buffer zone.

Adjacent to the northwest corner of the Rock Creek Reserve is the DOE National Wind Technology Center (NWTC). DOE has been conducting wind energy research on that site since the mid-1970's. It also serves as DOE's hybrid energy research and testing center. The NWTC is not associated with the Rocky Flats Environmental Technology Site. For the purposes of this management plan, use of the terms: DOE, Rocky Flats (RF), Rocky Flats Environmental Technology Site (RFETS), or Rocky Flats Field Office (RFFO) does not include the NWTC.

This Plan is intended to serve as the management plan for the area known as the Rock Creek Reserve as long as the area remains under DOE ownership. If Rocky Flats becomes a National Wildlife Refuge, a Refuge planning process will be conducted for the entire Site, and it will be managed in accordance with the enabling legislation and other law and policy applicable to the National Wildlife Refuge System (NWRS). It is anticipated that the transfer of the Rocky Flats property to the USFWS would not occur until the Final Comprehensive Environmental Response, Compensation, and Liability Act Record of Decision for Rocky Flats is issued. The overall actions proposed within this Plan are generally consistent with management of National Wildlife Refuges.

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EXECUTIVE REPORT

Summary

The Plan outlines many of the steps proposed during the next five years to provide for the stewardship of the natural resources of the Rock Creek Fish and Wildlife Cooperative Management Area (Rock Creek Reserve). The Plan proposes the continuation of current management programs and policies for the Buffer Zone (which include the Rock Creek Reserve), and differs from these programs mainly with the inclusion of these proposed actions:

- expansion of the Rock Creek Reserve from 800 acres to 1700 acres;
- development of an access and recreation study;
- development of a contaminants study for Rock Creek Reserve;
- assessment and determination of feasibility to stabilize all, or part of, the Lindsay Ranch;
- within the site-wide annual vegetation management plan, provide increased emphasis for noxious weed management, including increased biological controls;
- monitoring of water quality and quantity for Rock Creek; including determination of current and minimum in-stream flows; and
- introductions of sensitive, native faunal species (and removal of non-natives) and consideration of federally-listed plant species (in accordance with approved recovery plans) into Rock Creek Reserve.

The Plan does not preclude or compromise the accomplishment of the Site's current cleanup and closure mission, or any future considerations for the Site. The Plan has been developed through cooperation with the appropriate regulatory agencies and the public.

Purpose

The Plan guides implementation of the 1998 Natural Resources Management Policy (NRMP) for Rocky Flats from 2001 through 2006 (or until closure) for the land and natural resources of the Rock Creek Reserve and helps ensure compliance with environmental laws and regulations. The Plan helps provide the continued protection and conservation of the area's unique natural resources.

Scope

Rock Creek Reserve (Fig. 2) was established in May of 1999 in recognition of the area's biological significance. Although still under ownership of the DOE, Rock Creek Reserve will be co-managed with the Service as part of a cooperative agreement signed by these two agencies in 1999. The need for an integrated natural resources management plan was recognized and included as a requirement in the cooperative agreement. The Plan discusses management tools and options specifically for Rock Creek Reserve. The management options outlined in the Plan could be used (in conjunction with other, resource-specific management plans) to help manage the natural resources for other portions of, or the entire Site

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after the scheduled clean up is complete and if future land ownership/uses are compatible. The Plan is not intended to be a re-use plan, or any kind of decision document for the use of Rocky Flats after closure. Those issues will be addressed through other public participation processes.

The Plan is developed as a tool to cooperatively manage natural and cultural resources under the current federal ownership and land use conditions. Any significant changes to the current conditions will be addressed as a supplement to the Plan or in a separate document if necessary. All management strategies in this Plan will be consistent with the Rocky Flats current mission of facilities demolition and site remediation resulting in closure.

The Plan utilizes basic criteria for protecting and enhancing natural resources using watershed, landscape, and ecosystem perspectives, consistent with the current Rocky Flats mission and Service goals. Provisions of the Plan apply to all management entities at Rocky Flats. For the purposes of this document those entities are currently the DOE (including its contractors) and the Service. The Plan provides the management goals and guidance for Rock Creek Reserve for future specific natural resource management plans, such as noxious weed management plans, cultural resource management plans, etc.

Because of policies or projects defined as federal undertakings, the Plan was developed in accordance with the National Environmental Policy Act (NEPA). NEPA requires public involvement and consideration of reasonable alternatives and environmental impacts of the alternatives of federal actions, including the proposed action. NEPA analysis of reasonable alternatives (including no action) is incorporated within the Plan to achieve that goal. Some future natural resource management projects may require additional NEPA analysis if they do not fall within the scope of significance criteria established in this Plan/Environmental Assessment.

The goals, objectives and management principles presented in the plan are a result of discussions that occurred over several years concerning the possible management options for the buffer zone, and subsequent public and agency meetings and mailings. This process is documented in the administrative record for development of the Plan and is available upon request at the Rocky Flats Environmental Technology Site.

Environmental Compliance

The Plan helps DOE and the Service to comply with federal and State laws, most notably laws associated with environmental documentation, wetlands, endangered species, water quality, and wildlife management in general.

The Plan has the signatory approval of the Service. This signature approval includes agreement that the Plan complies with the Endangered Species Act of 1973 for activities in the Rock Creek Reserve area. The Service's review of the Plan constitutes informal consultation with regard to the Endangered Species Act. The Plan facilitates compliance with applicable laws and regulations, including:

National Environmental Policy Act of 1969

National Historic Preservation Act of 1966 (as amended through 1992)

Archaeological Resources Protection Act of 1979

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American Indian Religious Freedom Act of 1978
Native American Graves Protection and Repatriation Act of 1990
Federal Noxious Weed Act of 1974
Clean Water Act of 1978
Clean Air Act (as amended through 1990)
Federal Insecticide, Fungicide and Rodenticide Act
Federal Land Policy and Management Act 1979
Protection of Wetlands: Amends Executive Order 11990
Migratory Bird Treaty Act
Executive Order 13112, Invasive Species, 1999
Colorado Noxious Weed Act

Other natural resources management regulations and legislation relevant to this Plan are listed below.

Public Law 85-624- Fish and Wildlife Coordination Act
Public Law 89-669- Fish and Wildlife Conservation Act
Public Law 86-70- Bald Eagle Protection Act, as amended
Public Law 93-366- Non-game Act
Public Law 92-522- Federal Water Pollution Control Act Amendments of 1972
Public Law 90-583- Noxious Plant Control Act
Title 16 U.S. Code 590 - Soil Conservation
Title 16 U.S. Code 1271- National Trails System Act of 1968
Executive Order 11991- Protection and Enhancement of Environmental Quality
Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority
Populations and Low Income Populations
Executive Order 11990 – Protection of Wetlands
Executive Order 11988 – Floodplain Management

Relationship to the Rocky Flats Mission

From 1952 to 1992, the mission of the Rocky Flats Plant was to produce nuclear weapons components from plutonium, uranium, beryllium and stainless steel. Among other things, the Plant produced plutonium triggers for nuclear warheads and recycled old triggers. Manufacturing work was conducted in the approximately 400-acre Industrial Area. The Industrial Area is surrounded by an approximately 6,000-acre Buffer Zone. The Buffer Zone has been left largely undisturbed over the years, resulting in preservation of vegetation and fauna, including a federally-listed threatened species, the Preble's meadow jumping mouse. The Rock Creek Reserve is located in the northern part of the Buffer Zone and is considered at this time to be essentially uncontaminated (see Section 2.1.7). In 1992, the weapons production mission was curtailed and the mission transitioned to material stabilization and cleanup with the end of the Cold War.

The current mission of the Rocky Flats Environmental Technology Site is cleanup and closure. At closure, it is anticipated that all nuclear materials and wastes will have been removed from the Site, all buildings will have been demolished, and any remaining contamination will have been remediated per the

requirements of RFCA. Current plans call for this mission to be completed late in 2006.

The Plan does not evaluate Rocky Flats' current cleanup and closure mission, nor does it replace or regulate any requirement for environmental documentation of the current clean-up and closure mission at Rocky Flats.

Existing Natural Resources Management Policy

The Plan implements and is consistent with the 1998 NRMP, which establishes natural resource policies for numerous issues important to the management of the Rocky Flats Buffer Zone. The policies set forth in the NRMP serve to guide selection and funding of Buffer Zone management activities while the Site is being cleaned up under the Rocky Flats Cleanup Agreement (RFCA). The NRMP was developed to reach a milestone under RFCA, and is designed to guide natural resource policy decisions in accordance with closure activities. The Site revises the document as necessary. The Site will discuss any proposed revisions in a public meeting process to provide opportunities for comments.

The open space cleanup objective expressed in the RFCA Vision serves as the foundation for the resource management policies enumerated in the NRMP. This vision anticipates that the Site will be cleaned up so that it can be used as open space or converted to other appropriate uses consistent with community preferences. DOE will manage resources during cleanup in order to preserve currently available options for Buffer Zone use, so that these options can be considered during post-closure resource management discussions.

Partnerships

This document was prepared in partnership and cooperation by the DOE and the Service. These agencies are cooperating in accordance with the Interagency Agreement (Appendix 1) implemented in 1999 upon establishment of the Rock Creek Reserve. Responsibilities are outlined in Section B, Part IV of the Interagency Agreement. The Colorado Division of Wildlife (DOW) and stakeholders provided recommendations and technical expertise for this Plan. Some of the stakeholders and their roles include:

- **Natural Resource Trustees** - CERCLA section 104(b)(2) provides for government agencies to represent the citizens of the United States in protecting natural resources from releases of contaminants. Natural Resource Trustees at the Site include, at the federal level: the Secretary of Energy, Secretary of the Interior, and at the State level: the Deputy Director of the Colorado Department of Natural Resources, the Executive Director of Colorado Department of Public Health and Environment, and the Attorney General of the State of Colorado.
- **Rocky Flats Coalition of Local Governments** - formed in 1999 upon the sunset of the Rocky Flats Local Impacts Initiative, is made up of representatives of the cities and counties contiguous to Rocky Flats. The member governments are City of Arvada, City of Broomfield, City of Westminster, City of Boulder, Town of Superior, Jefferson County and Boulder County. The Coalition holds monthly meetings, open to the general public, to explore and discuss Rocky Flats cleanup, closure, and stewardship issues from a local government standpoint.
- **Rocky Flats Local Impacts Initiative** - operated from 1991 through March 1999 and funded by DOE, this organization represented and served as a focal point for the views and concerns of about 60

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organizations, including businesses and environmental, academic and citizen groups. It also advised DOE on the impact of workforce restructuring on local communities and managed several DOE-funded programs to help mitigate the impact of downsizing on these communities.

- **Rocky Flats Citizens Advisory Board** - this board was formed in 1993 to provide informed, community-based recommendations to EPA, the State, and DOE on the cleanup of Rocky Flats. The board consists of up to 30 volunteers, including local citizens, businesspersons, Rocky Flats workforce personnel, representatives of local governments, regulators, academia, and public interest and environmental organizations.
- **County governments** - Rocky Flats is located almost entirely within Jefferson County (39 acres are within Boulder County), along the foothills of the Rocky Mountains. Jefferson County has been informed about activities involving land use planning at RFETS, and planning and zoning for adjacent mining operations. Boulder County, which borders the Site on the north, has also taken increased interest in cleanup and closure, weed control, and land use planning.
- **Local Communities** - because they are located near Rocky Flats and could be affected by its cleanup and closure activities, cities such as Arvada, Broomfield and Westminster provide input to regulators, DOE, and the contractor on cleanup and closure issues. The Cities of Broomfield, Westminster, Arvada and Boulder (as well as Jefferson and Boulder Counties) own open-space lands near Rocky Flats. Land use planning coordination and cooperation among local open space owners is essential.
- **Environmental/ activist groups** - organized citizen groups, such as Rocky Mountain Peace and Justice Center and the Sierra Club, have been involved in Rocky Flats issues for years, from conducting antinuclear protests during the Site's production years to taking stands on current cleanup and closure issues.
- **Community groups** - these groups, including the North Jeffco Area Group and Boulder County Open Space have stressed the importance of keeping Rocky Flats as open space to preserve an important corridor from the foothills to Standley Lake.
- **Citizens** - individuals from all walks of life have actively participated in the numerous public processes conducted by the Site and have provided input and feedback on a myriad of Site issues.

Planned Initiatives

The Plan includes a description of ongoing and planned natural resources programs and projects for Rock Creek Reserve. The most significant proposals within this Plan include:

- expanding Rock Creek Reserve from 800 acres to 1700 acres;
- developing an access and recreation study;
- introducing sensitive native fish and wildlife species, or listed plant species in accordance with approved recovery plans;
- determining current and minimum in-stream flows required for support of sensitive species on Rock Creek;
- conducting contaminants sampling and analysis to support requirements for a possible National Wildlife Refuge designation;
- studying the feasibility of stabilizing the Lindsay Ranch;
- conserving threatened, endangered and sensitive species;
- monitoring vegetation, wildlife, air, and water quality;
- protecting unique natural resources areas;

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- enhancing the existing vegetation management program through practices such as prescribed burning to protect native plants, and provide improved wildlife habitat;
- managing habitat for all species of wildlife;
- managing endangered species and their habitats to ensure compliance with the Endangered Species Act;
- preventing soil erosion to protect habitats, wetlands, and water quality;
- providing input and support for an effective, integrated noxious weed management program;
- protecting and conserving wetlands;
- continuing current public education opportunities through guided tours;
- protecting potential cultural resources while conducting natural resources management; and
- using the National Environmental Policy Act (NEPA) process to conserve natural resources.

Plan Implementation Monitoring

The success of the Plan's implementation will be evaluated through continuing monitoring programs. Additional monitoring is proposed within the Plan for those actions that are not covered in the existing monitoring program.

Costs and Benefits

- **Costs:** Costs for preparation and coordination of the Plan are described in the 1999 Interagency Agreement with the Service (Appendix 1). An annual work plan identifying funding requirements for implementation of the Plan will be submitted through the normal budget process.
- **Rocky Flats Mission Benefits:** Implementation of the Plan will help maintain the quality of lands comprising Rock Creek Reserve. Public trust and cooperation will be enhanced through Rocky Flats' commitment to environmental stewardship and through the Plan's public participation process.
- **Environmental Benefits:** The Plan provides the basis for the conservation and protection of the Rock Creek Reserve. It will help reduce vegetation loss and prevent soil erosion. It will help with the continuation of threatened & endangered species through habitat conservation and enhance native ecosystems through introductions of sensitive native species. This plan supports native species, and manages the removal/suppression of non-native species. It will provide biodiversity conservation.
- **Other Benefits:** Quality of life for the Rocky Flats surrounding community will be improved through the preservation of unique ecological resources for current and future generations. The ecological resources will be conserved for the future ownership and use of the site.

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1.0 GOALS AND THE NEPA PROCESS

This chapter discusses DOE's and the Service's goals for managing Rock Creek Reserve's natural resources and integration of NEPA documentation.

1.1 THE ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE'S MISSION AND VISION

The current mission of the Rocky Flats Technology Site is cleanup and closure. At closure, all nuclear materials and wastes will have been removed from the Site, all buildings will have been demolished, and any remaining contamination will have been remediated per the requirements of RFCA. Current plans call for this mission to be completed late in 2006.

The open space cleanup objective expressed in the RFCA Vision (RFCA, Appendix 9) serves as the foundation for the resource management policies enumerated in the 1998 NRMP. This vision anticipates that the Site will be cleaned up so that it can be used as open space or converted to other appropriate uses consistent with community preferences. DOE will manage resources during cleanup in order to preserve currently available options for Buffer Zone use, so that these options can be considered during post-closure resource management discussions.

1.2 ROCK CREEK RESERVE NATURAL RESOURCES PURPOSE AND GOALS

The purpose for the establishment of Rock Creek Reserve was to create an avenue for agency cooperation in the management of ecologically important natural resource assets which are not expected to be affected by the cleanup activities and restrictions imposed on much of the remainder of the Rocky Flats Site. The Interagency Agreement at Appendix 1 further defines this purpose.

General Rock Creek Reserve natural resources management goals:

Goal 1. To cooperatively manage Rock Creek Reserve under DOE ownership to conserve, protect and enhance native ecosystems, plant communities, and wildlife species in a manner compatible with Rocky Flats' cleanup mission, including future public use parameters and existing real property interests.

Goal 2. Ensure the management of Rock Creek Reserve is compatible with the RFCA, the 1998 NRMP and all federal and State laws regulating the cleanup of Rocky Flats.

Goal 3. Cooperate with the Colorado Division of Wildlife to study and implement introductions of sensitive species.

Goal 4. Inventory, monitor, and manage soils, water, air, vegetation, and wildlife on Rock Creek Reserve with a consideration for biological diversity.

Goal 5. Ensure the management of Rock Creek Reserve is consistent with the protection of cultural and historic resources.

Goal 6. Implement this Plan within the framework of the Interagency Agreement developed between the DOE and the Service.

Goal 7. Protect and manage threatened and endangered species and critical habitat in accordance with the Endangered Species Act (ESA), NEPA, USFWS regulations and agreements, and other applicable laws or guidance. Consider species listed by the State of Colorado in the Plan.

1.3 PLAN AND NEPA INTEGRATION

This Plan incorporates NEPA analysis and serves as an Environmental Assessment. This section describes the integration of the Plan with its NEPA documentation. The Plan incorporates by reference the 1999 Rocky Flats Environmental Technology Site Vegetation Management Plan Environmental Assessment, in accordance with 40 CFR Section 1502.21 (CEQ NEPA Implementing Regulations), to “*cut down on bulk without impeding agency and public review of the action*”. Impacts from vegetation management practices are analyzed within that document, and it provides the impact analysis for many of the actions addressed within this Plan. Nothing in this Plan is to be interpreted as a diminishment of the policies, programs and projects as outlined in that Environmental Assessment.

1.3.1 Purpose, Need, and Rationale

The purpose of the Environmental Assessment is to identify and evaluate environmental consequences of implementing certain proposed actions in the Plan that have not undergone previous NEPA analysis, and to summarize concisely those that have. The NEPA determination will be summarized in a Decision Document as an appendix (Appendix 2, to be inserted upon approval). This integration satisfies the requirements of NEPA.

A discussion of alternatives is found within each section in Chapter 4 (Proposed Actions and Alternatives) and analyzed more fully in Chapter 5 (Environmental Consequences). Each management program is discussed under the contexts of selected management options, and other (not selected) management options, including the “no action” alternative when applicable. After five years the Plan will be reviewed and updated as necessary.

1.3.2 Summary Description of the Proposed Action and Alternatives

Management options that are consistent with existing policies, agreements and restrictions, and which still meet the goals of this Plan, were proposed. Alternatives that were not considered in alternative analyses sections include those which could compromise Rocky Flats’ cleanup and closure mission. Therefore, options such as unrestricted public access and recreation, which may inhibit the Site from performing its mission, will not be considered until special nuclear material is removed and completion of an Access and Recreation Study. Provisions are found within the Plan to address this issue for future consideration.

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Proposed Action

DOE proposes to fully implement the Plan, during 2001-2006 or until closure, in cooperation with the Service, to conserve, protect, and enhance native ecosystems, and threatened or endangered, sensitive, and native species. The Plan presents information on the management of natural resources on Rock Creek Reserve. It also describes the setting, defines land management units, and describes how the unit designated as Rock Creek Reserve will be managed to sustain ecological functions, to protect and enhance federally-listed and other non-game species, and support possible future uses. Major emphasis is placed on management practices to preserve the unique native plant communities, threatened and endangered species, and to minimize invasive species and restore the native plant and fish communities.

One of the proposed actions within the Plan that bears discussion in this section is to expand the boundaries of Rock Creek Reserve to include most of the Rock Creek drainage and additional areas of tall grass prairie. The entire Rock Creek drainage encompasses approximately 1500 acres, most of which occur on the Site. The proposed expansion would increase the total acreage of Rock Creek Reserve from 800 acres to 1700 acres (Fig. 2). The Service recommended and supports this proposed action. The proposed management options in this Plan will not change with the implementation of the boundary expansion. The expansion area does not include any known contaminated areas or eligible archaeological or historic sites (see Sections 2.1.7 and 3.6.1). The expanded area does include additional easements and a few structures, including a never-used landfill with a small support facility. The expansion would provide a more definable unit (watershed) for an ecosystem management approach.

Options Considered But Not Selected

Individual project options create numerous combinations, each of which could be an alternative to the proposed action. Various laws, compliance documents, DOE regulations, funding, etc. prohibit the implementation of many of these possibilities. For example, building erosion control structures in endangered species habitat may not be a viable option due to public law and DOE policy. On the other hand, selecting management techniques for preventing and controlling erosion is an option, and there are many choices for accomplishing this.

The “options considered but not selected” will be discussed as alternative actions following each management section. Environmental Assessments do not focus on alternatives analyses as much as Environmental Impact Statements do; thus, discussions will often be general and brief.

No Action

The “no action” alternative would be to manage natural resources on Rock Creek Reserve (both the 800 acre and expanded boundary option) as they are managed currently, without the additional guidance and options outlined in this Plan, and without the cooperative management with the Service. Compliance with laws and current management plans would ensure implementation of some programs but would ignore other options presented within this Plan. The “no action” alternative describes the current (baseline) conditions against which the proposed action and alternatives are compared.

When “No Action” is the Preferred Action

Rocky Flats currently manages its Buffer Zone natural resources, including the Rock Creek Reserve area, under existing management plans. The preferred action is sometimes the *continuance* of the current management practice (i.e., no change to the current action), or “no action” and is designated as such throughout the Plan under the heading ***Preferred Action: No Action***. Often, the current practices are adequate to meet the goals of this Plan. To help prevent confusion to the reader as to whether a proposed change is planned, or when no change will occur, the no action alternative is referred to in the Plan as “preferred”, since “proposed” connotes a change. For example, in much of the inventory and monitoring section the no action alternative is the preferred action because of the completeness of those current programs.

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2.0 Background

This section provides background information for the designated 800 acre Rock Creek Reserve, except where specified otherwise.

2.1 SETTING AND FACILITIES

More information about the existing facilities and future of the facilities for the Site can be found in the 1998 Natural Resources Management Policy and the 2006 Closure Project Baseline.

2.1.1 Location

Rock Creek Reserve is located on the northern edge of the Rocky Flats alluvial mesa (Fig 1). Near the line separating Boulder and Jefferson counties, the reserve is approximately two to three miles east of the foothills and on the far, western edge of the Great Plains. Rock Creek Reserve is bounded on the north by State Road 128, on the west by private land, other buffer zone area, and the DOE National Wind Technology Center. State Road 93 is in close proximity to the western boundary. The south and east portions of the Reserve are bordered by other portions of Rocky Flats and Indiana Street.

On a larger scale, Rock Creek Reserve is located in Jefferson County, Colorado (with 39 acres in Boulder County), 16 miles northwest of downtown Denver. Adjacent to the foothills of the Rocky Mountains, the Rock Creek Reserve is part of the 6266-acre Rocky Flats Environmental Technology Site, in close proximity to the large and rapidly growing Denver metropolitan area. Several million people now live within a 50-mile radius of the Site. Population growth is expected to continue along existing trends. Considerable development is now occurring in the vicinity of Rocky Flats.

Rock Creek/Rocky Flats is west of Interstate 25 and north of Interstate 70, the major north-south and east-west connectors across Colorado. Roads near the Site include State Highway 93 to the west, State Highway 128 to the north, Indiana Street on the east, and State Highway 72 to the south. No roads exist along the immediate southern and western boundary, and no public access roads traverse the Site. The Site is about 45 miles from Denver International Airport and about five miles from the Jefferson County Airport, which serves private and some commercial aircraft.

2.1.2 Rock Creek Reserve Acquisition and Acreage

Rock Creek Reserve was created in 1999 through a designation by Secretary of Energy Bill Richardson , and enactment of a cooperative agreement between DOE and the Service for management of Rock Creek Reserve's ecologically important resources. Approximately 800 acres of the northern Buffer Zone was designated as Rock Creek Reserve. One of the proposed actions is the expansion of the reserve to approximately 1700 acres. This alternative is discussed in Section 4.7.3.1.

Most of the Rock Creek Reserve was part of several livestock ranches (the Lindsay Ranch and other agricultural ownerships) before the property was purchased by DOE in 1974 through 1976.

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2.1.3. Mineral Rights

When the federal government bought the lands comprising Rocky Flats, the purchases did not include additional mineral rights. A mining permit, called the Bluestone Permit, was granted by the Colorado Division of Mining and Geology, and a zoning variance was passed by the Jefferson County Commissioners in 1995 that included part to the Rock Creek Reserve. The portion of the Bluestone permit lying within Rock Creek Reserve is located in the northwest, and includes approximately 250 acres, of which about 20 acres are permitted for mining and about 230 acres of the permitted area are designated as non-mining buffer. Mining operations have not yet begun in this area.

2.1.4. Rock Creek Reserve Neighbors

Cities and Open Lands:

Rock Creek Reserve is located near the cities of Arvada, Louisville, Westminster, Broomfield, Superior, and Boulder, as well as unincorporated portions of Jefferson and Boulder Counties (Fig. 1). Land around the Site primarily consists of ranchland, preserved open space, mining areas, and low-density residential areas and businesses. However, this rural pattern is beginning to change due to spreading development.

The towns of Superior and Broomfield have already experienced extensive development northeast of the Site. There is potential for similar development south of the Site within Vauxmont, an approved 18,000-acre industrial, office, commercial and residential community. State-owned lands southwest of the Site are used for grazing, mining, and potential environmental purposes. Along Highway 93, an area of land approximately 1,200 feet wide adjacent to the Site's western boundary is zoned industrial for eventual development. The National Wind Technology Center is located immediately adjacent to the northwest corner of the Reserve.

Preserved open space is the primary existing and proposed use of the lands north, west and east of the Site. The City of Boulder recently purchased the Van Fleet and Jewel Mountain properties west of Highway 93. On the west boundary, Rocky Flats is separated from the open space land by private land and the NWTC.

There are two reservoirs just downstream and east of the Site. Standley Lake serves as the drinking water supply for the Cities of Westminster, Northglenn and Thornton. To protect water quality at Standley Lake, a reservoir was constructed downstream on Woman Creek, just off-site, but upstream of Standley Lake. Great Western Reservoir previously served as a drinking water supply for the City of Broomfield. A diversion ditch routes water leaving the Site via Walnut Creek around Great Western Reservoir. Rocky Flats Lake (Smart Reservoir) is located on land adjacent to the southwest corner of the Site. It is generally believed by Site hydrologists, that Antelope Springs flows are partially a result of leakage from Rocky Flats Lake.

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Rocky Flats Environmental Technology Site:

1. Industrial Area

Encompassing approximately 400 acres, the Industrial Area is located in the center of Rocky Flats. The Industrial Area has more than 400 structures including manufacturing, chemical processing, laboratory and support facilities. The acreage of the Industrial Area includes the Protected Area.

2. Protected Area

Also located in the center of the Site, the Protected Area consists of 96 acres in the northern portion of the Industrial Area. The Protected Area contains the complex of former plutonium production or support buildings. This area is subject to stringent security requirements and other protection measures.

3. Buffer Zone

Rock Creek Reserve is located in the Rock Creek drainage area of the 5,870-acre Buffer Zone. The Buffer Zone surrounds the industrial area and protects it from potential encroachment by development. The Buffer Zone helps maintain distance to off-site residents in the case of accidental releases of hazardous or radioactive materials. Largely retained as open space, the Buffer Zone contains very few facilities, except for support facilities such as retention ponds, monitoring stations, sanitary landfills and dirt roads used for access and fire breaks. The entire Buffer Zone is fenced and access is regulated at the east and west entry gates.

The 280-acre DOE National Renewable Energy Laboratory (NREL), National Wind Technology Center is located in the northwest corner of the Buffer Zone, immediately adjacent to Rock Creek Reserve, on lands transferred from DOE/Rocky Flats Field Office custodianship to DOE/NREL.

2.1.5 Facilities

Rock Creek Reserve is located on a mostly unimproved area of Rocky Flats.

Structures

The Lindsay Ranch house, barn, some fencing, and an old manmade stock watering pond exist on the site. These structures have not been in use and are in various stages of disrepair. In the proposed boundary expansion, a landfill with small support building, constructed in the mid 1990s and never put into use, is located on the south boundary of the Rock Creek Reserve.

Easements

Rock Creek Reserve has outstanding easements for a U.S. West fiber optic line, a Coors Energy gas pipeline and Public Service has gas line and high voltage transmission line easements. The Upper Church and McKay ditches also flow through a portion of Rock Creek Reserve in the proposed boundary expansion.

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Transportation System

Rock Creek Reserve is currently accessed primarily through the Site's west gate along State Highway 93, which is in close proximity to the western part of the reserve. Several unpaved access roads traverse the reserve.

Water

Rock Creek Reserve depends entirely on groundwater seeps, springs and surface water runoff to feed the streams. Local surface water is generated as storm runoff, snowmelt and discharge from springs into the stream channel of Rock Creek.

Currently, there is no water rights ownership within Rock Creek Reserve. Water rights are held both upstream (groundwater) and downstream (groundwater and surface water) of Rock Creek Reserve.

Storm Water Drainage System

Storm water on Rock Creek Reserve is not collected or treated. Storm water flows via over-ground flow through natural drainages and streams, washes, etc., to deposit in river drainages.

2.1.6 Projected Changes in Facilities

There are no projected changes in DOE facilities within the Rock Creek Reserve over the course of the 5-year period for which this Plan is intended. The change in facilities (including removal) for the remainder of Rocky Flats is described in the 2006 Closure Project Baseline.

2.1.7 Type and Extent of Contamination on Rock Creek Reserve

Characteristic of this part of Colorado, Rock Creek Reserve has low levels of radionuclides due to naturally occurring uranium in the Colorado Rocky Mountains and due to fallout from past atmospheric testing of nuclear weapons (fallout radionuclides). A 1995 report entitled "Geochemical Characterization of Background Surface Soils" (Executive Summary at Appendix 3), confirms the validity of the Rock Creek area as background for naturally occurring radionuclides. This report provides information on the background levels for naturally occurring metals and radionuclides and supporting parameters, as well as for fallout radionuclides. A 1999 Colorado Department of Public Health and Environment report "Buffer Zone Contamination Review" identified from aerial photographs several disturbed areas in the Buffer Zone that were considered to have a potential for contamination. These areas included the Lindsay Ranch, possible trenches and slump areas in the Rock Creek Reserve. Subsequent investigations on the ground found no further evidence of contamination at those sites.

Two fires in the industrial area, as well as dispersal from leaking drums stored on the 903 pad, have deposited radionuclides in some portions of the Buffer Zone. In general, most of the Buffer Zone is not contaminated with radionuclides or hazardous wastes. This is especially true of Rock Creek Reserve, which is located both upwind and upgradient of the Industrial Area. The Rock Creek Reserve basin drains the northwest portion of the Buffer Zone. This basin is topographically isolated from the developed areas and receives no water from the Industrial Area (described in Section 2.1.4). After crossing Highway 128, flow continues to the northeast until its confluence with Coal Creek.

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2.2 LAND USE AND MANAGEMENT UNITS

2.2.1 Land Use

The acreage in Rock Creek Reserve, along with most of the remaining Buffer Zone surrounding the Industrial Area, has been utilized as a buffer area since it was acquired. The area is relatively undisturbed compared to areas east and northeast of Rocky Flats. Rock Creek Reserve is traversed by maintained dirt or gravel roads. Environmental remediation has disturbed less than 50 acres of the Buffer Zone, none of which has occurred in Rock Creek Reserve. Approximately 700 acres of the Site, with about 250 acres of that total in the Rock Creek Reserve, are under existing mining permits for minerals such as sand, gravel and clay (see Section 2.1.3). Land use on Rock Creek Reserve will not change during the time period this Plan covers.

2.2.2 Management Units

2.2.2.1 Rock Creek Reserve and Proposed Expansion

The established 800-acre Rock Creek Reserve is separated as a management unit for the purposes of this Plan because of the increased cooperative management with the Service in this particular area. The Service currently cooperates with Rocky Flats as a reviewer and in a consultation capacity when required. Rock Creek Reserve differs from the rest of the Site, however, in that the Service takes on a more proactive role in determining natural resource management priorities, policies and management recommendations. Expansion of Rock Creek Reserve to 1700 acres is proposed (Fig. 2). The Service recommends this expansion to provide a more comprehensive inclusion of the Rock Creek drainage area (watershed), which is approximately 1500 acres. Land management units are generally viewed and treated at a watershed level in contemporary management practices. A portion of the headwaters of the Rock Creek watershed occur off the Site to the west on privately owned land and the NWTC could not be included. Expansion of the boundaries of the Reserve will allow inclusion of all the Rock Creek watershed that exists on RFETS. Use of the term watershed in this plan refers only to the area of the watershed within RFETS and does not include the portion of the watershed off site..

The expansion would not impact any of the general management options listed in Chapter 4 of this Plan. The expansion does not include any known contaminated areas or eligible cultural sites. The expansion would include more of the xeric tallgrass prairie and Preble's meadow jumping mouse protection areas into one, more definable, management unit (watershed) than is currently described.

2.2.2.2 Remaining Buffer Zone

The remainder of the Buffer Zone will continue to be managed as currently outlined in existing management plans, policies and strategies. Many of these plans are updated annually. Buffer Zone drainages (Walnut Creek and Woman Creek) have been altered. No land use changes in the remaining Buffer Zone are anticipated over the course of this Plan.

2.2.2.3 Industrial Area

The Industrial Area, approximately 400 acres in the middle of the Site that comprise the nuclear weapons production plant, is where most of the closure and clean-up activities will occur. The cleanup and closure of the Industrial Area is driven primarily by the Rocky Flats Cleanup Agreement. Land use in the Industrial Area will not change significantly over the course of this Plan, but may change following closure.

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3.0 AFFECTED ENVIRONMENT

Much of the background information presented in this Chapter is taken from the 1998 Natural Resource Management Policy, 1997 Ecological Resource Management Plan for the Rocky Flats Environmental Technology Site, 1994 Rocky Flats Environmental Technology Site Environmental Report, 1994 Rocky Flats Plant Wetlands Mapping and Resource Study, and the 1992 Baseline Biological Characterization of the Terrestrial and Aquatic Habitats at Rocky Flats Plant. More detailed discussions of many topics discussed below are found in the above-mentioned reports, and in the Rocky Flats Cleanup Agreement. The most current lists of vegetation and wildlife species for the entire Site can also be found at <http://www.rfets.gov/>. This Web site provides ecological information under the "Environmental Data" button, then the "Ecology" button.

As discussed in the preface, it is often impossible to discuss the affected environment of Rock Creek Reserve without discussing the background and environment of the region as a whole. The affected environment includes not only the remainder of Rocky Flats, but also the area extending from Standley Lake on the east to the foothills of the Rocky Mountains to the west. When appropriate, affected environment for the region and its relationship to Rock Creek Reserve will be discussed.

3.1 TOPOGRAPHY, PHYSIOGRAPHY, GEOLOGY AND SOILS

3.1.1 Topography and Physiography

The environment at Rocky Flats is influenced by the Site's proximity to the Front Range of the Rocky Mountains and its location on a broad, eastward sloping plain of coalescing alluvial fans. As shown on U.S. Geological Survey maps, the Front Range trends north-south at elevations of about 9,800 feet above sea level, with elevations increasing to 13,000 feet along the Continental Divide about 16 miles west of Rocky Flats. The elevation of Rocky Flats varies from approximately 6200 feet at the western boundary to approximately 5650 feet at the southeastern corner. This suggests a gently sloping landscape. However, the Rock Creek Reserve, with a stream channel ranging from 6220 feet in the west to 5710 feet in the eastern portion, has slopes in the Rock Creek drainage that are the steepest of the three drainages located at the Site. Differences in the eroded depth of the three stream channels at the Site has resulted in formation of different soil-forming materials in Rock Creek than in Woman and Walnut Creeks, which have similar soils. Rock Creek's steeper ravines have a southwest-to-northeast orientation, while the other two creeks have wider valleys that trend west to east. This difference in aspect and slope can influence soil moisture, and thereby the habitat for plant community formation. Minor rock outcrops occur largely in the Rock Creek section of the site. Scattered Ponderosa Pines are located on these outcrops.

3.1.2 Geology

Rock Creek Reserve is located just east of the Front Range in the Denver Basin – an asymmetrical, north-south trending syncline with a steeply dipping western limb and a shallowly dipping eastern limb. The Denver Basin contains more than 9,840 feet of Pennsylvanian to Cretaceous sedimentary deposits. Geologic units at the Site, including Rock Creek Reserve, consist of unconsolidated surficial material and bedrock. Cretaceous deposits of the Arapahoe Formation, Laramie Formation, and Fox Hills Sandstone are unconformably overlain by Quaternary alluvial gravels, colluvial deposits, and artificial fill. Fox Hills

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and Laramie Formation sandstones form a prominent hogback that strikes north-northwest from Leyden Gulch north to the town of Marshall. Immediately west of Rocky Flats where the hogback is not visible, these sandstones are exposed in clay and gravel pits excavated through the Quaternary gravels. Soils are from several series, derived from surficial geologic formations.

3.1.2.1 Hydrogeology

The uppermost aquifer at the Site is comprised of the Rocky Flats Alluvium, valley fill alluvium, colluvium, bedrock sandstones, and weathered claystones of the Arapahoe and Laramie Formations. In general, groundwater in the uppermost aquifer occurs under unconfined conditions. Sitewide groundwater flow moves from the higher elevations in the west toward the lower drainages in the east. Sources of groundwater recharge to the uppermost aquifer include infiltration of precipitation, snowmelt, and surface water in ditches, streams and ponds. Discharge occurs through evapotranspiration from plants and as seeps when the table intersects the ground surface or surface water features such as streams, ditches, ponds or stream-eroded valleys. Groundwater levels at the Site rise annually in response to spring recharge and decline the remainder of the year as less precipitation occurs.

3.1.3 Soils

Soils at Rocky Flats are chiefly moderate to deep, well-drained clay, cobbly clay, and sandy loams, with moderate to low permeability. Soil types for the entire Site, including Rock Creek Reserve are shown in Fig. 3. Bottomland (floodplain and low terraces) soils are largely stratified loamy alluvium, made up of mesic Ustic Torrfluvents from the Haverson series. The Haverson series is well drained and commonly found on slopes of 0 to 9 percent. Soils of the terraces and upper hillsides, where gravel and cobble are common, are represented by combinations of the Denver and Kutch series. Both of these soils are well drained, deep (Denver) to moderately deep (Kutch), and are found on moderately steep slopes, 0 to 15 percent and 5 to 25 percent for Denver and Kutch, respectively. These mesic Torrertic Argiustolls are sandy loam formed from Rocky Flats Alluvium. Lower hillsides and areas toward the eastern boundary of the Site have soils from the Standley, Nunn, and Valmont series, which are largely mesic Ardic Argiustolls. These soils that vary in slope are deep and well drained. The slope for Standley, Nunn, and Valmont series are 0 to 60, 0 to 25 and 0 to 3 percent, respectively.

More information on the geology, hydrogeology, and soils of Rock Creek Reserve can be found in the 1991 Baseline Study for Rocky Flats and the 1995 Seepage Characterization Work Plan for the Rocky Flats Environmental Technology Site (EG&G, Rocky Flats Inc).

3.2 WATER RESOURCES

3.2.1 Surface Water/ Wetlands

Surface water flows from the Site via five streams which pass through or are adjacent to the Site. Three of these streams, North Walnut Creek, South Walnut Creek, and Woman Creek, contain detention ponds to protect neighboring cities' water supplies. Those creeks are part of the Big Dry Creek watershed. Rock Creek flows in a more northerly direction into Coal Creek off-site, and ultimately to the South Platte. The Industrial Area is located between two stream-cut valleys: North Walnut Creek and Woman Creek. This section focuses on the Rock Creek drainage.

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Surface water originates from two main sources on Rock Creek Reserve. The most important sources for the formation and maintenance of the aquatic ecosystem are groundwater discharges that form springs and seeps in numerous places along Rock Creek. These seeps and springs are perennial discharges that augment stream flow and provide stable habitats for aquatic organisms and plant communities that require additional water resources. Surface water runoff also contributes water to the ecosystem; but, in the semiarid climate of the Front Range, precipitation is sparse, and the hot dry winds can evaporate water at the soil surface. The presence of perennial marshland and riparian communities greatly increases the plant and animal diversity of Rock Creek Reserve.

Section 404 of the Clean Water Act delegates jurisdictional authority over wetlands to the U.S. Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA). The EPA is the lead agency, however, at CERCLA sites such as Rocky Flats. The Corps of Engineers and the EPA jointly define wetlands as “...*areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas*”.

Wetlands on Rock Creek Reserve and the rest of the Site are not rare or unique, but the large amount of seep/spring related wetlands in the Buffer Zone are rare along the Front Range of Colorado. These wetlands serve valuable and important functions, as do wetlands everywhere. They perform the role of a water purification system by retaining nutrients, sediments, and metals. They also provide forage, cover, and nesting habitat, which is very important in maintaining wildlife values. Figure 4 shows the location of Site (including Rock Creek Reserve) wetlands.

The 6,266-acre Site has approximately 1,100 wetlands covering approximately 191 acres that were identified and mapped in the 1994 Rocky Flats Plant Wetlands Mapping and Resource Study, U.S. Army Corps of Engineers. These wetlands include riparian (streamside) habitat, ponds, seeps, and hillside wetlands. Riparian areas are well known for the diversity of plant and animal communities they support. The Site Great Plains Riparian Woodland complex encompasses three vegetation community types, and provides important habitat for numerous songbird species, deer, and raptors, in addition to supporting the greatest number of the federally-listed, threatened Preble's meadow jumping mouse at the Site. The sustained quantity and timing of streamflows is required to support the riparian communities.

The 1994 Wetlands Mapping and Resource Study identified 25.4 acres of stream wetlands, and 32.2 acres of slope (seep) wetlands for a total of 57.6 acres of wetlands for Rock Creek and its subdrainages. Rock Creek was identified in that study as a high quality wetland based on the biodiversity of the wetlands. The largest, best watered, and most diverse of the slope wetlands are located in the Rock Creek and Woman Creek watersheds according to the study. The only significant manmade drainage feature on Rock Creek within the Reserve is the Lindsay Pond, used as a stock-watering pond prior to 1974, by the Lindsay Ranch. Other wetlands on Rock Creek Reserve are primarily associated with seeps along the northern slopes.

3.2.2 Groundwater

Groundwater at Rocky Flats, including Rock Creek Reserve, is relatively small in volume and slow to move, hence, slow to move off the Site. Rock Creek Reserve is unaffected by groundwater contamination, which moves in a southeasterly direction from the Industrial Area. The closest groundwater contamination plume to Rock Creek Reserve is the Property Utilization & Disposal plume, from a previous sanitary landfill, located south of Rock Creek Reserve. This plume, contaminated with volatile organic compounds (mainly solvents), migrates south and east, away from Rock Creek Reserve.

There are a number of small near-surface groundwater reservoirs, which feed important ecological features, such as upland wetlands. Upland wetlands include primarily wet meadow/marsh ecotone and the tall and short marshes. Groundwater seeps support the tall upland shrubland in Rock Creek Reserve.

3.2.3 Water Quality

The groundwater and surface water quality in Rock Creek Reserve is considered good. Supporting data can be found in "Event-Related Surface-Water Monitoring Report, EG&G, September 1994. Section 2.1.7 describes additional contamination related issues for Rock Creek Reserve. Sampling outlined in Section 4.2 may determine if there are any impacts to Rock Creek affecting groundwater and/or surface water quality.

3.3 CLIMATE AND AIR QUALITY

3.3.1 Climate

Typical of the Rocky Mountain Front Range, the climate at Rocky Flats is continental and semiarid. A climate is termed "continental" when the most profound influences on temperatures are determined by the air masses that form over the interior of the continents, in this case, North America. Frigid air masses that form over the Northwest Territories and central Canada, Alaska, and Siberia in winter occasionally affect eastern Colorado. During the summer months, very warm air masses form over the deserts and high plateaus of the southwestern United States. These air masses account for the hottest days along the Front Range. Continentality accounts for the large seasonal temperature variations and, in part, for the occasionally large temperature changes over short periods of time experienced at Rocky Flats.

In addition to the continental climate, the Site's sloping geographical location and its proximity to a major mountain range permit dramatic changes in temperature and rapidly changing weather conditions. The location of Rocky Flats can also work to moderate the otherwise continental climate. Air masses approaching from the west and descending the eastern slope of the Continental Divide are warmed and dried out upon reaching the foothills and adjacent plains. These situations result from a strong pressure differential that develops across the Continental Divide, between low pressure over the plains and high pressure building over the Great Basin.

Large centers of high pressure build over the Great Basin and central Rockies and frequently dominate weather along the Front Range with dry and sunny periods, especially in autumn and mid-winter. On average, the number of days with fair and dry conditions at Rocky Flats generally exceeds the number of

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days with inclement weather. It is not uncommon to see a month of dry and mostly clear days when large areas of high pressure build over the intermountain region.

3.3.1.1 Precipitation and humidity

The lower elevations of the Front Range, including Rocky Flats, are considered semiarid because of the relatively small amount of precipitation received. A semiarid climate has a precipitation range of 10 to 20 inches per year and/or an amount exceeded by potential evaporation and transpiration. Rocky Flats receives approximately 15 inches of precipitation each year. Of this amount, 70 percent usually falls in April through September. Thunderstorms occur about 40 days each year, mostly in summer. The average seasonal snowfall is about 65 inches. Great distances from a major water source and shadowing and downsloping from the Rocky Mountains are the primary reasons for the semiarid climate of the Front Range. Severe drought conditions will develop occasionally along the Front Range during unusually prolonged dry periods. These conditions often lead to wildfires in the prairies, which sometimes affect the Buffer Zone, including Rock Creek Reserve and other surrounding areas

The average relative humidity in mid-afternoon is about 40 percent. Humidity is higher at night, and the average at dawn is about 60 percent.

3.3.1.2 Temperature

Temperatures in the region are moderate with hot and cold extremes usually of short duration. The thin atmosphere at the relatively high elevation of Rocky Flats allows large diurnal temperature variations, with strong daytime warming and nighttime cooling. The historic temperature extremes have ranged from 29 degrees below zero (all temperatures are expressed in degrees Fahrenheit) in February 1989 to 102 degrees in July 1971. January, the coldest month, has an average daily minimum temperature of 18 degrees. Average daily temperatures in winter range from 20 to 45 degrees. July, the hottest month, has an average daily maximum temperature of 85 degrees. Average daily temperatures in summer range from 55 to 85 degrees, though short periods may be much hotter. The temperature range affects the plant growing season, the number of consecutive days when minimum daily temperatures exceed the freezing point from spring until fall. At Rock Creek Reserve the growing season can be expected to continue from mid-May to the end of September during 50 percent of the years.

3.3.1.3 Winds

The combination of clear skies, light winds and sloping terrain causes locally produced winds to form and flow along sloping terrain. Daytime heating causes upslope breezes to form either southeasterly winds which flow up the Rocky Flats slope, or northeasterly winds which flow up the South Platte River Valley. Winds reverse at night with a shallow northwest wind draining down the Rocky Flats slope.

During winter and early spring, downslope winds, known as chinooks, often produce strong westerly winds and large and rapid temperature increases. On occasion, chinooks can be damaging and dangerous but generally are just a temporary nuisance. Wind gusts will typically exceed 70 miles per hour a few times in a normal year. Peak gusts have been measured over 100 miles per hour.

3.3.2 Air Quality

National Ambient Air Quality Standards have been established to protect public health and the environment for six "criteria" pollutants: carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, particulate matter less than 10 microns in size (PM-10), and lead. Total suspended particulate (TSP) matter is also designated as a criteria pollutant by the State of Colorado. This Plan is primarily concerned with PM-10 and TSP emissions since they are the pollutants likely to be generated from management practices on Rock Creek Reserve.

Rock Creek Reserve is located within the boundary of the Denver Metropolitan Area for air quality planning purposes. This region is classified as "non attainment" for carbon monoxide, ozone, and PM-10, which means that the ambient air quality in the area does not meet National Ambient Air Quality Standards. Regulatory requirements may control the timing of certain natural resources management activities, such as prescribed burning, which requires a permit from the State. This helps to avoid contributing to the non-attainment of the Metro area and violating the Site's air quality permit.

Concentrations of TSP and PM-10 are determined by five air monitoring stations at the site boundary and are operated by the Colorado Department of Public Health and Environment. These stations monitor PM-10 and TSP as well as other criteria pollutants. Two of these stations are located just off-site at the northeast and southeast site boundary along Indiana Street. These sampling locations are downwind of Rock Creek Reserve and are thus representative of Site impacts. All criteria air pollutants are emitted from the Site in quantities less than the State of Colorado reporting thresholds under baseline conditions.

3.4 VEGETATION

The following sections present species information that has been observed the past nine years during monitoring and other routine activities within the Rock Creek drainage basin.

The distribution and composition of vegetation in the region has been affected by a series of natural and human-caused disturbances, including intense grazing until the land was acquired by DOE in 1974, natural fire suppression, and adjacent ground disturbing activities. Large areas of grassland have been invaded by diffuse knapweed and dalmatian toadflax over the past ten years (1999 Annual Vegetation Report for the Rocky Flats Environmental Technology Site). Other native grassland areas and riparian areas have been invaded by several species of exotic plants.

3.4.1 Vegetation Types

The uniqueness and diversity of the plant communities of Rock Creek Reserve are indicative of the entire Site, and have been documented by a number of studies. The topography and close proximity of the Site to the mountains has resulted in an interesting mixture of prairie and foothills plant communities at the Site. Federal threatened or endangered plant species are not known to occur on Rock Creek Reserve, or anywhere else at the Site. Plant communities range from xeric (dry) grassland communities to more hydric (wet) communities such as wet meadows and marshes.

Rocky Flats plant communities include:

- xeric tallgrass prairie (a large portion of which occurs on Rock Creek Reserve);
- xeric needle-and-thread grass prairie;
- mesic mixed grassland;
- reclaimed mixed grassland;
- shortgrass prairie;
- grassland composed of annual plants;
- wet meadow-marsh ecotone;
- short marsh and tall marsh;
- both short and tall upland shrublands (most of which occur on Rock Creek Reserve);
- Savannah shrublands;
- several types of riparian (stream bank) shrublands.
- riparian woodland, ponderosa pine woodland; and
- mudflats.

Figure 5 shows the various vegetation types and distribution for the entire Rocky Flats site. Rock Creek Reserve (current) and Rock Creek Reserve expansion (proposed) are demarcated on the map.

3.4.2 Vegetation Inventory

In developing the Rock Creek Reserve plant species list, only those plants that were identified to species (415 species), and confirmed against the Site's reference herbarium, are included in the species list in the 1999 Annual Vegetation Report for the Rocky Flats Environmental Technology Site. This list is based on the 800 acre boundary for the Reserve, and will be updated to include the expansion. By growth form, there are 86 grass species, 283 forbs, 2 vines, 5 cacti, 22 shrubs, and 17 tree species. Of the species recorded in Rock Creek Reserve, 81% (337) are native to the area. Species found in Rock Creek Reserve are listed in Appendix 4.

The Colorado Natural Heritage Program (CNHP) assessed the Buffer Zone for its ecological value (The Natural Heritage Resources of the Rocky Flats Environmental Technology Site and Their Conservation, Phase II: The Buffer Zone [CHNP Research Report No. 53, 1996]). The CNHP is a research entity of the Nature Conservancy housed at Colorado State University's College of Natural Resources. Natural Heritage programs across the country are part of an international network of conservation data centers. The CNHP study concluded the Site contains highly significant natural elements important for the protection of Colorado's natural diversity and encourages DOE to take actions to protect and appropriately manage the Site.

3.4.3 Plant Communities

The CNHP identified the plant communities of greatest ecological significance on Rock Creek Reserve, and the entire Site, as the xeric tallgrass prairie, the Great Plains riparian community, the tall upland shrubland community, and wetlands. Distributions of these and other plant communities are shown in Fig 5.

Xeric tallgrass prairie. The CNHP classifies the xeric tallgrass prairie plant community at the Site as very rare. Most of the remaining xeric tallgrass prairie in Colorado is found in Boulder and Jefferson

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counties in small, dispersed parcels. The CNHP report on Site natural heritage resources identifies the Site macrosite as the largest known remnant of xeric tallgrass prairie in Colorado, and probably the largest remaining parcel in all of North America. Macrosites provide boundaries for large, landscape level conservation planning, which includes areas adjacent to Rock Creek Reserve. A community comprised of big bluestem, little bluestem, mountain muhly, Fendler sandwort, and Porter's aster, less than 20 occurrences of the xeric tallgrass prairie are known worldwide. Approximately 1,800 acres of this xeric tallgrass prairie unit is within Rocky Flats' boundaries. About 56% of the site's xeric tallgrass prairie falls within the Rock Creek Reserve proposed expansion.

Great Plains riparian community. Identified by CNHP as Great Plains Riparian Woodland, this community is classified as rare and declining. It is characterized by a diverse mixture of plains cottonwood, peach-leaved willow, and coyote willow. Examples of this community are found in the Rock Creek, Walnut Creek, Woman Creek, and Smart Ditch drainages. The Great Plains riparian community also includes the communities described in the following sections. The riparian shrubland communities normally exist as an integral part of woodlands throughout the Great Plains.

Riparian shrubland. Two types of riparian shrubland are often found in association with the Great Plains Riparian Woodland community at the Site. These communities are dominated by leadplant or by coyote willow, and provide important habitat for many of the bird and mammal species found here, including the Preble's meadow jumping mouse. Combined with the Great Plains riparian community, these habitats support a prey base for many Site birds of prey, such as prairie falcons, great horned owls, screech owls, and red-tailed hawks.

Tall upland shrubland. The tall upland shrubland community is found on north-facing slopes primarily in the Rock Creek drainage. This community commonly occurs just above wetlands and seeps. The dominant tall shrubs are hawthorne, American plum and choke cherry, which are associated with other shrubs and plants common in the foothills to the west of the Site. Rock Creek Reserve harbors 94% of the tall upland shrubland plant community at Rocky Flats. Although the tall upland shrubland represents less than 1 % of the total area of the Site, it contains 55 % of the Site Vegetation species. In 1996, 333 species of vascular plants were recorded there. The herbaceous understory contains a number of species that are restricted to the cool, shaded microhabitat provided by the canopy. Many of these native species are predominant in the understory of the largest patches of tall upland shrubland on the Site. Their presence may indicate that these patches were affected less by past cattle grazing, or that they have returned to a more native state since the cessation of grazing. These native species include Fendler waterleaf, spreading sweetroot, anise root, carrionflower greenbriar, fragile fern, Colorado violet, Rydberg's violet, and northern bedstraw. Other studies reveal that the tall upland shrubland contains one of the highest species richness of birds on the Site and is very important as bird and other wildlife habitat, providing food, thermal and hiding cover, nesting locations, and deer fawning areas.

The tall upland shrubland was identified by the CNHP as a potentially unique shrubland community, possibly not occurring anywhere else. This community is used by many animals and birds throughout the year for cover and is used during the spring by mule deer as fawning areas. Several rare bird species, such as chestnut-sided warbler and blue-gray gnatcatcher, also inhabit this community during the breeding season. It is within this community that the globally rare (CNHP designation) hops blue butterfly has been observed, due to the abundance of wild hops growing there.

Other. Although some of the plant communities, such as the mesic mixed grasslands of the eastern

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portion of the Site (and Rock Creek Reserve) are not rare, they add important buffer areas and habitat elements to the Site ecosystem. The grasses in this community are turf-like, with different species (western wheatgrass, Kentucky bluegrass, blue grama, green needlegrass and Canada bluegrass) intermingling in a nearly continuous ground cover. The mesic grasslands on the south-facing hillsides provide important forage for mule deer in the winter. Large tracts of grasslands provide essential habitat to several prairie species. Mesic mixed grasslands cover approximately 55 percent of the entire Site, mostly in the Walnut Creek and Woman Creek watersheds. Mule deer are very dependent on these grasslands at certain times of the year, many raptor species depend on open grasslands for foraging areas, several species of prairie birds rely on these grasslands as nesting and foraging habitat, and several species of reptiles require this habitat as well.

3.4.4 Noxious Weeds

Noxious weed invasions are considered the foremost threat to the native plant communities of Rock Creek Reserve by the CNHP, Service and DOE. These weeds inhabit the understory of the tall upland shrubland, the riparian woodland, and have invaded the prairie grasslands. Control of noxious weeds is arguably the most important component of any natural resources management program for the Rock Creek Reserve. The native fauna, from the large herbivores to the invertebrates that depend on these plant communities, are directly affected by impacts to these areas. Predators that depend on these herbivores are indirectly affected by these adverse impacts.

Ten years ago, there was little diffuse knapweed in the Buffer Zone; now, this Colorado-listed noxious weed inhabits more than 60 percent of the Buffer Zone. Noxious weeds are defined by the State as exotic, aggressive plants that invade native habitat and cause adverse economic or environmental impacts. Typically, these exotic plants are resistant to the native plant predators and tolerant of or resistant to grazing. These weeds can displace native plant species by taking nutrients, water, light, and space from native vegetation. Invasion of these aggressive, damaging plants poses a serious threat to Rock Creek Reserve and remaining Buffer Zone plants and animals that depend on native plants.

Several species of noxious weeds are found in Rock Creek Reserve, as representative of the rest of the Buffer Zone. The presence of these weeds is a regional and sometimes national problem. Several species of these weeds are found across the entire region and are spreading rapidly, especially in disturbed areas. These weeds are highly aggressive and are contributing to the degradation and loss of native species richness and composition in the plant communities. Weed species on Rock Creek Reserve and the rest of the site and region include diffuse knapweed, musk thistle, dalmation toadflax, Canada thistle, and St. Johnswort. Diffuse knapweed, an aggressive tumbleweed, is currently given highest control priority. Canada thistle is common throughout most of the wetlands, musk thistle is sparse but widespread across mesic grasslands, and dalmation toadflax is common in xeric grasslands and other areas.

The three most abundant noxious weeds on the Site as identified in the 1999 Annual Vegetation Report were dalmatian toadflax, infesting 2,507 acres (Fig. 6), diffuse knapweed infesting 2,295 acres (Fig 7) and musk thistle, infesting 1,353 acres (Fig 8).

3.4.5 Sensitive, Threatened and Endangered Species

In addition to those sensitive plant communities already discussed in this section, a list of plant species and communities and wildlife species found on Rock Creek Reserve defined as "sensitive" by the CNHP,

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or listed as threatened or endangered by the State or federal government is found in Appendix 7. CNHP rankings and a definition of those rankings are included. This list shows sensitive species found on the rest of the Site also, since most of these species are found regionally or are highly mobile (faunal species) and migrate across the Site as well as off the Site.

No federally-listed plant species have been documented on Rock Creek Reserve. Several listed species have the *potential* to occur on Rock Creek Reserve (i.e., suitable habitat occurs and the species are found elsewhere in the region), including Ute Ladies' Tresses Orchid and Colorado Butterfly Weed.

3.5 FAUNA

Rock Creek Reserve's significant wildlife diversity is directly related to the habitat diversity in the region. The wildlife species richness list for the Rock Creek drainage (Appendix 5), was derived from compiling a species list from all ecological surveys, including fortuitous sightings, from 1991 through 1999. From all years and all studies, 171 wildlife species have been recorded in Rock Creek. Several of these records may have been only single observations. Broken down by general taxa, there are 28 mammal species, 134 bird species, 6 herptile (reptile and amphibian) species and 3 fish species. The information for this section was collected from the 1999 Rocky Flats Environmental Technology Site Annual Wildlife Survey Report. A list of fauna species found for the entire Site can be found in the 1992 Baseline Characterization of Terrestrial and Aquatic Habitats at Rocky Flats Plant.

No federally-listed, threatened or endangered fish, reptile, amphibian or invertebrate species are known to occur on Rock Creek Reserve, or the rest of the Site.

3.5.1 Mammals

The most abundant and conspicuous large mammals on Rock Creek Reserve include mule deer, several white tail deer, and Rocky Mountain elk. The coyote is the most common predator, with other carnivores including black bear, bobcat, gray fox, long-tailed weasel, mink, mountain lion and raccoon. Many small mammals are recorded (mice, shrews, voles and woodrats), most notably the federally-listed, threatened Preble's meadow jumping mouse. The black-tailed prairie dog does not occur currently on Rock Creek Reserve, but is found in small numbers at three former colony sites elsewhere at Rocky Flats. These populations are rebounding from a plague die-off that affected the populations several years ago. The bushy-tailed woodrat was recorded on the Site, but not on Rock Creek Reserve, for the first time in 1999.

3.5.2 Birds

The species richness list at Appendix 5 documents 134 species of birds from Rock Creek Reserve. The rare and varied habitat associations of Rock Creek Reserve support ground nesting grassland species, such as vesper sparrow, grasshopper sparrow, horned lark and western meadowlark.

Rock Creek Reserve's most common raptors are the red-tailed hawk and great horned owl. Less abundant raptors are attracted by the mosaic of trees for nesting and open habitat for hunting. These include American kestrel, Swainson's and ferruginous hawks (considered declining species by the Colorado Division of Wildlife), and the long-eared owl.

The orange-crowned warbler, great egret, and black vulture were recorded on the Site for the first time in 1999. The orange-crowned warbler was recorded in both Woman creek and Rock Creek.

3.5.3 Fish

Three species of fish are known to occur in Rock Creek and Lindsay Pond. These are the fathead minnow, largemouth bass, and stoneroller. The minnow and stoneroller are native to the area.

3.5.4 Reptiles and Amphibians

As is typical for the region, reptiles and amphibians are not well represented at the Site. Reptiles are found typically in the grasslands. The most abundant amphibian at the Site is the boreal chorus frog. The northern leopard frog is less common and requires perennial water, and can be found in the seeps of the tall upland shrubland, Great Plains riparian, and the ponds.

Six species of amphibians and reptiles are documented in the 1999 Annual Wildlife Survey Report to occur on Rock Creek Reserve. These are:

- Boreal chorus frog
- Northern leopard frog
- Tiger salamander
- Bull snake
- Prairie rattlesnake
- Western painted turtle

3.5.5 Invertebrates

Sampling of arthropods was conducted as part of the 1992 Baseline survey for the Site. Sampling was broken down into plant community sampling units. The following are the results taken from the important plant communities on Rock Creek Reserve. Percentages are expressed as percentage of the total sampled. It is expected, however, that most invertebrates found in any area of Rocky Flats would likely be found to some extent in all the others. The following are quantified as percentages of the total for all arthropods observed or collected.

Xeric tallgrass prairie – Terrestrial arthropod taxa in the xeric mixed grasslands community showed the lowest diversity compared to all communities. This results from the drier environment found in the xeric zone. The numbers of orders and families in the xeric zone were lower than site-wide community averages for arthropods. The most abundant insect families collected were Cicadellidae (leafhoppers, 19 %) and Formicidae (ants, 15 %). These two insect families include species specifically adapted to the drier habitats found in the xeric zone. Leafhoppers are generally plant-specific feeders and, therefore, have specialized relationships with plants found in this community. Arachnida (spiders, 12 %) were also well represented.

Tall upland shrubland – The diversity of arthropod taxa, both orders and families, was average for the tall upland shrubland when compared to all communities. Once again, the leafhopper family was the most abundant (15 %), followed by spiders (10 %). This community has several plant species that are

dependent on the bees, wasps and butterflies for pollination. The fruiting shrubs, such as chokecherry, wild plum and hawthorn, must be pollinated to produce fruit and viable seeds. The reproduction of these species depends on both the pollinators and the species that eat their fruits and scatter seeds.

Rare and imperiled invertebrates as defined by the CNHP have been observed on Rock Creek Reserve. Two species of Lepidoptera have been observed, the Arogos skipper and the Hops blue butterfly. The Hops blue larvae feed on the hops found growing in the tall upland shrubland.

Riparian woodland and shrubland – The riparian woodland had the greatest diversity of arthropod taxa and the largest number of families. This community complex also produced the largest total number of individuals. Once again the most abundant family was the leafhoppers (43 %). Hollows in the rotted heartwood of several old cottonwood trees provided hive sites for honeybee colonies.

The bottomland shrubland is dominated by leadplant with some shrubby willows intermixed. Taxon richness was average for terrestrial arthropods, as was the number of orders. The number of individuals was relatively low indicating a low abundance of arthropods. Leafhoppers led the pack again, accounting for 37 % of all arthropods collected.

Benthic macroinvertebrates were also sampled across the entire Site. Benthic macroinvertebrates, mostly larval stages of insects, are important members of the aquatic community because they have many functional roles. These species have relatively long life cycles (6 months to two years) and are a major food source for fish. Adult stages of aquatic insects are terrestrial. There were 155 taxa of benthic macroinvertebrates collected at the Site, including Rock Creek. The most abundant orders were Diptera (flies, 76 taxa), Trichoptera (caddis flies, 16 taxa), Coleoptera (beetles, 16 taxa) and Ephemeroptera (mayflies, 11 taxa). Several of these taxa are found only in clean water. The presence of so many taxa of caddis flies is a good water quality indicator, and can be used in the future as a baseline for water quality sampling on Rock Creek Reserve.

3.5.6 Sensitive, Threatened and Endangered Species

A list of wildlife species and plant communities found on Rock Creek Reserve defined as “sensitive” by the CNHP, or listed as threatened or endangered by the State or federal government is found in Appendix 7. CNHP rankings and a definition of those rankings are included. This list shows sensitive species found on the rest of the Site also, since most of these species are highly mobile and migrate across the Site as well as off the Site. These include the northern leopard frog, ferruginous hawk, black-crowned night heron, grasshopper sparrow and the loggerhead shrike. Only those listed “threatened or endangered” by the federal government are described in this section.

No federally-listed, threatened or endangered fish, reptile, amphibian, or invertebrate species are known to occur on Rock Creek Reserve, or the rest of the Site.

Preble’s Meadow Jumping Mouse

Rock Creek Reserve, along with all other main drainages that cross Rocky Flats, contains populations of, and habitat for, a resident federal threatened species, *Zapus hudsonius preblei*, the Preble’s meadow jumping mouse (Fig. 9). The mouse was listed as a threatened species on May 13, 1998 (63 FR 26517). No other federally listed mammals have been identified on Rock Creek Reserve. Preble’s meadow

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jumping mouse, a member of the jumping mouse family Zapodidae, is a federally-listed, threatened subspecies. This mouse is a small mouse of about 3.5 inches body length with a disproportionately long tail of 5.8 inches. The pelage is dark where the dorsal band runs down the back, olive yellow on the sides and white underneath with no dark dividing band. Approximately 70 individuals have been estimated as living in the Rock Creek drainage. Preble's occurs in habitat adjacent to streams and waterways along the Front Range of Colorado and southeastern Wyoming. According to the documentation accompanying the proposed USFWS 4(d) rule, the subspecies' habitat is the riparian zone, primarily defined by the 100-year floodplain, and adjacent uplands extending out about 100 meters (Environmental Assessment for a Proposed 4(D) Rule on the Prebles's Meadow Jumping Mouse, USFWS). Based on actual habitat and trapping data, however, Site ecologists have established Preble's Mouse Protection Areas according to Site-specific habitat conditions (Preble's Meadow Jumping Mouse Protection Policy for Rocky Flats Environmental Technology Site, DOE, September 2000).

The Site has prepared and implemented the above-mentioned Protection Policy for the Preble's meadow jumping mouse. The Preble's Protection Policy (Appendix 6) and other protection policies, plans, and procedures will be evaluated to determine whether implementation may need to be improved, and whether modifications are needed in light of new information, developments, or related conservation efforts, including off-site studies and identified data gaps.

Bald Eagle

The bald eagle was federally-listed endangered in most states but was reclassified as threatened because of significant increases in the number of breeding pairs (USFWS, 1995). The USFWS has considered de-listing the Bald Eagle, and data are currently being collected to analyze this decision. No breeding pairs of eagles nest on Rock Creek Reserve, although they have been observed traversing the Reserve.

Bald eagles generally nest near water in forest stands that contain a mixture of tall, old, and dead or dying trees. An active nest is located to the east of the Site near Standley Lake. In winter bald eagles may expand their home range in search of food or migrate to areas where food is available. Bald eagles are known to congregate at reservoirs, lakes, or rivers. Availability of roosting habitat is an important component of the eagle winter ecology. Roosting habitat consists of trees that extend above the forest canopy and provide a protected microclimate for resting eagles. Eagles feed primarily on fish and waterbirds but also on small mammals and mammal carcasses. Some eagle populations are migratory, whereas others remain near their breeding areas year-round.

American Peregrine Falcon

In 1995 Peregrine falcons were proposed for removal from the list of endangered and threatened wildlife. Peregrine falcons were subsequently de-listed in 1998. Peregrine falcons have been observed traversing and resting on Rock Creek Reserve.

3.6 CULTURAL RESOURCES

A cultural resource is any locality or object exhibiting evidence of prior human behavior. Cultural resources generally comprise specific locations at which one or more activities occurred in the past, and which were visibly modified in the process (e.g., through the building of structures or other non-portable

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features; modifications of the ground surface such as wagon ruts; or abandonment of portable items such as tools or refuse, i.e., artifacts). Cultural resources consist of prehistoric and historic buildings, sites, structures, districts, objects or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources may be any age, although generally they must be more than 50 years old to be considered for protection under existing cultural resource laws.

3.6.1 Archeological Resources

Surveys to locate cultural resources have been conducted over the entire acreage of the Site Buffer Zone. Two archeological surveys were conducted, one in 1989 (An Archaeological and Historical Survey of Selected Parcels Within the Department of Energy, Rocky Flats Plant, Northern Jefferson County, Colorado, Burney & Assoc. Inc, 1989) and in 1991 (Cultural Resources Class III Survey of the Department of Energy Rocky Flats Plant, Northern Jefferson and Boulder Counties, Colorado, Dames and Moore, 1991). While the surveys identified points of local interest in the Buffer Zone, such as Lindsay Ranch in the Rock Creek Reserve, no sites or artifacts eligible for listing on the National Register of Historic Places were found in the Buffer Zone. A total of 35 archeological sites and 29 isolated finds (usually one or two artifacts) have been recorded in the Buffer Zone. Identified archeological sites include stone rings and alignments, the remains of ranch buildings, trash dumps, stock ponds, corrals, irrigation ditches, an orchard, and a railroad grade. Isolated finds include chipped and ground stone artifacts, barbed wire, stone cairns, and pieces of farm equipment. Resources found during these surveys were primarily historic Euroamerican resources; Native American resources are rare at the Site. None of the sites or isolated finds in the Buffer Zone have been determined eligible for listing in the National Register of Historic Places. The Colorado State Historic Preservation Office (SHPO) concurred with the findings, and no special management or protective actions are required for these resources.

3.6.2 Historic Resources

A survey of the industrial area was prepared in 1995 and reported in the Cultural Resources Survey Report for the Rocky Flats Environmental Technology Site Industrial Area. The survey report concludes several of the facilities in the industrial area are of historic importance because of the role they played in the Site's contribution to the Cold War. Sixty-four facilities in the industrial area have been included in a historic district on the National Register of Historic Places. A Programmatic Agreement regarding the cleanup and closure activities at the Site between the Advisory Council on Historic Preservation, the SHPO, and DOE governs how Site historic information is being recorded.

3.6.2.1 Lindsay Ranch

The Lindsay Ranch, comprised of an old ranch house, barn, stock pond and fences, was evaluated for eligibility to the Register of National Historic Places and was determined to be ineligible, with SHPO concurrence. Description of the Ranch and results of the evaluation and reasons for ineligibility are documented in the Cultural Resources Class III Survey.

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3.7 SOCIOECONOMICS

Prior to the purchase of the land contained within the current Rock Creek Reserve and the proposed Reserve boundary expansion, the primary use of the land was livestock ranching. During the 1800s and the first half of the 1900s the social and economic life of this immediate area depended on the use of this land for grazing. When the U.S. government purchased this land in the 1950s and 1970s it effectively removed the lands within the boundaries of Rocky Flats from agricultural use. In addition, the security and safety aspects of Rocky Flats required termination of incidental use of the land, such as hunting, hiking and horseback riding.

3.7.1 Public Use

Tours of and visits to the Site, including Rock Creek Reserve, are currently arranged and coordinated through the Tours and Visits office in the DOE Office of Communications with significant support from the counterpart contractor organization. Site tours are given on an as needed/as requested basis and often include tours of the Buffer Zone area with its unique natural resources. Types of tours include formal visits by elected officials, DOE officials, and regulatory representatives as well as building or project specific tours for local stakeholders. It is the policy of the Site, in accordance with the DOE Openness Initiative, to accommodate as many requests for Site tours and visits as possible. As DOE continues with cleanup of Rocky Flats, operation of the Tours and Visits function should remain fairly constant. Tours and visits include the Rock Creek Reserve.

3.7.2 Rocky Flats Mission Considerations

The current mission of the Rocky Flats Environmental Technology Site is cleanup and closure. At closure, all nuclear materials and wastes will have been removed from the Site, all buildings will have been demolished, and any remaining contamination will have been remediated per the requirements of RFCA. Current plans call for this mission to be completed late in 2006.

Completion of the closure mission is not expected to directly affect Rock Creek Reserve. However, the continued presence of nuclear material throughout much of the closure project will necessitate continued limitations on unrestricted public access to the Site, including Rock Creek Reserve. In the unlikely event of a nuclear material accident in a facility that could result in significant release of plutonium, the Site's emergency plan is required to consider protective actions for anyone in the buffer zone. (Approval of Site Safety Analysis Report Annual Update, Golan letter, 2000) This may include evacuation and sheltering in order to reduce potential radiological exposures during the accident. Controlling access is a requirement derived from the safety analysis of potential accidents as required by *DOE Order 5480.23, Nuclear Safety Analysis Reports, 1992*.

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4.0 INTEGRATED NATURAL RESOURCES MANAGEMENT

PROPOSED ACTIONS AND ALTERNATIVES

The first step in biodiversity protection is to keep an inventory. An inventory, as used here, is an itemized list or catalogue of components of an ecosystem. This process has been ongoing for many years on Rock Creek Reserve.

Monitoring tracks trends (or absolute numbers if needed) of individual species or higher associations of species, such as vegetation cover types or plant communities. Monitoring is generally performed on a regular basis and often targets species with high economic or human-use values, sensitive species, and/or indicator species of overall ecosystem health.

DOE inventories and monitors soil, water, and priority plant and animal species and habitats. Both inventory and monitoring data are used to evaluate general and site-specific ecosystem integrity.

This chapter discusses the inventory, monitoring and management options identified for use on Rock Creek Reserve for each natural resource category.

The “no action” alternative as described under each separate resource area would be to manage natural resources on Rock Creek Reserve (both 800 acres and under the expanded boundary proposal) as they are managed currently. The preferred action is sometimes the continuance of the current management practice, or “no action” and is designated as such throughout this section under the heading Preferred Action: No Action. See Section 1.3.2 for clarification on the use of these terms.

4.1 SOILS INVENTORY, MONITORING AND MANAGEMENT

Soils monitoring and management is very closely related to the monitoring and management of vegetation. Soils have been inventoried across Rocky Flats, including Rock Creek Reserve, as part of the Site’s existing soil monitoring program. Soils were also mapped by the Natural Resources Conservation Service as part of a soil survey of the Golden, Colorado area (Fig 3).

4.1.1 Soils Inventory and Monitoring

Preferred Action: No Action

Soils have been inventoried, and monitoring will continue as currently accomplished through vegetation management in accordance with the Annual Vegetation Management Plan, the Natural Resource Management Policy, and the Vegetation Management Environmental Assessment.

Options Considered But Not Selected

A range of options from no monitoring of the existing soils to comprehensive, frequent monitoring would be accomplished under this alternative. Soils could be monitored extensively, but is not currently necessary for the purposes of this Plan. This option is not considered feasible at this time. No legal requirement exists for soil monitoring in Rock Creek Reserve, and currently available data are sufficient to support the objectives of this Plan.

4.1.2 Soils Management

Proposed Action

- Implement the enhanced noxious weed control integrated strategies that prevent soil erosion through enhancement of native vegetation as described in Section 4.4.2.
- Continue to implement the Annual Vegetation Management Plan which identifies watershed improvement strategies and best management plans, such as check dams, revegetation, and reseeding actions, to retard erosion across the entire Site.
- Soil erosion that occurs along roads will be diminished through the continued use of water turnouts (shallow trenches) water bars and barriers (e.g. straw bales) to divert the flow from the eroded road edges to the adjacent open areas.
- Cooperate with other agencies for their expertise in erosion control and prevention. Establish cooperative efforts to share expertise through Rock Creek Reserve site visits, evaluation and recommendations.

Options Considered But Not Selected

Construction of erosion control devices, such as earthen berms, or dams, etc. are not considered necessary for Rock Creek and its tributaries. Construction of these devices could also cause negative impacts to the federally-listed threatened Preble's meadow jumping mouse. Impacts could include direct mortality, harassment, and destruction of habitat and mouse hibernation dens.

No Action

No action would consist of the current erosion control methods, without implementing the enhanced weed control strategies, mitigation, and cooperative efforts with other agencies. No action would control soil erosion for an unknown period of time, but would increase soil erosion over the long run through the indirect impacts of severe weed infestations.

4.2 WATER INVENTORY, MONITORING AND MANAGEMENT

4.2.1 Surface Water/ Wetlands Inventory and Monitoring

The 6,266-acre Site has approximately 1,100 wetlands covering approximately 191 acres that were identified and mapped in the 1994 Rocky Flats Plant Wetlands Mapping and Resource Study (Fig. 4). Preliminary data shows no contamination in the Rock Creek Reserve (Section 2.1.7). Sampling has been proposed to ensure that Rock Creek's water resources are not diminished.

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Proposed Action

Quantity

- Observe areas where ground water is “daylighting”, i.e. pools or seeps, for changes in water levels not associated with climatic conditions.
- Install additional gauging if field observations indicate the need to do so.
- Determine current in-stream flows supporting riparian communities on Rock Creek.
- Determine the minimum in-stream flows necessary to continue supporting these riparian communities.

Quality

- Determine if any undesirable run-off is entering Rock Creek by sampling for water quality parameters indicative of water quality impacts, such as increased siltation and presence of undesirable chemicals.
- Perform additional benthic macroinvertebrate sampling to compare to the 1991 Baseline Characterization study.

Options Considered But Not Selected

Other options considered include a more comprehensive sampling regime for the waters of Rock Creek. The existing data, however, do not suggest that this is necessary. A complete aquatic insect study (including collection of adults) was considered. However, larval forms are considered adequate for sampling on Rock Creek. Past benthic macroinvertebrate sampling has shown an abundance of larvae that require clean water to complete their life cycles. Sampling for pollutants that are not normally associated with the kinds of activities with potential to impact Rock Creek are not being considered at this time. No known contaminated sites occur in Rock Creek Reserve that would warrant increased monitoring of surface water and runoff.

No Action

No action (no monitoring of water quantity and quality) has the potential for damage to wetlands, riparian areas and aquatic fauna through potential contamination and/or siltation going undetected. Decreased amounts of surface water flows to support the riparian communities could also go undetected if monitoring is not done. The sustained quantity and timing of streamflows in riparian ecosystems is essential to support the riparian plant and animal communities.

4.2.2 Surface Water/Wetlands Management

Rock Creek has been identified as a high-quality wetland complex. The primary management concerns are sustaining species diversity, genetic diversity, cover, productivity of the native plant species, and preservation of the animal populations using these areas. Two main concerns with the potential for impacts to surface water and wetlands on the Rock Creek Reserve have been identified: noxious weed spread and control, and adjacent land activities. These have the potential to affect both the quantity and quality of surface water and wetlands. Noxious weed management is discussed in Section 4.4.2.3.

Wetlands are already protected under many existing laws and policies. Section 404 of the CWA, 10 CFR, Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements; Executive Order 11990, Protection of Wetlands; and Executive Order 11988, Floodplain Management. The Site has a Site-Wide Wetland Comprehensive Plan (February 1997) and a Wetlands Identification and Protection Procedure (January 3, 1997) that provides instructions for identifying jurisdictional wetlands at the Site and ensuring the protection of these wetlands.

The Site goal for wetlands mitigation, identified in the Memorandum of Agreement (MOA) for the Administration of a Wetland Bank at the Site between DOE RFFO, EPA, the Corps, and the Service, is to achieve no overall net loss of wetland functions and values [e.g., wildlife habitat, critical habitat for endangered species, flood control, water quality improvement, and groundwater recharge], resulting from Site activities. This MOA describes how the Site will account for wetland impacts for a portion of potentially impacted wetlands using a mitigation bank established and maintained by DOE, Rocky Flats Field Office.

Preferred Action: No Action

- Continue with the current actions for surface water/wetlands protection.

Surface water management options for water quality and quantity are not considered necessary at this time for Rock Creek Reserve. It is not considered necessary based on these assumptions:

- The herbicide applications were conducted in accordance with applicable laws, regulations and label instructions and requirements.
- No known contaminated sites occur on Rock Creek Reserve.
- Surface water quality and quantity are not currently being impacted.

If the implementation of the monitoring actions proposed in Section 4.2.1 show any of the above assumptions to be incorrect, mitigation measures will be formulated and implemented if necessary.

Options Considered But Not Selected

Other options, such as enlarging wetlands and increasing surface water flows, are not feasible at this time for the purposes of this Plan, but may be considered as the future re-use and ownership of the Site is discussed and ultimately determined. Current data do not suggest the necessity for any of those options at this time, and they could directly impact Preble's meadow jumping mouse and/or its habitat adversely through construction of diversion structures, dams, and excavations.

4.2.3 Groundwater Inventory and Monitoring

Groundwater on Rock Creek Reserve is currently monitored for water levels in several locations (Fig 10). Groundwater is extensively monitored on the rest of the Site.

Reduction of ground water discharge into surface channels would lead to a significant loss of stream wetlands. Interruption of ground water flow to the seep wetlands by excavation and subsequent filling should be avoided as should activities that could reduce recharge of the aquifer. Lining of water supply

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canals, or tighter regulation of flows through the canals, could result in less recharge to shallow aquifers in the Rock Creek drainage.

Proposed Action

Quantity

- Review monitoring data from existing monitoring wells in Rock Creek Reserve to determine water level consistency.
- Measure seep areas to aid in assessing groundwater level changes not associated with climatic conditions.

Quality

- Sample existing groundwater monitoring wells located in Rock Creek Reserve for herbicides and other chemicals.

Options Considered But Not Selected

No contaminated sites have been identified within the boundaries of Rock Creek Reserve that require monitoring. A comprehensive groundwater monitoring program on Rock Creek Reserve would not be justified at this time. Groundwater monitoring options in addition to the proposed action are not considered necessary at this time.

No Action

There is no legal requirement for groundwater monitoring on Rock Creek Reserve. However, the no action alternative could result in negative impacts to groundwater if monitoring is not implemented. Impacts to groundwater would be observed by staff during other field activities, at which time the impacts could already be negatively affecting water quality and/or quantity.

4.2.4 Groundwater Management

Preferred Action: No Action

Groundwater management is not required currently for Rock Creek Reserve. It is not considered necessary based on these assumptions:

- Groundwater quantity is not impaired.
- Groundwater quality is not impaired.
- The herbicide applications were conducted in accordance with applicable laws, regulations and label instructions and requirements.
- No known contaminated sites have been identified on Rock Creek Reserve.

If the implementation of the monitoring actions proposed in Section 4.2.3 show any of the above assumptions to be incorrect, mitigation measures will be formulated and implemented if necessary.

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Options Considered But Not Selected

At this time, other groundwater management options, such as pump and treat systems for contaminants, barrier systems, etc., are not considered necessary, and are not justified for Rock Creek Reserve.

4.3 AIR QUALITY INVENTORY, MONITORING AND MANAGEMENT

This section has combined the Inventory, Monitoring and Management subsections for ease of reading and to simplify the organization of the section.

Site air monitoring activities assist in protecting the public and the environment by detecting and tracking any impact of Site operations on air quality at and near the Site. This includes characterizing any airborne materials that may be introduced and the meteorological conditions that influence their transport and dispersion. Data are used to plan, implement, and assess the effects of Site activities, including operations, construction, and decommissioning; to maintain emergency preparedness; and to demonstrate compliance with relevant regulations.

Preferred Action: No Action

- Air quality inventory, monitoring and management on Rock Creek Reserve are done in accordance with existing Site policy. Fugitive dust (PM-10 and TSP, described in Section 3.3.1.4) is not currently a concern on Rock Creek Reserve. Air quality is also monitored through implementation of the Annual Vegetation Management Plan. Proposed actions within this Plan with the potential to impact air quality were analyzed and documented in the 1998 Vegetation Management Environmental Assessment and Finding of No Significant Impact.

Options Considered But Not Selected

Air quality monitoring is currently done as determined by regulation and other agreement. Increased monitoring would be unnecessary as the current level of monitoring is based on statistical requirements for accuracy. At this time, air quality management options are not applicable. Management of fugitive dust such as dust suppressant on roads and prohibiting traffic are not necessary to control dust since traffic is minimal and fugitive dust is not currently a concern on Rock Creek Reserve.

4.4 BIOLOGICAL RESOURCES INVENTORY, MONITORING AND MANAGEMENT

4.4.1 Vegetation Inventory and Monitoring

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Preferred Action: No Action

- Continue with the current ecological monitoring program as documented in the Annual Vegetation Reports for the Rocky Flats Environmental Technology Site.
- Continue to update the vegetation inventory (including herbarium mounts) as new species are found during surveys, including site-specific surveys, sensitive plant species surveys, and other projects.
- Continue to maintain the plant species database.

Options Considered But Not Selected

There is no legal requirement to maintain a vegetation inventory. Thus, the option to do no additional work maintaining and expanding this inventory is viable. At the other extreme, DOE could expend a great deal of effort specifically developing a more complete vegetation inventory. The current level of inventory adequately supports the overall need for vegetation inventory and monitoring, as well as the goals of this Plan, making that option unjustifiable and unnecessary.

4.4.1.1 Sensitive, Threatened and Endangered Species Inventory and Monitoring

Sensitive species and plant communities are monitored on an annual basis as part of the ecological monitoring program. Rocky Flats has supported periodic monitoring and surveying for Ute Ladies Tresses Orchid and Colorado Butterfly Weed. Neither of these endangered plants has been found on Site. Intensive surveys were conducted two consecutive years, 1993 and 1994 (Report of Findings, Ute Ladies'-Tresses and Colorado Butterfly Weed Surveys, 1994). Monitoring will continue informally, in conjunction with other, annual surveys.

Proposed Action

There are populations of Ute Ladies Tresses Orchid and Colorado Butterfly Weed in Boulder and Jefferson Counties. Suitable habitat exists on Rock Creek Reserve, especially in the seeps that feed Rock Creek. Noxious weed control efforts may have allowed plants that have gone undetected in the past to have better establishment. Surveys for other species, including candidate species with potential to occur on Rock Creek Reserve, will be conducted as appropriate.

- Conduct formal surveys for Ute Ladies Tresses Orchid and Butterfly Weed in years following enhanced weed control and prescribed burning. Conduct limited burn in wetland areas where thatch has built up in great proportions, inhibiting plant growth. Ute Ladies Tresses Orchid is often discovered after a burn regime.
- Continue informal surveys in subsequent years.
- Prepare annual reports on formal survey results for the Service.
- Continue to monitor areas critical to sensitive plant and animal species.
- Survey for state-listed plant species on Rock Creek Reserve to the degree possible with available funding.

Options Considered But Not Selected

The option to do no additional work surveying for Ute ladies' tresses orchid and Colorado butterfly weed is viable. At the other extreme, DOE could expend a great deal of effort and funds specifically surveying for these plants on a yearly basis. Periodic surveys every few years are considered adequate to detect the species' presence, especially since noxious weed control may take several years. Frequent surveying also has the potential to impact sensitive areas from trampling, disturbing wildlife, etc.

No Action

If additional formal surveys are not conducted, presence of Ute ladies' tresses orchid or Colorado butterfly weed would only be detected by a fortuitous sighting. The potential exists for small populations to go undetected. These populations would not add to the recovery and de-listing efforts for the species (since they would be unknown) and could potentially be harmed in the short term by some weed control activities that would take place in potential habitat (especially herbicide applications).

4.4.1.2 Noxious Weeds Inventory and Monitoring

Noxious weeds have been identified and mapped across the entire site, including Rock Creek Reserve (Figs. 6,7,8). Ten years ago, there was little diffuse knapweed in the Buffer Zone; now, this Colorado-listed noxious weed inhabits approximately 2300 acres of the Buffer Zone. The most recent report, the 1999 Annual Vegetation Report, describes dalmatian toadflax as currently being the most pervasive noxious weed, infesting over 2500 acres of the Buffer Zone.

The 1999 report also describes the impacts of the 1997 herbicide application on the Site, including some areas of Rock Creek Reserve. The results have so far been favorable, and will be used to refine future management techniques.

Preferred Action: No Action

The current inventory and monitoring programs for noxious weeds provide a comprehensive database for Rock Creek Reserve and the entire Site. The Annual Vegetation Reports are complete and contain maps with the most recent identifications and distributions of noxious weed infestations. Weed infestations in the region with the potential to impact Rock Creek Reserve and the Site are identified through coordination with State and County weed experts.

Options Considered But Not Selected

The current inventory and monitoring process provides an excellent source of information on noxious weeds and is currently a very useful tool for land managers. A more intense inventory and monitoring program would not add to the existing program enough to justify the dedication of resources. At this time, other management options are not applicable.

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4.4.2 Vegetation Management

The Natural Heritage Program, DOE and USFWS have identified the primary threat to all native plant communities on Rocky Flats, including the Rock Creek Reserve, to be the displacement of the native vegetation by noxious, invasive weeds. The management strategies for all the native plant communities therefore focus on management of noxious weeds. Noxious weed control is discussed more thoroughly in Section 4.4.2.3. Existing vegetation management plans and policies include the 2000 Integrated Weed Control Strategy for the Rocky Flats Environmental Technology Site (Kaiser-Hill), the 1998 Vegetation Management Environmental Assessment (Kaiser-Hill) and the 2000 Annual Vegetation Management Plan for the Rocky Flats Environmental Technology Site (Kaiser-Hill).

4.4.2.1 Plant Communities

Plant communities found on Rock Creek Reserve, the remainder of the Site, and declining across the region, were identified by CNHP as sensitive areas in need of protection. For purposes of this Plan, they are listed here as the xeric tallgrass prairie, tall upland shrubland, and riparian woodland/shrubland.

4.4.2.1.1 Xeric Tallgrass Prairie

Proposed Action

- Increased noxious weed control, especially diffuse knapweed and dalmatian toadflax (see Section 4.4.2.3).
- Continue removal and rehabilitation of unnecessary roads and fences to lessen the genetic and reproductive impacts from fragmentation of the grasslands. Determine if any fences should remain as catchment devices for diffuse knapweed (a tumble weed).
- Implement approved prescribed burning, including vegetation monitoring consistent with the Vegetation Management Environmental Assessment and Section 4.6.2.. The monitoring of fire effects is necessary to evaluate community response and quantify vegetation trends over time. Pre- and post-fire monitoring, particularly in the xeric tallgrass prairie areas, is needed to assess impacts from fire to that plant community. The use of fire in tandem with weed control methods to reduce the distribution of the exotic weeds is another benefit that may be realized from pre- and post-fire research on Rock Creek Reserve.
- Continue to participate in regional approaches to tallgrass prairie conservation.

Options Considered But Not Selected

Considerable resources could be dedicated to a wide range of options. Examples include attempting to eradicate (completely remove) all noxious weeds, closing all roads through the area or seeding and watering on a large scale. The benefits compared to cost of these options are questionable, and probably impossible to achieve in the case of weed eradication, since these weeds occur across the region. Negative environmental impacts could also arise from a weed eradication process, which would probably require large amounts of herbicides. Increased use of herbicides affects non-target plant species and could impact water resources.

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No Action

The no action alternative would consist of the current management, including prescribed burning, for the xeric tallgrass prairie, as outlined in the existing management plans (listed in Section 4.4.2). Although this would adequately manage the prairie in the short term, the benefit from the increased noxious weed control of the proposed action would not be realized, and the grasslands could suffer in the long run.

4.4.2.1.2 Tall Upland Shrubland

Proposed Action

Management of the tall upland shrubland includes:

- Increased noxious weed management (see Section 4.4.2.3).
- Evaluate impacts to the groundwater seeps that are important for the survival of this plant community.
- Remove dead knapweed through use of prescribed fire, described in Section 4.6.3. Build up of brush from dead knapweed was identified by Site ecologists and the CHNP as one cause for damage to the tall upland shrubland. High winds once blew a great amount of dead knapweed into the tall upland shrubland, and consequent shading damaged some of the plant community. This has already been abated through the current weed control practices. Perform thinning, if necessary, for wildland fuel hazard reduction and also to improve wildlife habitat.
- Implement approved prescribed burning, including vegetation monitoring. The monitoring of fire effects is necessary to evaluate community response and quantify vegetation trends over time. Data collection and analyses will provide an understanding of ways to protect and/or enhance natural ecosystems. Past occurrences of fire in the tall upland shrubland have shown beneficial effects to the plant community. The use of fire to help reduce the distribution of noxious weeds is another beneficial action that may be realized from pre- and post-fire research on Rock Creek Reserve.

Options Considered But Not Selected

Considerable resources could be dedicated to a wide range of options. Examples include attempting to eradicate (completely remove) all noxious weeds that impact the tall upland shrubland, or increasing availability of groundwater upon which the seeps depend through unnatural means. The benefits compared to cost of these options are questionable, and probably impossible to achieve in the case of weed eradication. Negative environmental impacts could also arise from a weed eradication process, which would probably require large amounts of herbicides. Increased use of herbicides affects non-target plant species and could impact water resources.

No Action

The no action alternative would consist of the current management for the tall upland shrubland, as outlined in the existing vegetation management plans (see Section 4.4.2). Although this would probably adequately manage this rare plant community in the short term, the benefit from the increased noxious weed control efforts outlined in the proposed action would not be realized, and the tall upland shrubland could suffer in the long run.

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4.4.2.1.3 Riparian Woodland and Shrubland

Noxious weeds are considered the primary threat also to the riparian plant communities. The riparian woodland had only 73 percent native species as reported in the Terrestrial Vegetation Survey (1993-1995) for the Rocky Flats Environmental Technology Site (Kaiser-Hill). This plant community accounted for the highest number of species (species richness) of the plant communities. This community provides important habitat for the federally-listed, threatened Preble's meadow jumping mouse.

Proposed Action

- Increased noxious weed control efforts, especially Canada thistle.
- Evaluate planting cottonwoods or other native vegetation in strategic areas to enhance the benefits the trees provide to the riparian area, including the negative effect that shading would have on diffuse knapweed.
- Evaluate impacts to the surface water flows that are important for the survival of this plant community.

Options Considered But Not Selected

Considerable resources could be dedicated to a wide range of options. Examples include attempting to eradicate (completely remove) all noxious weeds affecting this plant community, or enlarging the riparian corridor through increasing in-stream flows. The benefits compared to cost of these options are questionable, and probably impossible to achieve in the case of weed eradication, and the lack of available water to increase the in-stream flows. Negative environmental impacts could also arise from the eradication process, which would probably require large amounts of herbicides in an aquatic system. Enlarging the existing riparian corridor could have negative impacts on the established vegetation and small mammal communities currently residing there, including the federally-listed, threatened Preble's meadow jumping mouse.

No Action

The no action alternative would consist of the current management for the riparian plant communities, as outlined in the existing vegetation management plans (see Section 4.4.2). Although this would probably adequately manage these communities, the benefit from the increased noxious weed control of the proposed action would not be realized, and the diversity of the riparian plant communities could suffer.

4.4.2.2 Sensitive, Threatened and Endangered Species

No threatened or endangered plant species as defined by the Endangered Species Act have been identified in surveys conducted on Rock Creek Reserve. Two federally-listed plants that are found in the region and have potential habitat on Rock Creek Reserve, but were not found in surveys are the Ute Ladies Tresses Orchid and the Colorado Butterfly Weed. If these plants are found in future surveys, management strategies will be formulated at that time. The introduction of these threatened or endangered plant species on Rock Creek Reserve will be considered in the development of recovery plans for these species. A draft recovery plan for Ute Ladies' Tresses Orchid is currently under review by the Service. Recovery plans are developed with public participation, and public concerns are addressed in the process. Sensitive plant communities and species will be managed according to the discussions above.

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4.4.2.3 Noxious Weeds

An Integrated Weed Control Strategy is currently applied at the Site including biological controls, mechanical controls, chemical controls, use of weed-free seed and mulch, and prompt revegetation of disturbed sites. The Site also has an Annual Vegetation Management Plan that addresses weed control methods, target species, and treatment areas to direct weed control efforts each year. Additionally, the Site has worked cooperatively with Jefferson County weed control personnel, and surrounding landowners to participate in regional weed control strategies and implement integrated weed control.

The Natural Resource Management Policy was analyzed in an Environmental Assessment in accordance with the National Environmental Policy Act. Vegetation management options and alternatives were analyzed, and the public was actively educated and involved. DOE and USFWS will continue to evaluate a range of options, including prescribed burning and herbicide spraying, and it may be necessary to use an array of techniques for long-term habitat maintenance. DOE and USFWS understand that there are some community concerns regarding controlled burns and herbicide use and will continue to address these in development and implementation of this Plan.

Prescribed burning, described in Section 4.6.2, can help control some weed species while promoting other weed species, depending upon specific conditions in each case that prescribed burning is applied. Prescribed burning, which has recently been approved, will be integrated with other weed control measures as part of an integrated weed control plan. Since Rock Creek Reserve is relatively unimpacted by radionuclide contamination (see Section 2.1.7), limited burns for native vegetation enhancement should be made available as a management option. Prescribed burning will also have a beneficial effect in reducing wildfire potential. A controlled test burn was implemented in May 2000. Data from that burn is being collected and analyzed to help make informed decisions for future burns.

The Site now controls noxious weeds in the Buffer Zone, including Rock Creek Reserve, through aerial and ground application of herbicides as part of an integrated weed management strategy. Data from 1997 herbicide plot applications are showing promising results, with the species richness of the affected plots returning to pre-application numbers by the end of 1999.

Proposed Action

The following management options will be available to land managers of Rock Creek Reserve as part of an overall integrated management strategy for noxious weeds. All options will comply with applicable laws and regulations, especially those that govern use of herbicides, prescribed burning and releases of biological control agents. If any option has the potential to impact any federally-listed threatened or endangered species, consultation on a project-specific basis with USFWS will be done in accordance with Section 7 of the Endangered Species Act.

- As part of the Annual Vegetation Management Plan, develop objectives for control of each noxious weed species with additional emphasis on non-chemical control methods.

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- Use guidance in the most current Annual Vegetation Management Plan to maintain consistency and integrate with weed control efforts across the rest of the Site.
- Continue herbicide applications when necessary and subsequent revegetation to reduce weed densities incorporating strategies outlined in the most recent Bureau of Land Management (BLM) Integrated Pest Management and Pesticide Application Certification Course.
- Continue use of prescribed burns to stimulate native plant growth and reduce litter. If necessary, reseed the burned areas found on steeper slopes with the native plant mix (if applicable) currently used for revegetation at Rocky Flats.
- Use mechanical means and cultural practices as described in the Annual Vegetation Management Plan. This may include additional options based on research currently conducted by Colorado State University at Fort Carson, Colorado for integrated control of cheatgrass and knapweeds.
- Continue to increase the biological control efforts against Canada thistle, musk thistle, diffuse knapweed and dalmatian toadflax using strategies proven to increase the chances for establishment and control found in the most current Annual Report for Biocontrol at Fort Carson, Colorado, (Texas Agricultural Experiment Station [TAES]). Obtain as many species as possible from the lists within the Report of insect species approved for release by United States Department of Agriculture's Animal & Plant Health Inspection Service and the Colorado Department of Agriculture.
- Introduce the field bindweed mite for control of field bindweed. The bindweed mite is approved for release by the USDA and CDA, and is proven successful to help with bindweed control in Texas.
- Enter into cooperative agreements with other agencies to redistribute approved biological control agents established on other federal lands in the region.

Options Considered But Not Selected

Other management options include the reliance on any one of the above control measures, without an integrated approach. In the case of mechanical and chemical controls, the benefits compared to costs are questionable since these are generally short term control measures that must be used in conjunction with other measures to provide long term control. Negative environmental impacts could result from some of them, especially overuse of herbicides. Prescribed burning indirectly controls noxious weeds by promoting native plant vigor and must also be used in conjunction with other control measures. Too much use of prescribed burning can have negative impacts to plants and soil. Grazing/ browsing with goats is an option that has been analyzed and discarded because of the damage goats can do if not intensely managed. The potential exists for goats to transport noxious weeds by seeds and plant parts to uninfested areas. At this time, it is felt the potential negatives to the Site's sensitive plant communities outweigh the potential benefits, especially in the riparian and seep areas.

No Action

The no action alternative would keep the noxious weed management exactly as it exists currently. Although this would provide some noxious weed control, the enhanced efforts of the proposed action would not be implemented, and noxious weeds could increase in the long run. The sensitive and unique plant communities of Rock Creek Reserve would be impacted, thereby impacting all the other elements of the ecosystem that depend on them.

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4.4.3 Faunal Inventory and Monitoring

4.4.3.1 Species Resident or Transient on Site (including mammals, birds, fish, reptiles, amphibians and invertebrates)

Preferred Action: No Action

- Monitoring and inventorying faunal species will continue in accordance with current management plans, including the Ecological Monitoring Program, as documented in the Annual Wildlife Survey Reports. Existing monitoring and inventory meet, and exceed in many cases, the level necessary to make informed management decisions.
- Continue to add to the faunal baseline inventory using observations and data from other field projects.

Options Considered But Not Selected

A higher level of monitoring and inventory is not considered necessary, and would be a costly alternative. Current monitoring programs adequately support the goals of this Plan. Depending on the methods used, there would be the potential for actual harm to a sensitive ecosystem such as that found in Rock Creek. Increased frequency of monitoring would cause trampling in sensitive plant communities and the potential to spread noxious weeds. Harassment of birds during nesting season causing nest abandonment could occur.

4.4.3.2 Sensitive, Threatened and Endangered Species

The Site, due to its geographic position between the Great Plains and the Front Range of the Rocky Mountains, includes a great diversity of terrain and provides a wide variety of wildlife habitats. The wide range of habitats provides year-round and seasonal habitat for a large number of wildlife species, including threatened, endangered, and other special-concern species. To facilitate monitoring the status of sensitive species, DOE maintains a list of such species that have the potential to occur at the Site. The Ecological Resource Management Plan, 1998 NRMP, and current Preble's Protection Policy (Appendix 6) for the Site identify Site management concerns, monitoring approach, and management strategies for threatened and endangered species. Monitoring data are reported in the Annual Wildlife Survey Report for the Site. Sensitive species will be managed according to the discussions above. Only federally-listed threatened or endangered species will be discussed here.

Preferred Action: No Action

Monitoring and inventorying threatened and endangered species, currently only the Preble's meadow jumping mouse, will continue in accordance with current management plans, including the Ecological Monitoring Program and Preble's Protection Policy. Existing monitoring and inventory meet, and exceed in many cases, the level necessary to make informed management decisions.

Options Considered But Not Selected

A higher level of monitoring and inventory is not considered necessary, and would be a costly alternative. Depending on the methods used, there would be the potential for harassment and harm to threatened and endangered species, currently only Preble's meadow jumping mouse, found in Rock Creek riparian habitat. Increased trapping and handling of mice could increase mortality. Indirect impacts through

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trampling of habitat and spreading noxious weeds could occur.

4.4.4 Faunal Management

Much of the faunal species management on Rocky Flats is directed towards listed species, primarily due to compliance requirements. Fortunately, measures for listed species also benefit many other species of plants and wildlife on the Site.

Fauna is managed mainly through habitat management. This is accomplished through wetlands management, plant community management, wildland fire management, erosion control, and noxious weed control. Those and other related activities are described in their corresponding sections of the plan.

4.4.4.1 Large Mammals

Large mammals present on the Site, including Rock Creek Reserve, are resident populations of mule deer, white-tailed deer, and occasionally mountain lion, bear and elk. These mammals out-migrate to some extent, and known individuals have often been observed off the Site. The only large predator that is resident is the coyote. Management strategy for deer and elk is a habitat-based approach depending on management of the plant communities these animals depend on. Studies show that coyote use of mule deer for food at Rocky Flats appears to be low during the summer and probably limited to fawns. This low utilization may be the result of availability of other coyote food such as voles (Ribic, 1978). Inventory and monitoring projects for mammals are described in Section 4.4.3.1. Protection and management of threatened and endangered species are important to the management and protection of mammals in general on Rock Creek Reserve.

Preferred Action: No Action

- Use measures established for federally-listed species to also provide protection for other mammals that occur on Rock Creek Reserve.
- Continue policy of coordination with Colorado DOW to control populations of large mammals if necessary.

Options Considered But Not Selected

Rocky Flats is not legally required to specifically manage non-federally-listed species. Thus, programs for mammals in general are not required to be implemented. However, most of Rock Creek Reserve and Site management programs and policies have positive effects for non-federally-listed species, including large mammals. Other management options include intensive management for large mammals through methods such as hunting, trapping, predator control, relocation, and species-level management. Hunting and trapping are not applicable at this time for previously discussed mission and security reasons. There is no indication that large mammals require, or will require in the foreseeable future, any kind of intensive management, such as culling.

4.4.4.2 Small Mammals

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Proposed Action

- Install bat houses in strategic locations to provide increased roosting areas and shelter for bats.

Options Considered But Not Selected

Intensive management for small mammals through methods such as predator control, trapping and relocation, planting additional food sources, supplying an artificial food source such as cracked corn, and species-level management were considered. These options all have the potential for ecosystem harm and negative impacts on biodiversity through management strategies that fail to consider the ecosystem as a whole. Predator/prey relationships could be upset. Feeding and planting additional food sources have the potential to cause population fluctuations and create imbalances in the native plant communities. Another option for small mammal management that has been suggested is the use of Rocky Flats, including Rock Creek Reserve, as a refuge for displaced, relocated black-tailed prairie dogs. Rocky Flats will continue its policy of not accepting relocated prairie dogs. Both the Service and DOE are concerned about the potential for damage to sensitive grasslands and the introduction of the plague to prairie dogs that currently populate the Site. Prairie dogs do not currently populate Rock Creek Reserve, but the potential exists for them to move into the Reserve naturally. Prairie dogs that naturally migrate to Rock Creek Reserve are not expected to require population control, as these measures have never been necessary in the past, due to a healthy predator/prey balance. A large, sudden influx of prairie dogs through relocations could disrupt the natural predator/prey relationship which exists on Rock Creek Reserve.

No Action

Not installing bat houses would not allow for increased roosting areas and shelter for these sensitive species that occur on Rock Creek Reserve, such as the small-footed myotis.

4.4.4.3 Birds

Proposed Action

- Place nesting boxes for blue birds in strategic areas of Rock Creek Reserve. Nesting boxes require regular maintenance, and will not be placed if it is determined that current staffing cannot support this. Boxes would only be placed in areas where they would not cause territorial impacts to other birds.

Options Considered But Not Selected

Rocky Flats is not legally required to specifically manage non-federally-listed species. Thus, programs for birds in general are not required to be implemented. Rocky Flats could establish intensive and extensive management strategies for birds, such as planting areas of specific food crops like sunflowers, predator control, constructing ponds for waterfowl, and other species-level management options. These options all have the potential for ecosystem harm and negative impacts on biodiversity through management strategies that fail to consider the native ecosystem as a whole. Rock Creek is not historic waterfowl habitat, and construction of habitat would be an artificial measure that would require increased surface water management to control. Installation of raptor perch poles was considered but not selected due to potential impacts of increased predation on sensitive species, either current resident species or any that

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may be introduced in the future. Electrocutions from power lines is not an issue at the Site. Raptor perch poles promote the presence of those species of hawks and owls that did not evolve in the prairie ecosystem, but that have increased in numbers with the presence of manmade structures for nesting and resting.

No Action

No action would not allow for nesting areas for blue birds.

4.4.4.4 Reptiles and Amphibians

Preferred Action: No Action

- Continue the monitoring and management practices already in place for protection of wetlands and grasslands. Implementation of proposed actions for noxious weeds, groundwater and surface water monitoring and management as outlined in their respective sections in this Plan will afford added protection to amphibians and reptiles.

Options Considered But Not Selected

Rocky Flats is not legally required to specifically manage non-federally-listed species. Thus, programs for reptiles and amphibians in general are not required to be implemented. Rocky Flats could establish intensive and extensive management programs for reptile and amphibian species and their habitats through methods such as predator control, enlargement of wetland areas and species-level management. These options all have the potential for ecosystem harm and negative impacts on biodiversity through management strategies that fail to consider the ecosystem as a whole. Rock Creek has not historically had large areas of wetland habitat, and construction of wetland habitat would be an artificial measure that would require increased surface water management to control. Reptiles already benefit from the grassland and other plant community management, and increased management is not necessary.

4.4.4.5 Invertebrates

Preferred Action: No Action

- Continue the monitoring and management practices already in place for protection of plant communities. Implementation of proposed actions for noxious weeds, and sensitive plant community management as outlined in their respective sections in this Plan will afford added protection to invertebrates, and contribute to the maintenance of riparian communities, providing habitat for the hops blue butterfly, Arogos skipper and other sensitive invertebrates.

Options Considered But Not Selected

Rocky Flats is not legally required to specifically manage non-federally-listed species. Thus, programs for invertebrates in general are not required to be implemented. Planting specific host plants for sensitive species such as the hops blue butterfly was considered, or planting flowers preferred by adult lepidoptera in general and host plants for larvae. These measures could impact the sensitive plant communities and would require intense management for noxious weed invasions. Planting flowers and placement of hives

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to attract bees was considered, but discarded due to intense management requirements and possible negative impacts to sensitive native plant communities.

4.4.4.6 Sensitive, Threatened and Endangered Faunal Species

Threatened and Endangered Species

Management of federally-listed, threatened and endangered species is required by the Endangered Species Act. Rock Creek Reserve currently has one resident federally-listed, threatened species, the Preble's meadow jumping mouse. The Site manages this species in accordance with the 1999 Memorandum of Agreement For Coordination Of Endangered Species Act Compliance With Activities At Rocky Flats Environmental Technology Site Between Department Of Interior Fish and Wildlife Service, Department of Energy, Environmental Protection Agency, Colorado Department of Health and Environment, and Colorado Department of Natural Resources (Appendix 8). The Preble's Meadow Jumping Mouse Protection Policy now in effect is a requirement of this agreement (Appendix 6). The Preble's Protection Policy addresses a range of programs and projects, and all aspects of remedial activities at Rocky Flats.

Preferred Action: No Action

- Continue to implement the existing Protection Policy prepared by the Site for the Preble's meadow jumping mouse, which is listed as a threatened species under the Endangered Species Act. The Preble's Protection Policy (Appendix 6) and other protection policies, plans and procedures are currently being evaluated to determine whether implementation may need to be improved, and whether modifications are needed in light of new information, developments, and related conservation efforts, including off-site studies and identified data gaps.
- Monitor off site research on federally-listed, threatened, endangered, and proposed species and their habitats that occur on the Site and use results of these research projects to improve management programs on Rock Creek Reserve.
- The proposed action listed in Section 4.2.1 to establish minimum in-stream flows for Rock Creek to support riparian habitat will benefit the continued survival of the mouse through the availability of that data as a habitat management tool.
- The proposed actions listed in Section 4.2.2 and 4.2.3 for groundwater and surface water monitoring in Rock Creek will benefit the continued survival of the mouse through the availability of that data as a habitat management tool.

Options Considered But Not Selected

Other management options would include implementing Preble's mouse habitat enhancement projects. Since the existing habitat adequately supports a viable mouse population (1999 Annual Wildlife Report, Appendix B, Preble's Meadow Jumping Mouse Study), these options are not considered necessary at this time for the Rock Creek Reserve. Projects such as enlarging riparian areas through digging, and extensive vegetation plantings could have negative short-term impacts. Trapping and moving mice from one area to another to produce new populations is an option that could have negative impacts on the individuals being relocated. Habitat enhancement projects could be proposed in the future in accordance with an approved recovery plan for the species. Those projects would be reviewed and coordinated as necessary at that

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time. Recovery plans are subject to NEPA analysis and undergo public review.

Sensitive Species

Sensitive species are defined as federal or State-listed species and those documented as sensitive by the CNHP. These species along with their CNHP ranking and definitions are listed in Appendix 7. Some sensitive species are proposed within this Plan for introduction to Rock Creek Reserve. Except for federally-listed species (described in Section 4.4.4.6), these species will be managed using the same approach as used for the general vegetation and faunal management.

Proposed Action

- Coordinate with the Colorado DOW to reintroduce the Plains sharp-tailed grouse and implement monitoring. The grouse is State-listed as endangered in Colorado, but is considered abundant in other states, and is not being considered for federal listing.
- Coordinate with the DOW to introduce native, sensitive species of fish, including Iowa darter, northern redbelly dace (State listed endangered) and common shiner (State listed threatened). Implement monitoring. The purpose of this action is to establish a fishery representative of this area in its original condition, and to provide a source of these species for reintroductions elsewhere. These species are not federally-listed, nor are they being considered for proposal for federal listing.
- Remove the exotic species of fish, such as bass, using established methods currently employed by the Service, from Rock Creek wetlands such as Lindsay Pond.

Options Considered But Not Selected

Rocky Flats is not legally required to specifically manage non-federally-listed species. Thus, programs for sensitive species are not required to be implemented. Most of Rocky Flats' management programs have positive effects for non-federally-listed species due to their emphasis on habitat protection. Rocky Flats could establish intensive and extensive management programs for species of special concern and their habitats. This would however, require species-level management which could conflict with the overall goal of enhancing biodiversity on Rock Creek Reserve. Specific projects for management of introduced species are not being considered that are not already part of the goals of ecosystem level and habitat management as set forth in this Plan.

No Action

The No Action alternative would not support the biodiversity with emphasis on native species goals set forth in Section 1.2 of this Plan. Non-native fish would continue to be the predominate species, and native species would not be introduced, and would not contribute to the native biodiversity goals of Rock Creek Reserve management.

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4.5 CULTURAL RESOURCES INVENTORY, MONITORING AND MANAGEMENT

This section has combined the Inventory, Monitoring and Management subsections for ease of reading and to simplify the organization of the section.

4.5.1 Archaeological Resources Inventory, Monitoring and Management

All known cultural resources at the Site have been evaluated for National Register eligibility. None were determined eligible. The Colorado SHPO has concurred with the findings. No additional evaluation is required, unless previously undiscovered resources are identified, or objects of potential scientific importance are identified. Even though all undisturbed areas within the Site, including Rock Creek Reserve, have been surveyed for cultural resources, the vegetation in some locations precludes a determination that there are absolutely no undiscovered resources.

The Site will monitor surface disturbing activities in the Buffer Zone for occurrences of undiscovered cultural resources. If any suspected cultural resources are discovered, the work will be stopped or rerouted to avoid the area. The suspected cultural resources will be evaluated for significance and managed according to Section 4.10.6 of the Rocky Flats Environmental Site Cultural Resource Management Plan (CRMP). The CRMP incorporates the information from both the archeological and industrial area surveys. The CRMP establishes guidelines regarding how to manage Site cultural resources.

Preferred Action: No Action

- Ground disturbing activities, removal of vegetation in certain areas and new erosion courses have the potential to uncover undiscovered buried deposits. Areas where any of these activities take place will continue to be monitored for cultural resources.
- Federal law prohibits commencement of federal undertakings that could impact cultural resources without undergoing the consultation process as outlined in Section 106 of the National Historic Preservation Act. The no action alternative, which is current policy, would still protect cultural resources as required by law. If any cultural remains are suspected, all activity will cease until the remains have been assessed for cultural significance.

Options Considered But Not Selected

Another option for monitoring and inventorying would be to conduct more in depth surveys than required by law, e.g., subsurface testing (testing below the surface for cultural resources before a project is implemented). This option is not necessary since the CRMP identifies the Buffer Zone as a low-density (low probability) area for cultural resources. These options could actually do harm to subsurface cultural deposits that otherwise may have been left unharmed.

No significant archaeological resources have been identified on Rock Creek Reserve. Therefore, other options for current management do not apply. If significant cultural resources are discovered in the

future, mitigation measures may range from simple avoidance of the site, to complete excavation and documentation. Avoidance and protection of sites via barriers, etc. would be the most probable management options.

4.5.2 Historic Resources Inventory, Monitoring and Management

The Lindsay Ranch is considered the only historically relevant structure on Rock Creek Reserve. While it is not listed as eligible for the Register of National Historic Places according to the National Historic Preservation Act, there is community interest in preserving the Lindsay Ranch. Suggestions have been made to reconstruct Lindsay Ranch for use as a visitors' center for Rock Creek Reserve. Since unrestricted public access to Rock Creek Reserve will not be allowed until the completion of the closure mission, the ultimate use of the ranch property cannot be determined until that time. The use of Lindsay Ranch, and public access in general, will need to be consistent with maintaining the ecological resources of Rock Creek Reserve. These issues will also be addressed in the Access and Recreation Study that is one of the proposed actions elsewhere in this Plan (Section 4.7.1). The following is proposed for the interim as other issues regarding public access and the Lindsay Ranch are being resolved.

Proposed Action

- DOE will work with interested stakeholders to determine what stabilization may be needed to prevent further degradation of Lindsay Ranch prior to closure. An assessment of the work needed to stabilize the structures and the hazards and impacts involved will be conducted first. Stabilization techniques may include replacing rotted wooden support features, protective temporary covering for the roof and windows, repairs to cracked cement foundations, removing and saving original features (doors, windows, etc.) for future use, pesticide treatments for wood destroying insects, etc. Such stabilization may be performed if funding can be made available from public and private sources. Stabilization may have short-term impacts resulting from noise and increased traffic. Care will be taken to prevent erosion and sedimentation into the Lindsay Pond. Consultation with the Service will be conducted if any planned activities have the potential to affect Preble's meadow jumping mouse habitat.

Options Considered But Not Selected

Complete restoration of the Ranch in the near term to its original condition was considered, but not selected because of the expense of such an option, and because the ultimate use of this property has not been determined at this time.

No Action

No action could negatively impact the property, especially the ranch house, allowing it to fall into such disrepair that no future rehabilitation would be possible.

4.6 LAND AND INFRASTRUCTURE MAINTENANCE

Rocky Flats has its own underground and aboveground utilities systems and supporting facilities. Except for unpaved access roads, fences and some utility lines, Rock Creek Reserve infrastructure is largely undeveloped. A landfill that was constructed and never put into use lies within the southern boundary of

the Rock Creek Reserve. Existing easements are described in Section 2.1.5.

4.6.1 Fence and Road Maintenance

There are several miles of unpaved roads on Rock Creek Reserve. Rocky Flats maintains unpaved roads in the Buffer Zone both as vehicle access and fire breaks. The Site has closed some roads to travel in order to increase prairie habitat. Also, the Site has reduced the width of road grading to 40 feet and driving vehicles off the road network is controlled to protect prairie habitat.

Proposed Action

- Initiate an Access and Recreation Study to be used as a management tool when recommending public access (roads, trails, etc.) options in the future. This study will include not only Rock Creek Reserve, but the entire Site.
- Continue to implement the existing policy that roads not necessary for access will be removed and rehabilitated through reseeded with the native vegetation found in the immediate area; these areas will be priority areas for noxious weed control.
- Roads, fences and signs that are considered necessary will continue to be maintained. Those considered not necessary will be removed.
- The Site will continue road-grading activities in Rock Creek Reserve to maintain roads and continue control of noxious weeds. The Site will minimize the width of road grading to protect prairie habitat while balancing fire control needs.
- The Site will continue to control off-road vehicle traffic.

Options Considered But Not Selected

All, or most, of the roads and fences could be removed. This would create a lack of access for those doing land rehabilitation measures, monitoring and research, causing severe negative impacts. Another option is that no roads and fences would be removed and rehabilitated, resulting in continued fragmentation of the prairie, and avenues for noxious weeds to invade and spread.

4.6.2 Fire Management Including Prescribed Fire

Wildfires at the Site, including Rock Creek Reserve, have been suppressed for many years. As a result, plant litter (dead plant material) has built up in most areas of the grasslands. This plant litter causes a number of management problems. Plant litter shades and stifles prairie plants when the accumulation builds too high, affecting the viability of such dominant species as big bluestem, little bluestem, mountain muhley, and others. This affects the viability of the xeric tallgrass prairie, mesic grasslands, and even wetlands. The thatch buildup also provides a heavy fuel load that can carry a prairie wildfire at a dangerous rate across open lands.

Grasslands at the Site evolved under conditions where fires periodically swept across the prairie every five to ten years on average. Fire is an important tool in prairie management and maintenance through removal of thatch and recycling of nutrients. Fires stimulate the growth and vigor of prairie species by releasing nutrients into the soil making them available to plants.

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Prescribed Burning

The Proposed Prescribed Burn Annual Rotation Plan for RFETS (Kaiser-Hill) has been developed and submitted to CDPHE (June 30, 2000). It is based on the Vegetation Management Environmental Assessment and Annual Vegetation Management Plan and will be implemented across the Site, including Rock Creek Reserve. The U.S. Forest Service is a cooperating agency implementing prescribed burns, and specific burn plans are developed for each prescribed burn in accordance with U.S. Forest Service requirements.

Prescribed burning (fires set intentionally as part of a fire plan, a specific set of requirements and prescribed weather conditions) can be used to rejuvenate overgrown habitats, reduce fuel loads, and reduce the chance of an uncontrolled wildfire. The greater the fuel load, the hotter the fire, and (1) the greater the potential of environmental damage and (2) the more rapid spread of a wildfire to either the industrial area or neighboring lands.

Neighboring local governments, including Jefferson County and Boulder County, routinely use prescribed burning. Site environmental documents note prescribed burning is recommended for a number of highly beneficial, previously described, purposes. However, many area residents are concerned about the possibility that fires in the Buffer Zone, including Rock Creek Reserve, could spread contamination.

DOE has a limited number of rangeland fire-fighting vehicles, and the current policy is to aggressively suppress unplanned fires using the Rocky Flats Fire Department, and if necessary, support services from local fire districts, under mutual aid agreements. Mutual aid agreements with local fire districts are designed to specifically support the Site during emergencies, not prescribed burns. However, depending on the availability of local departments, these departments may be able to support the Site in conducting prescribed burning. In general, fire suppression equipment would be provided by the agency contracted to conduct the prescribed burn, in accordance with the approved burn plan. The Vegetation Management Environmental Assessment describes the planned use of fire and other management tools. It also describes the alternatives in more detail and the impacts from each alternative.

Preferred Action: No Action

- Wildfires on Rock Creek Reserve will continue to be suppressed in accordance with existing policy and mutual aid agreements.
- Prescribed burning will be used on Rock Creek Reserve, in accordance with the approved Annual Vegetation Management Plan and Vegetation Management Environmental Assessment.
- Data from the 2000 prescribed test burn on the southwestern portion of Rocky Flats will be used to determine potential impacts to human health, identify potential erosion problems, and to identify benefits to the Site plant communities.
- All prescribed burning that could affect Preble's meadow jumping mouse will be done after consultation with the Service.
- All prescribed burns will include public notification, as well as, application and receipt of a burn permit from CDPHE. The Site will conduct pre-burn environmental sampling and air monitoring during the burns as appropriate to the areas involved.

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Options Considered But Not Selected

Options to introduce wild or domestic grazers such as cattle, sheep, bison were considered in an effort to effectively manage prairie plant and weed species. This alternative to prescribed fire would require intensive management including herding, fences, drift fences, electric fences, stock water sources and salt licks. Without this intensive management, damage to riparian areas and Preble's mouse habitat is likely to occur. Without intensive management, these grazers would use and damage riparian vegetation. Rocky Flats is not staff equipped or funded to implement this option. The proposed future uses of Rock Creek Reserve are not compatible with this option.

An option to use goats to control undesirable vegetation and to reduce litter was considered. For example, goats will eat noxious weeds if confined to small areas of noxious weed monocultures, but they will not selectively choose most of these weeds over more desirable native forbs. Goat browsing, like the grazing option described above, requires intensive management, such as herding and fencing. The pervasive weed and litter problem in Rock Creek Reserve is extensive, and not isolated to certain areas. To control undesirable vegetation in Rock Creek Reserve many goats would be required. This option is not consistent with the intended use of the Rock Creek Reserve for native species. Rocky Flats is not staffed, equipped or funded to implement this alternative. The potential for damage to riparian and other sensitive plant communities exists with this option.

4.7 SOCIOECONOMICS

There are no known socioeconomic issues associated with Rock Creek Reserve management for the duration of this Plan. This section describes the public use parameters that will be in effect for the duration of this Plan. Expansion of the Rock Creek Reserve, public use studies, and contaminants studies are presented as proposed actions here based on their relationship to public use. Although this Plan does not contain figures for monetary value for preserving natural resources associated with Rock Creek Reserve, there are studies that attempt to establish those values. There are both tangible and intangible values to surrounding communities for having adjacent, or nearby, open space lands.

4.7.1 Public Use

Notwithstanding necessary restrictions during active closure, it is DOE's desire that as many areas of the site ultimately be made available for public use and public education as possible, consistent with maintaining the ecological resources. DOE has asked that the Service evaluate the amount and type of public access that the land and resources will bear as part of the Service's ongoing cooperative management of Rock Creek Reserve. All reasonable alternatives for public use will be discussed with the local communities and community preferences for public use will be sought prior to opening the Site for public access. Rocky Flats Mission Considerations in relation to public access is discussed in Section 3.7.2.

Proposed Action

- Continue with the existing management policy for public tours and visits for the life of this Plan.
- Analyze public visitation options for post-closure through an Access and Recreation Study. This

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study will analyze the impacts of recreation and become the basis for recommendations on public access compatible with the future use of the land.

- Conduct contaminants sampling and analysis to support a potential National Wildlife Refuge designation. This will help comply with Service requirements through incorporation of a Service Level III contaminants study to identify potential contamination in Rock Creek Reserve. This will be prepared in cooperation with the Service's Environmental Contaminants Division. The Service's Level III portion of the study will be accomplished by the Service.
- Expand Rock Creek Reserve to 1700 acres (Fig. 2).

Options Considered But Not Selected

For the intended life of this Plan, there are no other options that are applicable. Continued need for a safety and security buffer zone by Rocky Flats requires continued limitation of public access until nuclear material is removed. In addition, the existence of a federally-listed, threatened species will continue to require protection of the habitat. If conditions warrant, or Congress mandates it, the area could become part of the USFWS Refuge System. If refuge designation occurs, management direction may change to meet the needs of the Refuge System. These options cannot be analyzed at this time since the future use of the Site has not been decided, and current restrictions are in place. Public comments have mainly focused on hiking and horse trails through the site. These will be analyzed in the Access and Recreation Study to be initiated under the Proposed Action.

No Action

No action would not allow for the study and planning of future public access to the Site and contaminants studies. This would not be conducive to good public access management decisions. Not expanding the boundaries of Rock Creek Reserve would not allow for good watershed management techniques since only part of the watershed would be included in the Rock Creek Reserve (see Section 1.3.2 for a more detailed analysis).

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5.0 ENVIRONMENTAL CONSEQUENCES

This Section expands on some of the environmental impacts briefly analyzed in the alternatives discussion throughout the Plan. The Plan incorporates by reference the Rocky Flats Environmental Technology Site Vegetation Management Environmental Assessment. Impacts from vegetation management practices are analyzed within that document, and it provides the impact analyses for many of the actions described within this Plan. Nothing in this Plan is to be interpreted as a diminishment of the policies, programs and projects as outlined in that EA.

As discussed in Section 1.3.2 of this document, three alternatives are considered:

- The “**proposed actions**” with implementation of the Plan.
- The “**options considered but not selected**” alternative, which discusses management strategies considered but not selected for inclusion within the Plan.
- The “**no action**” alternative. No action is the continuation of existing management practices.

The preferred (proposed) action is sometimes not a new proposal, but may be the continuance of a current management practice, or “no action” and is designated as such throughout the Plan under the heading *Preferred Action: No Action*. For example, in much of the inventory and monitoring section the no action alternative (current monitoring program) is the preferred action.

The proposed action alternatives would not have long-term negative environmental consequences compared to existing conditions. The “options considered but not selected” alternatives could have a wide range of environmental consequences, ranging from positive to negative on various components of the Rock Creek Reserve environment. In some cases, the alternatives differ significantly in their ability to proactively manage natural resources, support the Rocky Flats mission, and comply with environmental laws.

The “options considered but not selected” discussion in this section also includes the “no action” alternative in cases where “no action” is not the preferred alternative. This is done for brevity and to simplify the discussions.

The Plan provides guidelines for managing natural resources, and describes actions designed to maintain and improve Rock Creek Reserve’s native, natural resources. The Plan describes preferred options that allow flexibility in management that will be exercised as more information becomes available.

5.1 ROCK CREEK RESERVE BOUNDARY EXPANSION

Proposed Action

One of the actions proposed in this Plan is the expansion of the boundaries of Rock Creek Reserve to include most of the Rock Creek watershed. The watershed encompasses approximately 1500 acres, most of which occur on the Site. The proposed boundary expansion would bring the total acreage of Rock Creek Reserve from 800 acres to 1700 acres (Fig. 2). The Service supports this proposed action. The other proposed management options in this Plan will not change with the implementation of the boundary

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expansion. This Plan is not a watershed management plan. The intent is to protect, restore and conserve native species. Changing the boundary of the Rock Creek Reserve helps to do this by making a more definable land unit by incorporating natural and manmade boundary lines such as drainage features, topographical features and roads. The proposed boundary expansion does not include any known contaminated areas or eligible archaeological or historic sites. The proposed boundary expansion includes additional easements and structures, to include a never-used landfill with pond and support facility.

Options Considered But Not Selected

The Rock Creek Reserve proposed boundary expansion could have encompassed a wide range of acres and different boundary configurations. Contaminated areas were not considered for inclusion in Rock Creek Reserve. Range managers and wildlife biologists selected the best option based on the potential for contamination, and on an ecological approach. A general watershed approach was desired, and inclusion of as much of the tall grass prairie as practicable. Applying management practices to a better-defined land management unit allows a more unified approach, rather than managing fragments of habitat with no discernible boundaries. The No Action alternative would provide a more fragmented approach, since accessible areas of the watershed and adjoining sections of tall grass prairie would not be included in Rock Creek Reserve.

5.2 TOPOGRAPHY, PHYSIOGRAPHY, GEOLOGY AND SOILS

Proposed Action

The proposed action includes an existing integrated program for the planning of land maintenance and protection of soils through the management of vegetation. Brief periods of increased erosion could occur during land maintenance and rehabilitation activities (such as prescribed burning), but these would be insignificant compared to the erosion control benefits of enhancing native vegetation. There may be slight increases in erosion during bare ground aspects of rehabilitation of roads and other projects which disturb the soil, but the plan includes provisions to minimize erosion during and following these actions such as soil stabilization using structures and vegetation. The proposed action has evolved over years of active and successful management at Rocky Flats.

Options Considered But Not Selected

Other options could range from intensive erosion control programs that would provide relatively good soils protection to virtually no erosion control or damage prevention. Erosion, however, is not a major issue at this time on Rock Creek Reserve. Options in the Proposed Action will control limited areas of erosion that were identified in the tall upland shrubland areas. Most are aimed more at prevention than erosion repair. Construction of erosion control dams could have a greater impact than the current erosion. This would also impact a federal threatened species, the Preble's meadow jumping mouse found in Rock Creek riparian areas. Negative effects on Rock Creek Reserve's soils (and associated vegetation) would be greater using other options than under the proposed action.

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5.3 WATER RESOURCES

Proposed Action

Implementing the monitoring described in the Plan will not have a negative impact on the environment. It could have a very positive impact if potential problems are identified and subsequently mitigated. Monitoring water quantity and quality is not a legal requirement on Rock Creek Reserve, as it is within the other two watersheds that occur on the Site. Exploring the feasibility of obtaining water rights gives land managers a wider array of options for management of water quantity in the future, an option which could become necessary for protection of a federal-listed, threatened species, such as the Preble's meadow jumping mouse.

Options Considered But Not Selected

Other options range from doing nothing to intensive monitoring and testing of the groundwater and surface water of Rock Creek. The No Action alternative could result in negative impacts, going undetected, therefore causing harm to the Preble's meadow jumping mouse, and other native animal and plant species.

5.4 AIR QUALITY

Preferred Action: No Action

No negative long-term impacts would occur from implementation of the proposed actions. Air quality monitoring and management are currently done as determined by law and specific agreements between Rocky Flats and the regulatory agencies. Monitoring less than the existing level would result in noncompliance with State and federal law. Increased monitoring would be unnecessary as the current level of monitoring is based on statistical requirements for accuracy. Continued reclamation of roads and bare areas will further reduce the likelihood of PM-10 and TSP generation as fugitive dust.

Options Considered But Not Selected

Negative environmental impacts would not result from enhanced air quality projects, such as using dust suppressants (that have been assessed for impacts to vegetation and water) on roads, prohibiting traffic or no implementation of occasional prescribed burns. Prohibiting all traffic is not a viable alternative. Access is necessary for environmental programs and maintenance activities. Traffic is already kept to a minimum and is strictly controlled in the Buffer Zone, including Rock Creek Reserve.

5.5 BIOLOGICAL RESOURCES/ VEGETATION AND FAUNA

Proposed Action

The proposed action would provide management of faunal and vegetation resources on Rock Creek Reserve on an integrated basis. The Plan uses an ecosystem management strategy to achieve biological

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diversity conservation. It emphasizes the use of native species and the monitoring and control of invasive species, as emphasized in the Presidential memorandum to the heads of federal agencies (Office of the President, 1994) and Executive Order 13112, Invasive Species. The Plan incorporates biodiversity principles and analyzes impacts to biodiversity as outlined in the Council on Environmental Quality's 1993 report entitled Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act. Implementation of this Plan will have positive effects on the biodiversity of Rock Creek Reserve.

The plan includes specific actions to inventory, monitor, and manage the watershed and semi-arid ecosystem of Rock Creek Reserve, including wildlife habitat, native species introductions, protection of increasingly rare native plant communities, and an integrated approach to noxious weed management. These programs include monitoring a variety of plants and animals, wetlands protection, prairie ecosystem management to maintain and improve wildlife habitat, and means to detect and reduce impacts to surface waters.

This Plan incorporates by reference the Rocky Flats Environmental Technology Site Vegetation Management Environmental Assessment. Impacts from vegetation management practices are analyzed within that document, and it provides the impact analysis for many of the actions analyzed within this Plan. Nothing in this Plan is to be interpreted as a diminishment of the policies, programs and projects as outlined in that EA.

Some proposed actions with the potential for short-term negative impacts, or public concern are analyzed further here. These are:

Introduction of native species and removal of non-natives- Public concern for the potential for protected species to migrate off federal lands on to private lands has been raised. Introducing the Plains sharp-tailed grouse would not require Endangered Species Act coordination since the species is not federally-listed or being considered for listing. Establishment of these sensitive species, especially on lands that will remain open space in perpetuity, helps to avoid future federal listing by increasing their numbers and survival rates. The species is State listed as endangered, but is considered abundant in other states. The introduction would only occur after successful habitat restoration (decreasing the noxious weeds to an acceptable level) and enhancement of the native prairie. The DOW would be the lead agency in the introduction and would most likely use Rock Creek Reserve as one part of a region wide effort to establish the grouse. Although Rock Creek Reserve alone (or even the entire Site) would not afford enough habitat to establish viable populations, the connected acreage devoted to open space in this area may make the project more feasible. Introductions will be discussed and studied (availability of lek sites, predation, weed control, etc.), and the option to do so if an introduction plan is developed was desirable for this Plan.

Introduction of sensitive, native fish species- None of the native fish species proposed for introduction into the Rock Creek Reserve are being considered for federal listing. Establishing these species in more areas could help preclude listing in the future, and make more individuals available for transplant to other areas. Although the habitat in Rock Creek Reserve is considered marginal by Site ecologists and on the edge of the species' range, the loss of the core habitat areas in Colorado is one of the factors that have pushed the species to State listing. Because of the loss of core habitat area, habitat on the periphery if the species range usually holds the remaining populations, and are usually the potential sites for early

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restoration work. Both species proposed for introduction into Lindsay Pond are listed by the State of Colorado.

The long-term survival of bass and other aquatic species within the Lindsay Pond indicates that the site is capable of supporting fish populations. The presence of aquatic vegetation in Lindsay Pond also indicates that siltation events are usually of limited duration. Since floods and siltation are normal for foothill streams, most native fish are better adapted to flood and siltation events than the largemouth bass population. Larger sites than Lindsay Pond are desired, but as long as a species is sensitive and not a game fish, there is reluctance to allow the introduction of protected species due to regulatory concerns. Although the site is small, it is one of the few sites identified to date for possible restoration of native non-game fish species. This site has several benefits, such as isolation from non-native fish populations that could repopulate the area, and a lack of pressure to maintain a sport fishery at the site.

Predation from pelicans and cormorants could have a short-term impact until the fish population is well-established. Native Colorado fish are adapted to bird predation, but they are not adapted to predation from largemouth bass. The proposed action to remove the non-native largemouth bass and introduce native fish species will also benefit native bird species, as well as other native species over the long-term. The existing vegetation around the edge and throughout the bottom of the pond provides sufficient cover to maintain small fish species such as darters and dace.

Methods of non-native fish removal and impacts on non-target species- The purpose of the proposed action is to remove non-native largemouth bass. The bass have a long-term negative impact upon all native fish, amphibians, invertebrates and possibly some bird species. There are two EPA approved chemicals for the removal of fish within the United States. These two compounds are rotenone (powdered and liquid formulations) and antimycin (Fintrol). Rotenone is derived from the root of a South American plant, and is most often used for large fish restoration projects, with an application rate of 0.5 to 3.0 ppm. Antimycin is an antibiotic, and is effective in waters of low pH. Due to the expense of antimycin, it is most often used for smaller alpine trout restoration projects and the removal of sunfish from commercial catfish ponds at the rate of 2 to 10 ppb. An approved Fish Restoration Plan, and a Fish Control Permit must be obtained from the DOW prior to start of the project. The restoration plan would address the existing water quality, chemical best suited for the site, species salvage, time of application, duration of chemical contact, neutralization and restocking. At the legal application rate, impacts to mammals are highly unlikely. A 150 lb. person would have to ingest from 5 to 70 lbs. of Rotenone dust for mortality to occur. Due to the low application rates of antimycin, and low toxicity of antibiotics to mammals, there would be little impact to mammals from application up to 10 ppb. However, both fish control compounds and potassium permanganate (a neutralizer used in conjunction with control chemicals) can have short-term impacts to amphibians and invertebrates, within the legal application rates. To offset this impact, sensitive species are collected and set aside in a refugium during the fish control project and returned to the area after the chemical has been neutralized with potassium permanganate. Impacts to non-target species are also controlled by treating at times of the year when there are the fewest numbers of sensitive aquatic-dependent forms, and limiting the concentration and contact time of the chemical. The short-term impacts from the rotenone/antimycin projects are off-set by the long-term benefits to native species from the removal of non-native species.

Introduction of federally-listed plant species- Two species considered in the Plan for introduction to Rock Creek Reserve are the Ute Ladies' Tresses Orchid and the Colorado Butterfly Plant. These plants would

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only be introduced after a successful noxious weed control effort that would provide healthy and stable habitat for these plants. Plants will not be considered for introduction if weed control measures are ongoing in suitable (without weeds) areas. Introductions would only be accomplished as part of an approved USFWS Recovery Plan for the species. The purpose of Recovery Plans is to increase a federally-listed species' numbers within populations and/or number of populations to a point where they can be de-listed. Introduction of the species would benefit the species in the long-term and provide for a greater diversity of native species in Rock Creek Reserve. Input from the public goes into the development of Recovery Plans.

Increased biological control of noxious weeds- Although it may seem contradictory to import exotic species into an area when so much emphasis is on removal of non-native species, in the case of biological control it is considered necessary. When exotic plants enter the United States, their natural enemies are usually left behind. This lack of natural suppression allows the exotics to out-compete our native plants resulting in expansive monocultures of the invaders. When these invaders are aggressive, hard to control, pose a health risk to humans or livestock, or are considered to cause economic injury, they are listed as "noxious weeds" by federal and state agencies. Current laws mandate control of these weeds on both public and private lands. Biological control is one weapon used to fight noxious weeds. Unlike other control methods, biological control is self-sustaining, does not introduce toxic chemicals into the environment, is less labor intensive and less costly in the long-term. A well-planned program consists of releases into protective cages and/or open field releases, monitoring of baseline conditions, redistribution of established colonies, monitoring for results and feasibility studies. Although there are generally no short-term impacts from biological control, issues have been raised as to potential negative long-term impacts on non-target species. To date, data does not show significant negative impacts to native plants from any insect species released intentionally for weed biological control. The insects released as part of the proposed action in the Plan have all been released elsewhere in Colorado, have shown success in establishment and control, and have all been approved for release by USDA/APHIS and the Colorado Department of Agriculture. Each species undergoes a rigorous host screening process under starvation parameters before it is allowed for release in the United States. Only species that are shown to be specific for the target plant under study conditions are chosen for releases. Sometimes the insect will feed on plants within the genus of the target plant only when the target plant is not available. An example is *Rhinocyllus conicus*, a small weevil that was released in the 1960's and 1970's for control of musk thistle. That beetle has been observed on sensitive native thistles. Significant negative impacts to native thistles have not been quantified to date. *R. conicus* was known, however, to be a generalist (feeding on several plant species) when it was approved for release on musk thistle. Since then many environmental laws have been passed (NEPA, ESA) that make the approval for release of generalist species with a wide host range in the United States highly unlikely. Some beneficial species have been accidentally introduced into the United States along with their weed host species. The benefits of biological control of a given weed species must be considered to outweigh the risks of the insect species feeding on sensitive native plants. If this risk is considered acceptable, the insect species will be used in the program. Displacement of sensitive native species by noxious weeds, and the potential for common plants to become increasingly rarer because of noxious weeds is considered to be a greater risk than impacts from approved biological control agents.

Options Considered But Not Selected

Management options selected within the Plan are the result of years of on-the-ground research, monitoring and management of biological resources in the Rocky Flats Buffer Zone as well as consultations with local, regional, and federal natural resources management professionals. The Plan package represents the best recommendations of Rocky Flats natural resources personnel as well as those of cooperating partner agencies.

The other options, as a total package, would likely produce a lesser degree of ecosystem-wide benefits or be detrimental to some biological resources. Below are a few examples of “options considered but not selected” and their likely effects:

- Rock Creek Reserve could be managed with no monitoring of natural resources, which has the potential for ecological harm to the Rock Creek Reserve by allowing potential impacts to go undetected. This would not meet stewardship goals, support biological diversity, or satisfy requirements of threatened and endangered species management.
- Rock Creek Reserve could be managed for production of game species. This could reduce biological diversity, especially those species that require unique habitats.
- Rock Creek Reserve’s fish species could be managed for the existing, non-native species which occur there now, with no removal of exotics or introductions of species native to the area. This would not support biodiversity, a primary goal of this Plan.
- Land managers could manage exotic invasive species on Rock Creek Reserve without the benefit of enhanced integrated pest management strategies. This has the potential to reduce biological diversity in the long run and would be detrimental to native species of vegetation through continued reliance on chemical control.
- Expansion of the Rock Creek Reserve boundary could be configured differently, or not changed at all. This would not provide for the ecosystem management unit approach, and would promote management of fragmented habitats.

The “options considered but not selected” alternative would likely produce a less-balanced effect on biological resources than the proposed action. However, the degree of effect would be dependent upon objectives of natural resources management and the degree of implementation applied.

This alternative sometimes would emphasize reaction to problems rather than a proactive approach to natural resources management. This approach would emphasize site-specific responses to environmental compliance. Additional studies, surveys and monitoring of natural resources, and long term programs, would be lower priority. A reaction-to-problems approach would probably achieve compliance with laws and agreements, but it would not provide as many benefits to biological resources. Species level management would promote management of one or a few species, and could cause harm, or neglect of others. Examples include predator control, plantings of specific host plants, and habitat enhancement efforts targeting only limited areas. This could have a negative impact on predator/prey relationships, distribution of native plants and communities and create artificial habitats that would require intensive management to maintain.

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The “no action” alternative is preferred in some cases. Where it is not, no action could result in lack of information for good decision making, such as no monitoring for water quantity or quality, or data to help formulate access and recreation plans. No action could lessen biodiversity goals if the reintroduction of native wildlife species is not accomplished. No action would not allow for the enhancement of the biological control of certain noxious weeds, and continue or increase the reliance on herbicide use.

5.6 CULTURAL RESOURCES

Preferred Action: No Action

The proposed implementation of the Plan is consistent with existing cultural resources protection policy as documented in the CRMP, and as required by law. The Plan includes steps to protect cultural resources that may be discovered on Rock Creek Reserve during implementation of this plan. Ground-disturbing natural resources projects have the potential to uncover sites even in surveyed areas. The review of potential eligible sites by an archaeologist and the NEPA process are used to ensure protection of known and potential cultural resources while implementing the Plan. Study and possible stabilization of all or part of the Lindsay Ranch will not affect cultural or other resources and could preserve a locally recognized point of interest. Activities undertaken in Preble’s meadow jumping mouse habitat will undergo review by the Service, and all other management policies protecting natural resources will be complied with.

Options Considered But Not Selected

DOE must comply with laws and policies related to protection of cultural resources. Other options for monitoring and inventorying would be to conduct more in depth surveys than required by law, e.g., subsurface testing (testing below the surface for buried cultural deposits before a project is implemented). This option is not necessary since the CRMP identifies the Buffer Zone as a low-density (low probability) area for cultural resources. These options could negatively impact subsurface cultural deposits that otherwise may have been left unharmed. Other options would not apply in this case since Rocky Flats has undergone archaeological surveys and historic assessments for the entire Site.

5.7 LAND AND INFRASTRUCTURE MAINTENANCE

Preferred Action: No Action

Implementation of the proposed actions would have no long-term negative environmental impacts, and some short-term negative impacts (dust, erosion) could result. Positive impacts would result from the control of noxious weeds, removal of fences and rehabilitation of roads and trails. Working with off-site land managers to cooperate in land maintenance activities would continue to be beneficial. As part of the Annual Vegetation Management Plan, prescribed burning and use of herbicides have been environmentally assessed in accordance with NEPA and a Finding of No Significant Impact was published.

Options Considered But Not Selected

Other options such as too widespread or too frequent use of fire, and no use of fire have the potential for negative environmental impacts in both the short term and long term. Cultural sites could be damaged. Special status and other sensitive species could be at risk and erosion could increase from the large areas impacted and/or the frequency of the burning. Increased herbicide use could cause ecological damage through the cumulative effects on non-target species. No use of fire would remove a very important tool proven to benefit prairie species from the land manager's available options.

5.8 SOCIOECONOMICS

Proposed Action

Based on the reception of primarily positive comments regarding the formation and expansion of Rock Creek Reserve, it is anticipated that the existence and management of Rock Creek Reserve is socially and economically acceptable to the surrounding communities. Rock Creek Reserve was created as a natural protected area to preserve valuable plant communities and wildlife, and although it is not open to unlimited public access, it serves many of the functions similar to surrounding open space areas, such as: viewshed values, buffer between developed areas and protection of environmental features. It has been shown through many public comments on proposed land developments, allocation of taxes for land purchases, and general uses of the open space land for recreation, that the general public places great value on preserving large tracts of land for those purposes.

No negative impacts to the socioeconomics of the area result from this Plan. Public access above the current level is not applicable for Rock Creek Reserve for the life of this Plan. Positive impacts will result from the initiation of an Access and Recreation Study and contaminants studies to ensure the future use of the land and public access will be integrated with environmental goals and consider public health. The Access and Recreation Study will be a compilation of data that will help make decisions in the future for the kinds of public access, frequency, best areas, etc. to better plan public access with ecological goals in mind. Access could range from none to full access depending on the location and use of the land at that time. Easement holders will not be affected by this Plan. Impacts from easements will not change since easement holders are required to adhere to DOE procedures and follow the limitations specified in each individual easement. It is the responsibility of the easement holder to comply with applicable federal, State and local laws.

Expansion of the boundary of Rock Creek Reserve will result in positive impacts as discussed in Section 5.1.

Options Considered But Not Selected

For the intended life of this Plan, there are no other options that are applicable. Continued need for a safety buffer zone by Rocky Flats requires continued limitation of public access until nuclear material is removed. In addition, the existence of a federally-listed, threatened species will continue to require protection of the habitat. If conditions warrant, or Congress mandates it, the area could become part of the

USFWS Refuge System. If refuge designation occurs, management direction may change to meet the needs of the Refuge program. These options cannot be analyzed at this time since the future use of the Site has not been decided, and current restrictions are in place. Public comments have mainly focused on hiking and horse trails through the site. These will be analyzed in the study to be initiated under the Proposed Action. "No action" would not allow for the study and planning of future public access to the Site and contaminants studies. This would not be conducive to good public access management decisions. Not expanding the boundaries of Rock Creek Reserve would not allow for good watershed management techniques since only part of the watershed would be included in the Rock Creek Reserve as described in Sections 1.3.2 and 5.1.

5.9 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental impacts of their program, policies, and activities on minority or low-income populations in the surrounding community. This assessment has not identified any adverse or beneficial effects unique to minority or low-income populations in the affected area.

5.10 IRREVERSIBLE, IRRETRIEVABLE COMMITMENT OF RESOURCES

No irreversible or irretrievable commitment of resources is part of this Plan. The intent of this Plan is to conserve and protect natural resources to the fullest extent possible given Site mission considerations and funding levels.

5.11 CUMULATIVE IMPACTS

A cumulative impact is defined in 40 CFR Section 1508.7 as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." The location of the Rock Creek Reserve is discussed in detail in Section 2.1.1. Surrounding land for the Reserve includes open space, highways, private mining activities, the National Wind Technology Center, Rocky Flats buffer zone, and the Rocky Flats industrial area. There are a variety of activities occurring on those lands with associated impacts to the environment. Implementation of this management plan is not expected to result in incremental impacts to these surrounding lands, or the Rock Creek Reserve; therefore the negative cumulative impacts will not be increased from the level currently existing.

Past practices both on-site and off-site have contributed to noxious weed invasions and introductions of non-native fish species. Positive cumulative impacts should result over time from implementation of the Plan. Noxious weed control efforts using increased biological and other non-chemical means should help control weeds with less dependence on herbicides. The spread of increased numbers and species of biological control agents will benefit the entire region. Introductions of native species will help restore the

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biodiversity of those ecosystems. Preble's meadow jumping mouse continued conservation and habitat protection could have positive cumulative impacts by contributing to the recovery efforts that could lead to possible de-listing of the mouse in the future.

The management of Rock Creek Reserve's natural resources now will help ensure the future quality of these lands, and cumulatively maintaining the availability of high quality natural resources for the Front Range. This management will produce a positive cumulative impact.

SUMMARY OF IMPACTS

Figure: 11

Section	Negative Impacts	Positive Impacts
Boundary Expansion	None	<ul style="list-style-type: none"> • Provide a more definable unit (watershed) for an ecosystem management approach.
Topography, Physiographic, Geology, and Soils	<ul style="list-style-type: none"> • Minimal short-term erosion from road maintenance activities. 	<ul style="list-style-type: none"> • Use of water bars, etc. to control water flows on, or across, roads will reduce associated soil erosion. • Re-seeding with native grass species along roads where maintenance has exposed bare soils will reduce soil erosion. • Implementation of vegetation management (fire, herbicides) as analyzed in the Vegetation Management Environmental Assessment will provide long-term

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Water Resources	<ul style="list-style-type: none"> • Short-term impacts may occur from vehicle access to monitoring well sites if soil erosion occurs or gasoline spills occur and enter the stream channels. 	<p>benefits.</p> <ul style="list-style-type: none"> • Selected increased monitoring of surface and groundwater will assist in earlier detection of impacts from adjacent activities. • Monitoring of seep and spring flows will assist in early detection of flow reduction which could impact vegetation and fauna species. • Determination of minimum flows necessary to support the habitat will provide positive affects on habitat management planning activities.
Air Quality	<ul style="list-style-type: none"> • Soils bared by road maintenance activities could produce short-term impacts from wind erosion until reclamation is completed. • Short-term impacts could occur from prescribed burning activities, however these have been analyzed in the Vegetation Management Environmental Assessment which would apply to the Rock Creek Reserve. 	<ul style="list-style-type: none"> • Reclamation of bare soil areas and implementation of activities analyzed in the Vegetation Management Environmental Assessment (prescribed burning, herbicide application) will provide long-term benefits through maintenance of a robust native vegetation cover.
Biological Resources	<ul style="list-style-type: none"> • Short-term impacts 	<ul style="list-style-type: none"> • Long-term positive

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	<p>would occur with the removal of bass from Lindsay Pond, however introduction of native species such as the northern Redbelly Dace will be a positive long-term benefit to the ecosystem.</p>	<p>effects occur from maintaining a current Vegetation inventory and library so species composition changes can be noted as a reflection of the ecosystem health.</p> <ul style="list-style-type: none"> • Continuation of periodic specific surveys for Ute Ladies Tresses Orchid and Butterfly Weed will provide a benefit of early detection if they do naturally occur. • Long-term benefits, as analyzed in the Vegetation Management Environmental Assessment, for the native vegetation & fauna arise from aggressive noxious weed control. • Long and short-term benefits occur from selective use of prescribed burning on the vigor of native plant communities and uncontrolled fire hazard situations. • Removal of unnecessary roads and fences will be a long-term benefit as it lessens the fragmentation of the grasslands. It
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		<p>reduces the amount of bare soils where erosion can occur and noxious weeds become established.</p> <ul style="list-style-type: none"> • Increased use of approved biological controls on selected weed species in conjunction with other, more short-term control efforts, will have a long-term positive effect on the plant communities. • Installation of bat houses will be a benefit to assist in establishing a stable regional population of bats. • Installation of nesting boxes for blue birds will benefit the region-wide stabilization of those bird populations. • Monitoring and maintenance of water and vegetation resources will provide long-term protection for the federally listed Preble's Meadow Jumping Mouse. • Coordination with the Colorado DOW for introduction of species such as the Plains Sharp-tailed grouse could broaden the existing range of
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		these species and provide greater population stability.
Cultural Resources	<ul style="list-style-type: none"> Short-term impacts may occur from stabilization processes involving the Lindsay Ranch (vehicle and foot traffic, construction material storage, etc.) 	<ul style="list-style-type: none"> A long-term benefit may result from possible stabilization of Lindsay Ranch structures through coordination with interested stakeholders.
Lands & Infrastructure Maintenance	None	<ul style="list-style-type: none"> Noxious weed control, road maintenance, fence and road removal will provide positive benefits to the natural resources.
Socioeconomics	None	<ul style="list-style-type: none"> Initiation of an Access and Recreation Study, coordinated with local groups and governments, will result in public trail routes and options available on a regional basis to facilitate public use. In addition, it will define access needs for easement holders such as, water ditches and power lines.
Environmental Justice	None	None

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6.0 CONCLUSIONS

The Department of Energy and the U.S. Fish and Wildlife Service should implement an Integrated Natural Resource Management Plan for Rock Creek Reserve located in the Buffer Zone at the Rocky Flats Environmental Technology Site for the period 2001-2006 (or until closure) to manage natural resources, as well as to support the Rocky Flats cleanup and closure mission, and compliance with various environmental laws. Full implementation of the plan will also ensure the continued quality of Rock Creek Reserve's natural resources for the ultimate re-use and land ownership decisions yet to be made.

Implementing the Rock Creek Reserve Integrated Natural Resources Management Plan would not result in detrimental impacts. Minor adverse impacts on wildlife habitat will be mitigated by full implementation of restorative and proactive wildlife management provisions in the Plan. Implementing the Plan would provide beneficial impacts to soil, water, and biological resources, including federally-listed, threatened and endangered species. Implementation would allow the DOE and USFWS to manage the natural resources of Rock Creek Reserve in an effective manner to meet current and future conservation needs.

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APPENDIX 1

INTERAGENCY AGREEMENT
Number DE-AI34-99 RF 01776
between the
U.S. FISH WILDLIFE SERVICE
and the
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS FIELD OFFICE

For
THE ROCK CREEK FISH AND WILDLIFE COOPERATIVE MANAGEMENT AREA
AT THE ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

PART A. INTRODUCTION

I. PURPOSE

This Interagency Agreement (IA) between the U.S. Fish and Wildlife Service, Department of the Interior (the Service) and the U.S. Department of Energy, Rocky Flats Field Office (RFFO), is hereby entered into under the authority of the Economy Act, 31 U.S.C. section 1535. This IA identifies technical services to be provided by the Service for the purpose of conserving, protecting, developing, and managing the habitat on that approximately 800 acre portion of the Rocky Flats Environmental Technology Site's (Site's) Buffer Zone designated by RFFO as the Rock Creek Reserve, by establishing the Rock Creek Fish and Wildlife Management Area. Among other values, the Rock Creek Reserve is a unique riparian area, is inhabited by the threatened Preble's Meadow Jumping Mouse, and contains expanses of xeric tall grass prairie, which has been nearly extirpated along the Front Range.

The accomplishment of the Site's mission involving the management of nuclear materials, including health and safety and security, conducted pursuant to the authority of the Atomic Energy Act, as amended, 42 U.S.C. section 2011, *et seq.* (AEA) is the primary purpose for which RFFO exercises its custody and control of the Site. The Service and RFFO acknowledge that this AEA mission has priority with respect to decisions and actions concerning fish and wildlife cooperative management taken pursuant to this IA. They further acknowledge that the Service is charged with an independent, non-delegable statutory duty with respect to the Endangered Species Act, 16 U.S.C. section 1531, *et seq.* (ESA) for all federally listed species at the Site. This IA anticipates additional opportunities to protect, enhance, and restore fish and wildlife resources as part of the responsibilities of RFFO.

II. BACKGROUND

The Site is located in Northern Jefferson County, approximately 15 miles northwest of downtown Denver. From its construction in the early 1950's, the original 2,520 acre Site developed into an industrial complex consisting of approximately 700 facilities which were used as manufacturing, chemical processing, laboratory, support, research and development, and administrative facilities. The main production and support facilities were located near the center of the Site, commonly referred to as the Industrial Area, occupying about 385 acres. From 1972 through 1976, a surrounding 3,930 acres was acquired (including the approximately 800 acres comprising the Rock Creek Reserve

area) to function as a Buffer Zone. In certain instances, the acquisition was of the surface estate interest only. Non-Federal land adjacent to the Buffer Zone is still utilized primarily for agricultural, quarrying, and open space purposes. Since the Site was constructed, surrounding multi-use development has grown closer, and the Denver area population has increased to the point where currently about 2.5 million people live within a fifty mile radius of the Site.

The Site was listed as a National Priorities List (NPL) Site, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. section 9601, *et seq.*, in September 1989. The Buffer Zone, including the Rock Creek Reserve Area, has subsequently been investigated for hazardous substance contamination. This investigation has shown that the Rock Creek Reserve Area and surrounding Buffer Zone is not contaminated by hazardous substances. It is RFFO's intention to pursue an NPL Site partial delisting for these portions of the Site. Pursuant to CERCLA, 42 U.S.C. section 9620, a federal facility interagency agreement, known as the Rocky Flats Cleanup Agreement (RFCA) was entered into on July 19, 1996 by RFFO, the U.S. Environmental Protection Agency, Region VIII (EPA) and the Colorado Department of Public Health and Environment (CDPHE). RFCA established a cleanup and closure target of 2015. Shortly thereafter, the Department of Energy's ten-year planning initiative began and cleanup plans for closure were further refined. Since cleanup for closure will now be completed within the relative near term, there is a great deal of interest in the physical condition of the Site after completion of activities required pursuant to RFCA (end state) and in future alternative uses after the end state is reached.

Discussions with stakeholders on future use began in early 1994. These discussions led to formation of the Rocky Flats Future Site Use Working Group (FSUWG). The FSUWG spent approximately a year gathering data from the Site and the stakeholder community and preparing recommendations for DOE. The FSUWG made formal recommendations to DOE in a July 1995 report. Consistent with the recommendations of the FSUWG, RFCA has a Vision statement and Preamble that foresee open space in the Buffer Zone and light industrial uses in the Industrial Area as potential alternative uses of the Site after the end state is reached.

On May 13, 1998, the Preble's Meadow Jumping Mouse (mouse) was listed as a threatened species pursuant to the Endangered Species Act, 16 U.S.C. section 1531, *et seq.* (ESA). Because the Site contains known and potential habitat for the mouse, the Service, RFFO, EPA, CDPHE and the Colorado Department of Natural Resources entered into a Memorandum of Agreement for Cooperation of Endangered Species Act Compliance with Activities at the Rocky Flats Environmental Technology Site, effective February 26, 1999.

Section 3153 of Public Law 104-201, The National Defense Authorization Act for Fiscal Year 1997 (NDAA), required RFFO to develop future use plans for the Site, covering the period of 50 years beyond 1997. RFFO prepared "The Rocky Flats Environmental Technology Site Future Use Stakeholder Involvement Process" (Process Document) in September 1998, in response to this requirement. The Process Document was submitted to Congress in October 1998. The Process Document recognizes RFFO's obligation to

consult with the Rocky Flats Citizen's Advisory Board, affected local governments, including any local future use redevelopment authorities, and appropriate State agencies (Stakeholders) as required by the NDAA.

Section III of the Process Document summarizes the Buffer Zone status as follows: "Since the cessation of nuclear weapons production in 1992, Stakeholder interest in the cleanup, closure and future uses of the Site has been high. Based on current community consensus, Open Space of some form is the likely ... [use for the Buffer Zone after the Site's end state is reached]. Consistent with the RFCA and all stakeholder recommendations to date, the community is still seeking consensus on the range of specific open space options." This IA will help to preserve the valuable ecological resources of the Rock Creek Reserve area through the wildlife and habitat management expertise of the Service, thus protecting and enhancing the range of options.

In light of the above, this IA is designed to recognize the consensus that the Buffer Zone should be preserved for open space uses, by establishing the Rock Creek Fish and Wildlife Cooperative Management Area for the Rock Creek Reserve Area of the Buffer Zone. It also designed to recognize that RFFO needs information and assistance that can be provided through the expertise of the Service, in order to continue the Site's future use consultative process. Finally, it is designed to further a coordinated approach toward fulfilling RFFO's compliance obligations under diverse legal requirements.

PART B. ACCESS TO THE ROCK CREEK RESERVE.

I. DESCRIPTION

The RFFO, acting as the federal agency with jurisdiction, custody and control over the Site, hereby grants to the Service access to and use of the Site area designated as the Rock Creek Reserve. The Rock Creek Reserve encompasses an area of approximately 800 acres lying within Jefferson and Boulder Counties, State of Colorado, as described in the Exhibit dated May 11, 1999 attached hereto.

II. USE OF THE PROPERTY

The Service's use of the property shall be to cooperatively manage the Rock Creek Fish and Wildlife Cooperative Management Area and to conduct the activities described in the Statement of Work Part of this IA. It is the understanding of both RFFO and the Service (the Parties) that RFFO requires that the use of the property must be consistent with RFFO's continuing need for the Rock Creek Reserve area to function as a safety and security buffer for RFFO's ongoing activities involving the management of nuclear materials on the Site pursuant to its authority under the AEA. The parties believe this use for AEA purposes can be achieved in a manner consistent with the fish and wildlife cooperative management objectives of this IA. Should the Service determine that any use or action may adversely affect a listed species or otherwise violate the ESA, the Service will immediately advise RFFO and attempt to address the issue in a prompt and cooperative manner. To ensure that this requirement is met the Service agrees to manage the Rock Creek Fish and Wildlife Cooperative Management Area consistent with the

RFETS "Natural Resources Management Policy," Rev. 0, 9/30/98, (NRMP), Attachment 1 hereto. Future management of the Rock Creek Reserve will be in accordance with an Integrated Natural Resources Management Plan prepared by the Service, which shall be subject to approval by RFFO, which when so approved shall supersede the NRMP.

III. ACCESS TO THE PROPERTY

The Service is hereby granted access to the designated Rock Creek Reserve area, established as the Rock Creek Fish and Wildlife Cooperative Management Area of the Buffer Zone. In accordance with a Plan for Coordinated Access to be prepared by the Service in consultation with and approved by RFFO, the Service shall provide for appropriate access to the Rock Creek Reserve by coordination with the RFFO Technical Representative identified in this IA. The Plan for Coordinated Access shall identify and provide for access of those employees, contractors or subcontractors of RFFO or others entering under the AEA authority of RFFO for RFFO approved purposes. The Plan for Coordinated Access will, among other things, ensure that the Technical Representatives are informed of ongoing activities and will minimize potential conflicts regarding access for implementation of this IA and other RFFO approved purposes. RFFO shall provide appropriate training and access badges to allow the Service's staff or representatives assigned to perform the IA activities unescorted access to the Rock Creek Fish and Wildlife Cooperative Management Area.

IV. ENVIRONMENTAL RESPONSIBILITIES

The authority granted to the Service in this IA is limited to the cooperative management with the RFFO of natural resources pursuant to the NRMP and the Integrated Natural Resources Management Plan to be prepared by the Service and approved by the RFFO. Nothing herein shall be construed as authorizing the Service to manage or conduct any operations within the Site's Buffer Zone, including the Rock Creek Cooperative Fish and Wildlife Management Area, with respect to any hazardous substances or other contamination present at the time this agreement becomes effective, or otherwise related to RFFO activities or activities of third parties not under the direction or control of the Service. RFFO acknowledges that it shall have exclusive responsibility for any subsequent releases of hazardous substances originating from such contamination, whether or not such releases result from actions of the Service or others under the Service's authority for the purposes of implementing this IA. RFFO expressly recognizes that it shall maintain exclusive federal responsibility for all costs associated with any investigation of Site conditions and any cleanup, removal or remedial action or other compliance, closure, maintenance, restoration, or cleanup related activity required by federal, state or local laws or regulations which arise as a result of releases of hazardous substances (hazardous substances, for the purposes of this IA shall include, but not be limited to, nuclear material under RFFO's AEA authority, any hazardous or toxic substance, material or waste, or oil products or their derivatives) which is existing on the Rock Creek Fish and Wildlife Cooperative Management Area, on the effective date of the IA or otherwise resulting from Site activities, including the activities of RFFO employees, contractors, subcontractors or others entering under the AEA authority for RFFO approved purposes. The Service recognizes that it may be asked by RFFO to

contribute a portion of the costs associated with hazardous substance removal or remedial action required by applicable federal, state or local laws or regulation, which may arise solely as a result of the Service's activities, or the activities of others under the direction of the Service, in the Rock Creek Fish and Wildlife Cooperative Management Area. In such event, the parties agree to negotiate in good faith to determine whether the Service will contribute a share of such costs or to otherwise resolve the issue.

V. PERMITS AND LICENSES

The Service will abide by all federal, state and local laws and regulations applicable to the occupancy and operation of the Rock Creek Fish and Wildlife Cooperative Management Area, as appropriate. The Service will ensure that all operations conducted by it or by those present under the Service's authority are protective of the environment, associated natural and cultural resources, and of human health and safety. Each party will identify to the other any licenses, permits, certifications or authorizations that it determines to be required in order to comply with this paragraph. The parties shall work cooperatively with the permitting authority to decide the appropriate action to take.

PART C. STATEMENT OF WORK

I. PARTIES' TECHNICAL REPRESENTATIVES

The Parties designate the following Technical Representatives for the purposes of administering and implementing this IA. Any notices or reports or other documents to be furnished by each Party to the other pursuant to this IA shall be sent by first class mail to the named Technical Representative herein. Any other means of transmittal may be used if the receiving representative acknowledges receipt in writing.

a. The Service:

U.S. Fish and Wildlife Service
Colorado Fish and Wildlife Assistance Office
755 Parfet St., Room 496
Lakewood, CO 80215
Project Officer: Bruce Rosenlund, Project Leader
Colorado Fish and Wildlife Assistance Office
Telephone: 303-275-2393

b. RFFO:

U.S. Department of Energy
Rocky Flats Filed Office
P.O. Box 928
Golden, CO 80402
Program Officer: John Rampe, Deputy Assistant Manager
Environment and Infrastructure
Telephone: 303-966-6246

The RFFO Technical Representative will provide technical direction to the Service regarding the activities conducted under this IA that do not change the scope, schedule or cost of those activities. A Party may name a new Technical Representative at any time upon 10 days written notice to the other Party's Technical Representative.

II. ASSOCIATED AGREEMENTS

The Memorandum of Agreement for Cooperation of Endangered Species Act Compliance with Activities at the Rocky Flats Environmental Technology Site, effective February 26, 1999 (MOA) between the Parties and other signatories, remains in full force and effect. Funding under this IA shall not be used by the Service to provide funding to any third party to perform activities under the MOA without express written authorization of RFFO.

III. ACTIVITIES TO BE PERFORMED

The parties shall cooperate in implementing the Site's NRMP and the succeeding Integrated Natural Resources Management Plan in the Rock Creek Fish and Wildlife Cooperative Management Area. The Service shall propose changes that may be recommended based upon its performance of the IA, for inclusion in revisions to the NRMP prior to completion of the Integrated Natural Resources Management Plan.

The Service will, consistent with Service Policy and within limitations of funds and personnel, provide management services and other assistance within the scope of work agreed to on an annual basis under Part D of this IA for the following purposes:

1. Ongoing ecological management of the Rock Creek Fish and Wildlife Cooperative Management Area.
2. Review for adequacy existing Site plans related to the Rock Creek Reserve and the Buffer Zone.
3. Prepare and update the Coordinated Access Plan for the Service's representatives.
4. Cooperate with the Site to maintain and enhance mouse populations including habitat maintenance.
5. Provide vegetation management assistance to maintain biodiversity and minimize incursion of exotic weed species.
6. Maintain and enhance the wildlife and habitat values in the Rock Creek Reserve for native species.
7. Evaluate the ecological resources and values of the Rock Creek Reserve, with a goal of formulating recommendations regarding the long term federal management of the Rock Creek Reserve as a protected area after RFFO's custody, control and

stewardship terminate, including but not limited to inclusion of the Rock Creek Reserve into the National Wildlife Refuge System.

8. Assist RFFO in a consultative process with the general public, stakeholders, and other agencies regarding the preservation of the Rock Creek Reserve under federal management in the future. The consultative process will include sharing of information, discussions and consideration of comments provided by the general public, stakeholders, and other agencies during consultation.
9. Consult with RFFO regarding the ecological management of the Buffer Zone in general and its relationship to the ecological management of the Rock Creek Fish and Wildlife Cooperative Management Area.

Parts of the information or studies resulting from these activities may be applicable for use by RFFO to meet its consultation obligations under section 7 of the ESA. It shall be the responsibility of RFFO to conduct any analysis required pursuant to the National Environmental Policy Act, 42 U.S.C. section 4321, *et seq.* (NEPA) for any proposed action that may result from implementation of this IA. The foregoing activities to be conducted by the Service will assist RFFO in meeting its NEPA obligations.

IV. DELIVERABLES

The Parties agree that the following deliverables will be due on the dates indicated.

1. Plan for Coordinated Access, including Training Requirements for Service representatives. July 1, 1999.
2. Complete review and provide written comments on current management policies, plans and practices applicable to or affecting the Rock Creek Fish and Wildlife Cooperative Management Area. January 4, 2000.
3. Provide written recommendations for changes and implementation strategies for the future Integrated Natural Resources Management Plan for the Rock Creek Fish and Wildlife Cooperative Management Area. January 4, 2000.
4. Report on the nature and extent of information concerning biota, habitat values, and other relevant criteria necessary for further consideration pursuant to the Service's planning and evaluation process for inclusion in the National Wildlife Refuge System. The report is also to include any other recommendations the Service may have with respect to possible alternative uses of the Rock Creek Reserve. January 4, 2000.

PART D. ADMINSTRATIVE

I. ESTIMATED FUNDING AMOUNT FOR PERIOD OF PERFORMANCE

This IA shall be for the period May 17, 1999, through September 30, 2006. The performance period may be extended or shortened by mutual written agreement of the parties. Funding will be provided on an annual basis prior to the beginning of each performance period. Annual performance periods shall begin on May 17 and end on May 16 each year, except the last period, which shall end on September 30, 2006. Estimated performance period annual program budgets (not including the Service's overhead charges) necessary to implement this IA are as follows:

Period Beginning	1999	2000	2001	2002
Labor + Benefits	\$74,432	\$78,005	\$81,125	\$84,370
Materials, Supplies and Travel	\$20,000	\$20,000	\$20,000	\$20,000
Period Beginning	2003	2004	2005	2006
Labor + Benefits	\$87,745	\$91,255	\$94,905	\$49,351
Materials, Supplies and Travel	\$20,000	\$20,000	\$20,000	\$10,000

II. FINANCIAL ADMINISTRATION

On the effective date of this agreement, or as soon as possible thereafter, RFFO shall issue the Service a Department of Energy Funds-Out Interagency Agreement with appropriate funding and administrative General Provisions/Requirements acceptable to RFFO and the Service, incorporating this IA as the statement of work. The Parties may revise or amend this IA at any time. Revisions or amendments shall be in writing signed by the Parties.

The Parties' Technical Representatives shall meet at least annually to review progress and to identify and reach agreement on specific future Deliverables that are expected to result for each of the Activities to be Performed. Such annual agreements shall ensure that these Deliverables are to be performed within the funding amounts identified in this IA. The Funds-Out Interagency Agreement will be modified to authorize the funding to implement the annual agreement.

Any permit and/or license fees attributable to the Service's activities in Rock Creek Fish and Wildlife Cooperative Management Area shall be reimbursed if incurred by the Service within the estimated funding amounts agreed to in this IA.

III. REMOVAL OF PROPERTY UPON TERMINATION

Following a termination of this IA the Service shall remove from the Rock Creek Fish and Wildlife Cooperative Management Area any personal property and equipment installed by the Service or its representatives, that it can reasonably remove. The method of removal of structures, whether real or personal property, is subject to RFFO approval which will not be unreasonably withheld.

If either Party terminates the IA the Service shall remove any personal property and equipment from the Rock Creek Fish and Wildlife Cooperative Management Area by the effective date of the termination.

In the event of a change in mission at the Site, which might require termination of access, RFFO shall endeavor to provide notice of the anticipated change to the Service at the earliest practicable point. Following a termination by RFFO under this authority the Service shall have 180 days to remove any personal property and equipment from the Rock Creek Fish and Wildlife Cooperative Management Area.

The Service is responsible for the disposition of any personal property and equipment removed under this section.

IV. APPROVAL OF MANAGEMENT PLANS

To ensure that the terms and conditions of this IA will be met by the Service, the Service agrees to involve RFFO early in the development of all plans and policies specific to the Rock Creek Fish and Wildlife Cooperative Management Area. RFFO expressly reserves the rights of approval over any management plan or policy developed by the Service regarding the management of the Rock Creek Fish and Wildlife Cooperative Management Area. No Service management plan or policy, nor any change to approved Service plans or policies, shall be effective until RFFO has issued written approval. Such approval shall not be unreasonably withheld. Present and future uses of the Rock Creek Fish and Wildlife Cooperative Management Area under this IA shall be consistent with the RFFO approved Integrated Natural Resources Management Plan.

V. REASSIGNMENT

Neither this IA, nor any interest herein nor claim thereunder may be assigned nor transferred by the Service except as expressly authorized in writing by RFFO.

VI. EFFECTIVE DATE

The effective date of this IA shall be the date on which the last Party signs this IA. This IA shall remain in effect for all Parties, subject to the Modification and Revisions and Termination sections herein.

Ralph O. Morganweck
Ralph O. Morganweck, Regional Director, Region 6
U.S. Fish and Wildlife Service

5-17-99
Date

Jessie M. Roberson
Jessie M. Roberson, Manager,
Rocky Flats Field Office, U.S. Department of Energy

May 17, 1999
Date

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APPENDIX 2

U.S. Department of Energy

Finding of No Significant Impact

Integrated Natural Resources Management Plan and Environmental Assessment for Rock Creek Reserve

Summary: The Department of Energy (DOE) with the assistance and cooperation of the U.S. Fish and Wildlife Service, prepared an Integrated Natural Resources Management Plan and Environmental Assessment (Plan)(DOE/EA-1371) for the Rock Creek Reserve at the Rocky Flats Environmental Technology Site (Site) located north of Golden, Colorado. The Rock Creek Reserve was established in May 1999 in recognition of the area's biological significance. Although still under the ownership of the DOE, the Rock Creek Reserve will be co-managed with the U. S. Fish and Wildlife Service as part of an interagency agreement signed by these two agencies in 1999. The need for an integrated natural resources management plan was recognized and included as a requirement in the interagency agreement.

The EA describes and analyzes: a) Alternatives (No Action, Actions Considered But Not Selected, and Proposed Actions) to be considered; b) Affected Environment, which describes the current conditions of the reserve and the buffer zone in general; and c) Environmental Consequences of the various alternatives.

The EA was the subject of public comment from December 4, 2000, through January 31, 2001. Written comments regarding the EA were received from various local city governments, state and federal agencies, environmental organizations, and individuals. Common inquiries included the affects of access and recreation on sensitive species protection, habitat protection, and enhancement. Concerns about specific details regarding features and planned initiatives to accommodate the vegetation and fauna of the reserve were also submitted. Many suggested word changes were submitted by various groups and individuals. The comments received were generally construed to be supportive of the Integrated Natural Resources Management Plan and Environmental Assessment for the Rock Creek Reserve. The comments were assessed and considered, and where appropriate the Plan was modified. The comments, as well as the DOE's responses, are included as Appendix 10 in the Final Integrated Natural Resources Management Plan/Environmental Assessment for the Rock Creek Reserve.

Proposed Action: The Plan outlines the proposed steps that provide the stewardship of the natural resources of the Rock Creek Reserve. The Plan proposes the continuation of current management programs and polices for the buffer zone (which include the Rock Creek Reserve) and differs from these programs mainly in the inclusion of these proposed actions:

- expansion of the Rock Creek Reserve from 800 acres to 1,700 acres;
- development of an access and recreation study;
- development of a contaminants study for the Rock Creek Reserve;
- assessment and determination of feasibility to stabilize all, or part of, the Lindsay Ranch;
- within the annual vegetation management plan, provide increased emphasis for noxious weed management, including increased biological controls;
- monitoring of water quality and quantity for Rock Creek, including determination of current and minimum in-stream flows; and

- introductions of sensitive native faunal species (and removal of non-natives) and consideration of introducing federally-listed plant species (in accordance with approved recovery plans) into the Rock Creek Reserve.

Alternatives Considered: Management options that are consistent with existing policies, agreements, and restrictions, and which still meet the goals of the Plan, were proposed. Alternatives that were not considered in the alternative analysis sections include those which could compromise the Site's cleanup and closure mission. Therefore, options such as unrestricted public access and recreation that would inhibit the Site from performing its mission were not considered.

Environmental Effects: No negative environmental effects are expected to result from the implementation of this Plan. On the contrary, positive cumulative impacts should result over time. The Plan encourages bio-diversity through the protection of communities and ecosystems, the promotion of native species, the protection of rare and ecologically important species, and the restoration of ecosystems, communities, and native species.

The management of the Rock Creek Reserve's natural resources now will ensure the future availability of quality lands.

**For Further Information
About This Action Contact:**

Cliff Franklin
NEPA Document Manager
U.S. Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, CO 80403-8200
Telephone: (303) 966-5919

**For Copies Of The EA
Contact:**

Joe Rau
NEPA Compliance Officer
U.S. Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, CO 80403-8200
Telephone: (303) 966-7410

Determination: Based on the information and analysis in the Plan/EA, the DOE has determined that the proposal to implement the preferred alternatives described in the Integrated Natural Resources Management Plan and Environmental Assessment for the Rock Creek Reserve does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 as amended. Therefore, an environmental impact statement is not required, and the DOE is issuing this Finding of No Significant Impact for the Proposed Action.

Signed at Golden, Colorado, this 3rd day of April 2001.


Barbara A. Mazurowski, Manager
Rocky Flats Field Office
U.S. Department of Energy

APPENDIX 3

EXECUTIVE SUMMARY

The Background Soils Characterization Program (BSCP) study followed the Data Quality Objective (DQO) guidelines established by the U.S. Environmental Protection Agency (EPA). A work plan was prepared and approved by the U.S. Department of Energy (DOE), the EPA, and the Colorado Department of Public Health and Environment (CDPHE).

An exploratory data analysis (EDA) performed during the development of the *Background Soils Characterization Plan* (DOE, 1994) indicated that two sampling efforts were appropriate to characterize background surface soils and augment the existing background data set (i.e., Rock Creek) for the chemicals in the vicinity of the Rocky Flats Environmental Technology Site (RFETS). Those sampling efforts were completed as follows:

- Group 1 (Metals, Naturally Occurring Radionuclides, and Organic Compounds):
Twenty samples were collected just north of RFETS from soils that are similar in topography, parent material, and historic use to soils on RFETS. These samples were analyzed for naturally occurring radionuclides (uranium and radium isotopes), metals and selected inorganic constituents, semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs).
- Group 2 (Fallout Radionuclides):
Fifty samples were collected from remote (offsite) locations along the Colorado Front Range for measuring activities of fallout radionuclides (americium-241, cesium-134, cesium-137, strontium-89+90, and plutonium-239+240) in surface soils.

Summary statistics for metals and certain other inorganic constituents, fallout radionuclides, SVOCs, pesticides, herbicides, PCBs, and selected physical parameters for background surface soils sampled and analyzed in the BSCP study are presented in Tables E-1 through E-3. Summary statistics for the Rock Creek study are presented in Tables E-4 through E-6. Discussion of these results and a comparison of the BSCP data set with the Rock Creek data set (which has been used as the background data set to date), are presented in Section 4.0 of this report. Data from the BSCP and Rock Creek studies were also compared with data from existing regional background studies.

Despite minor differences between the Rock Creek and BSCP data for naturally occurring (i.e., Group 1) analytes, both the Rock Creek and BSCP data sets appear to be subsets of the "true" background population. The BSCP results for Group 1 analytes verify the validity of the Rock Creek data as representative of background conditions for these analytes in surficial soils.

Although the mean and maximum activities for plutonium in Rock Creek samples are slightly higher than those for the BSCP samples, the Rock Creek data are within the

range of a recently completed background study by Colorado State University. When the error terms for the analyses are considered (see Appendix B for data printout), there is little real difference in the values.

Either the Rock Creek or BSCP data may be used for future comparison studies. The BSCP data set may be preferred because of the well-documented work plan, which followed EPA's DQO process, and the exploratory data analysis, which determined the sample size necessary for the chemical characterization of surficial soils.

An additional objective not included in the work-plan development, but considered helpful for present and future remediation projects determined the mass-isotope ratio of plutonium-239/plutonium-240 for 12 remote (i.e., Group 2) samples. These results are included as Appendix A of this report. The average plutonium-240/plutonium-239 ratio for the 12 samples was 0.155 ± 0.019 ; the average plutonium-241/plutonium-239 ratio was determined to be 0.0030 ± 0.0004 . These mass-isotope ratios for regional fallout for plutonium can be used in future studies at RFETS, as well as in other regional studies of fallout radionuclides.

Because the plutonium-240/plutonium-239 ratio for fallout (0.155) is significantly different than the that for plutonium processed at RFETS (240/239 ratio = 0.065), determination of the plutonium-240/plutonium-239 atom ratios in soil samples could be used to separate the plutonium into its global fallout component and its RFETS component.

TABLE E-1

**SUMMARY STATISTICS FOR BSCP GROUP 1 ANALYTES:
METALS AND NATURALLY OCCURRING RADIONUCLIDES**

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	Mean	Standard Deviation	Tol Fact	99/99 UTL*	Units
Aluminum	Normal	20	0	4050	17100	10244	3329	3.8316	22999	mg/kg
Antimony	X	20	96	.19U	0.47	X	X	3.8316	X	mg/kg
Arsenic	Normal	20	0	2.3	9.6	6.09	2	3.8316	13.75	mg/kg
Barium	Normal	20	0	45.7	134	102.4	19.43	3.8316	176	mg/kg
Beryllium	Normal	20	0	0.24	0.9	0.66	0.153	3.8316	1.25	mg/kg
Cadmium	Nonparam	20	39	.295U	2.3	0.714	0.449	3.8316	2.335	mg/kg
Calcium	Normal	20	0	1450	4550	2969	749	3.8316	5839	mg/kg
Cesium	X	20	100	6.05U	7U	X	X	3.8316	X	mg/kg
Chromium	Normal	20	0	5.5	16.9	11.29	2.85	3.8316	22.21	mg/kg
Cobalt	Normal	20	0	3.4	11.2	7.29	1.81	3.8316	14.22	mg/kg
Copper	Nonparam	20	0	5.2	15.85	12.94	2.56	3.8316	22.75	mg/kg
Iron	Normal	20	0	7390	18100	12549	2744	3.8316	23063	mg/kg
Lead	Normal	20	0	8.6	53.3	33.6	10.51	3.8316	73.87	mg/kg
Lithium	Lognormal	20	0	4.8	11.6	7.69	1.93	3.8316	15.08	mg/kg
Magnesium	Lognormal	20	0	1310	2800	1913.1	468.1	3.8316	3707	mg/kg
Manganese	Normal	20	0	129	357	237.3	63.89	3.8316	482.1	mg/kg
Mercury	Lognormal	20	65	.04U	0.12	0.072	0.031	3.8316	0.191	mg/kg
Molybdenum	X	20	91	.29U	0.9U	X	X	3.8316	X	mg/kg
Nickel	Normal	20	0	3.8	14	9.63	2.64	3.8316	19.74	mg/kg
Potassium	Normal	20	0	1110	2830	2061.2	453	3.8316	3797	mg/kg
Selenium	Nonparam	20	39	.29U	1.4	0.634	0.295	3.8316	1.76	mg/kg
Silicon	Normal	20	0	934	1650	1383.5	179	3.8316	2069	mg/kg
Silver	X	20	100	.19U	.22U	X	X	3.8316	X	mg/kg
Sodium	Lognormal	20	0	43.8	105	62.16	14.84	3.8316	119.02	mg/kg
Strontium	Lognormal	20	0	9.6	45.2	28.44	10.25	3.8316	67.92	mg/kg
Thallium	X	14*	100	.385U	.445U	X	X	4.2224	X	mg/kg
Tin	X	20	91	1.35U	2.9	X	X	3.8316	X	mg/kg
Vanadium	Normal	20	0	10.8	45.8	27.85	8.87	3.8316	61.84	mg/kg
Zinc	Normal	20	0	21.1	75.9	49.56	12.1	3.8316	95.92	mg/kg
Radium-226	Lognormal	20	0	0.1	0.805	0.619	0.153	3.8316	1.20	pCi/g
Radium-228	Normal	20	0	0.2	2.3	1.35	0.48	3.8316	3.189	pCi/g
Uranium-233/234	Lognormal	20	0	0.6	3.1	1.097	0.578	3.8316	3.31	pCi/g
Uranium-235	Lognormal	20	0	0.11	0.34	0.0539	0.02	3.8316	0.13	pCi/g
Uranium-238	Lognormal	20	0	0.74	2.6	1.09	0.455	3.8316	2.83	pCi/g

a = All UTLs calculated assuming a normal distribution.

X = Not applicable because > 80% of data were non-detects.

% Non-detects are calculated from all accepted valid data except equipment rinsates.

Min and Max values: lowest/highest detected value or, if no detected values, 1/2 IDL followed by U.

Uranium-238 had 2 outliers removed for calculation of UTL; outliers retained for summary statistics.

* Six thallium samples were rejected during the validation process.

TABLE E-2

SUMMARY STATISTICS FOR BSCP GROUP 1 ANALYTES:
SUPPORTING DATA TYPES

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	99/99 UTL	Mean	Standard Deviation	Units
Ammonia	Normal*	20	39	0.5U	7	NC	2.0333	1.8977	mg/kg
Carbonate	Normal*	20	100	5U	5.5U	NC	X	X	mg/kg
Nitrate/Nitrite	Normal*	20	0	2	7	NC	4	1.6859	mg/kg
Oil & Grease	Normal*	20	0	52	130	NC	94.575	19.325	mg/kg
pH	Normal*	20	NA	6	6.8	NC	6.3575	0.2424	pH
Specific Cond.	Normal*	20	NA	0.1	0.53	NC	0.2083	0.0896	mmhos/cm
TOC	Normal*	20	0	4920	17600	NC	16133	2696.9	mg/kg
% Clay	Normal*	20	0	7	36	NC	20.45	8.62	%
% Sand	Normal*	20	0	22	76	NC	43.93	15.27	%
% Silt	Normal*	20	0	18	45.5	NC	35.76	7.52	%
Bulk Density	Normal*	20	0	0.9	1.2	NC	0.923	0.07	g/cm ³

Normal* : Distribution assumed to be normal for summary statistics of supporting data

NC = Not calculated

TOC = Total Organic Carbon

Min and Max Values: lowest/highest value detected if no detached values, 1/2 IDL followed by U.

X = Not applicable because greater than 80% were non-detects.

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TABLE E-3

SUMMARY STATISTICS FOR BSCP GROUP 2 ANALYTES:
FALLOUT RADIONUCLIDES AND SUPPORTING DATA

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	Tol Fact	99/99 UTL	Mean	S.D.	Units
Fallout Radionuclides										
Americium-241	Nonparam	50	0	0.001	0.025	3.1369	0.037	0.0107	0.006	pCi/g
Cesium-134	Nonparam	50	0	0.05	0.3	3.1369	0.369	0.2	0.056	pCi/g
Cesium-137	Lognormal	50	0	0.3	1.7	3.1369	2.25	0.941	0.372	pCi/g
Plutonium-239/240	Lognormal	50	0	0.017	0.072	3.1369	0.084	0.038	0.014	pCi/g
Strontium-89/90	Lognormal	50	0	0.065	0.64	3.1369	0.708	0.254	0.128	pCi/g
Supporting Data										
% Clay	Normal*	50	0	1	34	X	X	11.58	6.37	%
% Sand	Normal*	50	0	24	78	X	X	53.29	11.97	%
% Silt	Normal*	50	0	20	51	X	X	35.21	7.49	%
Soil density	Normal*	50	0	0.8	1.2	X	X	0.944	0.78	g/cm ³
Total Organic Carbon	Normal*	50	0	1.4	6.05	X	X	3.66	1.24	%

X = Not calculated or not applicable

Normal*: Distribution assumed normal for summary statistics of supporting data

S.D. = standard deviation

TABLE E-4

SUMMARY STATISTICS FOR ROCK CREEK GROUP 1 ANALYTES:
METALS AND NATURALLY OCCURRING RADIONUCLIDES

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	Mean	Standard Deviation	Tol Factor	99/99 UTL ^a	Units
Aluminum	Lognormal	18	0	8550	17950	12993	2251.5	3.9604	21910	mg/kg
Antimony	X	18	100	4.2U	7.3U	X	X	3.9604	X	mg/kg
Arsenic	Normal	18	0	2.1	8.5	5.82	1.81	3.9604	12.86	mg/kg
Barium	Nonparam	18	0	120	470	195	84.58	3.9604	481.1	mg/kg
Beryllium	Lognormal	18	43	0.44	1.1	0.681	0.119	3.9604	1.1523	mg/kg
Cadmium	Nonparam	17	71	0.3U	1.8	0.732	0.434	4.0367	2.45	mg/kg
Calcium	Lognormal	18	0	2260	8810	5068.1	2220.5	3.9604	13862	mg/kg
**Cesium	Lognormal	18	48	.225U	75U	31.29	30.13	3.9604	831.6	mg/kg
Chromium	Normal	18	0	10.5	20.2	15.029	2.476	3.9604	24.85	mg/kg
*Cobalt	Lognormal	18	0	4.4	24	7.778	4.308	3.9604	24.839	mg/kg
Copper	Normal	18	0	7.7	18.45	12.964	3.629	3.9604	27.34	mg/kg
Iron	Lognormal	18	0	10400	24900	15382	3226.6	3.9604	28160	mg/kg
Lead	Lognormal	18	0	29.35	51	37.535	6.024	3.9604	61.392	mg/kg
Lithium	Normal	18	0	7.1	14.95	10.981	2.273	3.9604	19.97	mg/kg
Magnesium	Lognormal	18	0	1440	5195	2853.3	1050	3.9604	7011.6	mg/kg
*Manganese	Lognormal	18	0	188.5	2220	443.6	457.04	4.1233	2328.1	mg/kg
Mercury	X	18	96	0.03U	0.075U	X	X	3.9604	X	mg/kg
Molybdenum	X	18	96	0.7U	2.7	X	X	3.9604	X	mg/kg
Nickel	Normal	18	0	7.8	18.7	12.578	3.588	3.9604	26.8	mg/kg
Potassium	Normal	18	0	1950	4205	2977.9	575.43	3.9604	5157	mg/kg
Selenium	Normal	18	22	0.105U	0.76	0.43	0.196	3.9604	1.21	mg/kg
**Silicon	Nonparam	18	0	54.8	1845	780.96	700.48	3.9604	8180	mg/kg
Silver	X	18	100	0.5U	1.45U	X	X	3.9604	X	mg/kg
Sodium	Lognormal	18	43	56.9	192.5	115.37	33.658	3.9604	248.67	mg/kg
Strontium	Lognormal	18	0	20.9	79.05	35.335	13.821	3.9604	90.072	mg/kg
Thallium	Normal	18	65	0.105U	0.41	0.23	0.084	3.9604	0.563	mg/kg
Tin	X	18	39	10.75U	58.5	32.541	12.936	3.9604	83.79	mg/kg
Vanadium	Normal	18	0	20.95	45.6	31.603	60.49	3.9604	55.56	mg/kg
Zinc	Lognormal	18	0	41.4	70.58	55.818	7.784	3.9604	86.646	mg/kg
Radium-226	Lognormal	10	0	0.75	1.1	0.945	0.128	5.0737	1.5944	pCi/g
Radium-228	Normal	10	0	1.3	2.9	2.177	0.531	5.0737	4.874	pCi/g
Uranium-233/234	Lognormal	16	0	0.91	1.472	1.145	0.156	4.1233	1.7882	pCi/g
Uranium-235	Lognormal	16	0	0.011	0.12	0.053	0.033	4.1233	0.1891	pCi/g
Uranium-238	Lognormal	16	0	0.9	1.521	1.183	0.188	4.1233	1.9582	pCi/g

a = All UTLs are calculated assuming normal distribution.

X = Not applicable because > 80% data were non-detects.

% Non-detects are calculated from all accepted valid data except equipment rinsates.

Min and Max values: highest/lowest detected value or, if no detected values, 1/2 IDL followed by U

IDL = instrument detection limit.

*Manganese contains 2 outliers, cobalt one; outliers included in summary statistics, not included for UTLs.

**Cesium and Silicon exhibit bimodal distributions; Cesium bimodal is due to two different IDLs

All UTLs are calculated assuming normal distribution.

TABLE E-5
SUMMARY STATISTICS FOR ROCK CREEK:
SUPPORTING DATA TYPES

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	Mean	Standard Deviation	99/99 UTL	Units
Ammonia	Normal*	9	50	0.172U	4.81	1.614	1.56	NC	mg/kg
Carbonate	X	3	100	25U	25U	X	X	X	mg/kg
Nitrate/Nitrite	Normal*	9	0	0.705	4.79	2.319	1.47	NC	mg/kg
Oil & Grease	Normal*	9	10	27U	160	81.7	40.7	NC	mg/kg
pH	Normal*	6	0	6.39	9.1	7.63	0.93	NC	pH
Specific Conductance	Normal*	6	0	11.2	32.75	22.06	9.43	NC	umhos/cm
Total Organic Carbon	Normal*	6	0	9970	19900	15570	3783	NC	mg/kg

X = Not calculated because 100% of data were non-detects.

Normal* = Assumed to be normal distribution for summary statistics of supporting data

NC = Not calculated

TABLE E-6

SUMMARY STATISTICS FOR ROCK CREEK, GROUP 2 ANALYTES:
FALLOUT RADIONUCLIDES

Analyte	Distribution	Count (n)	% Non-Detect	Min	Max	Mean	Standard Deviation	Tol Fact	99/99 UTL	Units
Americium-241	Lognormal	14	0	0.0095	0.036	0.02	0.007	4.3372	0.05036	pCi/g
Cesium-134	Nonparam	9	0	0.071	0.1	0.084	0.012	5.3889	0.148667	pCi/g
Cesium-137	Lognormal	12	0	0.71	2.5	1.41	0.49	4.633	3.68017	pCi/g
Plutonium-239/240	Lognormal	18	0	0.026	0.1	0.055	0.014	3.9604	0.110446	pCi/g
Strontium-89/90	Normal	9	0	0.095	1	0.618	0.298	5.3889	2.23892	pCi/g

All UTLs are calculated assuming normal distribution.

APPENDIX 4

FAMILY	SCINAME96
ACERACEAE	<i>Acer glabrum</i> Torr.
ACERACEAE	<i>Acer negundo</i> L. var. <i>interius</i> (Britt.) Sarg.
AGAVACEAE	<i>Yucca glauca</i> Nutt.
ALISMATACEAE	<i>Alisma trivale</i> Pursh
ALISMATACEAE	<i>Sagittaria latifolia</i> Willd.
AMARANTHACEAE	<i>Amaranthus albus</i> L.
AMARANTHACEAE	<i>Amaranthus retroflexus</i> L.
ANACARDIACEAE	<i>Rhus aromatica</i> Ait. var. <i>trilobata</i> (Nutt.) A. Gray
ANACARDIACEAE	<i>Toxicodendron rydbergii</i> (Small) Greene
APIACEAE	<i>Berula erecta</i> (Huds.) Cov. var. <i>incisum</i>
APIACEAE	<i>Cicuta maculata</i> L. var. <i>angustifolia</i> Hook.
APIACEAE	<i>Conium maculatum</i> L.
APIACEAE	<i>Daucus carota</i> L.
APIACEAE	<i>Harbouria trachypleura</i> (Gray) C. & R.
APIACEAE	<i>Heracleum sphondylium</i> L. ssp. <i>montanum</i> (Schleich.) Briq.
APIACEAE	<i>Ligusticum porteri</i> C. & R.
APIACEAE	<i>Lomatium orientale</i> Coult. & Rose
APIACEAE	<i>Musineon divaricatum</i> (Pursh.) Nutt. var. <i>hookeri</i> T. & G.
APIACEAE	<i>Osmorhiza chiliensis</i> H. & A.
APIACEAE	<i>Osmorhiza longistylis</i> (Torr.) DC var. <i>longistylis</i>
APOCYNACEAE	<i>Apocynum androsaemifolium</i> L.
APOCYNACEAE	<i>Apocynum cannabinum</i> L.
ASCLEPIADACEAE	<i>Asclepias incarnata</i> L.
ASCLEPIADACEAE	<i>Asclepias pumila</i> (Gray) Vail
ASCLEPIADACEAE	<i>Asclepias speciosa</i> Torr.
ASCLEPIADACEAE	<i>Asclepias stenophylla</i> A. Gray
ASCLEPIADACEAE	<i>Asclepias viridiflora</i> Raf.
ASTERACEAE	<i>Achillea millefolium</i> L. ssp. <i>lanulosa</i> (Nutt.) Piper
ASTERACEAE	<i>Agoseris glauca</i> (Pursh.) Dietr.
ASTERACEAE	<i>Ambrosia artemisiifolia</i> L.
ASTERACEAE	<i>Ambrosia psilostachya</i> DC.
ASTERACEAE	<i>Ambrosia trifida</i> L.
ASTERACEAE	<i>Antennaria microphylla</i> Rydb.
ASTERACEAE	<i>Antennaria parvifolia</i> Nutt.
ASTERACEAE	<i>Anthemis cotula</i> L.
ASTERACEAE	<i>Arctium minus</i> Bernh.
ASTERACEAE	<i>Arnica fulgens</i> Pursh.
ASTERACEAE	<i>Artemisia campestris</i> L. ssp. <i>caudata</i> (Michx.) Hall & Clem.
ASTERACEAE	<i>Artemisia dracunculus</i> L.
ASTERACEAE	<i>Artemisia frigida</i> Willd.
ASTERACEAE	<i>Artemisia ludoviciana</i> Nutt. var. <i>ludoviciana</i>
ASTERACEAE	<i>Aster falcatus</i> Lindl.
ASTERACEAE	<i>Aster fendleri</i> A. Gray
ASTERACEAE	<i>Aster hesperius</i> A. Gray var. <i>hesperius</i>
ASTERACEAE	<i>Aster laevis</i> L. var. <i>geyeri</i> A. Gray
ASTERACEAE	<i>Aster porteri</i> Gray
ASTERACEAE	<i>Bidens cernua</i> L.
ASTERACEAE	<i>Bidens frondosa</i> L.
ASTERACEAE	<i>Carduus nutans</i> L. ssp. <i>macrolepis</i> (Peters.) Kazmi
ASTERACEAE	<i>Centaurea diffusa</i> Lam.

ASTERACEAE Centaurea repens L.
 ASTERACEAE Chrysanthemum leucanthemum L.
 ASTERACEAE Chrysopsis fulcrata Greene
 ASTERACEAE Chrysopsis villosa Pursh.
 ASTERACEAE Chrysothamnus nauseosus (Pall.) Britt. ssp. graveolens (Nutt.) Piper
 ASTERACEAE Chrysothamnus nauseosus (Pall.) Britt. ssp. nauseosus
 ASTERACEAE Cichorium intybus L.
 ASTERACEAE Cirsium arvense (L.) Scop.
 ASTERACEAE Cirsium flodmanni (Rydb.) Arthur
 ASTERACEAE Cirsium ochrocentrum A. Gray
 ASTERACEAE Cirsium undulatum (Nutt.) Spreng.
 ASTERACEAE Cirsium vulgare (Savi) Ten.
 ASTERACEAE Conyza canadensis (L.) Cronq.
 ASTERACEAE Crepis occidentalis Nutt.
 ASTERACEAE Crepis runcinata (James) T. & G.
 ASTERACEAE Dyssodia papposa (Vent) Hitchc.
 ASTERACEAE Erigeron canus A. Gray
 ASTERACEAE Erigeron compositus Pursh var. dicoideus A. Gray
 ASTERACEAE Erigeron divergens T. & G.
 ASTERACEAE Erigeron flagellaris A. Gray
 ASTERACEAE Erigeron pumilus Nutt.
 ASTERACEAE Erigeron speciosa (Lindl.) DC. var. macranthus (Nutt.) Cronq.
 ASTERACEAE Erigeron strigosus Muhl. ex Willd.
 ASTERACEAE Erigeron vetensis Rydb.
 ASTERACEAE Gaillardia aristata Pursh.
 ASTERACEAE Gnaphalium chilense Spreng.
 ASTERACEAE Grindelia squarrosa (Pursh.) Dun.
 ASTERACEAE Gutierrezia sarothrae (Pursh.) Britt. & Rusby
 ASTERACEAE Happlopappus spinulosus (Pursh) DC.
 ASTERACEAE Helianthus annuus L.
 ASTERACEAE Helianthus ciliaris DC.
 ASTERACEAE Helianthus maximiliani Schrad.
 ASTERACEAE Helianthus nuttallii T. & G.
 ASTERACEAE Helianthus petiolaris Nutt.
 ASTERACEAE Helianthus pumilus Nutt.
 ASTERACEAE Helianthus rigidus (Cass.) Desf. ssp. subrhomboides (Rydb.) Heiser
 ASTERACEAE Heliomeris multiflora Nuttall
 ASTERACEAE Hymenopappus filifolius Hook. var. cinereus (Rydb.) I. M. Johnst.
 ASTERACEAE Iva axillaris Pursh.
 ASTERACEAE Iva xanthifolia Nutt.
 ASTERACEAE Kuhnia chlorolepis Woot. & Standl.
 ASTERACEAE Kuhnia eupatorioides L.
 ASTERACEAE Lactuca oblongifolia Nutt.
 ASTERACEAE Lactuca serriola L.
 ASTERACEAE Leucelene ericoides (Torr.) Greene
 ASTERACEAE Liatris punctata Hook.
 ASTERACEAE Machaeranthera bigelovii (Gray) Greene
 ASTERACEAE Machaeranthera canescens (Pursh) A. Gray
 ASTERACEAE Microseris cuspidata (Pursh.) Sch. Bip.
 ASTERACEAE Onopordum acanthium L.
 ASTERACEAE Picradeniopsis oppositifolia (Nutt.) Rydb.

ASTERACEAE	<i>Ratibida columnifera</i> (Nutt.) Woot. & Standl.
ASTERACEAE	<i>Rudbeckia ampla</i> Nelson
ASTERACEAE	<i>Scorzonera laciniata</i> L.
ASTERACEAE	<i>Senecio fendleri</i> Gray
ASTERACEAE	<i>Senecio integerrimus</i> Nutt.
ASTERACEAE	<i>Senecio plattensis</i> Nutt.
ASTERACEAE	<i>Senecio spartioides</i> T. & G.
ASTERACEAE	<i>Senecio tridenticulatus</i> Rydb.
ASTERACEAE	<i>Solidago canadensis</i> L.
ASTERACEAE	<i>Solidago gigantea</i> Ait.
ASTERACEAE	<i>Solidago missouriensis</i> Nutt.
ASTERACEAE	<i>Solidago mollis</i> Bart.
ASTERACEAE	<i>Solidago nana</i> Nutt.
ASTERACEAE	<i>Solidago rigida</i> L.
ASTERACEAE	<i>Sonchus arvensis</i> L. ssp. <i>uglinosus</i> (Bieb.) Nyman
ASTERACEAE	<i>Sonchus asper</i> (L.) Hill
ASTERACEAE	<i>Stephanomeria pauciflora</i> (Torr.) A. Nels.
ASTERACEAE	<i>Taraxacum laevigatum</i> (Willd.) DC.
ASTERACEAE	<i>Taraxacum officinale</i> Weber
ASTERACEAE	<i>Thelesperma megapotanicum</i> (Spreng.) O. Ktze.
ASTERACEAE	<i>Townsendia grandiflora</i> (Nutt.)
ASTERACEAE	<i>Townsendia hookeri</i> Beaman
ASTERACEAE	<i>Tragopogon dubius</i> Scop.
ASTERACEAE	<i>Tragopogon porrifolius</i> L.
ASTERACEAE	<i>Xanthium strumarium</i> L.
BERBERIDACEAE	<i>Berberis repens</i> Lindl.
BETULACEAE	<i>Alnus incana</i> (L.) Moench ssp. <i>tenuifolia</i> (Nuttall) Breitung
BETULACEAE	<i>Betula occidentalis</i> Hook.
BORAGINACEAE	<i>Asperugo procumbens</i> L.
BORAGINACEAE	<i>Cryptantha virgata</i> (Porter) Payson
BORAGINACEAE	<i>Cynoglossum officinale</i> L.
BORAGINACEAE	<i>Hackelia floribunda</i> (Lehm.) I. M. Johnst.
BORAGINACEAE	<i>Lappula redowskii</i> (Hornem.) Greene
BORAGINACEAE	<i>Lithospermum incisum</i> Lehm.
BORAGINACEAE	<i>Lithospermum multiflorum</i> Torr.
BORAGINACEAE	<i>Mertensia lanceolata</i> (Pursh.) A. DC.
BORAGINACEAE	<i>Onosmodium molle</i> Michx. var. <i>occidentale</i> (Mack.) Johnst.
BORAGINACEAE	<i>Plagiobothrys scouleri</i> (H. & A.) I. M. Johnst.
BRASSICACEAE	<i>Alyssum alyssoides</i> (L.) L.
BRASSICACEAE	<i>Alyssum minus</i> (L.) Rothmaler var. <i>micranthus</i> (C. A. Mey.) Dudley
BRASSICACEAE	<i>Arabis fendleri</i> (S. Wats.) Greene var. <i>fendleri</i>
BRASSICACEAE	<i>Arabis glabra</i> (L.) Bernh.
BRASSICACEAE	<i>Arabis hirsuta</i> (L.) Scop. var. <i>pynocarpa</i> (Hopkins) Rollins
BRASSICACEAE	<i>Barbarea vulgaris</i> R. Br.
BRASSICACEAE	<i>Camelina microcarpa</i> Andr. ex DC.
BRASSICACEAE	<i>Capsella bursa-pastoris</i> (L.) Medic.
BRASSICACEAE	<i>Cardaria chalepensis</i> (L.) Hand-Mazz
BRASSICACEAE	<i>Cardaria draba</i> (L.) Desv.
BRASSICACEAE	<i>Chorispora tenella</i> (Pall.) DC.
BRASSICACEAE	<i>Conringia orientalis</i> (L.) Dum.
BRASSICACEAE	<i>Descurainia pinnata</i> (Walt.) Britt.

BRASSICACEAE	<i>Descurainia richardsonii</i> (Sweet) Schultz
BRASSICACEAE	<i>Descurainia sophia</i> (L.) Webb ex Prantl.
BRASSICACEAE	<i>Draba nemorosa</i> L.
BRASSICACEAE	<i>Draba reptans</i> (Lam.) Fern.
BRASSICACEAE	<i>Erysimum capitatum</i> (Nutt.) DC.
BRASSICACEAE	<i>Erysimum repandum</i> L.
BRASSICACEAE	<i>Hesperis matronalis</i> L.
BRASSICACEAE	<i>Lepidium campestre</i> (L.) R. Br.
BRASSICACEAE	<i>Lepidium densiflorum</i> Schrad.
BRASSICACEAE	<i>Lesquerella montana</i> (A. Gray) Wats.
BRASSICACEAE	<i>Nasturtium officinale</i> R. Br.
BRASSICACEAE	<i>Physaria vitulifera</i> Rydb.
BRASSICACEAE	<i>Rorippa palustris</i> (L.) Bess. ssp. <i>hispida</i> (Desv.) Jonsell
BRASSICACEAE	<i>Sisymbrium altissimum</i> L.
BRASSICACEAE	<i>Thlaspi arvense</i> L.
CACTACEAE	<i>Coryphantha missouriensis</i> (Sweet) Britt. & Rose
CACTACEAE	<i>Echinocereus viridiflorus</i> Engelm.
CACTACEAE	<i>Opuntia fragilis</i> (Nutt.) Haw.
CACTACEAE	<i>Opuntia macrorhiza</i> Engelm.
CACTACEAE	<i>Opuntia polyacantha</i> Haw.
CACTACEAE	<i>Pediocactus simpsonii</i> (Engelm.) Britt. & Rose
CALLITRICHACEAE	<i>Callitriche verna</i> L.
CAMPANULACEAE	<i>Campanula rotundifolia</i> L.
CAMPANULACEAE	<i>Lobelia siphilitica</i> L. var. <i>ludoviciana</i> A. DC.
CAMPANULACEAE	<i>Triodanis leptocarpa</i> (Nutt.) Nieuw.
CANNABACEAE	<i>Humulus lupulus</i> L. var. <i>lupuloides</i> E. Small
CAPPERACEAE	<i>Polansia dodecandra</i> (L.) DC. ssp. <i>trachysperma</i> (T. & G.) Iltis
CAPRIFOLIACEAE	<i>Symphoricarpos occidentalis</i> Hook.
CAPRIFOLIACEAE	<i>Symphoricarpos oreophilus</i> Gray
CAPRIFOLIACEAE	<i>Viburnum opulus</i> L. var. <i>americanum</i> Ait
CARYOPHYLLACEAE	<i>Arenaria fendleri</i> A. Gray
CARYOPHYLLACEAE	<i>Cerastium arvense</i> L.
CARYOPHYLLACEAE	<i>Cerastium brachypodum</i> (Engelm. ex A. Gray) Robins.
CARYOPHYLLACEAE	<i>Cerastium vulgatum</i> L.
CARYOPHYLLACEAE	<i>Conosilene conica</i> (L.) Fourreau ssp. <i>conoidea</i> (L.) Love & Kjellqvist
CARYOPHYLLACEAE	<i>Paronychia jamesii</i> T. & G.
CARYOPHYLLACEAE	<i>Saponaria officinalis</i> L.
CARYOPHYLLACEAE	<i>Silene antirrhina</i> L.
CARYOPHYLLACEAE	<i>Silene drummondii</i> Hook.
CARYOPHYLLACEAE	<i>Silene pratensis</i> (Raf.) Godr. & Gren
CARYOPHYLLACEAE	<i>Spergularia rubra</i> (L.) K. Presl.
CARYOPHYLLACEAE	<i>Stellaria longifolia</i> Muhl. ex Willd.
CARYOPHYLLACEAE	<i>Vaccaria pyramidata</i> Medic.
CERATOPHYLLACEAE	<i>Ceratophyllum demersum</i> L.
CHENOPODIACEAE	<i>Atriplex canescens</i> (Pursh.) Nutt.
CHENOPODIACEAE	<i>Chenopodium album</i> L.
CHENOPODIACEAE	<i>Chenopodium atrovirens</i> Nutt.
CHENOPODIACEAE	<i>Chenopodium berlandieri</i> Moq.
CHENOPODIACEAE	<i>Chenopodium botrys</i> L.
CHENOPODIACEAE	<i>Chenopodium denticatum</i> A. Nels.
CHENOPODIACEAE	<i>Chenopodium fremontii</i> S. Wats.

CHENOPODIACEAE	<i>Chenopodium leptophyllum</i> Nutt. ex Moq.
CHENOPODIACEAE	<i>Chenopodium overi</i> Aellen
CHENOPODIACEAE	<i>Kochia scoparia</i> (L.) Schrad.
CHENOPODIACEAE	<i>Salsola iberica</i> Senn. & Pau.
CLUSIACEAE	<i>Hypericum majus</i> (A. Gray) Britt.
CLUSIACEAE	<i>Hypericum perforatum</i> L.
COMMELINACEAE	<i>Tradescantia occidentalis</i> (Britt.) Smyth
CONVOLVULACEAE	<i>Calystegia macouni</i> (Greene) Brummitt
CONVOLVULACEAE	<i>Calystegia sepium</i> (L.) R. Br. ssp. <i>angulata</i> Brummitt
CONVOLVULACEAE	<i>Convolvulus arvensis</i> L.
CONVOLVULACEAE	<i>Evolvulus nuttallianus</i> R. & S.
CRASSULACEAE	<i>Sedum lanceolatum</i> Torr.
CUPRESSACEAE	<i>Juniperus communis</i> L.
CUPRESSACEAE	<i>Juniperus scopulorum</i> Sarg.
CUSCUTACEAE	<i>Cuscuta approximata</i> Bab.
CYPERACEAE	<i>Carex athrostachya</i> Olney
CYPERACEAE	<i>Carex aurea</i> Nutt.
CYPERACEAE	<i>Carex bebbii</i> (Bailey) Fern
CYPERACEAE	<i>Carex brevior</i> (Dew.) Mack. ex Lunell.
CYPERACEAE	<i>Carex douglasii</i> F. Boott.
CYPERACEAE	<i>Carex eleocharis</i> Bailey
CYPERACEAE	<i>Carex emoryi</i> Dew.
CYPERACEAE	<i>Carex filifolia</i> Nutt.
CYPERACEAE	<i>Carex heliophila</i> Mack.
CYPERACEAE	<i>Carex hystericina</i> Muhl. ex Willd.
CYPERACEAE	<i>Carex interior</i> Bailey
CYPERACEAE	<i>Carex lanuginosa</i> Michx.
CYPERACEAE	<i>Carex nebrascensis</i> Dew.
CYPERACEAE	<i>Carex oreocharis</i> Holm.
CYPERACEAE	<i>Carex praegracilis</i> W. Boott.
CYPERACEAE	<i>Carex rostrata</i> Stokes ex Willd.
CYPERACEAE	<i>Carex scoparia</i> Schkuhr. ex Willd.
CYPERACEAE	<i>Carex simulata</i> Mack.
CYPERACEAE	<i>Carex stipata</i> Muhl.
CYPERACEAE	<i>Carex vulpinoidea</i> Michx.
CYPERACEAE	<i>Eleocharis acicularis</i> (L.) R. & S.
CYPERACEAE	<i>Eleocharis compressa</i> Sulliv.
CYPERACEAE	<i>Eleocharis macrostachya</i> Britt.
CYPERACEAE	<i>Eleocharis parvula</i> Link ex Boff. & Fingerbr. var. <i>anachaeta</i> (Torr.) Svens.
CYPERACEAE	<i>Scirpus acutus</i> Muhl.
CYPERACEAE	<i>Scirpus pallidus</i> (Britt.) Fern
CYPERACEAE	<i>Scirpus pungens</i> Vahl
CYPERACEAE	<i>Scirpus validus</i> Vahl.
ELAEAGNACEAE	<i>Elaeagnus angustifolia</i> L.
EQUISETACEAE	<i>Equisetum arvense</i> L.
EQUISETACEAE	<i>Equisetum laevigatum</i> A. Br.
EQUISETACEAE	<i>Equisetum variegatum</i> Schleich.
EUPHORBIACEAE	<i>Euphorbia dentata</i> Michx.
EUPHORBIACEAE	<i>Euphorbia fendleri</i> T. & G.
EUPHORBIACEAE	<i>Euphorbia marginata</i> Pursh.
EUPHORBIACEAE	<i>Euphorbia robusta</i> (Engelm.) Small

EUPHORBIACEAE	<i>Euphorbia serpyllifolia</i> Pers.
EUPHORBIACEAE	<i>Euphorbia spathulata</i> Lam.
EUPHORBIACEAE	<i>Tragia ramosa</i> Nutt.
FABACEAE	<i>Amorpha fruticosa</i> L.
FABACEAE	<i>Amorpha nana</i> Nutt.
FABACEAE	<i>Astragalus adsurgens</i> Pall. var. <i>robustior</i> Hook.
FABACEAE	<i>Astragalus agrestis</i> Dougl. ex G. Don
FABACEAE	<i>Astragalus bisulcatus</i> (Hook.) A. Gray
FABACEAE	<i>Astragalus canadensis</i> L.
FABACEAE	<i>Astragalus crassicaarpus</i> Nutt.
FABACEAE	<i>Astragalus drummondii</i> Dougl. ex Hook.
FABACEAE	<i>Astragalus flexuosus</i> (Hook.) G. Don
FABACEAE	<i>Astragalus lotiflorus</i> Hook.
FABACEAE	<i>Astragalus shortianus</i> Nutt. ex T.&G.
FABACEAE	<i>Astragalus spathulatus</i> Sheld.
FABACEAE	<i>Astragalus tridactylicus</i> Gray
FABACEAE	<i>Coronilla varia</i> L.
FABACEAE	<i>Dalea candida</i> Michx. ex Willd. var. <i>oligophylla</i> (Torr.) Shinnars.
FABACEAE	<i>Dalea purpurea</i> Vent
FABACEAE	<i>Glycyrrhiza lepidota</i> Pursh.
FABACEAE	<i>Lathyrus eucosmus</i> Butters and St. John
FABACEAE	<i>Lotus corniculatus</i> L.
FABACEAE	<i>Lupinus argenteus</i> Pursh ssp. <i>ingratus</i> (Greene) Harmon
FABACEAE	<i>Lupinus argenteus</i> Pursh var. <i>argenteus</i>
FABACEAE	<i>Medicago lupulina</i> L.
FABACEAE	<i>Medicago sativa</i> L. ssp. <i>sativa</i>
FABACEAE	<i>Melilotus alba</i> Medic.
FABACEAE	<i>Melilotus officinalis</i> (L.) Pall.
FABACEAE	<i>Oxytropis lambertii</i> Pursh.
FABACEAE	<i>Psoralea tenuiflora</i> Pursh.
FABACEAE	<i>Robinia pseudo-acacia</i> L.
FABACEAE	<i>Thermopsis rhombifolia</i> var. <i>divaricarpa</i> (Nels.) Isely
FABACEAE	<i>Trifolium hybridum</i> L.
FABACEAE	<i>Trifolium pratense</i> L.
FABACEAE	<i>Trifolium repens</i> L.
FABACEAE	<i>Vicia americana</i> Muhl. ex Willd.
FUMARIACEAE	<i>Fumaria vaillantii</i> Lois
GENTIANACEAE	<i>Gentiana affinis</i> Griseb.
GENTIANACEAE	<i>Swertia radiata</i> (Kell.) O. Ktze.
GERANIACEAE	<i>Erodium cicutarium</i> (L.) L'Her.
GERANIACEAE	<i>Geranium caespitosum</i> James ssp. <i>caespitosum</i>
GROSSULARIACEAE	<i>Ribes aureum</i> Pursh
GROSSULARIACEAE	<i>Ribes cereum</i> Dougl.
GROSSULARIACEAE	<i>Ribes inerme</i> Rydb.
HALORAGACEAE	<i>Myriophyllum exalbescens</i> Fern.
HYDROPHYLLACEAE	<i>Hydrophyllum fendleri</i> (Gray) Heller
HYDROPHYLLACEAE	<i>Phacelia heterophylla</i> Pursh.
IRIDACEAE	<i>Iris missouriensis</i> Nutt.
IRIDACEAE	<i>Sisyrinchium montanum</i> Greene
JUNCACEAE	<i>Juncus articulatus</i> L.
JUNCACEAE	<i>Juncus balticus</i> Willd.

JUNCACEAE	<i>Juncus bufonius</i> L.
JUNCACEAE	<i>Juncus dudleyi</i> Wieg.
JUNCACEAE	<i>Juncus ensifolius</i> Wikst. var. <i>montanus</i> (Englm.) C. L. Hitchc.
JUNCACEAE	<i>Juncus interior</i> Wieg.
JUNCACEAE	<i>Juncus longistylis</i> Torr.
JUNCACEAE	<i>Juncus nodosus</i> L.
JUNCACEAE	<i>Juncus torreyi</i> Cov.
JUNCACEAE	<i>Juncus tracyi</i> Rydb.
LAMIACEAE	<i>Dracocephalum parviflorum</i> Nutt.
LAMIACEAE	<i>Hedeoma hispidum</i> Pursh.
LAMIACEAE	<i>Lycopus americanus</i> Muhl. ex Barton
LAMIACEAE	<i>Lycopus asper</i> Greene
LAMIACEAE	<i>Marrubium vulgare</i> L.
LAMIACEAE	<i>Mentha arvensis</i> L.
LAMIACEAE	<i>Monarda fistulosa</i> L. var. <i>menthifolia</i> (Grah.) Fern.
LAMIACEAE	<i>Monarda pectinata</i> Nutt.
LAMIACEAE	<i>Nepeta cataria</i> L.
LAMIACEAE	<i>Prunella vulgaris</i> L.
LAMIACEAE	<i>Salvia reflexa</i> Hornem.
LAMIACEAE	<i>Scutellaria brittonii</i> Porter
LAMIACEAE	<i>Stachys palustris</i> L. ssp. <i>pilosa</i> (Nutt.) Epling
LEMNACEAE	<i>Lemna minor</i> L.
LILIACEAE	<i>Allium cernuum</i> Roth
LILIACEAE	<i>Allium geyeri</i> S. Wats.
LILIACEAE	<i>Allium textile</i> A. Nels. & Macbr.
LILIACEAE	<i>Asparagus officinalis</i> L.
LILIACEAE	<i>Calochortus gunnisonii</i> S. Wats.
LILIACEAE	<i>Leucocrinum montanum</i> Nutt.
LILIACEAE	<i>Smilacina stellata</i> (L.) Desf.
LILIACEAE	<i>Zigadenus venenosus</i> Wats. var. <i>gramineus</i> (Rydb.) Walsh ex Peck
LINACEAE	<i>Linum perenne</i> L. var. <i>lewisii</i> (Pursh.) Eat. & Wright
LINACEAE	<i>Linum pratense</i> (Nort.) Small
LYTHRACEAE	<i>Ammania robusta</i> Herr & Regel.
LYTHRACEAE	<i>Lythrum alatum</i> Pursh.
MALVACEAE	<i>Malva neglecta</i> Wallr.
MALVACEAE	<i>Sidalcea candida</i> Gray
MALVACEAE	<i>Sidalcea neomexicana</i> Gray
MALVACEAE	<i>Sphaeralcea coccinea</i> (Pursh.) Rydb.
NYCTAGINACEAE	<i>Mirabilis hirsuta</i> (Pursh.) MacM.
NYCTAGINACEAE	<i>Mirabilis linearis</i> (Pursh.) Heimerl
NYCTAGINACEAE	<i>Mirabilis nyctaginea</i> (Michx.) MacM.
ONAGRACEAE	<i>Calylophus serrulatus</i> (Nutt.) Raven
ONAGRACEAE	<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i> (Lehm.) Hock & Raven
ONAGRACEAE	<i>Epilobium paniculatum</i> Nutt.
ONAGRACEAE	<i>Gaura coccinea</i> Pursh.
ONAGRACEAE	<i>Gaura parviflora</i> Dougl.
ONAGRACEAE	<i>Oenothera flava</i> (A. Nels.) Garrett
ONAGRACEAE	<i>Oenothera howardii</i> (A. Nels.) W. L. Wagner
ONAGRACEAE	<i>Oenothera villosa</i> Thunb. ssp. <i>strigosa</i> (Rydb.) Dietrich & Raven
ORCHIDACEAE	<i>Habenaria hyperborea</i> (L.) R. Br.
OROBANCHACEAE	<i>Orobanche fasciculata</i> Nutt.

OXALIDACEAE	<i>Oxalis dillenii</i> Jacq.
PAPAVERACEAE	<i>Argemone polyanthemus</i> (Fedde) G. Ownbey
PINACEAE	<i>Picea pungens</i> Engelm.
PINACEAE	<i>Pinus ponderosa</i> Laws
PINACEAE	<i>Pseudotsuga menziesii</i> (Mirb.) Franco
PLANTAGINACE	<i>Plantago lanceolata</i> L.
PLANTAGINACE	<i>Plantago major</i> L.
PLANTAGINACE	<i>Plantago patagonica</i> Jacq.
POACEAE	<i>Aegilops cylindrica</i> Host
POACEAE	<i>Agropyron caninum</i> (L.) Beauv. ssp. <i>majus</i> (Vasey) C. L. Hitchc.
POACEAE	<i>Agropyron cristatum</i> (L.) Gaertn.
POACEAE	<i>Agropyron dasystachyum</i> (Hook.) Scribn.
POACEAE	<i>Agropyron desertorum</i> (Fisch.) Schult.
POACEAE	<i>Agropyron elongatum</i> (Host) Beauv.
POACEAE	<i>Agropyron griffithsii</i> Scribn. & Smith
POACEAE	<i>Agropyron intermedium</i> (Host) Beauv.
POACEAE	<i>Agropyron repens</i> (L.) Beauv.
POACEAE	<i>Agropyron smithii</i> Rydb.
POACEAE	<i>Agropyron spicatum</i> (Pursh) Scribn. and Sm.
POACEAE	<i>Agrostis scabra</i> Willd.
POACEAE	<i>Agrostis stolonifera</i> L.
POACEAE	<i>Alopecurus geniculatus</i> L.
POACEAE	<i>Andropogon gerardii</i> Vitman
POACEAE	<i>Andropogon scoparius</i> Michx.
POACEAE	<i>Apera interrupta</i> (L.) Beauvois
POACEAE	<i>Aristida basiramea</i> Engelm. ex Vasey var. <i>basiramea</i>
POACEAE	<i>Aristida purpurea</i> Nutt. var. <i>longiseta</i> (Steud.) Vasey
POACEAE	<i>Aristida purpurea</i> Nutt. var. <i>robusta</i> (Merrill) A. Holmgren & N. Holmgr
POACEAE	<i>Avena fatua</i> var. <i>sativa</i> (L.) Hauskn.
POACEAE	<i>Bouteloua curtipendula</i> (Michx.) Torr.
POACEAE	<i>Bouteloua gracilis</i> (H. B. K.) Lag ex Griffiths
POACEAE	<i>Bouteloua hirsuta</i> Lag
POACEAE	<i>Bromus briziformis</i> F. & M.
POACEAE	<i>Bromus inermis</i> Leyss. ssp. <i>inermis</i>
POACEAE	<i>Bromus japonicus</i> Thunb. ex Murr.
POACEAE	<i>Bromus tectorum</i> L.
POACEAE	<i>Buchloe dactyloides</i> (Nutt.) Engelm.
POACEAE	<i>Calamagrostis stricta</i> (Timm.) Koel
POACEAE	<i>Cenchrus longispinus</i> (Hack.) Fern
POACEAE	<i>Ceratochloa marginata</i> (Nees ex Stued.) Jackson
POACEAE	<i>Dactylis glomerata</i> L.
POACEAE	<i>Danthonia spicata</i> (L.) Beauv. ex R. & S.
POACEAE	<i>Dichantherium linearifolium</i> (Scribn.) Gould
POACEAE	<i>Dichantherium oligosanthes</i> (Schultz) Gould var. <i>scribnerianum</i> (Nash) G
POACEAE	<i>Digitaria sanguinalis</i> (L.) Scop.
POACEAE	<i>Echinochloa crusgallii</i> (L.) Beauv.
POACEAE	<i>Elymus canadensis</i> L.
POACEAE	<i>Elymus juncea</i> Fisch.
POACEAE	<i>Eragrostis cilianensis</i> (All.) E. Mosher
POACEAE	<i>Eragrostis curvula</i> (Schrad.) Nees
POACEAE	<i>Eragrostis pilosa</i> (L.) Beauv.

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POACEAE	<i>Festuca octoflora</i> Walt.
POACEAE	<i>Festuca ovina</i> L. var. <i>rydbergii</i> St. Yves
POACEAE	<i>Festuca pratensis</i> Huds.
POACEAE	<i>Glyceria grandis</i> S. Wats. ex A. Gray
POACEAE	<i>Glyceria striata</i> (Lam.) Hitchc.
POACEAE	<i>Hordeum brachyantherum</i> Nevski
POACEAE	<i>Hordeum jubatum</i> L.
POACEAE	<i>Koeleria pyramidata</i> (Lam.) Beauv.
POACEAE	<i>Leersia oryzoides</i> (L.) Sw.
POACEAE	<i>Lolium perenne</i> L. var. <i>aristatum</i> Willd.
POACEAE	<i>Lolium perenne</i> L. var. <i>perenne</i>
POACEAE	<i>Muhlenbergia asperifolia</i> (Nees. & Mey.) Parodi
POACEAE	<i>Muhlenbergia filiformis</i> (Thurb.) Rydb.
POACEAE	<i>Muhlenbergia montana</i> (Nutt.) Hitchc.
POACEAE	<i>Muhlenbergia racemosa</i> (Michx.) B. S. P.
POACEAE	<i>Muhlenbergia wrightii</i> Vasey
POACEAE	<i>Oryzopsis hymenoides</i> (R. & S.) Ricker
POACEAE	<i>Panicum capillare</i> L.
POACEAE	<i>Panicum virgatum</i> L.
POACEAE	<i>Phalaris arundinacea</i> L.
POACEAE	<i>Phleum pratense</i> L.
POACEAE	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.
POACEAE	<i>Poa bulbosa</i> L.
POACEAE	<i>Poa canbyi</i> (Scribn.) Piper
POACEAE	<i>Poa compressa</i> L.
POACEAE	<i>Poa fendleriana</i> (Steud.) Vasey
POACEAE	<i>Poa juncifolia</i> Scribn.
POACEAE	<i>Poa palustris</i> L.
POACEAE	<i>Poa pratensis</i> L.
POACEAE	<i>Polypogon monspeliensis</i> (L.) Desf.
POACEAE	<i>Schedonnardus paniculatus</i> (Nutt.) Trel.
POACEAE	<i>Secale cereale</i> L.
POACEAE	<i>Setaria viridis</i> (L.) Beauv.
POACEAE	<i>Sitanion hystrix</i> (Nutt.) Sm. var. <i>brevifolium</i> (Sm.) Hitchc.
POACEAE	<i>Sorghastrum nutans</i> (L.) Nash
POACEAE	<i>Spartina pectinata</i> Link
POACEAE	<i>Sphenopholis obtusata</i> (Michx.) Scribn.
POACEAE	<i>Sporobolus asper</i> (Michx.) Kunth
POACEAE	<i>Sporobolus cryptandrus</i> (Torr.) A. Gray
POACEAE	<i>Sporobolus heterolepis</i> (A. Gray) A. Gray
POACEAE	<i>Sporobolus neglectus</i> Nash
POACEAE	<i>Stipa comata</i> Trin. & Rupr.
POACEAE	<i>Stipa neomexicana</i> (Thur.) Scribn.
POACEAE	<i>Stipa spartea</i> Trinius
POACEAE	<i>Stipa viridula</i> Trin.
POACEAE	<i>Triticum aestivum</i> L.
POACEAE	X <i>Agrohordeum macounii</i> (Vasey) Lepage
POLEMONIACEAE	<i>Collomia linearis</i> Nutt.
POLEMONIACEAE	<i>Gilia ophthalmoides</i> Brand. ssp. <i>clokeyi</i> (Mason) A. & V. Grant
POLEMONIACEAE	<i>Ipomopsis spicata</i> (Nutt.) V. Grant ssp. <i>spicata</i>
POLEMONIACEAE	<i>Microsteris gracilis</i> (Hook.) Greene

POLEMONIACEAE	Navarretia minima Nutt.
POLYGONACEAE	Eriogonum alatum Torr.
POLYGONACEAE	Eriogonum effusum Nutt.
POLYGONACEAE	Eriogonum jamesii Benth.
POLYGONACEAE	Eriogonum umbellatum Torr.
POLYGONACEAE	Polygonum arenastrum Jord. ex Bor.
POLYGONACEAE	Polygonum convolvulus L.
POLYGONACEAE	Polygonum douglasii Greene
POLYGONACEAE	Polygonum hydropiper L.
POLYGONACEAE	Polygonum lapathifolium L.
POLYGONACEAE	Polygonum pennsylvanicum L.
POLYGONACEAE	Polygonum persicaria L.
POLYGONACEAE	Polygonum ramosissimum Michx.
POLYGONACEAE	Polygonum sawatchense Small
POLYGONACEAE	Rumex acetosella L.
POLYGONACEAE	Rumex crispus L.
POLYGONACEAE	Rumex maritimus L.
POLYGONACEAE	Rumex obtusifolius L.
POLYGONACEAE	Rumex salicifolius Weinm. ssp. triangulivalvis Danser
POLYPODIACEAE	Cystopteris fragilis (L.) Bernh.
PORTULACACEAE	Claytonia rosea Rydb.
PORTULACACEAE	Portulaca oleracea L.
PORTULACACEAE	Talinum parviflorum Nutt.
POTAMOGETONACEAE	Potamogeton foliosus Raf.
POTAMOGETONACEAE	Potamogeton natans L.
PRIMULACEAE	Androsace occidentalis Pursh.
PRIMULACEAE	Dodecatheon pulchellum (Raf.) Merrill
PRIMULACEAE	Lysimachia ciliata L.
RANUNCULACEAE	Anemone cylindrica A. Gray
RANUNCULACEAE	Anemone patens L.
RANUNCULACEAE	Clematis hirsutissima Pursh
RANUNCULACEAE	Clematis ligusticifolia Nutt.
RANUNCULACEAE	Delphinium nuttalianum Pritz. ex Walpers
RANUNCULACEAE	Delphinium virescens Nutt. ssp. penardii (Huth) Ewan
RANUNCULACEAE	Myosurus minimus L.
RANUNCULACEAE	Ranunculus macounii Britt.
RANUNCULACEAE	Ranunculus scleratus L.
RANUNCULACEAE	Ranunculus trichophyllus Chaix
RANUNCULACEAE	Thalictrum dasycarpum Fisch. & Ave-Lall
RHAMNACEAE	Ceanothus fendleri A. Gray
RHAMNACEAE	Ceanothus herbaceus Raf. var. pubescens (T. & G.)
ROSACEAE	Agrimonia striata Michx.
ROSACEAE	Amelanchier alnifolia Nutt.
ROSACEAE	Crataegus erythropoda Ashe
ROSACEAE	Crataegus succulenta Link var. occidentalis (Britton) E. J. Palm.
ROSACEAE	Geum aleppicum Jacq.
ROSACEAE	Geum macrophyllum Willd.
ROSACEAE	Physocarpus monogynus (Torr.) Coult.
ROSACEAE	Physocarpus opulifolius (L.) Raf.
ROSACEAE	Potentilla arguta Pursh
ROSACEAE	Potentilla fissa Nutt.

ROSACEAE	Potentilla gracilis Dougl. ex Hook. var. glabrata (Lehm.) C. L. Hitchc.
ROSACEAE	Potentilla hippiana Lehm.
ROSACEAE	Potentilla norvegica L.
ROSACEAE	Potentilla paradoxa Nutt.
ROSACEAE	Potentilla pensylvanica L.
ROSACEAE	Potentilla pulcherrima x hippiana
ROSACEAE	Potentilla rivalis Nutt.
ROSACEAE	Prunus americana Marsh.
ROSACEAE	Prunus pumila L. var. besseyi (Bailey) Gl.
ROSACEAE	Prunus virginiana L. var. melanocarpa (A. Nels.) Sarg.
ROSACEAE	Pyrus malus L.
ROSACEAE	Rosa acicularis Lindl.
ROSACEAE	Rosa arkansana Porter
ROSACEAE	Rosa woodsii Lindl.
ROSACEAE	Rubus deliciosus Torr.
ROSACEAE	Rubus idaeus L. ssp. sachalinensis (Levl.) Focke var. sachalinensis
ROSACEAE	Sanguisorba minor Scop.
ROSACEAE	Sorbus scopulina Greene
RUBIACEAE	Galium aparine L.
RUBIACEAE	Galium septentrionale Roemer & Schultes
SALICACEAE	Populus alba L.
SALICACEAE	Populus angustifolia James
SALICACEAE	Populus deltoides Marsh. ssp. monilifera (Ait.) Eckenw.
SALICACEAE	Populus x acuminata Rydb.
SALICACEAE	Salix amygdaloides Anderss.
SALICACEAE	Salix exigua Nutt. ssp. exigua
SALICACEAE	Salix exigua Nutt. ssp. interior (Rowlee) Cronq.
SALICACEAE	Salix fragilis L.
SALICACEAE	Salix irrorata Andersson
SALICACEAE	Salix lutea Nutt.
SANTALACEAE	Comandra umbellata (L.) Nutt.
SAXIFRAGACEAE	Heuchera parvifolia Nutt. ex T. & G.
SAXIFRAGACEAE	Saxifraga rhomoidea Greene
SCROPHULARIACEAE	Castilleja integra A. Gray
SCROPHULARIACEAE	Castilleja sessiliflora Pursh.
SCROPHULARIACEAE	Collinsia parviflora Dougl. ex Lindl.
SCROPHULARIACEAE	Gratiola neglecta Torr.
SCROPHULARIACEAE	Linaria dalmatica (L.) Mill.
SCROPHULARIACEAE	Linaria vulgaris Hill
SCROPHULARIACEAE	Mimulus floribundus Dougl. ex Lindl.
SCROPHULARIACEAE	Mimulus glabratus H. B. K. var. fremontii (Benth.) A. L. Grant
SCROPHULARIACEAE	Penstemon albidus Nutt.
SCROPHULARIACEAE	Penstemon secundiflorus Benth.
SCROPHULARIACEAE	Penstemon strictus Benth. in De Candolle
SCROPHULARIACEAE	Penstemon virens Penn.
SCROPHULARIACEAE	Penstemon virgatus Gray ssp. asa-grayi Crosswhite
SCROPHULARIACEAE	Scrophularia lanceolata Pursh.
SCROPHULARIACEAE	Verbascum blattaria L.
SCROPHULARIACEAE	Verbascum thapsus L.
SCROPHULARIACEAE	Veronica americana (Raf.) Schwein. ex Benth.
SCROPHULARIACEAE	Veronica anagallis-aquatica L.

SCROPHULARIACEAE	<i>Veronica catentata</i> Penn.
SCROPHULARIACEAE	<i>Veronica peregrina</i> L. var. <i>xalapensis</i> (H. B. K.) St. John & Warren
SELAGINELLACEAE	<i>Selaginella densa</i> Rydb.
SMILACACEAE	<i>Smilax herbacea</i> L. var. <i>lasioneura</i> (Small) Rydb..
SOLANACEAE	<i>Physalis heterophylla</i> Nees
SOLANACEAE	<i>Physalis virginiana</i> P. Mill.
SOLANACEAE	<i>Quincula lobata</i> (Torr.) Raf.
SOLANACEAE	<i>Solanum rostratum</i> Dun.
SOLANACEAE	<i>Solanum triflorum</i> Nutt.
TAMARICACEAE	<i>Tamarix ramosissima</i> Ledeb.
TYPHACEAE	<i>Typha angustifolia</i> L.
TYPHACEAE	<i>Typha latifolia</i> L.
ULMACEAE	<i>Ulmus pumila</i> L.
URTICACEAE	<i>Parietaria pensylvanica</i> Muhl. ex Willd.
URTICACEAE	<i>Urtica dioica</i> L. ssp. <i>gracilis</i> (Ait.) Seland.
VERBENACEAE	<i>Lippia cuneifolia</i> (Torr.) Steud.
VERBENACEAE	<i>Verbena bracteata</i> Lag. & Rodr.
VERBENACEAE	<i>Verbena hastata</i> L.
VIOLACEAE	<i>Hybanthus verticillatus</i> (Ort.) Baill.
VIOLACEAE	<i>Viola nuttallii</i> Pursh.
VIOLACEAE	<i>Viola rydbergii</i> Greene
VIOLACEAE	<i>Viola scopulorum</i> (Gray) Greene
VIOLACEAE	<i>Viola sororia</i> Willd.
VITACEAE	<i>Vitis riparia</i> Michx.
ZYGOPHYLLACEAE	<i>Tribulus terrestris</i> L.

SPECIES	SPECCODE	CASCL
Mountain Maple	ACGL1	T
Box-elder	ACNE1	T
Yucca	YUGL1	T
American Water Plantain	ALTR1	T
Common Arrowhead	SALA1	T
Tumbleweed	AMAL2	T
Rough Pigweed	AMRE1	T
Fragrant Sumac	RHAR1	T
Poison Ivy	TORY1	T
Water Parsnip	BEER1	T
Water Hemlock	CIMA1	T
Poison Hemlock	COMA1	T
Wild Carrot	DACA2	T
Whiskbroom Parsley	HATR1	T
Cow Parsnip	HESP1	T
Porter's Lovage	LIPO1	T
Wild Parsley	LOOR1	T
Musineon	MUDI1	T
Sweet Cicely	OSCH1	T
Anise Root	OSLO1	T
Spreading Dogbane	APAN1	T
Hemp Dogbane	APCA1	T
Swamp Milkweed	ASIN1	T
Plains Milkweed	ASPU1	T
Showy Milkweed	ASSP1	T
Narrow-leaved Milkweed	ASST1	T
Green Milkweed	ASVI1	T
Yarrow	ACMI1	T
False Dandelion	AGGL1	T
Common Ragweed	AMAR1	T
Western Ragweed	AMPS1	T
Giant Ragweed	AMTR1	T
Pink Pussytoes	ANMI1	T
Pussytoes	ANPA1	T
Dog Fennel	ANCO1	T
Burdock	ARMI1	T
Arnica	ARFU1	T
Western Sagewort	ARCA1	T
Silky Wormwood	ARDR1	T
Silver Sage	ARFR1	T
White Sage	ARLU1	T
Aster	ASFA1	T
Fendler's Aster	ASFE1	T
Panicled Aster	ASHE1	T
Smooth Blue Aster	ASLA1	T
Aster	ASPO1	T
Nodding Beggarticks	BICE1	T
Beggar-ticks	BIFR1	T
Musk Thistle	CANU1	T
Diffuse Knapweed	CEDI1	T

Russian Knapweed	CERE1	T
Ox-eye Daisy	CHLE1	T
Golden Aster	CHFU1	T
Golden Aster	CHV11	T
Greenplume Rabbitbrush	CHNA1	T
Rubber Rabbitbrush	CHNA2	T
Common Chicory	CIIN1	T
Canada Thistle	CIAR1	T
Flodman's Thistle	CIFL1	T
Yellow Spine Thistle	CIOC1	T
Wavyleaf Thistle	CIUN1	T
Bull Thistle	CIVU1	T
Horseweed	COCA1	T
Hawksbeard	CROC1	T
Hawksbeard	CRRU1	T
Fetid Marigold	DYPA1	T
Fleabane	ERCA1	T
	ERCO1	T
Fleabane	ERDI1	T
Fleabane	ERFL1	T
Fleabane	ERPU1	T
Oregon Fleabane	ERSP1	T
Daisy Fleabane	ERST1	T
LaVeta Fleabane	ERVE1	T
Blanket Flower	GAAR1	T
Cotton-batting	GNCH1	T
Curly-top Gumweed	GRSQ1	T
Snakeweed	GUSA1	T
Cutleaf Ironplant	HASP1	T
Common Sunflower	HEAN1	T
Texas Blue Weed	HEC11	T
Maximilian Sunflower	HEMA1	T
Nuttall's Sunflower	HENU1	T
Plains Sunflower	HEPE1	T
Sunflower	HEPU1	T
Stiff Sunflower	HERI1	T
Showy Goldeneye	HEMU1	T
Hymenopappus	HYFI1	T
Poverty Weed	IVAX1	T
Marsh Elder	IVXA1	T
False Boneset	KUCH1	T
False Boneset	KUEU1	T
Blue Lettuce	LAOB1	T
Prickly Lettuce	LASE1	T
White Aster	LEER1	T
Blazing Star	LIPU1	T
Bigelovi's Tansy Aster	MABI1	T
Hoary Aster	MACA1	T
False Dandelion	MICU1	T
Scotch Thistle	ONAC1	T
Picradeniopsis	PIOP1	T

Prairie Coneflower	RACO1	T
Goldenglow	RUAM1	T
False Salsify	SCLA1	T
Groundsel	SEFE1	T
Groundsel	SEIN1	T
Prairie Ragwort	SEPL1	T
Groundsel	SESP1	T
Groundsel	SETR1	T
Canada Goldenrod	SOCA1	T
Late Goldenrod	SOG11	T
Prairie Goldenrod	SOM11	T
Soft Goldenrod	SOMO1	T
Low Goldenrod	SONA1	T
Rigid Goldenrod	SORI1	T
Field Sow Thistle	SOAR2	T
Prickly Sow Thistle	SOAS1	T
Wire Lettuce	STPA1	T
Red Seeded Dandelion	TALA1	T
Dandelion	TAOF1	T
Greenthread	THME1	T
Easter Daisy	TOGR1	T
Easter Daisy	TOHO1	T
Goat's Beard	TRDU1	T
Salsify	TRPO1	T
Cocklebur	XAST1	T
Oregon Grape	BERE1	T
Alder	ALIN1	T
Water Birch	BEOC1	T
Madwort	ASPR1	T
Miners Candle	CRV11	T
Hound's Tongue	CYOF1	T
Large-flowered Stickseed	HAFL1	T
Stickseed	LARE1	T
Puccoon	LIIN1	T
	LIMU1	T
Bluebells	MELA1	T
False Gromwell	ONMO1	T
Popcorn Flower	PLSC1	T
Pale Alyssum	ALAL1	T
Alyssum	ALMI1	T
Rock Cress	ARFE3	T
Tower Mustard	ARGL1	T
Rock Cress	ARHI1	T
Yellowrocket Wintercress	BAVU1	T
Small-seeded False Flax	CAMI1	T
Shepherd's Purse	CABU1	T
Lens-padded Hoary Cress	CACH1	T
Hoary Cress	CADR1	T
Blue Mustard	CHTE1	T
Hare's-ear Mustard	COOR1	T
Tansy Mustard	DEPI1	T

Tansy Mustard	DERI1	T
Flixweed	DESO1	T
Yellow Whitlowort	DRNE1	T
White Whitlowort	DRRE1	T
Western Wallflower	ERCA2	T
Bushy Wallflower	ERRE1	T
Dame's Rocket	HEMA2	T
Field Peppergrass	LECA1	T
Peppergrass	LEDE1	T
Bladderpod	LEMO1	T
Watercress	NAOF1	T
Double Bladder-pod	PHVI1	T
Bog Yellow Cress	ROPA1	T
Tumbling Mustard	SIAL1	T
Field Penny Cress	THAR1	T
Nipple Cactus	COMI1	T
Hedgehog Cactus	ECVI1	T
Little Prickly Pear	OPFR1	T
Twistspine Prickly Pear	OPMA1	T
Plains Prickly Pear	OPPO1	T
Nipple Cactus	PESI1	T
Water Starwort	CAVE1	T
Harebell	CARO1	T
Great Lobelia	LOSI1	T
Venus' Looking Glass	TRLE1	T
Common Hops	HULU1	T
Clammy-weed	PODO2	T
Western Snowberry	SYOC1	T
Snowberry	SYOR1	T
Highbush Cranberry	VIOP1	T
Fendler's Sandwort	ARFE2	T
Prairie Chickweed	CEAR1	T
Short-stalked Chickweed	CEBR1	T
Common Mouse-Ear	CEVU1	T
Community Campion	COCO1	T
James' Nailwort	PAJA1	T
Bouncing Bet	SAOF1	T
Sleepy Catchfly	SIAN1	T
Campion	SIDR1	T
White Campion	SIPR1	T
Sand Spurry	SPRU1	T
Long-leaved Stitchwort	STLO1	T
Cow Cockle	VAPY1	T
Coontail	CEDE1	T
Four-winged Saltbush	ATCA1	T
Lamb's Quarters	CHAL1	T
Dark Goosefoot	CHAT1	T
Pitseed Goosefoot	CHBE1	T
Jerusalem Oak	CHBO1	T
Desert goosefoot	CHDE1	T
Fremont Goosefoot	CHFR1	T

Goosefoot	CHLE2	T
Overi's Goosefoot	CHOV1	T
Kochia	KOSC1	T
Russian-Thistle	SAIB1	T
Greater St. John's-wort	HYMA1	T
Common St. John's-wort	HYPE1	T
Spiderwort	TROC1	T
Hedge Bindweed	CAMA1	T
Hedge Bindweed	CASE1	T
Field Bindweed	COAR1	T
Evolvulus	EVNU1	T
Stonecrop	SELA1	T
Common Juniper	JUCO1	T
Rocky Mountain Juniper	JUSC1	T
Dodder	CUAP1	T
Sedge	CAAT1	T
Sedge	CAAU1	T
Sedge	CABE1	T
Sedge	CABR1	T
Sedge	CADO1	T
Sedge	CAEL1	T
Sedge	CAEM1	T
Sedge	CAFI1	T
Sedge	CAHE1	T
Sedge	CAHY1	T
Sedge	CAIN1	T
Sedge	CALA1	T
Sedge	CANE1	T
Sedge	CAOR1	T
Sedge	CAPR1	T
Sedge	CARO2	T
Sedge	CASC1	T
Sedge	CASI1	T
Sedge	CAST1	T
Fox Sedge	CAVU1	T
Spikerush	ELAC1	T
Spikerush	ELCO1	T
Spikerush	ELMA1	T
Spikerush	ELPA1	T
Bulrush	SCAC1	T
Bulrush	SCPA1	T
Pungent Bulrush	SCPU1	T
Bulrush	SCVA1	T
Russian Olive	ELAN1	T
Field Horsetail	EQAR1	T
Smooth Horsetail	EQLA1	T
Variiegated Scouring Rush	EQVA1	T
Toothed Spurge	EUDE1	T
Fendler's Euphorbia	EUFE1	T
Snow-on-the-Mountain	EUMA1	T
Spurge	EURO1	T

Thyme-leaved Spurge	EUSE1	T
Spurge	EUSP1	T
Noseburn	TRRA1	T
False Indigo	AMFR1	T
Dwarf Wild Indigo	AMNA1	T
Standing Milkvetch	ASAD1	T
Field Milkvetch	ASAG1	T
Two-grooved Vetch	ASBI1	T
Canada Milk-vetch	ASCA1	T
Ground-plum	ASCR1	T
Drummond Milkvetch	ASDR1	T
Pliant Milkvetch	ASFL1	T
Lotus Milk-Vetch	ASLO1	T
Short's Milkvetch	ASSH1	T
Draba Milk-Vetch	ASSP2	T
Foothill Milkvetch	ASTR1	T
Crown Vetch	COVA1	T
White Prairie Clover	DACA1	T
Purple Prairie Clover	DAPU1	T
Wild Licorice	GLLE1	T
Purple Peavine	LAEU1	T
Birdfoot Trefoil	LOCO1	T
	LUAR2	T
Silvery Lupine	LUAR1	T
Black Medick	MELU1	T
Alfalfa	MESA1	T
White Sweetclover	MEAL1	T
Yellow Sweetclover	MEOF1	T
Purple Locoweed	OXLA1	T
Wild Alfala	PSTE1	T
Black Locust	ROPS1	T
Golden Banner	THRH1	T
Alsike Clover	TRHY1	T
Red Clover	TRPR1	T
White Clover	TRRE1	T
American Vetch	VIAM1	T
Fumitory	FUVA1	T
Northern Gentian	GEAF1	T
Green Gentian	SWRA1	T
Filaria	ERCI1	T
Common Wild Geranium	GECA1	T
Golden Currant	RIAU1	T
Western Red Currant	RICE1	T
Common Gooseberry	RIIN1	T
American Milfoil	MYEX1	T
Waterleaf	HYFE1	T
Scorpionweed	PHHE1	T
Western Blue Flag	IRMI1	T
Blue-eyed Grass	SIMO1	T
Articulate Rush	JUAR1	T
Baltic Rush	JUBA1	T

Toad Rush	JUBU1	T
Dudley Rush	JUDU1	T
Rush	JUEN1	T
Inland Rush	JUIN1	T
Rush	JULO1	T
Knotted Rush	JUNO1	T
Torrey's Rush	JUTO1	T
Tracy Rush	JUTR1	T
Dragonhead	DRPA1	T
Rough False Pennyroyal	HEHI1	T
American Bugleweed	LYAM1	T
Rough Bugleweed	LYAS1	T
Common Horehound	MAVU1	T
Field Mint	MEAR1	T
Wild Bergamot	MOFI1	T
Spotted Bee-Balm	MOPE1	T
Catnip	NECA1	T
Selfheal	PRVU1	T
Lance-leaved Sage	SARE1	T
Britton's Skullcap	SCBR1	T
Hedge Nettle	STPA2	T
Duckweed	LEMI1	T
Wild Onion	ALCE1	T
Geyer's Onion	ALGE1	T
Wild White Onion	ALTE1	T
Asparagus	ASOF1	T
Sego Lily	CAGU1	T
Mountain Lily	LEMO2	T
Spikenard	SMST1	T
Death Camass	ZIVE1	T
Blue Flax	LIPE1	T
Norton's Flax	LIPR1	T
Robust Toothcup	AMRO1	T
Winged Loosestrife	LYAL1	T
Common Mallow	MANE1	T
White Checkermallow	SICA1	T
New Mexico Checkmallow	SINE1	T
Red False Mallow	SPCO1	T
Hairy Four-O'Clock	MIHI1	T
Narrowleaf Four O'Clock	MILI1	T
Wild Four-O'Clock	MINY1	T
Plains Yellow Primrose	CASE2	T
Willow Herb	EPCI1	T
Willow Herb	EPPA1	T
Scarlet Gaura	GACO1	T
Velvety Gaura	GAPA1	T
Evening Primrose	OEFL1	T
Yellow Stemless Evening Pr	OEHO1	T
Common Evening Primrose	OEVI1	T
Northern Green Orchid	HAHY1	T
Broomrape	ORFA1	T

Gray-Green Wood Sorrel	OXDI1	T
Prickly Poppy	ARPO1	T
Blue Spruce	PIPU1	T
Ponderosa Pine	PIPO1	T
Douglas-Fir	PSME1	T
English Plantain	PLLA1	T
Common Plantain	PLMA1	T
Patagonian Plantain	PLPA1	T
Jointed Goatgrass	AECY1	T
Slender Wheatgrass	AGCA1	T
Crested Wheatgrass	AGCR1	T
	AGDA1	T
Crested Wheatgrass	AGDE1	T
Tall Wheatgrass	AGEL1	T
	AGGR1	T
Intermediate Wheatgrass	AGIN1	T
Quackgrass	AGRE1	T
Western Wheatgrass	AGSM1	T
Bluebunch Wheatgrass	AGSP1	T
Ticklegrass	AGSC1	T
Redtop	AGST1	T
Marsh Foxtail	ALGE2	T
Big Bluestem	ANGE1	T
Little Bluestem	ANSC1	T
Italian Windgrass	APIN1	T
Forktip Threeawn	ARBA1	T
Fendler Threeawn	ARFE1	T
Red Threeawn	ARLO1	T
Cultivated Oats	AVFA1	T
Side-oats Grama	BOCU1	T
Blue Grama	BOGR1	T
Hairy Grama	BOHI1	T
Rattlesnake Grass	BRBR1	T
Smooth Brome	BRIN1	T
Japanese Brome	BRJA1	T
Downy Brome	BRTE1	T
Buffalo-grass	BUDA1	T
Northern Reedgrass	CAST2	T
Field Sandbur	CELO1	T
Rescuegrass	CEMA1	T
Orchardgrass	DAGL1	T
Poverty Oatgrass	DASP1	T
Slimleaf Dichanthelium	DILI1	T
Scribner Dichanthelium	DIOL1	T
Hairy Crabgrass	DISA1	T
Barnyard Grass	ECCR1	T
Canada Wild Rye	ELCA1	T
Russian Wild Rye	ELJU1	T
Stinkgrass	ERCI2	T
Weeping Lovegrass	ERCU1	T
India Lovegrass	ERPI1	T

Six-weeks Fescue	FEOC1	T
Sheep's Fescue	FEOV1	T
Meadow Fescue	FEPR1	T
Tall Mannagrass	GLGR1	T
Fowl Mannagrass	GLST1	T
Meadow Barley	HOBR1	T
Foxtail Barley	HOJU1	T
Junegrass	KOPY1	T
Rice Cutgrass	LEOR1	T
Italian Ryegrass	LOPE1	T
Perennial Ryegrass	LOPE2	T
Scratchgrass	MUAS1	T
Muhly	MUF11	T
Mountain Muhly	MUMO1	T
Marsh Muhly	MURA1	T
Spike Muhly	MUWR1	T
Indian Ricegrass	ORHY1	T
Witchgrass	PACA1	T
Switchgrass	PAV11	T
Reed Canarygrass	PHAR1	T
Timothy	PHPR1	T
Common Reed	PHAU1	T
Bulbous Bluegrass	POBU1	T
Canby's Bluegrass	POCA1	T
Canada Bluegrass	POCO1	T
Muttongrass	POFE1	T
Alkali Bluegrass	POJU1	T
Fowl Bluegrass	POPA1	T
Kentucky Bluegrass	POPR1	T
Rabbitfoot Grass	POMO1	T
Tumblegrass	SCPA2	T
Rye	SECE1	T
Green Foxtail	SEV11	T
Squirreltail	SIHY1	T
Indian-grass	SONU1	T
Prairie Cordgrass	SPPE1	T
Prairie Wedgegrass	SPOB1	T
Rough Dropseed	SPAS1	T
Sand Dropseed	SPCR1	T
Prairie Dropseed	SPHE1	T
Poverty Grass	SPNE1	T
Needle-and-thread	STCO1	T
New Mexico Feather Grass	STNE1	T
Porcupine-grass	STSP1	T
Green Needlegrass	STV11	T
Wheat	TRAE1	T
	AGMA1	T
Collomia	COL11	T
Gilia	GIOP1	T
Spike Gilia	IPSP1	T
	MIGR1	T

Navarretia	NAMI1	T
Winged Eriogonum	ERAL1	T
Spreading Wild Buckwheat	EREF1	T
James' Wild Buckwheat	ERJA1	T
Sulphur Flower	ERUM1	T
Knotweed	POAR1	T
Wild Buckwheat	POCO2	T
Knotweed	PODO1	T
Water Pepper	POHY1	T
Pale Smartweed	POLA1	T
Pennsylvania Smartweed	POPE1	T
Lady's Thumb	POPE2	T
Knotweed	PORA1	T
Knotweed	POSA1	T
Sheep Sorrel	RUAC1	T
Curly Dock	RUCR1	T
Golden Dock	RUMA1	T
Bitter Dock	RUOB1	T
Willow Dock	RUSA1	T
Fragile Fern	CYFR1	T
Spring Beauty	CLRO1	T
Common Purslane	POOL1	T
Prairie Fameflower	TAPA1	T
Leafy Pondweed	POFO1	T
Floatingleaf Pondweed	PONA1	T
Western Rock Jasmine	ANOC1	T
Shooting Star	DOPU1	T
Fringed Loostrife	LYCI1	T
Candle Anemone	ANCY1	T
Pasque-flower	ANPA2	T
Hairy Clematis	CLHI1	T
Western Clematis	CLLI1	T
Blue Larkspur	DENU1	T
Prairie Larkspur	DEVI1	T
Mousetail	MYMI1	T
Macoun's Buttercup	RAMA1	T
Cursed Crowfoot	RASC1	T
Hairy Leaf Buttercup	RATR1	T
Purple Meadow Rue	THDA1	T
Buckbrush	CEFE1	T
New Jersey Tea	CEHE1	T
Striate Agrimony	AGST2	T
Saskatoon Service-berry	AMAL1	T
Hawthorne	CRER1	T
Hawthorn	CRSU1	T
Yellow Avens	GEAL1	T
Large-leaved Avens	GEMA1	T
Mountain Ninebark	PHMO1	T
Ninebark	PHOP1	T
Tall Cinquefoil	POAR2	T
Cinquefoil	POFI1	T

Cinquefoil	POGR1	T
Wooly Cinquefoil	POHI1	T
Norwegian Cinquefoil	PONO1	T
Bushy Cinquefoil	POPA2	T
Cinquefoil	POPE4	T
Hybrid Cinquefoil	POPU1	T
Cinquefoil	PORI1	T
Wild Plum	PRAM1	T
Sand Cherry	PRPU1	T
Chokecherry	PRVI1	T
Apple	PYMA1	T
Prickly Wild Rose	ROAC1	T
Prairie Wild Rose	ROAR1	T
Western Wild Rose	ROWO1	T
Boulder Raspberry	RUDE1	T
Raspberry	RUID1	T
Burnet	SAMI1	T
Mountain Ash	SOSC1	T
Catchweed Bedstraw	GAAP1	T
Northern Bedstraw	GASE1	T
Silver Poplar	POAL1	T
Narrow-leaved Cottonwood	POAN3	T
Plains Cottonwood	PODE1	T
Lanceleaf Cottonwood	POAC1	T
Peach-leaf Willow	SAAM1	T
Coyote Willow	SAEX2	T
Sandbar Willow	SAEX1	T
Crack Willow	SAFR1	T
	SAIR1	T
Yellow Willow	SALU1	T
Bastard Toadflax	COUM1	T
Alumroot	HEPA1	T
Diamondleaf Saxifrage	SARH1	T
Orange Paintbrush	CAIN2	T
Downy Paintbrush	CASE3	T
Blue Lips	COPA1	T
Hedge Hyssop	GRNE1	T
Toadflax	LIDA1	T
Butter-and-eggs	LIVU1	T
Monkey Flower	MIFL1	T
Roundleaf Monkey-flower	MIGL1	T
White Beardtongue	PEAL1	T
Penstemon	PESE1	T
Rocky Mountain Penstemon	PEST1	T
Slender Penstemon	PEVI1	T
Penstemon	PEVI2	T
Figwort	SCLA2	T
Moth Mullein	VEBL1	T
Common Mullein	VETH1	T
Brooklime Speedwell	VEAM1	T
Water Speedwell	VEAN1	T

Catenate Ironweed	VECA1	T
Purslane Speedwell	VEPE1	T
Spikemoss	SEDE1	T
Carion Flower	SMHE1	T
Clammy Ground cherry	PHHE2	T
Virginia Ground Cherry	PHVI2	T
Purple Ground Cherry	QULO1	T
Buffalo Bur	SORO1	T
Cut-leaved Nightshade	SOTR1	T
Salt Cedar	TARA1	T
Narrow-leaved Cattail	TYAN1	T
Common Cattail	TYLA1	T
Siberian Elm	ULPU1	T
Pennsylvania Pellitory	PAPE1	T
Stinging Nettle	URDI1	T
Fog-fruit	LICU1	T
Prostrate Vervain	VEBR1	T
Blue Vervain	VEHA1	T
Nodding Green Violet	HYVE1	T
Yellow Prairie Violet	VINU1	T
Rydberg's Violet	VIRY1	T
Colorado Violet	VISC1	T
Northern Bog Violet	VISO1	T
River-bank Grape	VIRI1	T
Puncture Vine	TRTE1	T

APPENDIX 5

Rock Creek Reserve Wildlife Species List

Taxonomic Group	Common Name		
Fish	Fathead Minnow	Fish	
	Largemouth Bass	Fish	
	Stoneroller	Fish	
Amphibian	Boreal Chorus Frog	Herptile	Amphibian
	Northern Leopard Frog	Herptile	Amphibian
	Tiger salamander	Herptile	Amphibian
Reptile	Bullsnake	Herptile	Reptile
	Prairie rattlesnake	Herptile	Reptile
	Western Painted Turtle	Herptile	Reptile
Passerine Bird	American Crow	Bird	Passerine
	American Goldfinch	Bird	Passerine
	American Robin	Bird	Passerine
	American Tree Sparrow	Bird	Passerine
	Barn Swallow	Bird	Passerine
	Black-billed Magpie	Bird	Passerine
	Black-capped Chickadee	Bird	Passerine
	Black-headed Grosbeak	Bird	Passerine
	Black-throated Gray Warbler	Bird	Passerine
	Blue Grosbeak	Bird	Passerine
	Blue Jay	Bird	Passerine
	Blue-gray Gnatcatcher	Bird	Passerine
	Bohemian Waxwing	Bird	Passerine
	Brewer's Blackbird	Bird	Passerine
	Brewer's Sparrow	Bird	Passerine
	Broad-tailed Hummingbird	Bird	Passerine
	Brown thrasher	Bird	Passerine
	Brown-headed Cowbird	Bird	Passerine
	Chestnut-collared longspur	Bird	Passerine
	Chestnut-sided warbler	Bird	Passerine
	Chipping Sparrow	Bird	Passerine
	Clay-colored Sparrow	Bird	Passerine
	Cliff Swallow	Bird	Passerine
	Common Grackle	Bird	Passerine
	Common Nighthawk	Bird	Passerine
	Common Poorwill	Bird	Passerine
	Common Raven	Bird	Passerine
	Common Yellowthroat	Bird	Passerine
	Dark-eyed Junco	Bird	Passerine
	Downy Woodpecker	Bird	Passerine
	Eastern Kingbird	Bird	Passerine
	Eastern Phoebe	Bird	Passerine
	European Starling	Bird	Passerine
Fox sparrow	Bird	Passerine	
Golden-crowned Kinglet	Bird	Passerine	
Grasshopper Sparrow	Bird	Passerine	
Gray Catbird	Bird	Passerine	
Green-tailed Towhee	Bird	Passerine	

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Rock Creek Reserve Wildlife Species List

Taxonomic Group	Common Name		
	Hairy Woodpecker	Bird	Passerine
	Horned Lark	Bird	Passerine
	House Finch	Bird	Passerine
	House Sparrow	Bird	Passerine
	House Wren	Bird	Passerine
	Lapland Longspur	Bird	Passerine
	Lark Bunting	Bird	Passerine
	Lark Sparrow	Bird	Passerine
	Lazuli Bunting	Bird	Passerine
	Lesser Goldfinch	Bird	Passerine
	Loggerhead Shrike	Bird	Passerine
	MacGillivray's Warbler	Bird	Passerine
	Marsh Wren	Bird	Passerine
	Mountain Bluebird	Bird	Passerine
	Mountain chickadee	Bird	Passerine
	Mourning Dove	Bird	Passerine
	Northern Flicker	Bird	Passerine
	Northern mockingbird	Bird	Passerine
	Northern Oriole	Bird	Passerine
	Northern Shrike	Bird	Passerine
	Orange-crowned warbler	Bird	Passerine
	Pine Siskin	Bird	Passerine
	Red-breasted Nuthatch	Bird	Passerine
	Red-winged Blackbird	Bird	Passerine
	Rock Dove	Bird	Passerine
	Rock Wren	Bird	Passerine
	Ruby-crowned Kinglet	Bird	Passerine
	Rufous Hummingbird	Bird	Passerine
	Rufous-sided Towhee	Bird	Passerine
	Sage Thrasher	Bird	Passerine
	Savannah Sparrow	Bird	Passerine
	Say's Phoebe	Bird	Passerine
	Snow bunting	Bird	Passerine
	Solitary Vireo	Bird	Passerine
	Song Sparrow	Bird	Passerine
	Swainson's Thrush	Bird	Passerine
	Tree Swallow	Bird	Passerine
	Vesper Sparrow	Bird	Passerine
	Violet-green Swallow	Bird	Passerine
	Virginia's Warbler	Bird	Passerine
	Western Kingbird	Bird	Passerine
	Western Meadowlark	Bird	Passerine
	Western Tanager	Bird	Passerine
	Western Wood-Pewee	Bird	Passerine
	White-breasted Nuthatch	Bird	Passerine
Passerine Bird	White-crowned Sparrow	Bird	Passerine
	Willow Flycatcher	Bird	Passerine
	Wilson's Warbler	Bird	Passerine
	Yellow Warbler	Bird	Passerine
	Yellow-breasted Chat	Bird	Passerine
	Yellow-headed Blackbird	Bird	Passerine

Rock Creek Reserve Wildlife Species List

Taxonomic Group	Common Name		
	Yellow-rumped Warbler	Bird	Passerine
Raptor	American Kestrel	Bird	Raptor
	Bald Eagle	Bird	Raptor
	Barn Owl	Bird	Raptor
	Ferruginous Hawk	Bird	Raptor
	Golden Eagle	Bird	Raptor
	Great Horned Owl	Bird	Raptor
	Long-eared Owl	Bird	Raptor
	Merlin	Bird	Raptor
	Northern Goshawk	Bird	Raptor
	Northern Harrier	Bird	Raptor
	Peregrine Falcon	Bird	Raptor
	Prairie Falcon	Bird	Raptor
	Red-tailed Hawk	Bird	Raptor
	Rough-legged Hawk	Bird	Raptor
	Sharp-shinned Hawk	Bird	Raptor
	Short-eared Owl	Bird	Raptor
	Swainson's Hawk	Bird	Raptor
	Turkey Vulture	Bird	Raptor
Waterfowl	American Coot	Bird	Waterfowl
	American Wigeon	Bird	Waterfowl
	Black-crowned Night-heron	Bird	Waterfowl
	Blue-winged Teal	Bird	Waterfowl
	Bufflehead	Bird	Waterfowl
	Canada Goose	Bird	Waterfowl
	Cinnamon Teal	Bird	Waterfowl
	Common Merganser	Bird	Waterfowl
	Common Snipe	Bird	Waterfowl
	Double-crested Cormorant	Bird	Waterfowl
	Gadwall	Bird	Waterfowl
	Great Blue Heron	Bird	Waterfowl
	Greater Scaup	Bird	Waterfowl
	Greater Yellowlegs	Bird	Waterfowl
	Green-winged Teal	Bird	Waterfowl
	Killdeer	Bird	Waterfowl
	Lesser Scaup	Bird	Waterfowl
	Long-billed Curlew	Bird	Waterfowl
	Mallard	Bird	Waterfowl
	Redhead	Bird	Waterfowl
	Ring-billed Gull	Bird	Waterfowl
Waterfowl	Ring-necked Duck	Bird	Waterfowl
	Sandhill Crane	Bird	Waterfowl
	Semipalmated sandpiper	Bird	Waterfowl
	Sora	Bird	Waterfowl
	Virginia Rail	Bird	Waterfowl
Small Mammal	Deer Mouse	Mammal	Small
	Harvest mouse	Mammal	Small
	Hispid Pocket Mouse	Mammal	Small

Rock Creek Reserve Wildlife Species List

Taxonomic Group	Common Name		
	House Mouse	Mammal	Small
	Masked shrew	Mammal	Small
	Meadow Vole	Mammal	Small
	Mexican Woodrat	Mammal	Small
	Plains Harvest Mouse	Mammal	Small
	Prairie Vole	Mammal	Small
	Preble's meadow jumping mouse	Mammal	Small
	Western Harvest Mouse	Mammal	Small
Big Game			
	Elk (Wapiti)	Mammal	Big Game
	Mule deer	Mammal	Big Game
	Mule X White-tailed deer	Mammal	Big Game
	White-tailed deer	Mammal	Big Game
Midsized Mammal			
	Black-tailed prairie dog	Mammal	Midsized
	Common porcupine	Mammal	Midsized
	Eastern fox squirrel	Mammal	Midsized
	Jackrabbit species	Mammal	Midsized
	Muskrat	Mammal	Midsized
Carnivore			
	American black bear	Mammal	Carnivore
	Bobcat	Mammal	Carnivore
	Common gray fox	Mammal	Carnivore
	Coyote	Mammal	Carnivore
	Long-tailed weasel	Mammal	Carnivore
	Mink	Mammal	Carnivore
	Mountain lion	Mammal	Carnivore
	Raccoon	Mammal	Carnivore

APPENDIX 6

PREBLE'S MEADOW JUMPING MOUSE
PROTECTION PLAN, REVISION 6
U.S. DEPARTMENT OF ENERGY, ROCKY FLATS FIELD OFFICE
(July 27, 1999)

1. This Protection Plan applies to the Department of Energy (DOE) and its contractors at Rocky Flats Environmental Technology Site (Site).
2. Site activities will be evaluated under Procedure 1-D06-EPR-END.03, *Identification and Protection of Threatened, Endangered, and Special-Concern Species* (T&E Procedure) to protect the Preble's meadow jumping mouse (*Zapus hudsonius preblei*) and its habitat at the Site. The Preble's meadow jumping mouse is listed as a threatened species under the Endangered Species Act (ESA), and as such is a Special-concern Species at the Site.
3. Site activities are also evaluated under Procedure 1-S73-ECOL-001, *Wetland Identification and Protection*, which ensures wetland protection at the Site. Wetland protection is also required under the Clean Water Act (CWA). Additionally, primary habitat of the Preble's mouse includes wetlands.
4. The DOE, Rocky Flats Field Office (RFFO) ESA Coordinator (or a designee), as identified in the T&E Procedure.
5. Figure 1 of Appendix A provides a map of the Protection Areas for the Preble's mouse. These designations include Protection Areas and Contiguous Wetlands. See Appendix A for definitions of these terms.
6. Only necessary work is permitted in Protection Areas. Necessary work is defined as: that which is designed to study the Preble's mouse; required to protect or enhance natural resource values; or is expressly required by regulatory direction or agreement. Any necessary work that may cause significant disturbance, destruction, or other impacts to Protection Areas must be approved in advance of any work, and reviewed by the U.S. Fish and Wildlife Service (USFWS). The Site's ecologists shall review and approve/disapprove projects proposed in Protection Areas, then refer projects that may modify Preble's mouse habitat to the ESA Coordinator for concurrence. No project that will cause significant impact to a Protection Area may proceed until the ESA Coordinator has concurred. The ESA Coordinator shall examine the project, review may affect determinations as required with the USFWS, and concur/object within 10 working days of notification. DOE may allow the project to proceed, with or without modification, after review with the USFWS has been completed. The ESA Coordinator shall notify the project manager and the ecologists of the results of the review process including whether the project may proceed and if project modifications are required.
7. Any Site activity that will occur in Contiguous Wetlands shall also be subject to review and approval under the T&E and Wetland Procedures. The Site's ecologists shall review and approve/disapprove projects proposed in Contiguous Wetlands. If disapproved, such activities will be referred to the ESA Coordinator. Project modification may occur to allow the project to proceed.
8. Any activity, in any of the areas identified, as indicated on the *Preble's Mouse Protection Area Map* (Figure 1, Appendix A), may be referred to the ESA Coordinator for review with the USFWS.

Preble's Mouse Protection Areas

For the purpose of the *Preble's Meadow Jumping Mouse Protection Plan, Revision 6, U.S. Department of Energy, Rocky Flats Field Office*, Preble's Mouse Protection Areas are identified on Figure 1. The 1996 Site Vegetation Map was used as the base map from which units of characteristic Preble's mouse habitat, adjacent grassland vegetation, and wetlands were identified for use in this map. The riparian corridor understory mapping revisions made in 1999 and observations made during spring 1999 trapping were also used to make revisions to the protection area map. Protection Areas and Contiguous Wetlands are defined as follows:

Protection Areas

Protection Areas include all characteristic habitat where the Preble's mouse has been documented, based on studies conducted at the Site since 1991. This habitat is comprised of woody vegetation types: riparian woodland, riparian shrubland, tall upland shrubland, and short upland shrublands (snowberry and skunkbush sumac adjacent to streams). Also included in the protection area category is a 100-foot band of grassland/herbaceous wetland from the perimeter these woody vegetation types. These Protection Areas are along stream channels, pond margins, and around seep wetlands in all stream drainages of the Site.

Contiguous Wetlands

Contiguous Wetlands include wetlands adjacent to, contiguous with, or upstream from Protection Areas. Although these areas already receive protection under the Clean Water Act, they shall receive additional protection at the Site as potential Preble's mouse habitat and because they are essential to maintaining the quality of adjacent Preble's mouse habitat. Wetlands play an important role in capturing upstream waters, and regulating their release downstream. Wetlands are also a natural filtration system that helps settle silt and purify water. Thus, wetlands have a direct effect on Preble's mouse habitat by ensuring that a clean, consistent source of moisture is available to sustain the downstream areas. This naturally controlled release of water throughout the year may be an essential factor in long-term maintenance of the riparian vegetation communities and requisite for the survival of the Preble's mouse. Additionally, wetlands within the riparian zone are now known to act as travel corridors between occupied areas of Preble's mouse habitat and dispersal routes.

Note: This mapped feature does not include all Site wetlands. Projects planning work should use the Site Wetlands Map, which includes all jurisdictional wetlands, to ensure compliance with the Clean Water Act.

APPENDIX 7

Table 3-21. Special-concern species search list for the Rocky Flats Environmental Technology Site (effective date May 14, 2001)

Delisted Species Known to Occur at Rocky Flats

Birds

American Peregrine Falcon (*Falco peregrinus*)¹

Federal Threatened Species Known to Occur at Rocky Flats

Birds

Bald Eagle (*Haliaeetus leucocephalus*)^{2,3}

Mammals

Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)^{2,4,5,6}

Federal Special-Concern Species Known to Occur at Rocky Flats

Reptiles

Eastern Short Horned Lizard (*Phrynosoma douglassii brevirostra*)^{4,8}

Birds

Northern Goshawk (*Accipiter gentilis*)^{4,8}

Baird's Sparrow (*Ammodramus bairdii*)^{4,8}

Western Burrowing Owl (*Athene cunicularia hypugea*)^{4,8,18}

Ferruginous Hawk (*Buteo regalis*)^{4,5,7}

Black Swift (*Cypseloides niger*)^{4,8}

Loggerhead Shrike (*Lanius ludovicianus*)^{4,5}

White-faced Ibis (*Plegadis chihi*)^{5,8}

Mammals

Small-footed Myotis (*Myotis subulatus* = *M. ciliolabrum*)^{4,8}

Black-tailed Prairie Dog (*Cynomys ludocivianus*)¹⁹

Colorado Species of Special Concern Known to Occur at Rocky Flats

Amphibians

Northern Leopard Frog (*Rana pipiens*)^{4,7}

Birds

Long-billed Curlew (*Numenius americanus*)^{7,8}

American White Pelican (*Pelecanus erythrorhynchos*)^{4,5}

Federal Endangered Species with Potential Habitat at Rocky Flats

Birds

Whooping Crane (*Grus americana*)

Least Tern (*Sterna antillarum*)

Piping Plover (*Charadrius melodus*)

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)¹⁰

Mammals

Black-footed Ferret (*Mustela nigripes*)¹¹

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Table 3-21 (cont.)

Federal Threatened Species with Potential Habitat at Rocky Flats

Plants

Ute Ladies'-tresses (*Spiranthes diluvialis*)¹²

Insects

Pawnee Montane Skipper (*Hesperia leonardus montana*)

Federal Proposed Species with Potential Habitat at Rocky Flats

Plants

Colorado Butterfly Plant (*Gaura neomexicana* var. *coloradensis*)¹³

Federal Candidate Species with Potential Habitat at Rocky Flats

Birds

Mountain Plover (*Charadrius montanus*)¹⁴

Federal Special-Concern Species with Potential Habitat at Rocky Flats

Plants

Bell's Twinpod (*Physaria bellii*)⁵

Tulip Gentian (*Eustoma grandiflora*)⁵

Adder's Mouth Orchid (*Malaxis brachypoda*)⁵

Insects

Regal Fritillary (*Speyeria idalia*)⁵

Fish

Plains Topminnow (*Fundulus sciadicus*)⁵

Birds

Western Snowy Plover (*Charadrius alexandrinus nivosus*)⁵

Black Tern (*Chlidonias niger*)⁵

Mammals

Spotted Bat (*Euderma maculatum*)⁵

Long-eared Myotis (*Myotis evotis*)⁵

Fringed Bat (*Myotis thysanodes*)⁵

Long-legged Myotis (*Myotis volans*)⁵

Pale Townsend's Big-eared Bat (*Plecotus townsendii pallescens*)⁵

Plains Spotted Skunk (*Spilogale putorius interrupta*)⁵

Swift Fox (*Vulpes velox*)^{11,5}

Colorado Threatened Species with Potential Habitat at Rocky Flats

Fish

Common Shiner (*Notropis cornutus*)¹⁴

Colorado Species of Special Concern with Potential Habitat at Rocky Flats

Fish

Stonecat (*Noturus flavus*)¹⁴

Table 3-21 (cont.)

Birds

- Barrow's Goldeneye (*Bucephala islandica*)¹⁴
- Greater Sandhill Crane (*Grus canadensis tibida*)^{2,8}
- Plains Sharp-tailed Grouse (*Tympanuchus phasianellus jamesi*)¹⁵

Watch-Listed Species Known to Occur at Rocky Flats

Reptiles

- Red-sided Garter (*Thamnophis sirtalis*)
- Western Yellowbelly Racer (*Clouber constrictor*)

Birds

- Black-crowned Night-heron (*Nycticorax nycticorax*)¹⁶
- American Bittern (*Botarus lentiginosus*)¹⁶
- Bufflehead (*Bucephala albeola*)¹⁶
- Eared Grebe (*Podoiceps nigricollis*)¹⁶
- Sora (*Porzana carolina*)¹⁶
- Cooper's Hawk (*Accipiter cooperii*)¹⁶
- Sharp-shinned Hawk (*Accipiter striatus*)¹⁶
- Golden Eagle (*Aquila chrysaetos*)¹⁶
- Swainson's Hawk (*Buteo swainsoni*)¹⁷
- Northern Harrier (*Circus cyaneus*)¹⁸
- Merlin (*Falco columbarius*)¹⁶
- Prairie Falcon (*Falco mexicanus*)¹⁶
- Short-eared Owl (*Asio flammeus*)¹⁸
- Long-eared Owl (*Asio otus*)¹⁶
- Olive-sided Flycatcher (*Contopus borealis*)¹⁸
- Chestnut-sided Warbler (*Dendroica pensylvanica*)¹⁸
- Virginia's Warbler (*Vermivora virginiae*)¹⁸
- Baird's Sparrow (*Ammodramus bardi*)¹⁸
- Grasshopper Sparrow (*Ammodramus savannarum*)¹⁸
- Lark Bunting (*Calamospiza melanocorys*)¹⁸
- Chestnut-collared Longspur (*Calcarius ornatus*)¹⁸
- Field Sparrow (*Spizella pusilla*)¹⁸

Mammals

- Olive-backed Pocket Mouse (*Perognathus faciatus infraluteus*)¹⁶
- Merriam's Shrew (*Sorex merriami*)¹⁶

NOTES:

1. The species *Falco peregrinus* was delisted by the U.S. Fish and Wildlife Service in 1999.
2. Colorado State threatened species (ST).
3. The USFWS has down-listed the bald eagle to threatened status.
4. In February 1996, the U.S. Fish and Wildlife Service (USFWS) revised the list of candidate species to include only proposed and C1 species. All former candidate species except C1 species are now classified unofficially as "at-risk" and are still considered special-concern species. The search-list includes these species because they may be upgraded to C-1 species at any time.

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Table 3-21 (cont.)

5. This species is resident or regularly visits Rocky Flats.
6. In May 1998, the USFWS listed the Preble's meadow jumping mouse as a threatened species.
7. Colorado species of special concern (SC).
8. The species has been observed infrequently at Rocky Flats.
9. Listed on August 20, 1997.
10. Species was listed as a State threatened species May 8, 1998.
11. This species was collected previously near Rocky Flats.
12. These species have historically used areas in the vicinity, and suitable feeding or residential habitat exists at Rocky Flats.
13. Proposed for listing as threatened on March 24, 1998.
14. Federal candidate species for listing as threatened or endangered.
15. Colorado State endangered species.
16. Colorado Natural Heritage Program list of rare and imperiled species.
17. Species of special interest to the Colorado Division of Wildlife due to recent winter range die-off of the species.
18. Birds listed by the USFWS as "Migratory Nongame Birds of Management Concern: The 1995 List" that occur at the Site.
19. Although the U.S. Fish and Wildlife Service declined to list the black-tailed prairie dog in 2000, it has been added to the list of candidate species, and may be listed in the future.

Note: Candidate, proposed, and listed species lists are under constant revision. As data are reviewed by the USFWS, species are added to and removed from this list on a year-round basis. This list for Rocky Flats Environmental Technology Site is updated annually.

Sources:

1. Colorado Natural Heritage Program 1999 List of Rare and Imperiled Animals, Plants, and Natural Communities.
2. Federal Register, February 28, 1996, pp. 7596-7613.
3. Migratory Nongame Birds of Management Concern in the United States: The 1995 List.

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APPENDIX 8

MEMORANDUM OF AGREEMENT
FOR COORDINATION OF ENDANGERED SPECIES ACT COMPLIANCE WITH
ACTIVITIES AT ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
BETWEEN
DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE,
DEPARTMENT OF ENERGY, ENVIRONMENTAL PROTECTION AGENCY,
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, AND
COLORADO DEPARTMENT OF NATURAL RESOURCES

I. BACKGROUND

1.1 On March 25, 1997, the Preble's Meadow Jumping Mouse (PMJM) was proposed for listing as an endangered species under the Endangered Species Act (ESA), 16 U.S.C. § 1531 et seq., by the Fish and Wildlife Service (Service), a constituent bureau of the U. S. Department of Interior. The PMJM is found in several of the wet riparian areas located at the Department of Energy (DOE) Rocky Flats Environmental Technology Site (Site). On May 13, 1998, the Service published a final rule to list the PMJM as a threatened species under the ESA. Following the listing, the PMJM became the subject of informal consultation pursuant to 50 C.F.R. § 402.13. In satisfaction of ESA requirements that federal agencies engage in interagency cooperation, 16 U.S.C. § 1536, and in conformance with the provisions of this Memorandum of Agreement (MOA), the DOE will prepare and submit a biological assessment (BA) and request that the Service initiate formal consultation concerning implementation of the Rocky Flats Cleanup Agreement (RFCA), other Site closure activities, and the "Preble's Meadow Jumping Mouse Protection Policy", to be finalized as the "Protection Plan".

1.2 The Site formerly played a role in the production of components for nuclear weapons. Weapons component production has ceased and the mission is now facility decommissioning and cleanup and closure of the Site. Activities at the Site range from stabilization and interim storage of plutonium awaiting final disposition off-site under the Atomic Energy Act (AEA), 42 U.S.C. § 2011 et seq., to hazardous substance removal and remediation activities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., the Colorado Hazardous Waste Act (CHWA), Colorado Revised Statutes § 25-15-301, et. seq., and the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6901 et seq.

1.3 All of the Site is a CERCLA National Priorities Listed (NPL) Site. Under CERCLA, all DOE cleanup and closure activities at the Site are governed by the July 1996 RFCA between the DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Public Health and Environment (CDPHE). DOE is required by law to perform the cleanup work resulting in Site decommissioning. DOE activities in this regard are subject to EPA and CDPHE statutory authorities to approve and monitor both the conduct and completion of the cleanup. The provisions of the RFCA comprise the legal document that describes the relationship between the Agencies during cleanup and ensures the effective and efficient cleanup of the Site.

1.4 Since as early as 1993, not long after the PMJM was discovered at the Site, DOE has proactively protected the PMJM and its habitat. Over time, protection has progressed from informal habitat protection to required protection and mitigation actions. Initial protection for the PMJM was afforded through implementation of the Site procedure to protect sensitive species, "Identification and Protection of Threatened, Endangered, and Special-Concern Species" (T&E Procedure). As a candidate species, the PMJM was protected in accordance with the T&E Procedure for special concern species. In 1994, the "Preble's Meadow Jumping Mouse Interim Protection Policy" was developed and informally implemented, and was subsequently formally implemented in 1995. The Interim Policy continued to be revised and refined and is currently identified as Revision 5a of the "Preble's Meadow Jumping Mouse Protection Policy". The current Policy acknowledges the status of the PMJM as a "threatened" species, and provides direction consistent with the T&E Procedure for protection of the species.

1.5 In addition to development and implementation of the Preble's Meadow Jumping Mouse Protection Policy, DOE has undertaken numerous ongoing efforts to protect and conserve the PMJM and associated habitat. In 1992, little was known about the PMJM following its discovery at the Site the previous year, although the PMJM was listed as a candidate species under the ESA. Consequently, DOE contracted to have a study conducted to identify locations of PMJM populations and to identify key habitat characteristics. This study, which spanned 1993 and 1994, provided the basis for development of protection measures for the species at the Site and has additionally served as a basis for the development of a Collaborative Planning Process currently being facilitated by the Colorado Department of Natural Resources (DNR). Since the initial study was performed, Site ecologists have made and continue to make annual evaluations of the Site PMJM populations and habitat. These studies have significantly contributed to the existing body of data relating to the species, including data describing habitat, population dynamics, genetics, and movement.

1.6 As a result of implementation of Site T&E Procedures in conjunction with habitat mapping activities at the Site, and as a result of implementation of the Preble's Meadow Jumping Mouse Protection Policy in conjunction with T&E Procedures, Site activities have been relocated or redesigned to limit impact to actual or potential PMJM habitat to ensure that activities being conducted at the Site: 1) first, eliminate impact to the PMJM; 2) reduce impact to the PMJM; or, 3) as a last resort, mitigate impact to the PMJM. Current PMJM protection and mitigation strategies that have been implemented include work site surveys in accordance with T&E procedures including: project redesign to remove projects from PMJM habitat; project footprint redesign to avoid PMJM impacts; installation of spill barriers between a project and a PMJM population drainage; project rescheduling to avoid PMJM active periods; and other mitigation activities.

II. STATEMENT OF PURPOSE

2.1 The purpose of this MOA is to develop a process by which each Party, in accordance with its authorities, can work together to achieve compliance with the mandates of the RFCA, other Site closure activities, and the ESA, including the conservation of listed species such as the PMJM.

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III. AUTHORITIES FOR COORDINATING RFCA, OTHER SITE CLOSURE ACTIVITIES, AND ESA COMPLIANCE

3.1 RFCA provides that the Site is divided into the "Industrial Area" and the "Buffer Zone". Maps illustrating the location of each zone are attached. Pursuant to the RFCA, Part 8, Regulatory Approach, CDPHE has been designated the Lead Regulatory Agency (LRA) for RFCA activities in the Industrial Area, while EPA is the LRA for RFCA activities in the Buffer Zone. Conversely, CDPHE is the Support Regulatory Agency (SRA) for activities regulated by RFCA in the Buffer Zone and off-site, while EPA is the SRA for activities regulated by RFCA in the Industrial Area. The final selection of remedies will proceed according to CERCLA section 120 (see RFCA paragraph 84).

3.2 The parties to this MOA (Parties) acknowledge that, under the RFCA, Site cleanup must satisfy all applicable or relevant and appropriate federal and state environmental laws and regulations (ARARs) as required by 42 U.S.C. § 9621 (CERCLA section 121) absent waiver by EPA. A Master List of Site ARARs is incorporated in the August 1998 RFCA Implementation Guidance Document, Appendix J, which is updated annually. Under the heading "Natural Resource and Wildlife Protection Laws", the ESA is listed as a RFCA ARAR requiring substantive compliance with regard to consultation and preparation of a biological assessment under Section 7 of the ESA and 50 CFR § 402. The RFCA ESA ARAR provides that DOE, EPA, and CDPHE will engage in interagency cooperation with respect to species listed as endangered or threatened under the ESA.

3.3 The Federal Water Pollution Control Act (FWPCA), 33 U.S.C. § 1251 et. seq., is an ARAR under RFCA. Substantive compliance with the FWPCA, including requirements relating to wetlands impacts regulated by FWPCA section 404, 33 U.S.C. § 1344, is required in association with RFCA cleanup activities. A March 1996 Memorandum of Agreement for the Administration of a Wetland Bank at Rocky Flats (Wetland Banking MOA) between DOE, EPA, the United States Army Corps of Engineers (Corps), and the Service provides that EPA is responsible for ensuring substantive requirements of FWPCA section 404 are met in conjunction with RFCA cleanup activities. With respect to non-CERCLA activities at the Site, the Corps continues to administer substantive and administrative requirements of FWPCA section 404. A related compliance agreement is the June 1990 Memorandum of Agreement between DOE and the Federal Energy Regulatory Commission (FERC) which provides that FERC is responsible for Site dam safety and inspection to determine Site compliance with the Federal Guidelines for Dam Safety. The Wetland Banking MOA and the FERC MOA may be used to develop information and to coordinate compliance with the ESA at the Site.

3.4 Pursuant to CERCLA section 104(b)(2), an October 1994 Memorandum of Understanding establishes Natural Resource Trustee responsibilities at the Site. Site Natural Resource Trustees are comprised of DOE, DOI, DNR, CDPHE, and the Colorado Attorney General. The EPA is also a party to the Trustees MOU in recognition of its role as a CERCLA LRA at the Site. Under the Trustees MOU, parties are responsible for coordinating and cooperating in carrying out responsibilities involving multiple trustees due to coexisting or contiguous natural resources or concurrent jurisdictions. Parties to the Trustees MOU agree to cooperate in coordinating investigations and planning, and to cooperate in integrating natural resource protection, restoration, mitigation, and enhancement activities into Site cleanup plans and activities whenever practicable.

3.5 The Service is responsible for administration and enforcement of the ESA. In November 1995, a Memorandum of Agreement between The State of Colorado and The Department of Interior Concerning Programs to Manage Colorado's Declining Native Species (Colorado MOA) was executed. Under the Colorado MOA, DOI and the Colorado DNR and its Division of Wildlife agree to cooperatively act and encourage voluntary actions designed to reduce or eliminate risks to species and their habitats through development of Conservation Agreements and other appropriate measures. Pursuant to the Colorado MOA, DNR is currently facilitating a region-wide Collaborative Planning Process to facilitate ESA compliance required by the listing of the PMJM as a threatened species under the ESA.

3.6 The Service enters into this Memorandum of Agreement for Coordination of Endangered Species Act Compliance With Cleanup and Closure Activities at Rocky Flats Environmental Technology Site (ESA MOA) pursuant to the ESA, the Colorado MOA Concerning Programs to Manage Colorado's Declining Native Species, the MOU for Natural Resource Trustee Responsibilities at the Site, and the Wetland Banking MOA.

3.7 DOE enters into this ESA MOA pursuant to the CERCLA, RCRA, AEA, RFCA, ESA, relevant Executive Orders, the Colorado MOA Concerning Programs to Manage Colorado's Declining Native Species, the MOU for Natural Resource Trustee Responsibilities at the Site, and the Wetland Banking MOA.

3.8 The EPA, Region VIII enters into this ESA MOA pursuant to CERCLA, RCRA, RFCA, relevant Executive Orders, the MOU for Natural Resource Trustee Responsibilities at the Site, and the Wetland Banking MOA.

3.9 The CDPHE enters into this ESA MOA pursuant to CERCLA, RCRA, CHWA, RFCA, the Colorado MOA Concerning Programs to Manage Colorado's Declining Native Species, and the MOU for Natural Resource Trustee Responsibilities at the Site.

3.10 The Colorado DNR enters into this ESA MOA pursuant to the ESA, the Colorado MOA Concerning Programs to Manage Colorado's Declining Native Species, and the MOU for Natural Resource Trustee Responsibilities at the Site.

3.11 Pursuant to, and to the extent of their respective authorities to enter into this ESA MOA as described above, the Parties agree they are bound by the provisions established in this ESA MOA to coordinate cleanup and closure activities at the Site and other Site closure activities with ESA compliance.

IV. INTERAGENCY COORDINATION

4.1 DOE is developing and has begun implementation of a conservation plan for the PMJM entitled the "Preble's Meadow Jumping Mouse Protection Policy", which is to be finalized as the "Protection Plan" (Plan). The Plan contains a long-term strategy for protection of the PMJM and for conservation of PMJM habitat at the Site. Through the interagency cooperation process, the Service will provide technical assistance as needed in the finalization and implementation of the Plan. The completed Plan is expected to include provisions to protect species that share PMJM habitat.

4.2 Following execution of this MOA, DOE will prepare and submit a BA and request that the Service initiate formal Section 7 consultation concerning the implementation of the RFCA, other Site closure activities, and the Plan. The BA will address actions that will have no effect and actions that may affect the PMJM or other federally listed species.

4.3 The DOE and the Service agree to provide all Parties with the opportunity to participate in the ESA consultation concerning the RFCA, other Site closure activities, and the PMJM Protection Plan. The DOE shall submit the Plan to the EPA and the CDPHE for review and concurrence prior to submitting the Plan to the Service for Section 7 consultation. The DOE shall include the Plan in the RFCA Implementation Guidance Document and shall implement the Plan in conjunction with other closure activities. Subsequent to consultation, the Plan requirements shall be addressed in RFCA decision documents and will be implemented in RFCA cleanup and closure activities in accordance with CERCLA section 121, 42 U.S.C. § 9621.

4.4 The Service will prepare a biological opinion (BO) based on the BA provided by the DOE on the RFCA, other Site closure activities, and the Plan. The Plan is expected to be the basis for any conservation recommendations, reasonable and prudent measures (RPMs), or reasonable and prudent alternatives (RPAs) developed for the PMJM or other listed species. The BO and the incidental take statement (ITS) issued by the Service shall apply to Site activities which may affect the PMJM or other listed species.

4.5 Prior to initiation of any actions or activities which are identified in the BA developed by DOE as having the potential to affect the PMJM or other federally listed species, written notice shall be provided to the Service regarding consistency with the BO and ITS. The Service shall have thirty (30) days to provide written concurrence or nonconcurrence. If the Service does not provide written concurrence within thirty (30) days, concurrence shall be presumed. If any RFCA or other Site closure activities cannot be undertaken consistent with the BO, Section 7 consultation may be reinitiated.

4.6 The Parties agree that if Section 7 consultation or the dispute resolution process defined herein produce recommendations for conservation, recovery, or habitat enhancement that require decisions relating to land use, such land use recommendations will be subject to public review.

V. DISPUTE RESOLUTION

5.1 Before any final BO is issued pursuant to this MOA, the Service will provide the DOE with a draft BO as provided by applicable regulations. Upon receipt of the draft Opinion, the DOE shall have a period of time agreed to by the Parties to confer with the EPA and the CDPHE and to provide comments or written disagreement with the draft BO and the associated reasoning or explanation for the disagreement.

5.2 If the DOE and the Service are unable to reach agreement with respect to a written disagreement or a dispute pursuant to this MOA, including whether proposed RFCA or other Site closure activities are consistent with the BO, the Parties agree to convene a meeting at the staff level to attempt, in good faith, to resolve the disagreement or dispute. If resolution at the staff level is not possible, the Parties agree that the level of management consistent with at least the level of the signatories to this MOA shall convene a meeting to attempt, in good faith, to resolve the disagreement or dispute.

5.3 Upon receiving the comments of the DOE, and upon resolution of any written disagreement, the Service shall issue its final BO, which should include the resolution of any written disagreement submitted by the DOE, or the Service shall issue a final BO incorporating the Service's reasoning with respect to its findings concerning any disagreement.

5.4 The Service is not a party to the RFCA. The EPA, the CDPHE, and the DOE agree that efforts to resolve disputes between EPA or CDPHE and Service requirements may constitute force majeure or a valid basis upon which a good cause change of a RFCA regulatory milestone may be requested.

VI. PUBLIC INFORMATION

6.1 The Parties agree that public information campaigns may be useful in explaining the importance of coordinating ESA compliance and PMJM protection with Site activities. The Parties agree to discuss, and where appropriate to coordinate, the development and implementation of outreach efforts that may be conducted in association with this ESA MOA.

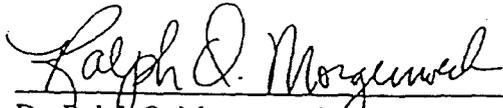
VII. CONSISTENCY WITH APPLICABLE LAW

7.1 This ESA MOA is subject to all applicable laws and nothing herein shall be construed to alter, amend, or affect existing laws. Nothing in this ESA MOA shall be construed as obligating any of the Parties to expend any funds in excess of appropriations authorized by law or otherwise commit any of the Parties to any action which it lacks authority to undertake.

VIII. EFFECTIVE DATE, DURATION, AND MODIFICATIONS

8.1 The effective date of this ESA MOA shall be the date on which the last Party signs this ESA MOA. This ESA MOA shall remain in effect for all Parties, subject to modification upon mutual agreement of the Parties, and subject to termination upon 90 days written notice by a single Party. Termination of participation or withdrawal by one Party shall not constitute a termination of the MOA nor affect the obligations of the remaining Parties.

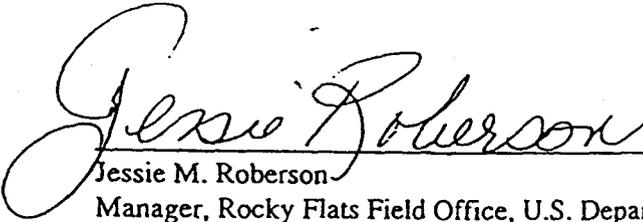
IX. APPROVAL OF ESA MOA



Dr. Ralph O. Morgenweck
Regional Director, Region 6, U.S. Fish and Wildlife Service

January 19, 1999

Date



Jessie M. Roberson
Manager, Rocky Flats Field Office, U.S. Department of Energy

December 8, 1998

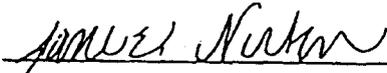
Date



Max H. Dodson
Director, Ecosystems Protection and Remediation,
U.S. Environmental Protection Agency, Region VIII

January 26, 1999

Date



Executive Director,
Colorado Department of Public Health and Environment

February 9, 1999

Date



Executive Director, Colorado Department of Natural Resources

February 26, 1999

Date

APPENDIX 9

**Comment/Response for
Rock Creek Reserve Integrated Natural Resources Management Plan**

Commentor	Comment #	Comment/Response for Rock Creek Reserve Integrated Natural Resources Management Plan
K-H Ecology Group	1-1	<p>Comment: Under "Planned Initiatives" (p.6), how can you accomplish sensitive species protection, habitat protection, and enhancement while allowing public access and recreation?</p> <p>Response: There are many cases where public access can be provided where there are sensitive species. Any public use activity allowed will be done in such a way, and in accordance with applicable laws and regulations, and in such a way to fully protect the natural resources of the Site.</p>
	1-2	<p>Comment: We assume that under Goal 4 (p. 10) that USFWS Reserve personnel will be interfacing with Site Air Quality, Water Quality, and Actinide Migration Study groups for input into this inventory.</p> <p>Response: Yes, interfacing with the Site resource specialists will be a high priority.</p>
	1-3	<p>Comment: In Section 2.1.4, last paragraph (p. 14) Rocky Flats Lake is south WEST of the Site.</p> <p>Response: Thanks, that correction will be made to the text.</p>
	1-4	<p>Comment: Lindsay Pond is not the only manmade drainage feature in Rock Creek Reserve, but it is the most visible. There are several other small stockpounds and canals in Rock Creek.</p> <p>Response: You are right, however, it is felt that Lindsay Pond is the most significant structure in Rock Creek that will be suitable for species management.</p>
	1-5	<p>Comment: We suggest that the word vegetation replace flora and floral as indicated in the redline document since all existing Site documents use "vegetation".</p> <p>Response: We will make that change in text of the Plan.</p>
	1-6	<p>Comment: The references to black-crowned night herons nesting in tall upland shrubland in Rock Creek were attributed to Ms. Murdock, and she requested of CNHP that they be corrected. They apparently were not, and she would appreciate not having that mis-quote perpetuated. The night herons were recorded nesting in willows rimming Pond D-1 in the southeastern corner of the Site.</p> <p>Response: The correction will be made to the text of the Plan on page 25.</p>
	1-7	<p>Comment: The orange-crowned warbler was recorded in Woman Creek and Rock Creek in 1999.</p> <p>Response: We will add Rock Creek to the reference made for the orange-crowned warbler in the text of page 29, Section 3.5.2: Birds, in the Plan.</p>
	1-8	<p>Comment: Section 4.4.1, Proposed Action (p.40); there are no endangered species at the Site.</p> <p>Response: The appropriate change will be made to page 40 of the Plan.</p>
	1-9	<p>Comment: Site ecologists do not support the idea of planting cottonwood trees where they presently do not grow.</p> <p>Response: Even though the Plan includes the option of planting cottonwood trees, the actual planting would occur only if there is a direct value to the natural resource situation at a particular location.</p>

	1-10	<p>Comment: Note that there is no longer an "Annual Weed Control Plan". This is one and the same as the Annual Vegetation Management Plan which includes weed control as a subset of the vegetation management activities conducted at the Site.</p> <p>Response: That correction will made in the text of the Plan.</p>
	1-11	<p>Comment: Nest boxes may be useful for some cavity nesters, and may encourage bluebirds to remain at the Site during the nesting season, but right now, bluebirds (mountain and western) are only observed during migration. It should also be noted that appropriate nesting habitat for wood ducks does not really occur in Rock Creek.</p> <p>Response: The nesting boxes are included as another management option for management of the wildlife in Rock Creek. The decision to install nesting boxes will depend on what specific species the FWS wants to encourage. The wood duck reference will be removed from the text of the Plan on page 48.</p>
	1-12	<p>Comment: Site ecologists do not think attempting to install perch poles is advisable or necessary.</p> <p>Response: Agreed. The text discussing installation of perch poles has been removed from the Plan.</p>
	1-13	<p>Comment: Site ecologists do not support the idea of restoring the Lindsay Ranch buildings, and more specifically do not agree with making the old ranch a visitor center.</p> <p>Response: The decision for establishment of a Visitor Center is outside the scope of this plan. From strictly a wildlife habitat basis, the restoration could have adverse impacts on the bats and birds that utilize the house as a nesting or shelter situation. From a historical basis and community desire basis, there may be stabilization or restoration activities. Mitigation opportunities will have to be carefully explored if the stabilization or restoration activities proceed.</p>
Colorado Division of Wildlife	2-1	<p>Comment: We are particularly pleased to see the plan's inclusion of noxious weed mapping and control throughout the preserve. As you are well aware, this is an issue that all landowners should be attentive of - your proactive measures are to be complimented.</p>
		<p>Response: Your support is acknowledged and appreciated.</p>
	2-2	<p>Comment: Additionally, we encourage and support the sensitive species proposed action in Sec. 4.4 for reintroducing sharp-tail grouse and perhaps some native minnows in the wetland areas.</p> <p>Response: DOE expects that DOW will assume the lead role for introducing the sharp tail grouse. The Site looks forward to working with the Division on native fish introduction projects.</p>
	2-3	<p>Comment: In the Executive Summary a bulleted point of proposed action is "development of an access and recreation study for Rock Creek Reserve." There was no other mention of this throughout the remainder of the report, and we are curious to know what scale you are thinking.</p> <p>Response: The Access and Recreation Study will be delayed until we have time to engage the public and adjacent open space managers. In addition, the Access and Recreation Study will be conducted for the entire Rocky Flats Site, not just Rock Creek. If the proposed designation of Rocky Flats as a National Wildlife Refuge comes to fruition, the refuge requirements will dictate the type and amount of access allowed. Please see Sections 4.7, 4.6.1, and 5.8 in the Plan.</p>
DOE - Golden	3-1	<p>Comment: Preface states "the buffer zone has been described as a "crown jewel" for its importance..." A discussion of the origin and significance of the "crown jewel" designation would strengthen this discussion.</p>

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Field Office		<p>Response: The exact source of that term is not clear, however, it has been used sporadically by private parties and adjacent municipalities during discussions of the future of Rocky Flats and the use of the buffer zone. It was also officially used as part of the proclamation signed on May 17, 1999, by Secretary of Energy Bill Richardson, Regional Director Fish & Wildlife Service Ralph Morgenweck, and Colorado Governor Bill Owens, creating the Rock Creek Reserve.</p>
	3-2	<p>Comment: Preface states that no clean-up funds will be used for preparation or implementation of the subject plan, but no other funding source is identified. How will the plan be funded?</p>
		<p>Response: Funding for implementation of the Rock Creek Reserve Plan by the FWS will come out of the Rocky Flats Field Office funding, a separate funding account is used to pay for the Contractor closure activities.</p>
	3-3	<p>Comment: Figure 1, Federal Land and State of CO land are indicated in the same color (BLUE).</p>
		<p>Response: Figure 1 has been changed to avoid the potential confusion associated with using the same color on adjacent land parcels owned by different entities.</p>
	3-4	<p>Comment: Figure 2, the existing Rock Creek Reserve boundary is not indicated. Have the Reserve boundaries been formally surveyed? Legal descriptions of the existing and proposed Reserve locations would help clarify Reserve boundaries as they relate to the Reserve's neighbors.</p>
		<p>Response: Please refer to Figure # 2, the existing Rock Creek Reserve is shown in shaded red. Neither reserve boundary has been surveyed as all of the land and adjoining land is within the RFETS boundary except on the north side which is bordered by Colorado State Highway 128 and the National Wind Technology Center (NWTTC). The existing Rock Creek Reserve boundaries have not been formally surveyed, nor will the expanded Rock Creek Reserve be formally surveyed. The boundaries on the north and northwest follow the boundary of the Rocky Flats Environmental Technology Site. The lower west side follows the appropriate section lines as shown on the map. The remaining boundary of the Reserve roughly follows secondary roads and geophysical features of the drainage. The only adjacent neighbors to the Reserve boundary are Colorado State Highway 128 and the NWTTC.</p>
	3-5	<p>Comment: Page 3, Environmental Compliance, paragraph 2 states "The Plan has the signatory approval of the Service." Presumes issuance of a FONSI prior to public comment.</p>
		<p>Response: The approval of the Plan by the Service does not presume the issuance of a FONSI.</p>
	3-6	<p>Comment: Page 3, paragraph 2 states "The plan assumes compliance with applicable laws and regulations..." Why is compliance assumed and not verified? "Facilitates" could be used in place of "assumes".</p>
		<p>Response: Text has been changed to reflect recommended change.</p>
	3-7	<p>Comment: Page 4 states the Rock Creek Reserve is essentially uncontaminated. If substantiating information is available, why does the subject plan indicate the need for a contaminants study?</p>
		<p>Response: The US Department of Interior requires a pre-acquisition contaminants survey for all lands being acquired by any means, into the National Wildlife Refuge System. There are three levels of pre-acquisition surveys, with Level III being the most comprehensive and involving analytical samples. The Level III survey will address ecological receptors and potential threats to wildlife health as well as human health. Due to the past use of the Site, the Level III survey will go directly to a Level III survey. The extent and design of the Level III survey is undetermined at this time, but will be designed to survey the entire buffer zone, which will include the Reserve. Although they won't be utilized here, the Level I survey involves a standardized check list of contaminate issues. Level II involves a more detailed evaluation that is triggered by an affirmative finding in the Level I check list, and</p>

		may involve site visits and a more involved review of existing documents. Also refer to Section 2.1.7.
3-8	Comment: Page 5, What is the RFCA? The document needs a reference page identifying acronyms.	
	Response: The text on Page 5 will be changed to include the definition of RFCA.	
3-9	Comment: Page 7, indicates need for contaminants sampling and analysis -- why?	
	Response: Please refer to response: 3-7.	
3-10	Comment: Page 7, what is the existing monitoring plan identified in this section?	
	Response: The monitoring referred to is the monitoring conducted through existing monitoring programs and additional monitoring specific to certain actions within this management plan. Title of section has been changed to read "Plan Implementation Monitoring".	
3-11	Comment: Page 11, states "The expansion area does not contain any known contaminated areas or eligible archeological or historic sites." This statement should be supported with citations, or with cross-references if citations occur elsewhere in the document.	
	Response: References have been added to text. Change to text on Pages 16 and 32.	
3-12	Comment: Page 11, first indication of watershed approach to ecosystem management. Descriptions of ecosystem and watershed management (objectives, guiding principles, etc.) here would clarify the ecosystem management approach as it relates to the proposed Action and subsequent impact analyses.	
	Response: This should not be confused with "total watershed" approach. The entire Rock Creek watershed is not included in the Rock Creek Reserve. Some of the upper part of the watershed is off Site on private land and NWTC land. In addition, the lower part of the Rock Creek watershed is downstream from RFETS, on private land and Boulder open space. The term "watershed" is used in its general meaning for the purposes of this Plan, to describe the areas in the Reserve that drain into Rock Creek, and provide a more definable unit of land mass. This plan is not a watershed management plan, but is intended to manage the native species that occur in the Rock Creek Reserve.	
3-13	Comment: Page 13, "This section provides background information for Rock Creek Reserve only." Is this the existing 800 acres, the proposed expansion area, or the entire existing and proposed areas?	
	Response: This "Background" section refers to the 800 acre Rock Creek Reserve, unless it is specified otherwise under certain sections. Clarification has been added to text.	
3-14	Comment: Page 13, Ref. To Fig. 1, "Near the line separating Boulder and Jefferson Counties..." Note that Fig. 1 does not indicate the county line.	
	Response: Figure # 1 has been revised to include the Boulder/Jefferson county line.	
3-15	Comment: Page 13, "...and the DOE wind energy test site." The proper name for this site is the National Wind Technology Center(NWTC). NWTC is an existing DOE facility operated by the National Renewable Energy Laboratory (NREL).	
	Response: This change is made to the text referenced on page 13.	
3-16	Comment: Page 13, "Growth trends project a 20 percent population increase..." Statement needs a citation.	
	Response: Text has been changed.	

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3-17	<p>Comment: Page 14, "Mining operations have not yet begun in this area" As a baseline condition, any known mining plans for this area (the 20 acres) should be indicated here. A map showing the mineral leases would strengthen this section.</p> <p>Response: The regulatory entities for mining at Rocky Flats include the Jefferson County Board of Adjustments and its associated Planning Department and the Colorado Division of Minerals and Geology. Both agencies maintain current mining permit and zoning files. Mineral leases may or may not align with the mining permit and zoning maps and may or may not be recorded in the Jefferson County records. The Department of Energy neither tracks mineral leases nor maintains current maps depicting mineral leases..</p>
3-18	<p>Comment: A map showing the indicated easements would strengthen this discussion.</p> <p>Response: RFETS is currently working on combining several maps into one map showing the existing easements at the Rocky Flats site, but it will not be completed in time to be included in the management plan.</p>
3-19	<p>Comment: Page 16, A discussion and map of the Rock Creek watershed would strengthen this section, and provide necessary baseline information for subsequent watershed management plan discussions and impact analyses.</p> <p>Response: Figure 2 shows, through the contour lines, the location and extent of Rock Creek drainage in relation to the Site and the Reserve. The Rock Creek basin drains the northwest portion of the buffer zone. This basin is topographically isolated from the developed areas and receives no water from the Industrial Area. After crossing under Highway 128, flow continues to the northeast until its confluence with Coal Creek. In addition please refer to Response: 3-12.</p>
3-20	<p>Comment: Page 16, This section does not address NWTc, which is a DOE facility carved out of the Rock Flats Buffer Zone and not subject to 2006 closure. DOE plans to continue operating NWTc as its premier wind and hybrid energy R&D facility.</p> <p>Response: It would be inappropriate to address NWTc in this section. This section addresses land use within the Rock Creek Reserve and the Site buffer zone. The NWTc is not part of the Rock Flats Environmental Technology Site but is viewed as one of its neighbors. The NWTc's proximity to Rock Creek is acknowledged in Section 2.2.2.1.</p>
3-21	<p>Comment: Page 16, The document would be strengthened by clarifying the information presented in this section. For example, did RFETS specifically look for radionuclides on Rock Creek Reserve resulting from RFETS operations and the 1957 and 1969 fires?</p> <p>Response: The referenced report detailing survey of the surface soils was prepared in 1995, thus any radionuclides found would have included any contamination resulting from the two mentioned fires. The report confirms the levels as being background or lower for naturally occurring radionuclides. Also refer to Page 16 in text of plan.</p>
3-22	<p>Comment: Page 17, NWTc is a DOE facility not located on private land. Incorporation of NWTc's existing management practices within the watershed would strengthen the ecosystem approach presented in the subject plan.</p> <p>Response: DOE does not view the Rock Creek Reserve as an ecosystem existing by itself. It can be influenced by activities occurring on adjacent lands, including private land, but is beyond the scope of this plan to incorporate all surrounding land management practices. NWTc's existing management practices in the Rock Creek watershed will be considered and incorporated as appropriate for the Rock Creek Reserve as this Plan is implemented. Text on page 17 has been changed to reflect that NWTc is not located on private land.</p>
3-23	<p>Comment: Page 20, Document would be strengthened with data supporting claims of surface and groundwater baseline characteristics. If water quality is currently good, why is additional sampling indicated to determine potential impacts?</p>

		<p>Response: This Plan is not written to include detailed data on natural resources in the Rock Creek Reserve. Please refer to referenced documents, such as <i>Event-Related Surface-Water Monitoring Report</i>, EG&G, September 1994, and <i>Draft Seep and Spring Analysis In support of the Accelerated Site Action Project For Site Closure</i>, RMRS, 1996, that do include the appropriate data. The additional sampling referred to on Page 21 is planned to ensure that activities are not affecting the overall existing quality of the surface and groundwater resources in the Reserve.</p>
	3-24	<p>Comment: Figure 5 shows the majority of the NWTTC site as Xeric Tallgrass Prairie, however NWTTC's vegetation survey indicates that the tallgrass plant community comprises only a small portion of the SW corner of the NWTTC site.</p> <p>Response: The vegetation map shown is based on vegetation surveys conducted prior to transfer of the land to the NWTTC. The vegetation type shown was based on characteristics used by the Nature Conservancy and others to classify vegetation types as Xeric Tallgrass Prairie. Since that area of land is no longer part of RFETS, NWTTC should rely on survey data that it is most comfortable with.</p>
	3-25	<p>Comment: Page 30, A map showing cultural survey areas would strengthen this section.</p> <p>Response: The entire Site has been surveyed as one area. Cultural resource locations are typically not made public to ensure eligible sites are not vandalized.</p>
	3-26	<p>Comment: Page 32, last line. This section should be clarified to why public access to Rock Creek should be restricted.</p> <p>Response: As stated on Page 32, public access is restricted to all of the buffer zone until all the public health issues are resolved. Restricted access is a requirement of DOE Order 5480.23 to reduce the risk of exposure to the public if a nuclear accident was to occur and is not imposed because of the Rock Creek Reserve designation. Although the current restrictions are for safety reasons there may be restrictions on human access imposed at a later time to protect wildlife and habitat. Also refer to Response: # 2-3. Please refer to Section 3.7 in text of plan.</p>
	3-27	<p>Comment: Page 33, Section 4.0: The reviewers found this Chapter confusing in its handling of the "No Action" alternative. Our assumption is that "No Action" represents the application of Rock Creek Reserve management practices on the existing 800 acres to the entire proposed expansion area. As written, "No Action" could be interpreted as leaving the Reserve at 800 acres.</p> <p>Response: The boundary expansion "no action" alternative applies only to that specific preferred action within the plan. It is stated within the Plan, on page 11, "Proposed Action", that implementation of the boundary expansion will not change the proposed management options under consideration.</p>
	3-28	<p>Comment: Page 65, The subject plan provides limited information regarding ongoing activities outside the Rock Creek Reserve boundaries, and no Region of Influence for cumulative effects is identified. Thus, the conclusion of no negative cumulative impacts is not well supported.</p> <p>Response: There will not be any negative cumulative impacts from implementation of this Plan. The text in Section 5.11 on page 68 has been changed to clarify the region of influence for determining no cumulative negative impacts. If there are negative impacts from the surrounding land, it will not be because of implementation of this Plan, but because of off-site activities and may require actions directed specifically at that problem.</p>
Friends of the Foothills	4-1	<p>Comment: We have reviewed the draft Rock Creek Management Plan developed by USFWS with DOE, and support its adoption.</p> <p>Response: Your support is acknowledged and appreciated.</p>
	4-2	<p>Comment: As the plan is finalized, we strongly urge you to carefully craft the language of the document so that it will be compatible with the proposed future use of the entire Rocky Flats site as a wildlife refuge as represented in the Udall - Allard draft legislation.</p> <p>Response: We believe the Plan provides for management of the Rock Creek Reserve that will not preclude any use.</p>

Jerry Henderson	5-1	<p>Comment: Does the Plan deal sufficiently with the easements, mineral rights and water rights?</p> <p>Response: We feel the Plan has addressed these situations sufficiently. The easement holders have the rights of access set forth in their easements and must follow Rocky Flats procedures when exercising those rights, including water conveyance easements and utility easements. Those exercising mineral rights interests must comply with applicable Federal, State, and local law pertaining to zoning, mining reclamation permits, endangered species, wetlands and other legal requirements. The current natural habitat has developed based on the existing water quantities and it is expected to continue if that amount of water flow continues.</p>
	5-2	<p>Comment: The Plan establishes no timetable for some of its key proposals. For instance, agency personnel admit that completion of a Trails and Access Plan may be several years away. It could be needed as early as 2007.</p> <p>Response: Priorities for implementation of proposed actions will be dependent on available funding and personnel over the next five years. This document does not include provisions for a Trails and Access Plan. The proposed Access and Recreation Study will help develop a wide range of appropriate and Refuge-compatible access and recreational options that could be considered in the future. If the Site becomes a National Wildlife Refuge the ultimate determination for the "need" for trails and public access will be made in the refuge Comprehensive Conservation Planning Process. If it does not become a refuge, it is expected the Study will be completed prior to closure of the site in 2006.</p>
	5-3	<p>Comment: The Level III Contaminant Study is ill-defined. Does USFWS have more or less stringent requirements than the site's own buffer zone characterization?</p> <p>Response: Please refer to Response: # 3-7</p>
Colorado Department of Public Health and Environment	6-1	<p>Comment: The report does not appear to benefit from the experience of on-site personnel who currently perform buffer zone management work, prepare the survey reports and interface with the other activities underway at the Site.</p>
	6-2	<p>Response: This Plan is a cooperative effort between the FWS and DOE. The FWS preparer met with on-site contractor personnel prior to writing of the plan to get their input. In addition, natural resource management plans prepared by the on-site personnel were included in this plan through reference and/or incorporation of pertinent information. The on-site personnel have had opportunity to review and comment on this plan in a similar fashion as the general public. The preparation of this plan, and implementation of actions within this plan, have been, and will continue to be, interfaced with other Site activities which can be impacted, may impact the Rock Creek Reserve.</p> <p>Comment: An understanding of the Rock Creek Reserve hydrology is critical for the water balance and land reconfiguration studies underway for the Industrial Area of Rocky Flats.</p>
	6-3	<p>Response: A thorough understanding of the Rock Creek hydrology is not necessary for management and protection of the Reserve. General hydrology functions will fulfill the needs of the Rock Creek Reserve management.</p> <p>Comment: The report appears to minimize the potential impacts of current and permitted mining within and adjacent to the Reserve; in fact, mining areas are not even shown in the figures.</p> <p>Response: The Plan includes monitoring of the natural resources in the Rock Creek Reserve. If monitoring determines there are impacts, they will be addressed as appropriate. The Department of Energy neither tracks mineral leases nor maintains current maps depicting mineral leases.</p>

6-4	<p>Comment: To our knowledge, no baseline has been prepared of the Reserve showing the depth to ground water with spatial and temporal variation, the pathways for seeps and alluvial discharges, and the habitat requirements in relation to any proposed mining activities.</p> <p>Response: Groundwater has been sampled at several locations throughout the Reserve. These well sites have yielded ground water levels and general water quality data. Additional sampling included in this Plan will add data to better define current conditions.</p>
6-5	<p>Comment: The report also ignores the status of the Recovery Plan for the Preble's Meadow Jumping Mouse (PMJM) presently under development.</p> <p>Response: The PMJM Recovery Team was formed in 2000, with a draft PMJM Recovery Plan not anticipated until at least October 2001. If a draft PMJM Recovery Plan is completed by October 2001, a final Plan should follow about a year later. When the Recovery Plan is approved, any recovery criteria and tasks that apply to Rocky Flats will be incorporated into the RF-Mouse Protection Plan, and this plan will be reviewed by the FWS for compliance with ESA.</p>
6-6	<p>Comment: All of RFETS is potentially PMJM habitat, including what is now the Industrial Area after closure.</p> <p>Response: Through years of intensive trapping and tracking of the Preble's Mouse on Site, ecologists have a very good idea what areas are used by the mouse. The majority of the Site is not suitable as PMJM habitat, and the potential for mouse habitat within the Industrial Area will be determined by the outcome of the Land Reconfiguration Studies. The PMJM habitat is mainly associated with riparian zones or contact areas between riparian areas and the shortgrass zone.</p>
6-7	<p>Comment: What is required, however, is that both the DOE and FWS take seriously the need to integrate their activities in order to develop the additional knowledge and data necessary for both management of the Site's resources and for successful closure of the Site.</p> <p>Response: In order to properly manage and protect these resources, DOE and FWS will obtain the data they feel is necessary to make informed decisions on the Rock Creek Reserve.</p>
6-8	<p>Comment: These future activities need to occur within public view and with the involvement of all affected parties. We expect to monitor this progress and participate in assuring that the necessary integration takes place.</p> <p>Response: There were public scoping sessions on this plan, the Draft plan was presented at public meetings, and public comments were solicited. We encourage your interest in the management of the Reserve, as we do all members of the public. Public involvement is limited to review and comment.</p>
7-1	<p>Comment: Arvada appreciate DOE's efforts to enlist the resources of FWS temporarily during the Rocky Flats cleanup effort to assist in the stewardship of portions of the Buffer Zone. We hope that this arrangement will reinforce the site's commitment to manage Rocky Flats' ecological resources in a manner that is firmly based on sound scientific analysis.</p> <p>Response: Your support is acknowledged and appreciated.</p>
7-2	<p>Comment: We recommend that DOE and FWS focus primarily on natural methods of resource management, and minimize the use of artificial intervention, particularly in future efforts to reduce noxious weeds and to introduce native species.</p> <p>Response: The Rock Creek Reserve exists in the midst of a landscape that is highly altered and manipulated by human activities. The "natural" forces that drove the evolutionary development of these habitats (e.g. natural fire regime, bison grazing, etc.) no longer exist. The Site and its resources are threatened by human-induced disturbances, especially invasive exotic weeds. Hence, active management of the Site is essential to restore and conserve the significant natural resources of the area. The Site utilizes an approved integrated approach to noxious weed control, including</p>

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		herbicides, biological controls, and mechanical means.
7-3		<p>Comment: We request that DOE and FWS add the provision for substantive local public involvement in all aspects of the development, implementation, and decision making of each of the proposed actions in the plan.</p> <p>Response: Please refer to Response: # 6-8.</p> <p>Comment: In finalizing the plan, we recommend that the text be reviewed and revised to include the technical and policy comments that you receive as part of this initial comment period.</p> <p>Response: As was stated at the public meetings and in the cover letter initiating the public comment period, as part of the NEPA process, the comments received during this public comment period are considered herein, and where appropriate, changes to the text of the Plan are made.</p>
8-1	Westminster City Office	<p>Comment: The City questions the inclusion of the proposed expansion of the Rock Creek Reserve from 800 acres to 1700 acres in the Natural Resources Management Plan. The expansion should be addressed as a separate issue with (1) appropriate justification for increasing the Reserve from 800 to 1700 acres, (2) appropriate justification for not including the entire Rocky Flats Buffer Zone in the Reserve expansion.</p> <p>Response: As explained in Section 5.1, it was desirable to extend the Reserve boundary to more fully encompass the entire Rock Creek watershed that exists on the Site. This allows an ecosystem approach for management of the natural resources. The initial Reserve boundary was established based upon best estimates of the ecosystem functions at the time, which are for the most part, independent of any boundary designation. The expansion will capture more of the area that directly influences the ecosystem interactions within the Rock Creek Watershed. The Rock Creek Reserve may be further expanded in the future as deemed appropriate.</p> <p>Comment: Westminster strongly supports including the entire Woman Creek drainage located in the southern buffer zone in the Reserve plan as soon as possible.</p> <p>Response: Please refer to Response: # 8-1.</p> <p>Comment: Figure 1, which is a draft map showing open space and its current ownership that is contiguous to Rocky Flats, needs to be upgraded to show additional open space that is owned by the City of Westminster. Attached you will find the map with the area to be included outlined.</p> <p>Response: Figure 1 has been changed to reflect the additional land designated by Westminster as open space.</p> <p>Comment: Prairie dog migration into the Rock Creek Reserve has the potential to negatively impact the integrity of the proposed cap at some point in the future.</p> <p>Response: The decision regarding use of caps is outside the scope of this plan, however, if a final decision is made to use caps, such as on the existing landfill, the design criteria will include ways to prevent, or discourage, burrowing animals from digging. There are ways to use natural materials, such as rock, or broken concrete to discourage these animals. There are many examples of these efforts available in the private sector, including work being done at the Rocky Mountain Arsenal where prairie dogs are abundant.</p> <p>Comment: Discussions of an access and recreation study for the Reserve are premature at this point in time.</p> <p>Response: Please refer to Response: # 5-2.</p> <p>Comment: Westminster supports use of private funds to provide an assessment and determination of a feasibility to stabilize all or part of the Lindsay Ranch. Cleanup funds should not be used for this purpose.</p>
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		<p>Response: There are no plans to use cleanup funds for assessing the feasibility of stabilizing the Lindsay Ranch.</p> <p>Comment: Within the Site-wide annual noxious weed management plan, provide increased emphasis on the Reserve for noxious weed management, including increased biological controls. Westminster notes that these weed species are located across the site, not just in the rock Creek Reserve area. It does not seem prudent to only treat the Rock Creek Area</p> <p>Response: Treatment of noxious weeds in Rock Creek will not be an effort conducted by itself; the Site-wide Vegetation Management Plan includes treatment of noxious weeds on a Site-wide basis. The Vegetation Management Plan analyzes the integrated weed management efforts as a combined program, however, there may be isolated patches of weeds in Rock Creek that will be treated with bio-controls where closer monitoring of the effects can be done. In some cases Rock Creek could be used for the initial release and establishment of the insect species, with subsequent redistribution across the Site.</p>
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		<p>Comment: If it is determined that there is not enough flow in Rock Creek to support the Reserve, will water shares have to be purchased to augment the flow? Who will provide and pay for the purchase of the additional water?</p> <p>Response: The existing flow in Rock Creek supports excellent wildlife habitat and a threatened wildlife species. The current habitat exists based on these natural flows. It is anticipated that continuation of the natural flows will maintain this excellent habitat without needing flow augmentation. Please refer to Response: # 5-1.</p> <p>Comment: Any introduction of sensitive, native faunal species should only occur after there is a plan in place for the management of the entire site as a wildlife refuge.</p> <p>Response: Providing and protecting habitat for native wildlife is one of the purposes of the Rock Creek Reserve. Thus, any action that promotes the restoration and preservation of native species will not only meet the purpose of the Reserve, but will help promote partnerships with the state and counties for the preservation of native species within Boulder and Jefferson counties. In addition the RFETS Natural Resource Management Policy (September 30, 1998) included the policy of consideration of re-introduction of special concern species on a species-by-species basis. That Policy was completed following public review.</p> <p>Comment: The Rock Creek Plan does not identify the implementing agreements and agencies concerning the Prebles' meadow jumping mouse (PMJM) or the generation of a Habitat Conservation Plan (HCP).</p> <p>Response: As described on Page 5 of the Plan, this was developed in accordance with an Interagency Agreement between DOE and the FWS. Rocky Flats will be completing a revised Preble's Meadow Jumping Mouse Protection Plan, which will be the equivalent of a HCP for the Site, including appropriate Section 7 consultation under the ESA. In addition, RFFO has been involved with Jefferson county as they proceed toward development of their HCP. RFFO is involved with the PMJM Steering Committee where HCPs are addressed and coordinated on a multi-county basis to ensure uniformity.</p> <p>Comment: Is the map identifying the PMJM habitat based on actual trappings or identified riparian zones with the potential to maintain a viable habitat.</p> <p>Response: The PMJM mouse protection areas map is based in part on actual trapping and radio-collar tracking efforts over a number of years. In some areas actual mouse capture has not occurred, however those areas were designated as habitat based on similarities such as vegetation and distance to water.</p> <p>Comment: With the decision to perform no additional surveys of the Ute ladies' tresses orchid or Colorado butterfly weed, the potential for small populations to go undetected and be harmed by herbicide application is high.</p> <p>Response: Multiple years of surveys for federally listed native plants on the Site have been negative, and these plant species are not known to occur upstream of</p>
	8-8	
	8-9	
City of Broomfield	9-1	
	9-2	
	9-3	

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		<p>Rocky Flats. Based upon this information, the U.S. Fish and Wildlife Service informed Rocky Flats in 1999, that further formal surveys for these two species will not be required unless there is a disturbance of wetlands in potential habitat. Although additional formal surveys are not planned, work associated with pre- and post-herbicide applications will provide additional observation of plant species within Rocky Flats. During normal annual vegetation surveys, K-H ecologists make a concerted effort to look for new, or overlooked plant species. Overall, without the control of noxious weeds, there will be additional losses to the Rocky Flats native plant community. Based on existing off-site Ute ladies' tresses orchid and Colorado butterfly weed populations, it is thought that if they were to be found on the Site it would be around Antelope Springs in the Woman Creek drainage and some of the hillside springs above Rock Creek.</p>
	9-4	<p>Comment: Land use currently addresses existing mining permits for minerals. This potential disturbance is not consistent with future proposed land use for Rock Creek, or with the stewardship goals identified for the area.</p> <p>Response: The Land Use Section 2.2 provides background information to place the management of the Rock Creek Reserve in context. Mineral owners have a right of access for extraction of minerals. How that extraction occurs and the mitigation required is determined by entities other than DOE. Also please refer to Response: # 5-1.</p>
	9-5	<p>Comment: Additional information should be included within the document to address easements and access related to U.S. West fiber optic line, Coors Energy gas pipeline, Public Service gas line, the high voltage transmission line, and any other known easements. The easements for Upper Church and McKay ditches will also need to be assessed for routine operations and maintenance (O&M). The specific process addressing O&M is not clearly identified. The plan should clearly define easement holder's needs and the ability to access these areas.</p> <p>Response: The RCR management plan treats all easement holders equally. Holders of easements are required to adhere to the Site procedures and follow the limitations specified in each individual easement. The management plan states that it does not preclude the exercise of private property rights and it is the private property right holder's responsibility to comply with applicable Federal, State, and local laws. Also please refer to Response: # 5-1.</p>
	9-6	<p>Comment: To determine if any undesirable runoff is entering Rock Creek, will sampling be performed to detect any undesirable chemicals associated with herbicide applications?</p> <p>Response: Herbicides are applied according to the label restrictions developed by the Environmental Protection Agency (EPA) and the chemical manufacturer. These restrictions dictate application amounts, and distance from open water, among application controls. As part of the directions to the contractor, (the licensed herbicide applicator and helicopter pilot), the Site establishes buffer zones, and distances from open water surfaces that a given herbicide can be applied. The helicopter pilot follows written instructions, areas marked on a map, and is guided through a Global Positioning System (GPS) on board the helicopter. Herbicide sampling in Rock Creek will be determined on the individual weed control project. If there is a high potential of herbicide entering the surface water, the project will be reviewed for alternative approaches. There may be ways to increase distance, use a different herbicide, or a different type of application, such as hand wiping. The first approach is to prevent the potential for herbicide entering the stream, then if necessary, the herbicide will be applied in the least intrusive manner. The need to sample the surface water will be based on the residual risk associated with the final decision for herbicide application.</p>
	9-7	<p>Comment: How often will the existing groundwater monitoring wells located in Rock Creek be sampled for herbicides or other chemicals?</p> <p>Response: A specific sampling program for the Reserve will be prepared after this Management Plan is approved and as part of the Plan implementation. The type and amount of sampling will be based on adequacy of available data, potential threats to the natural resources, and available funding.</p>
	9-8	<p>Comment: In the case of wetlands, how will the Site account for wetland impacts using a mitigation bank? With stewardship goals in mind, what are the foreseen activities that may potentially impact wetlands?</p> <p>Response: In the Rock Creek Reserve there are no foreseen activities that will impact the wetlands unless a later determination is made that an enhancement project for wetlands is feasible, in which case the impacts would be limited in scale, of a short-term nature, and consulted under Section 7 of the</p>

	Endangered Species Act. Wetland mitigation for other areas of the Site is beyond the scope of this plan.
9-9	<p>Comment: The potential air quality impacts associated with prescribed burns need to be added to the air quality section within this document.</p> <p>Response: The Site obtains an air quality permit from the State of Colorado for each of the prescribed burns that it conducts. The Vegetation Management Plan addresses prescribed burning. That plan was approved after conductance of a full and open public process under NEPA. The Site will follow the State of Colorado air quality regulations in conducting its prescribed burns. Burn plans will be prepared in compliance with Colorado regulations. Those plans will address safety procedures involving smoke impacts, and potential visibility reductions on public highways adjacent to the Site.</p>
9-10	<p>Comment: The plan does not address the detail of proposed actions for floral management that will be used to control noxious weeds and the prevention of infestations from noxious weeds.</p> <p>Response: Details of vegetation management including prevention of noxious weed infestations, are included in the Annual Vegetation Management Plan. That includes planting of native species to re-vegetate an area if soil disturbance occurs. The best management practice for preventing noxious weed infestations is maintaining a healthy, viable native vegetation ground cover.</p>
9-11	<p>Comment: Prescribed burns will require substantial communications with stakeholders to address the need for prescribed burns and associated positive impacts to ecological communities.</p> <p>Response: The prescribed burning process is addressed in the Annual Vegetation Management Plan. This includes designation of areas to be burned, potential impacts of burning, and the necessary public communication process. Burning within the Rock Creek Reserve is not treated as a separate burning activity, but is treated as a component of the larger Site-wide burning program. The associated positive impacts from burning have been addressed in the text of this Plan. See Section 5.7, 4.4.2.3, and 4.6.2 in Plan.</p>
9-12	<p>Comment: The application of herbicides will also be used as a management tool to control noxious weeds, but the document does not address specifics such as how often, when, and where the herbicides will be used.</p> <p>Response: The use of herbicides is an action addressed in the Site-wide Annual Vegetation Management Plan. The specifics of herbicide applications are addressed as part of the total vegetation management program. As stated in the text of this Plan, where herbicide application is desirable within the boundaries of the Preble's Mouse habitat, Section 7 Consultation will first occur with the US Fish & Wildlife Service. Also refer to Response. # 9-6.</p>
9-13	<p>Comment: Identify the document that will control the use and management of herbicide application within the Rock Creek Reserve.</p> <p>Response: The document that controls herbicide applications in Rock Creek as well as the rest of the Site is the Annual Vegetation Management Plan referenced in Section: 4.4.2.3, Page 44.</p>
9-14	<p>Comment: Broomfield is concerned that the plan addresses the feasibility of obtaining water rights to provide the land manager with a wider array of options for management of water quantity, which could be necessary in the future to protect the PMJM. How does the Site plan on obtaining additional water rights?</p> <p>Response: The Site is only going to explore the feasibility of obtaining water rights for existing flows at this time. It is expected that water rights would only be necessary for maintaining the present water flow situation in Rock Creek. There are no enhancements planned that would require any additional water over what is presently existing in Rock Creek.</p>
9-15	<p>Comment: The "Group I" sampling effort included semi-volatile organic compounds, but did not include volatile organic compounds. What is the justification for omitting volatile organic compounds?</p>

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		<p>Response: In 1994 when this study was conducted, it was felt that there wasn't any compelling reason to try to collect volatile organic compounds. Volatile organics, by their very nature of being volatile, dissipate rapidly in the environment. Since these samples were taken to characterize background data, the Group I samples were taken off-site in soils similar to those found on Rocky Flats. They were collected in open land where industrial activity has not occurred and thus the chance of having volatile organics present was low to non-existent. In addition, collection of soil samples contained volatile organics is difficult because of the dissipation occurring during collection procedures.</p>
	9-16	<p>Comment: The City of Broomfield expects that we will continue to be involved, informed, and allowed to participate in the revisions to the Rock Creek Reserve Management Plan.</p>
		<p>Response: There are no planned revisions of the Rock Creek Management Plan expected after this Plan becomes final. If some circumstance requires an revision, the public will be notified. Briefings and tours are available upon request based on your interests in staying informed about the management of Rock Creek.</p>
US Fish & Wildlife Service - Lakewood Ecological Services Field Office	10-1	<p>Comment: Jefferson and Boulder counties, in cooperation with local governmental jurisdictions, and representatives from individual interests such as the agricultural industry and homebuilders are working to develop regional Habitat Conservation Plans which will address impacts to the Preble's meadow jumping mouse (Preble's) and associated habitat types. The Plan should contain a discussion of its consistency with these "County Planning efforts, should include an evaluation in terms of how projects on both Reserve Area, and RFETS in general, could potentially affect regional long-term conservation planning efforts, and should also discuss how proposed activities will sustain or preclude preserve design options.</p>
		<p>Response: DOE has been involved with the Jefferson County Habitat Conservation Plan effort, and supports the conservation of PMJM. There are no actions planned in Rock Creek that would jeopardize the development and implementation of the County Habitat Conservation Plan process, or negatively impact PMJM populations or habitat within Rock Creek. Also refer to Response: # 9-1.</p>
	10-2	<p>Comment: Several water-related issues are discussed in the Plan, including water quality, water quantity, groundwater monitoring and management, and surface water and wetland monitoring and management. A discussion of current and future water diversions, onsite and future groundwater pumping and other depletion issues should be included, along with an analysis of associated potential adverse impacts on riparian areas and wetlands on the Reserve Area.</p>
		<p>Response: It is beyond the scope of this Plan to address off-site land management activities. At this time, there are no known impacts to Rock Creek from off-site management activities. Water diversions or groundwater pumping activities are not planned in Rock Creek Reserve.</p>
	10-3	<p>Comment: We recommend that the Plan discuss the effects of any proposed projects on the hydrology of riparian or wetland communities within their sphere of influence. Of particular importance is an analysis of the adequacy of proposed means to convey major flood or runoff flows without impacting vegetation off-site or in any restoration or enhancement areas.</p>
		<p>Response: There are no planned on-site projects within the Rock Creek drainage that will impact the hydrology of the riparian or wetlands communities. There will not be any projects in the Rock Creek drainage, within the Reserve, that will impact or affect the stream's historic natural ability to convey floods or runoff flows.</p>
	10-4	<p>Comment: Mineral rights and other mining issues should be discussed in detail for both the Reserve Area as well as RFETS and areas adjacent.</p>
		<p>Response: Those exercising mineral rights interests must comply with Federal, State, and local law pertaining to zoning, mining reclamation permits, endangered species, wetlands and other legal requirements. How that extraction occurs and any mitigation required is determined by entities other</p>

	<p>than DOE. Also refer to Responses: # 9-4, 6-3, and 5-1.</p> <p>Comment: Control of noxious weeds should be done in such a way that is consistent with endangered and sensitive species management. The Management Plan should identify specific standards for weed control that will not kill or harm federally-listed or sensitive species.</p> <p>Response: Control of noxious weeds will be done in a manner compatible with threatened and endangered species management. Consultation with FWS will be done whenever a weed control measure has the potential to impact these species or their habitat, in accordance with the Annual Vegetation Management Plan and EA. The benefits to native habitat gained from carefully-planned noxious weed control are expected to help ensure the continued existence of sensitive species.</p>
10-5	<p>Comment: It is unclear why raptor poles are proposed within the Reserve Area. A second concern regarding this issue is how the placement of raptor poles will increase the level of predation on the Preble's or be consistent with efforts to reintroduce Plains sharp-tailed grouse.</p> <p>Response: Please refer to Response: #1-12. The use of Raptor poles have been removed as a management option.</p>
10-6	<p>Comment: The Plan should contain specific measures which will be taken to perpetually protect the habitat value of proposed mitigation, as well as enhancement and restoration areas. Issues that should be addressed include restrictions on access as well as monitoring and management programs.</p> <p>Response: The Plan is written with a life of 5 years, equal to the period of the Interagency Agreement between FWS and DOE, but could be extended through Closure. The Plan is written to provide protection and/or enhancement to the natural resources in the Rock Creek Reserve. Whether this area becomes a Refuge or is managed as open space, all projects will be planned and conducted with measures to ensure the health of the habitat. Access restrictions will be addressed through the Access and Recreation Study or through the refuge system Comprehensive Conservation Planning Process. Please refer to Response: # 5-2.</p>
10-7	<p>Comment: The issue of outstanding easements across the Reserve Area is mentioned within the document. However, there is no discussion regarding how the utilization of these easements would adversely affect native habitats or sensitive, threatened, or endangered species. We recommend that the final Plan contain a detailed analysis of these issues.</p>
10-8	<p>Response: For the most part, the easements included within the Rock Creek Reserve (including expanded boundary), are easements that have been in place for some time. The exception is the lower part of McKay Ditch, which was changed to an underground pipeline. That portion was consulted on with the FWS under the Endangered Species Act and mitigation was accomplished. The impacts on habitats or wildlife species from the remaining easements have not been noticeable. There are two-track, unimproved roads on, or along, most of the easements to allow owners necessary access for maintenance. There are not expected to be any significant adverse impacts from continued use of these access roads. Maintenance of the water conveyance ditches, such as cleaning out vegetation and sediments, may require Section 10 consultation between the ditch owners and the FWS.</p>
10-9	<p>Comment: We recommend that the issue of future use or rehabilitation of the old landfill be addressed. Are there plans to actively use this facility in the future? If so, what are the potential adverse effects of such use? If the facility will not be used, will it be restored back to native habitat?</p> <p>Response: The landfills are not included in the existing, or expanded, boundary of the Rock Creek Reserve. Action necessary for cleanup and/or closure of the old landfill is outside the scope of this management plan. Also refer to Response: # 11-5.</p>
10-10	<p>Comment: The Plan makes no mention of future transportation corridor issues. Are there any known or proposed transportation easements across the Reserve Area?</p> <p>Response: There are no current proposed transportation corridor issues. There are no existing plans addressing what Site access will be necessary after closure. The proposed Access and Recreational Study may address these needs and propose a range of options for internal access.</p>

	10-11	<p>Comment: The document is unclear as to the definitions of preferred vs. proposed actions. Within the Section 7 consultation process and the National Environmental Policy Act regulations, there are standardized uses of these terms. We recommend that these terms be well defined and used consistently throughout the document.</p> <p>Response: The terms "preferred" and "proposed" are defined in Section 1.3. We feel these definitions are explicit and the terms are used consistently throughout the document. The terms have been used, as defined, in other Integrated Natural Resource Management Plans and meet the requirements of the National Environmental Policy Act.</p>
	10-12	<p>Comment: The document contains no discussion of a funding plan or guarantee of funding for the proposed actions. We recommend that the document define clear priorities regarding which monitoring and management actions will be carried out if full funding is unavailable or, in lieu of such a list, what mechanisms will be used to provide for implementation of the stated Plan actions.</p> <p>Response: The Rock Creek Integrated Natural Resource Management Plan is not a budgetary document, and thus cannot be the vehicle to obligate federal funds. We will assess the available RFFO funds on an annual basis and apply funds based on the priorities determined by DOE and FWS at the time.</p>
City of Boulder	11-1	<p>Comment: Page 14, 2.1.3 Mineral Rights ; We suggest adding language that either ensures or promotes restoration and re-vegetation of any mining area using native species obtained from the closest available source and adequate weed control.</p> <p>Response: Restoration and revegetation using native species could be mining permit requirements and such requirements are the responsibility of entities other than DOE. DOE supports the use of native species on reclamation activities. Also please refer to Response # 10-4.</p>
	11-2	<p>Comment: Additional groundwater monitoring in the northwest section of the Reserve should be conducted to assess any changes in groundwater flow from gravel mining or other activity that could adversely effect wetlands and streams.</p> <p>Response: A review of the adequacy of the groundwater sampling program to determine if there are additional locations and water quality parameters that need closer scrutiny will be part of the planning activity associated with this Plan. If additional sampling is deemed necessary it will be prioritized along with the other necessary work in the Reserve to determine available funding.</p>
	11-3	<p>Comment: While insects (biological controls) may be approved for release by the US Department of Agriculture and the State of Colorado, they were not likely tested on many of the native plants found in our area. As a result, we strongly request language to include a short and long term monitoring program to assess effectiveness and to ensure non-target organisms are not being adversely effected.</p> <p>Response: All reasonable precautions will be taken whenever an insect is considered for release in this program. All insects considered for release at this time have already been released in other areas of Colorado, some with successful results, especially in the case of knapweed. To date, we have found no data supporting significant negative impacts to native plants from insects released for weed biocontrol. The potential benefits to many native plant species from biocontrol are weighed against any potential negative impacts before a decision is made to release insects. Plant pathogens are not being considered at this time, however, because of the increase potential to impact non-target species.</p>
	11-4	<p>Comment: We support and look forward to participating in an Access and Recreation Study to analyze public visitation options. It is important that we work together to ensure trail connections to City of Boulder lands that benefit visitors and that minimize environmental impacts. We request that the most recent research be used in this analysis including edge effect and habitat fragmentation information.</p> <p>Response: Please refer to Response # 5-2.</p>
	11-5	<p>Comment: We continue to urge expansion of the proposed reserve to include about 320 contiguous acres to the west and the landfill area to the south.</p>

	Response: Please refer to Response # 8-1.	
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APPENDIX 10



Department of Energy

ROCKY FLATS FIELD OFFICE
10808 HIGHWAY 93, UNIT A
GOLDEN, COLORADO 80403-8200

MAY 16 2001

01-DOE-00928

Mr. LeRoy W. Carlson
Colorado Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

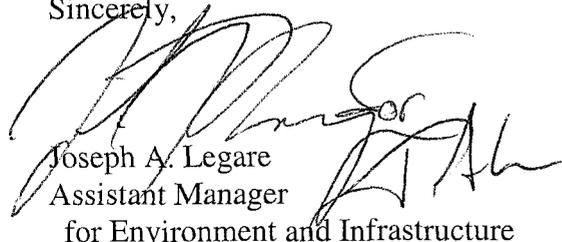
Dear Mr. Carlson:

Enclosed is the Biological Assessment for implementation of the Rock Creek Reserve Integrated Natural Resources Management Plan and Environmental Assessment (Plan). The Plan was developed jointly with the U.S. Fish and Wildlife Service for management of the Rock Creek Reserve.

The Biological Assessment is provided for informal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Threatened and Endangered Species Act. The general activities described in the Plan and the Biological Assessment will have no affect, or may affect, but is not likely to adversely affect the Threatened and Endangered Species located within the area of the Rock Creek Reserve. If specific activities are later developed that affect the Preble's Meadow Jumping Mouse, or its habitat, additional consultation will be initiated.

The Department of Energy requests that the U.S. Fish and Wildlife Service concur with the Biological Assessment determination. If you have any questions, please call me at (303) 966-5918 or Cliff Franklin at (303) 966-5919.

Sincerely,


Joseph A. Legare
Assistant Manager
for Environment and Infrastructure

Enclosure

cc w/o Encl:
C. Franklin, AI, RFFO
J. Rau, AI, RFFO

BIOLOGICAL ASSESSMENT

FOR

**IMPLEMENTATION OF THE ROCK CREEK RESERVE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
AND ENVIRONMENTAL ASSESSMENT**

ASSESSING POTENTIAL IMPACTS TO

PREBLE'S MEADOW JUMPING MOUSE
(Zapus hudsonius preblei)

AT

**ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO**

Scope

This Biological Assessment (BA) was prepared to comply with the Endangered Species Act (ESA) section 7(a)(2) and to fulfill the requirements of the National Environmental Policy Act (NEPA). A draft Integrated Natural Resources Management Plan and Environmental Assessment for Rock Creek Reserve (Plan) was prepared and submitted for public and agency review and comment in March 2001. The U.S. Fish and Wildlife Service (Service), Office of Ecological Services, requested a BA to identify potential impacts to the Preble's meadow jumping mouse (Preble's), a federally-listed threatened species that resides in the Rock Creek Reserve. 50 CFR Section 402.02 requires BAs to be prepared for "major construction activities", or activities with similar impacts. Federal agencies must document the evaluation of the effects of their actions to threatened or endangered species or their designated critical habitat. Informal consultation with the Service determined a BA to be the best method to begin formal consultation and identify potential impacts from proposed actions within the Plan. This BA discusses only those actions considered within the Plan that "may affect" Preble's or its habitat. This BA discusses only those potential impacts that would occur from management activities in the Rock Creek Reserve. Activities in other areas of the Rocky Flats Environmental Technology Site with potential to impact Preble's are being considered in a separate process.

Background

Rock Creek Reserve (Fig. 1) was established in May of 1999 in recognition of the area's biological significance. Although still under ownership of the Department of Energy (DOE), Rock Creek Reserve is co-managed with the Service as part of a cooperative agreement signed by the two agencies in 1999. The need for an integrated natural resources management plan was recognized and included as a requirement in the cooperative agreement. The Plan discusses management tools and options specifically for Rock Creek Reserve for the next five years.

The Plan was developed as a tool to cooperatively manage natural and cultural resources under the current federal ownership and land use conditions. Any significant changes to the current conditions will be addressed as a supplement to the Plan or in a separate document if necessary. All management strategies in the Plan will be consistent with Rocky Flats' current mission of facilities demolition and site remediation resulting in closure.

The Plan utilizes basic criteria for protecting and enhancing natural resources using watershed, landscape, and ecosystem perspectives, consistent with the current Rocky Flats mission and Service goals. Provisions of the Plan apply to all management entities at Rocky Flats. For the purposes of this document those entities are currently the DOE (including its contractors) and the Service. The Plan provides the management goals and guidance for Rock Creek Reserve for future specific natural resource management plans, such as noxious weed management plans, cultural resource management plans, etc.

Threats that warranted listing of Preble's by the Service under the ESA should be reduced and native species health and abundance improved through implementation of the Plan.

Upon public and agency review of the Plan and approval, the DOE agrees to implement the Plan and the "2001 Preble's Meadow Jumping Mouse Management Policy for the Rocky Flats Environmental Technology Site".

New construction that would potentially impact federally-listed species or their habitat, emergency actions and other activities not covered in this BA will require additional consultation under section 7 of the ESA.

I. BASELINE

Under the interagency agreement, Rock Creek Reserve was originally comprised of 800 acres in the north Buffer Zone area of the Rocky Flats Environmental Technology Site. Under the approved expansion proposal within the Plan, Rock Creek Reserve now comprises approximately 1700 acres. Of the 1700 acres, 150 to 200 acres contain Preble's habitat. Rock Creek Reserve is considered to be relatively uncontaminated with hazardous waste and radionuclides, showing background levels in previous samples (refer to the Plan for more details).

II. SPECIES INVOLVED

The primary focus of this BA is the potential for adverse impacts to Preble's and/or the habitat upon which the species depends within the Rock Creek Reserve. The potential impacts described in this BA could also impact other native species resident or transitory on Rock Creek Reserve. These species/communities include, but are not limited to, unique plant communities, native fish populations, and migratory birds. The Bald Eagle does not nest in Rock Creek Reserve, and the main prey in the area, prairie dogs, does not occur in Rock Creek Reserve. A pair of Bald Eagles nests near Standley Lake, a reservoir located approximately five miles from Rock Creek Reserve. None of the management proposals within the Plan are expected to affect Bald Eagles.

Using an ecosystem approach, implementation of the Plan should improve the status of Preble's and other native species existing within Rock Creek Reserve through actions designed to protect and enhance native plant communities and other resources. However, de-listing of federally-listed species will depend upon the removal of range-wide threats to the species and completion of the goals and objectives of a Service-approved Recovery Plan.

III. RESPONSIBLE PARTIES

Department of Energy Rocky Flats Field Office
10808 Highway 93 Unit A
Golden, CO 80403

United States Department of Interior
Colorado Fish and Wildlife Management Assistance Office
755 Parfet Suite 496
Lakewood CO 80215

IV. PROBLEMS FACING PREBLE'S

The success of any conservation or recovery program depends on eliminating or reducing the impact of activities that threaten the species' existence. The following list is a compilation of threats based on the five criteria considered for federal listing of a species in Section 4(a)(1) of the ESA:

- a. The present or threatened destruction, modification or curtailment of its habitat or range.
- b. Overutilization for commercial, recreational, scientific or educational purposes.
- c. Disease, predation, competition or hybridization.
- d. The inadequacy of existing regulatory mechanisms.
- e. Other natural (e.g., drought) or human induced (e.g., socio-political) factors affecting its continued existence.

The Plan identifies the main threat to Preble's, its habitat and other sensitive species/plant communities within the Rock Creek Reserve as modification of habitat through the presence of several species of particularly aggressive, invasive weeds, and outlines activities to remove or reduce this threat. These actions, although considered to be overall beneficial, have the potential to adversely affect Preble's individuals.

V. PROPOSED ACTIONS WITH POTENTIAL TO AFFECT PREBLE'S

Although beneficial in the long-term, the following natural resource management actions proposed within the Plan are considered to have the potential for short-term adverse impacts to Preble's or its habitat. Please refer to the Rock Creek Reserve Integrated Natural Resources Management Plan and Environmental Assessment for additional detail.

A. Noxious Weed Control Measures. Approximately 850 acres of Rock Creek Reserve are infested with several species of noxious (invasive) weeds. Of that acreage, approximately 10 to 15 acres falls within Preble's habitat. The Plant Protection Act and the Colorado Weed Management Act require that measures be undertaken to control, and prevent the spread, of listed noxious weeds. The following measures are proposed to control noxious weeds in the Rock Creek Reserve. They are listed in the order of severity of potential impacts to Preble's and other sensitive plant and animal species.

1. Herbicide applications.

1.1. Adverse impacts could result from direct exposure to the chemical at the time of application. Exposure from immediate ingestion of vegetation with the chemical residue on it or within it from a systemic herbicide could also occur. This type of exposure could result in a teratogenic or carcinogenic effect on the animal species exposed. Timing of applications is

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crucial to minimize these impacts while still gaining the benefit of controlling the weeds. No more than 2% (3 acres) of Preble's habitat in Rock Creek Reserve will be treated with herbicides in any year, for a maximum total of 10% (15 acres) over the life of the Plan (5 years).

Applications of herbicides will not be made in Preble's habitat while Preble's are active, or while migratory, ground-nesting birds are breeding in areas that could be impacted. Herbicides would not be used near open water and would be used in wetland areas only through the use of back-pack sprayers to ensure precise application to monocultures of the target weed (most likely Canada thistle). Applications would comply with label restrictions and would be done in very limited areas. Biological control would be the main strategy in riparian areas and wetlands.

1.2. Indirect impacts to Preble's and other sensitive species could result from adverse impacts to non-target plants which comprise the ecosystem. Diffuse knapweed and Dalmatian toadflax in the more upland habitat, and Canada thistle in the riparian area and wetlands are the main threats. These weeds displace the native vegetation that Preble's depends upon for survival. The Plan includes monitoring and re-vegetating with native species as the target weed populations decline. Removal of one weed species can set the stage for another aggressive weed to gain a foothold. Minimization of impacts to non-target species is important to the overall goal of the Plan. There will be, however, short-term, adverse impacts to non-target species from herbicide applications. Invasive weed control strategy as outlined in the Plan uses other, more long-term methods to control weeds, with herbicides used only in support of the other forms of control.

2. Prescribed burning. Prescribed burning has the beneficial impacts of returning nutrients to the soil for use by native plant species, and reducing fuel (thatch) in Preble's habitat. This will minimize the risk of wildfires, and fires made hotter by increased fuel loads, which could have an even greater impact on Preble's and its habitat. Prescribed burning would be done in conjunction with herbicide usage as described above to provide optimum benefit for weed control when applicable. This method would be used when a monoculture of the weed is present. Prescribed burning would be implemented in the fall, with herbicide applications following in the early spring to kill the increased number of weeds that germinate from the soil seed bank after burning. Heat from the fire may cause more weed seeds to germinate, along with the removal of the thatch's shading effect. Herbicides can then be used more effectively. This method may or may not be applicable in some areas of Preble's habitat.

2.1. Direct impacts from burning that could adversely affect Preble's and other sensitive species include killing or harming individuals active above ground during a burn. A small window of opportunity for burning is available due to restrictions on burning at certain times of the year by the State of Colorado. Burning in Rock Creek Reserve would be prescribed during the early spring (March for xeric tallgrass prairie) or late fall (October for wetland areas) to avoid the presence of Preble's, nesting ground birds and most reptiles. If used, prescribed burning will be implemented in no more than 2% (1 to 4 acres) of Preble's habitat in any one year, for a maximum of no more than 10% (5 to 20 acres) of Preble's habitat being burned over the life of the Plan. Prescribed burning is a controversial issue at Rocky Flats because of public concerns, and burning may not be implemented at all, or at the lesser (1 acre) range of implementation. If approved for implementation, areas not within Preble's habitat will be burned in accordance with the Prescribed Burn Annual Rotation Plan for Rocky Flats. These areas will then afford firebreak protection for subsequent burns. It is DOE policy that each prescribed burn

implemented at Rocky Flats will be coordinated and documented in a specific burn prescription plan. Any burn planned to take place in Rock Creek Reserve in all, or part, of Preble's habitat will also include a Preble's habitat protection and mitigation section in the case that a prescribed burn were to become uncontrollable due to unexpected high winds, etc. This habitat protection and mitigation section could include measures such as the use of natural firebreaks (roads, creek, etc.), immediate re-vegetation efforts or re-location of individuals to other areas of suitable habitat in an emergency situation. Specific burn prescription plans that include Preble's habitat will be submitted to Ecological Services for consultation and approval.

2.2. Indirect adverse impacts to Preble's and other sensitive species could occur from damage to the native plant communities through too frequent use of burns. Frequent burning can damage the root systems of the native grasses allowing annual, weedy species to dominate. This is apparent in areas that are burned every year, for example, ranges on military lands that often catch fire as a result of military training. Damage to the native grasses and other vegetation in general also results in erosion from areas of bare ground. Loss of topsoil and sedimentation from run-off could result in increased stream turbidity and off-site transport, especially during heavy rain events. Burning wetland areas in the fall decreases the chances of this happening until ground cover has re-established somewhat. Due to the availability of water, wetland vegetation has the ability to recover at a faster rate than vegetation in the xeric, upland areas. A given area of ground would only be subjected to prescribed burning one time during the five-year period of the Plan, with burning planned for late October/early November, or in April.

Not utilizing prescribed burning may also be considered a potential adverse impact. Years of fire suppression have caused a high level of thatch buildup, increasing the fuel load greatly above what would naturally occur. This increases the potential for an uncontrollable wildfire in Preble's habitat, and for the increased fuel load to cause fires to burn hotter, causing more damage to plant roots and trapped wildlife.

3. Biological Control. Biological controls (insects) have been released at Rocky Flats for several species of noxious weeds. The Plan proposes to increase the use of biological control for diffuse knapweed, dalmatian toadflax and Canada thistle.

3.1. Direct impacts to Preble's and its habitat would be insignificant. The insects would not cause impacts, and the presence of workers releasing insects and recording field data would be minimal. No insect species will be released if they have been proven to attack native plants elsewhere. A literature search has revealed very little research implicating problems with non-target hosts, implying that this has not been a significant problem with biological control of weeds under current environmental laws, such as the ESA and NEPA.

3.2. Indirect impacts would be beneficial overall through the restoration of habitat to native plant species. As with any weed control method, an adverse indirect impact could result through the succession of different weed species as the target weed populations decline, especially if the secondary weed is of no use as food or cover for Preble's. Monitoring of the weedy areas will determine if reseeded/revegetation is required.

B. Structural stabilization of the Lindsay Ranch. The barn is located approximately 200 feet from the streambed and Lindsay pond, and the ranch house is approximately 300 feet from the stream and pond.

1. Direct impacts. Any construction activity in the vicinity of the house or barn has the potential to harm or harass wildlife, including individual Preble's. The barn and house are used extensively by wildlife. American kestrels nest in the house, great horned owls nest in the barn. Deer use the barn for shelter, and a porcupine has been reported to use the house for shelter. Any stabilization activity would be accomplished in the late fall or winter to avoid the harm or harassment of nesting raptors and other migratory birds, including waterfowl on Lindsay pond. Preble's would be hibernating, and care would be taken to keep all vehicles and equipment on the road to avoid damage to vegetation and soils.

2. Indirect impacts to wildlife could result if the stabilization measures rendered the buildings unusable for wildlife (especially raptors) by closing off entrances/exits to the buildings, or removing nesting substrates. This could actually benefit individual Preble's by removing the presence of those predators from the immediate area.

C. Use of rotenone to remove bass from Lindsay pond. The use of rotenone in Lindsay pond would have severe short-term impacts on the aquatic life in the pond, especially fish, amphibians and invertebrates. These impacts are very short-lived, and the return of native fish, amphibians and invertebrates to ponds treated in this manner is generally quite successful.

1. Direct adverse impacts to Preble's and other non-target wildlife would be insignificant due to the timing of the rotenone application. This would be scheduled for October when impacts to wildlife would be minimal, and Preble's would be hibernating. Barriers such as sandbags would be used to prevent leakage of rotenone and potassium permanganate (neutralizer) into the downstream area.

2. Indirect impacts would be overall beneficial. Bass, a non-native species, have great impact, especially in small isolated systems where they remove all native fish and most amphibians, through predation. They are currently the only fish species present in Lindsay pond. Bass prey on small mammals and birds also, and could prey on swimming Preble's. The removal of this fish species will have a positive effect in general through the re-establishment of a more diverse population of aquatic species in Lindsay pond, and would remove the possibility of bass preying upon Preble's in Lindsay pond.

VI. CUMULATIVE IMPACTS

The potential exists for cumulative adverse short-term impacts from the combination of prescribed burning and spraying herbicides in Preble's habitat. This would be minimized through mitigation. Mitigation would include timing burns and herbicide applications to take place during Preble's hibernation, spot spraying of small areas of weeds to minimize impacts to non-target vegetation, burning combined with spraying only when a monoculture of the weed is present, and monitoring impacts. If adverse impacts such as succession of non-desirable vegetation or lack of re-vegetation are observed after the first year (or at any time), those control

methods will cease while the techniques are re-evaluated. Controlling noxious weeds and restoring native vegetation would have long-term cumulative benefits to Preble's and its habitat.

VII. CONCLUSIONS

Implementation of the proposed actions discussed above is subject to the availability of funds. These actions were identified as having the potential to adversely affect individual Preble's through short-term, direct and indirect impacts. Mitigation as part of the proposed actions ensures the adverse impacts would be minimal or non-existent and would impact only individuals; the continued existence of the species would not be jeopardized. The overall long-term impacts are expected to be beneficial not only to Preble's, but to the wildlife in general found in the Rock Creek Reserve.

APPENDIX 11



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

IN REPLY REFER TO:

ES/GJ-6-CO-01-F-021
Mail Stop 65412 LKWD

MAY 21 2001

Joseph A. Legare
Assistant Manager for Environment and Infrastructure
Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

Dear Mr. Legare:

In accordance with section 7 of the Endangered Species Act as amended (16 U.S.C. 1531 et seq.) (Act) and the Interagency Cooperative Regulations (50 CFR 402), this transmits the U.S. Fish and Wildlife Service's final biological opinion on the effects of proposed actions on federally-listed endangered and threatened species as described in the Biological Assessment for the Implementation of the Rock Creek Reserve Integrated Natural Resources Management Plan and Environmental Assessment (BA). The BA assesses potential impacts to federally-listed species which may occur through the implementation of the Rock Creek Reserve Integrated Natural Resources Management Plan and Environmental Assessment (Plan).

Your request for formal consultation was agreed to at a meeting which occurred in early May, 2001, at the offices of the Service and was based upon review of the Plan. At issue are the effects of the proposed actions on the threatened Preble's meadow jumping mouse (*Zapus hudsonius preblei*). No other federally-listed species will be affected by the proposed activities. If the various project descriptions change, or previously unknown listed species are found to be present and adversely affected, the effect determinations would change and require reinitiation of formal consultation.

Your cover letter for the BA, dated May 16, 2001, states that the activities described in the Plan and BA will have "no affect, or may affect, but is not likely to adversely affect" any federally-listed species within the Rock Creek Reserve. The Service disagrees with this conclusion and believes that the two activity types described in the Plan may adversely affect the Preble's meadow jumping mouse. Therefore, we have provided the following biological opinion and accompanying Incidental Take Statement.

This biological opinion is based on information provided in the BA, the Plan, and informal consultation between our staffs. The above-mentioned documents are incorporated herein by reference. A complete administrative record of this consultation is on file at the Service's Field Office.

Consultation History

On May 13, 1998, Preble's was listed as threatened under the Act. Full protection for Preble's became effective on June 12, 1998.

Rock Creek Reserve was established in May of 1999 in recognition of the area's biological significance. Although still under ownership of the Department of Energy (DOE), Rock Creek Reserve is co-managed with the Service as part of a cooperative agreement signed by the two agencies in 1999. The need for an integrated natural resources management plan was recognized

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and included as a requirement in the cooperative agreement. The Plan discusses management tools and options specifically for Rock Creek Reserve for the next five years.

The Plan was developed as a tool to cooperatively manage natural and cultural resources under the current federal ownership and land use conditions. The Plan utilizes basic criteria for protecting and enhancing natural resources using watershed, landscape, and ecosystem perspectives, consistent with the current Rocky Flats Environmental Technology Site (RFETS) mission of facilities demolition and site remediation resulting in closure, as well as reflecting Service goals. The Plan provides the management goals and guidance for Rock Creek Reserve for future specific natural resource management plans, such as noxious weed management plans, cultural resource management plans, etc.

The consultation process allows DOE and the Service to examine regional trends and issues. Programmatic consultations on limited time frames facilitate the identification of problems and issues before they become severe and while proactive remedies still exist. Such early and continual cooperative efforts between action agencies and regulatory agencies represent a critical component in the adaptive management process.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The action area is located on the RFETS in northern Jefferson County, Colorado. The proposed action is the implementation of the Plan. The BA discussed only those actions considered within the Plan that "may affect" Preble's or its habitat and only those potential impacts that would occur from management activities in the Rock Creek Reserve. Activities in other areas of the RFETS with potential to impact Preble's will be considered in a separate process. Any significant changes to the current conditions will be addressed as a supplement to the Plan or in a separate document if necessary. Using an ecosystem approach, implementation of the Plan should improve the status of Preble's and other native species existing within Rock Creek Reserve through actions designed to protect and enhance native plant communities and other resources.

The Plan identifies the main threat to Preble's, its habitat and other sensitive species/plant communities within the Rock Creek Reserve as modification of habitat through the presence of several species of particularly aggressive, invasive weeds, and outlines activities to remove or reduce this threat. Although beneficial in the long-term, some natural resource management actions proposed within the Plan may have the potential for short-term adverse impacts to Preble's or its habitat.

In reviewing the Plan, the Service has determined that the following activities may result in adverse effects to Preble's. Therefore, these proposed activities are evaluated in this biological opinion and the effects of incidental take are analyzed. Specifically, these actions are described below.

1. Noxious Weed Control Measures - Herbicide Application. Approximately 850 acres of Rock Creek Reserve are infested with several species of noxious (invasive) weeds. Of that acreage, approximately 10 to 15 acres falls within Preble's habitat. No more than 2% (3 acres) of Preble's habitat in Rock Creek Reserve (assuming a minimum of 150 acres of suitable, occupied habitat) will be treated with herbicides in any year, for a maximum total of 10% (15 acres) over the life of the Plan (5 years).
2. Prescribed Burning. A maximum of 2% (3 acres) of Preble's habitat in any one year, for a maximum of no more than 10% (15 acres) of Preble's habitat would be burned over the life of the Plan. Direct impacts from burning that could adversely affect Preble's and other sensitive species include killing or harming individuals active above ground during a burn. Prescribed burning would be done in conjunction with herbicide usage to provide optimum benefit for weed control when applicable.

Conservation Measures

Actions in the project description that will be implemented to further the recovery of threatened and endangered species are known as conservation measures. As part of the proposed action, the beneficial effects of these conservation measures are taken into consideration in the jeopardy and incidental take analyses. Conservation measures are part of the proposed action and their implementation is required under the terms of this consultation. Specific conservation measures identified in the BA and the Plan and included in this biological opinion that will benefit threatened and endangered species include the following.

Herbicide Applications

1. Applications of herbicides will not be made in Preble's habitat while Preble's are active.
2. Herbicides would not be used near open water and would be used in wetland areas only through the use of back-pack sprayers to ensure precise application to monocultures of the target weed (most likely Canada thistle).
3. Applications would comply with label restrictions and would be done in very limited areas.

Prescribed Burning

4. Burning in Rock Creek Reserve would be prescribed during the early spring (March for xeric tallgrass prairie) or late fall (October for wetland areas) to avoid the presence of Preble's.
5. Any burn planned to take place in Rock Creek Reserve in all, or part, of Preble's habitat will also include a Preble's habitat protection and mitigation section in the case that a prescribed burn were to become uncontrollable due to unexpected high winds, etc. This habitat protection and mitigation section could include measures such as the use of natural firebreaks (roads, creek, etc.), immediate re-vegetation efforts or re-location of individuals to other areas of suitable habitat in an emergency situation. Specific burn prescription plans that include Preble's habitat will be submitted to Ecological Services for consultation and approval.

STATUS OF THE PREBLE'S MEADOW JUMPING MOUSE

Preble's is a small rodent in the family Zapodidae and is 1 of 12 recognized subspecies of the species *Z. hudsonius*, the meadow jumping mouse. Preble's is native only to the Rocky Mountains-Great Plains interface of eastern Colorado and southeastern Wyoming. This shy, largely nocturnal mouse lives in moist lowlands with dense vegetation. It is 8 to 9 inches long (its tail accounts for 60 percent of its length) with hind feet adapted for jumping. Preble's hibernates underground from September to May.

Historic records for Preble's define a range including Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Elbert, Jefferson, Larimer, and Weld counties in Colorado; and Albany, Laramie, Platte, Goshen, and Converse counties in Wyoming (Kruttsch 1954, Compton and Hugie 1993). Armstrong et al. (1997, p. 77) described typical Preble's habitat as "well-developed plains riparian vegetation with relatively undisturbed grassland and a water source in close proximity." Also noted was a preference for "dense herbaceous vegetation consisting of a variety of grasses, forbs and thick shrubs."

Preble's has undergone a decline from its historic range and populations within its remaining range have been lost. Habitat loss and fragmentation resulting from human land uses have adversely impacted Preble's populations. David Armstrong (University of Colorado, pers. com. 1998) concluded that the meadow jumping mouse, in this region as elsewhere, is a habitat specialist, and that its specialized habitat is declining.

Compton and Hugie (1993, 1994) cited human activities that have adversely impacted Preble's including: conversion of grasslands to farms; livestock grazing; water development and management practices; and residential and commercial development. Shenk (1998) linked potential threats to ecological requirements of Preble's and suggested that factors which impacted vegetation composition and structure, riparian hydrology, habitat structure, distribution, geomorphology, and animal community composition must be addressed in any conservation strategy.

Residential and commercial development, accompanied by highway and bridge construction, and instream alterations to implement flood control, directly remove Preble's habitat, or reduce, alter, fragment, and isolate habitat to the point where the Preble's can no longer persist. Corn et al. (1995) proposed that a 100 meter (328 foot) area of unaltered habitat be established to protect the flood plain of Monument Creek from a range of human activities that might adversely affect Preble's or its habitat. Roads, trails, or other linear development through Preble's habitat may act as barriers to movement. Shenk (1998) suggested that on a landscape scale, maintenance of acceptable dispersal corridors linking patches of Preble's habitat may be critical to its conservation.

Further information about the biology and status of the Preble's can be found in the "Conservation Assessment and Preliminary Conservation Strategy for Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)" (Shenk, 1998, available upon request).

ENVIRONMENTAL BASELINE

Under the interagency agreement, Rock Creek Reserve was originally comprised of 800 acres in the north Buffer Zone area of the RFETS. Under the approved expansion proposal within the Plan, Rock Creek Reserve now comprises approximately 1700 acres. Of the 1700 acres, 150 to 200 acres contain Preble's habitat.

EFFECTS OF ACTION

The proposed actions will affect a maximum of 30 acres of potential Preble's habitat over the life of the Plan. Specifically, this includes a maximum of 3 acres annually for noxious weed control within Preble's habitat and 3 acres annually for prescribed within the 5-year period (a maximum total of 6 acres annually).

The riparian corridors located within Rock Creek Reserve are expected to be inhabited by Preble's year-round. Therefore, there is a possibility that the proposed actions could directly impact Preble's through direct killing and alteration of habitat likely to be used by Preble's. The areas to be impacted represent a small portion of the potential Preble's habitat present within Rock Creek Reserve. The projects are not expected to significantly impact the ability of Preble's to travel upstream or downstream along suitable riparian areas.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The project area is located on the RFETS in northern Jefferson County, Colorado. Any additional adverse affects not included in this biological opinion will require reinitiation of this opinion or separate section 7 consultations. Current land use outside of RFETS is becoming focused upon residential and commercial development, rather than historic agricultural uses, and is expected to continue at a substantial rate. Therefore, the Service expects a variety of additional direct and secondary adverse impacts to continue to occur due to future development outside of these lands which could affect the viability of Preble's populations on the RFETS.

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CONCLUSION

This biological opinion is based on information regarding cumulative effects, conditions forming the environmental baseline, the status of the Preble's, and the importance of the project area to the survival and recovery of the species. The data used in this biological opinion constitute the best scientific and commercial information currently available.

It is the Service's biological opinion that neither the direct nor indirect effects of the proposed projects (which includes the implementation of conservation measures agreed to during informal consultation and outlined in this biological opinion) will jeopardize the continued existence of Preble's. Although the proposed projects may adversely affect Preble's and its habitat within Rock Creek Reserve, the proposed actions and conservation measures will avoid the likelihood of jeopardy to the species. No critical habitat has been designated for this species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by DOE, as appropriate, for the exemption in section 7(o)(2) to apply. DOE has the continuing duty to regulate the activities covered by this Incidental Take Statement. If DOE fails (1) to assume and implement the terms and conditions or (2) to require any hired personnel or contractors to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to any permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, DOE must report the progress of the proposed actions or their impacts on the species to the Service as specified in the Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that it will be difficult to quantify or detect incidental take of Preble's due to direct mortality because of their small size and secretive nature. However, the following level of take can be anticipated by loss of food, cover, and other essential habitat elements. The Service anticipates that the proposed actions will result in incidental take of an undetermined number of Preble's associated with a maximum of **30 acres of potential Preble's habitat over 5 years. Specifically, this includes a maximum of 6 acres annually, to be comprised of 3 acres annually due to noxious weed control activities/herbicides and 3 acres annually for prescribed burning** (the majority of which would be in upland forage areas).

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Preble's.

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1. DOE will monitor the extent of habitat impacted to ensure that it does not exceed the authorized area.
2. Any accidental impacts to areas outside of the authorized area will be restored and mitigated in coordination with the Service.
3. DOE will monitor all aspects of any proposed restoration, enhancement, and mitigation actions to ensure project completion and success.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, DOE must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring. These terms and conditions are non-discretionary.

1. Workers onsite will be trained by a qualified biologist as to the reason for, and importance of, limiting impacts to vegetated habitat.
2. Work will be supervised at all times by an onsite individual from DOE or by an authorized representative familiar with Preble's and its habitat needs.
3. In the unlikely event that a Preble's (dead, injured, or hibernating) is located during any proposed activities, the Service's Colorado Ecological Services Field Office of the Service (303) 275-2370 or the Service's Law Enforcement Office (303) 274-3560 will be contacted immediately.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed actions. If, during the course of the action, this level of incidental take (loss of 30 acres of potential Preble's habitat over a 5-year period) is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. DOE must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that may be used to minimize or avoid adverse affects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service believes that the Plan will contribute to the conservation of the Preble's on RFETS lands.

REINITIATION NOTICE

This concludes formal consultation on the implementation of the Rock Creek Reserve Integrated Natural Resources Management Plan and Environmental Assessment through Calendar Year 2006. As required by 50 CFR 402.16, reinitiation of formal consultation is required if; (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an adverse effect to the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances

Mr. Joseph A. Legare

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where incidental take exceeds the amount authorized, any operations causing such take must cease pending reinitiation.

If you have any questions or would like to discuss this in more detail or we can be of further assistance, please contact Kathleen Linder of my office at (303) 275-2370.

Sincerely



LeRoy W. Carlson
Colorado Field Supervisor

cc: FWS:GJ (L. Bjornestad)
FWS:Regional Office (B. McCue)
DOE - RFETS (C. Franklin)
Jefferson County (N. Neelan)
Boulder County (P. Fogg)
Reading File
Linder

Ref:KAL\rckyflats\RockCrkProgBO.wpd

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- Armstrong, D.M., M.E. Bakeman, A. Deans, C.A. Meaney, and T.R. Ryon. 1997. Report on habitat findings of the Preble's meadow jumping mouse. Boulder (CO); report to the U.S. Fish and Wildlife Service and Colorado Division of Wildlife. 91 pp.
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- Compton, S.A., and R.D. Hugie. 1994. Addendum to the status report on *Zapus hudsonius preblei*, a candidate subspecies. Logan (UT): Pioneer Environmental Services, Inc.; under contract with the U.S. Fish and Wildlife Service. 8 pp.
- Krutzsch, P.H. 1954. North American jumping mice (genus *Zapus*). University of Kansas Publications, Museum of Natural History 7:349-472.
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Figure 1

Rocky Flats Environmental Technology Site Vicinity Open Space Map

- EXPLANATION**
- County Line
 - Land Ownership**
 - Jefferson County Openspace
 - Boulder County Openspace
 - Westminster Openspace
 - Federal
 - State

- Standard Map Features**
- Buildings and other structures
 - Solar Evaporation Ponds (SEP)
 - Lakes and ponds
 - Streams, ditches, or other drainage features
 - Fences and other barriers
 - Contour
 - Heavy duty paved roads
 - Medium duty paved roads
 - Light duty paved roads
 - Dirt roads
 - Railroads

DATA SOURCES AND FEATURES:
 Buildings, fences, hydrology, roads and other structures from 1996 aerial imagery data
 Digitized from the orthophotograph, 1995

1995, 1996, United States Government for Rocky Flats and
 by the U.S. Environmental Protection Agency. The use of these symbols,
 names, or any other information contained herein does not constitute
 an endorsement, approval, or any other official position of the
 U.S. Environmental Protection Agency, or any of its employees,
 contractors, or agents. The use of these symbols, names, or any other
 information contained herein does not constitute an endorsement,
 approval, or any other official position of the U.S. Environmental
 Protection Agency, or any of its employees, contractors, or agents.



Scale = 1:32540
 1 inch represents 2745 feet

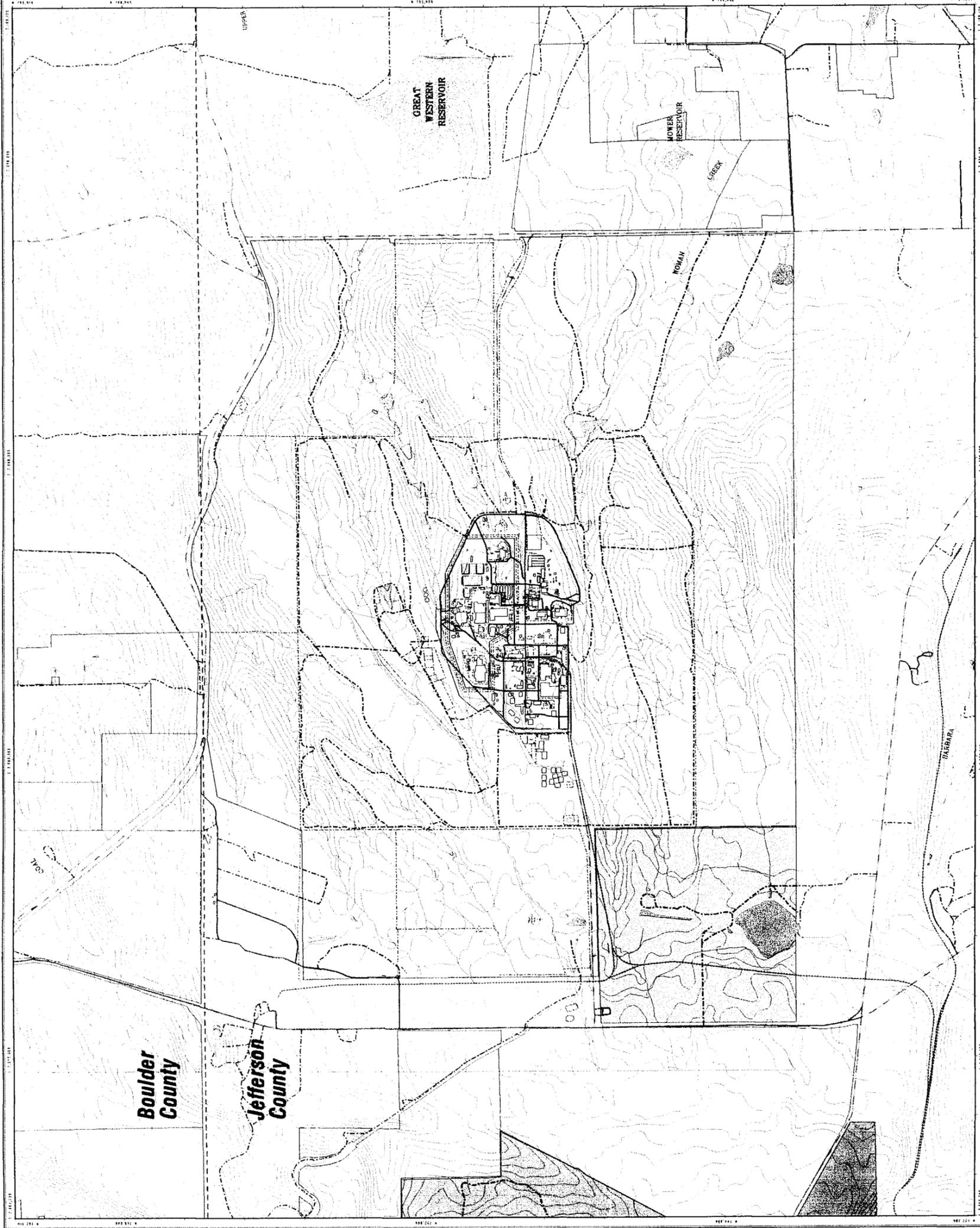


State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD83

U.S. Department of Energy
 Rocky Flats Environmental Technology Site
 OIS Dept. 303-866-7707

DRAFT

MAP ID: 01-0326
 March 01, 2001



The Rock Creek Reserve

Figure 2

MAP LEGEND

- Existing reserve extent
(852 acres)
- Proposed Rock Creek Reserve boundary
(1,793 acres)

Standard Map Features

- Buildings
- Ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads
- Contours (25 ft)

NOTE: The Reserve boundary is an estimate only and does not represent a legal boundary.

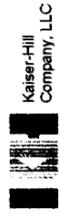
DATA SOURCE
 Rock Creek Reserve boundary provided by Exponent, 1999.
 Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&C RSL, Las Vegas. Digitized from the orthophotographs, 1/95.
 Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours.
 The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994. Aerial Flyover at ~10 meter resolution.
 The DEM post-processing performed by MK, Winter 1997.



1:22473
 1000 0 1000 2000 Feet

State Plane Coordinate Projection
 Colorado Central Zone
 Datum: NAD27

Prepared by: **Exponent** For: **U.S. Department of Energy**
Rocky Flats Environmental Technology Site



Kaiser-Hill
 Company, LLC

December 6, 1999

Project ID: K2-0024

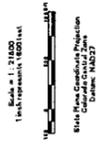
W:\Eco_projects\projects\K2-0024\RockCreek.apr

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RFETS Soils Map
Figure 3

- EXPLANATION**
- Denver clay loam, 2 - 5%
 - Denver clay loam, 5 - 8%
 - Denver-Kutch clay loam, 5 - 8%
 - Denver-Kutch clay loam, 8 - 15%
 - Denver-Kutch-Midway clay loam, 8 - 25%
 - Englewood clay loam, 0 - 2%
 - Englewood clay loam, 2 - 5%
 - Fairbairns cobbly sandy loam, 0 - 3%
 - Fairbairns stoney sandy loam, 0 - 5%
 - Haverson loam, 0 - 3%
 - Layden-Pilmen-Standley cobbly clay loams, 15 - 50%
 - McClave clay loam, 0 - 3%
 - Midway clay loam, 8 - 30%
 - Nederland very cobbly sandy loam, 15 - 50%
 - Nunn clay loam, 0 - 2%
 - Nunn clay loam, 2 - 5%
 - Pits, gravel
 - Rock outcrop, Sedimentary
 - Standley-Nunn gravelly clay loam, 0 - 5%
 - Valmont clay loam, 0 - 3%
 - Wisconsin-Nederland very cobbly sandy loam, 0 - 3%
 - Wisconsin-Layden cobbly loam, 8 - 30%
 - Yeager-Fairmont-Midway complex, 15 - 50%
- Standard Map Features**
- Buildings and other structures
 - Solar Evaporation Ponds (SEP)
 - Lakes and ponds
 - Streams, ditches, or other drainage features
 - Fences and other barriers
 - Paved roads
 - Dirt roads

NO SOURCE MAP FEATURES:
 Source: U.S. Geological Survey, 1:250,000 Scale Topographic Map Series, Denver, Colorado, 1980. Other features shown on this map are not necessarily shown on the source map.



U.S. Department of Energy
 Rocky Flats Environmental Technology Site

Prepared by:
DynCorp
 THE ART OF TECHNOLOGY

GIS Dept. 800-960-7707
 Prepared for:
KAISER III, L.

MAP ID: 88-0011
 Date: October 26, 2000



Wetlands

Figure 4

MAP LEGEND

Wetlands (Combined Wet Meadow/Marsh, Short Marsh, and Tall Marsh Habitat Types)



Standard Map Features

New Landfill

Buildings

Lakes & Ponds

Streams & ditches

Fences

Paved roads

Dirt roads

DATA SOURCE:

Management Unit and wetland boundaries provided by Exponent. Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 195 hypsography derived from digital elevation model (DEM) file by Morrison Knudsen using Arc TIN software. The DEM was processed to contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Note:

These locations approximate the boundaries of the Management Units. The boundaries are not exact and should not be treated as such.



1:23552
1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

For:



Kaiser-Hill
Company, LLC

MAP ID: 2K-0158

March 14, 2000



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1999 Dalmatian Toadflax (*Linaria dalmatica*) Distribution

Figure 6

MAP LEGEND

-  High Density Areas
-  Medium Density Areas
-  Low Density Areas
-  Scattered Density Areas

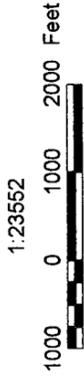
Standard Map Features

-  Buildings
-  Lakes & Ponds
-  Streams & ditches
-  Fences
-  Paved roads
-  Dirt roads
-  Contours (20 ft)

DATA SOURCE:
1999 weed distributions provided by Exponent. Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1995. Hypsography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover. The DEM post-processing performed by MK, Winter 1997.

Note:

These locations approximate the boundaries of infestation areas. The boundaries are not exact and should not be treated as such. These areas may not represent all populations on Site.



State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

Prepared by: **Exponent**
For: **U.S. Department of Energy
Rocky Flats Environmental Technology Site**



Exponent
Kaiser-Hill
Company, LLC

MAP ID: K2-0018

March 14, 2000



1999 Diffuse Knapweed (Centaurea diffusa) Distribution

Figure 7

MAP LEGEND

-  High Density Areas
-  Medium Density Areas
-  Low Density Areas
-  Scattered Density Areas

Standard Map Features

-  Buildings
-  Lakes & Ponds
-  Streams & ditches
-  Fences
-  Paved roads
-  Dirt roads
-  Contours (20 ft)

DATA SOURCE:
1999 weed distributions provided by Exponent, Inc. and other sources. The map was constructed from 1984 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1995 topography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1984 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Note:

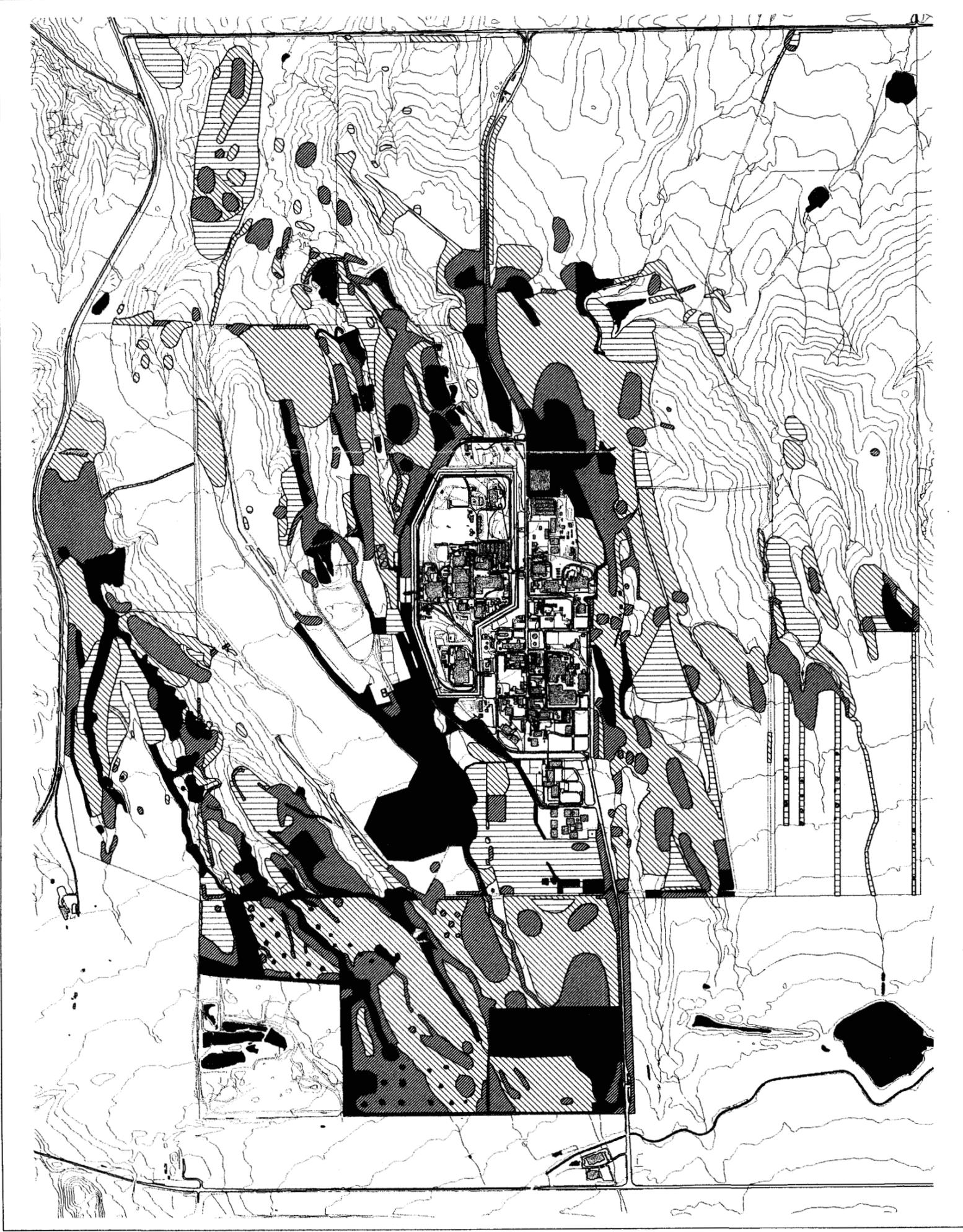
These locations approximate the boundaries of infestation areas. The boundaries are not exact and should not be treated as such. These areas may not represent all populations on Site.



1:23552



State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27



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MAP ID: K2-0017

March 14, 2000

1999 Musk Thistle (*Carduus nutans*) Distribution

Figure 8

MAP LEGEND

-  High Density Areas
-  Medium Density Areas
-  Low Density Areas
-  Scattered Density Areas

Standard Map Features

-  Buildings
-  Lakes & Ponds
-  Streams & ditches
-  Fences
-  Paved roads
-  Dirt roads
-  Contours (20 ft)

DATA SOURCE:
1999 weed distributions provided by Exponent. Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1/85 Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1984 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Note:

These locations approximate the boundaries of infestation areas. The boundaries are not exact and should not be treated as such. These areas may not represent all populations on Site.



1:23552
1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:

Exponent



Kaiser-Hill
Company, LLC

For:

MAP ID: K2-0019

March 14, 2000



PH

Preble's mouse protection area map
August, 2000.

Figure 9

LEGEND

-  Protection Areas
-  Contiguous Wetlands

Standard Features

-  Buildings
-  Lakes & ponds
-  Streams & ditches
-  Fences
-  Paved roads
-  Dirt roads
-  Contours (25 ft)

DATA SOURCE FOR STANDARD FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by E&C/R INC., Las Vegas, NV.
Contours derived from digital elevation model (DEM) data by Merrison, Koudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Whiter, 1997.

Data Source -

Protection Areas and Contiguous Wetlands provided by Exponent, 2000.
POC: Karan North, KH x9876.

Note:

This map is based on best current knowledge as of August, 2000, and supersedes all previous versions of this map.
As research on the species continues, this map will undergo further revision. Be sure to use the most current map for planning.

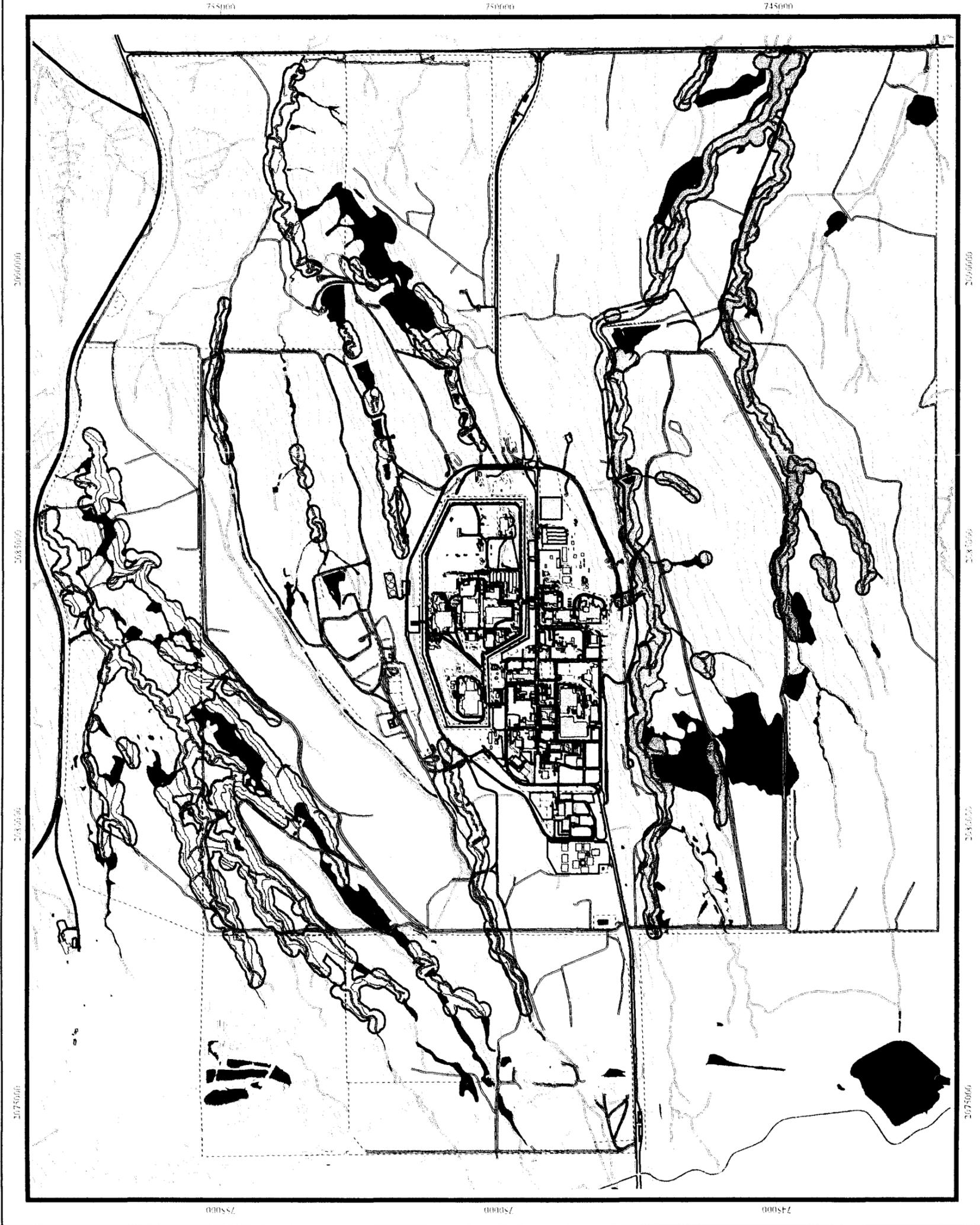


State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

Prepared by: **Exponent**
For: **U.S. Department of Energy
Rocky Flats Environmental Technology Site**

Kaiser-Hill Company, LLC

MAP ID: 99-0367 August 15, 2000



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*** DRAFT ***

Rock Creek Reserve and Ground Water Wells
Figure 10

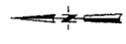
EXPLANATION

- Groundwater Wells outside of Rock Creek Reserve
- Groundwater Wells inside of Rock Creek Reserve
- Rock Creek Reserve
- Proposed Rock Creek Reserve Boundary

Standard Map Features

- Buildings and other structures
- ▨ Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- - - Fences and other barriers
- Combout (20-Foot)
- Paved roads
- Dirt roads

DATE SOURCE MAP FEATURES:
 The source map features were derived from a digital elevation model (DEM) and a digital orthophoto mosaic (DOM) of the site. The DEM was derived from a 1:250,000 scale topographic map. The DOM was derived from an aerial photograph taken in 1997. The source map features were digitized from the DEM and DOM. The source map features were checked for accuracy and completeness. The source map features were updated to reflect the current status of the site. The source map features were checked for accuracy and completeness. The source map features were updated to reflect the current status of the site.



Scale = 1 : 180,000
1 inch represents approximately 1508 feet



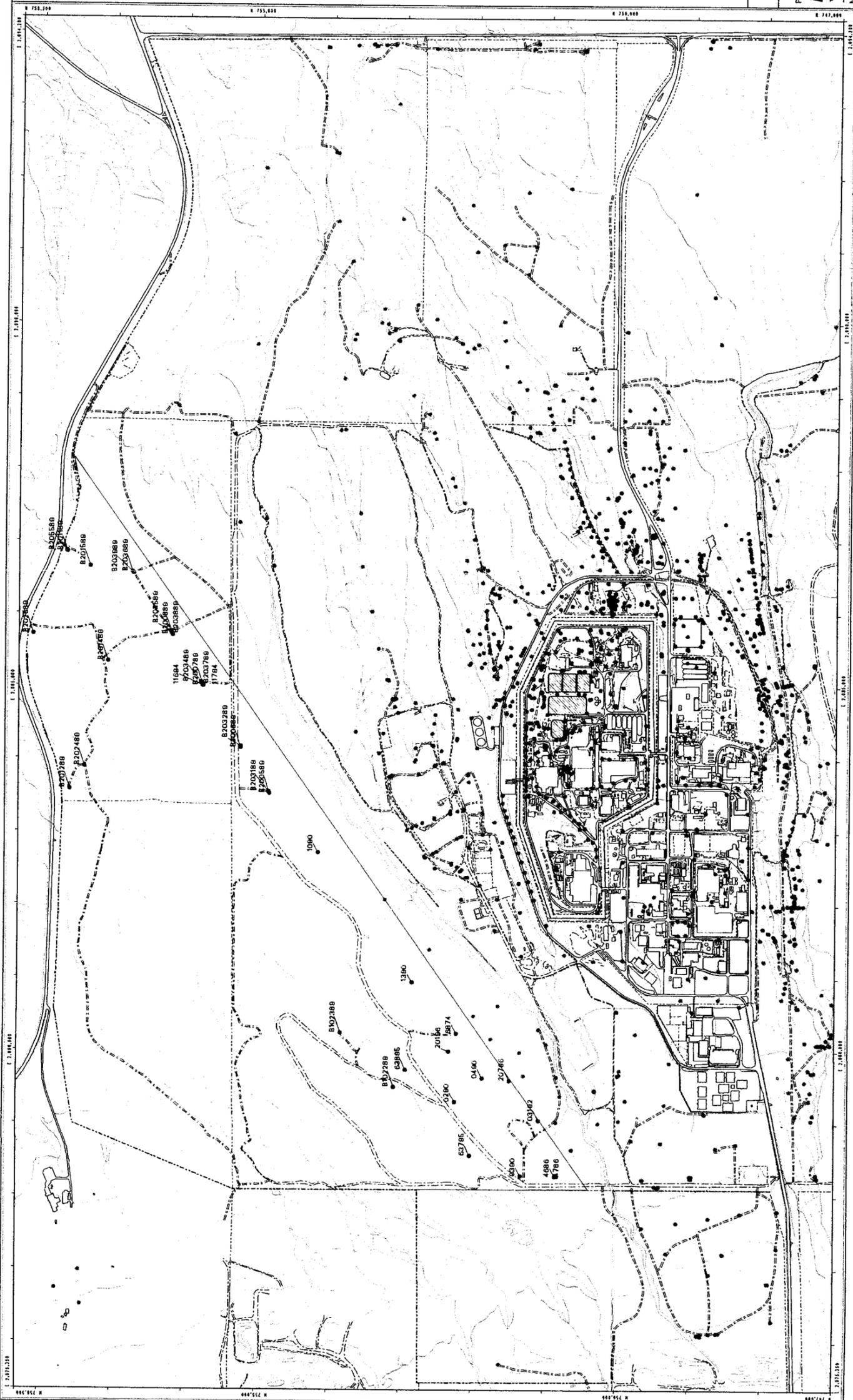
State Plane Coordinate Projection
California Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **DynCorp**
 THE ART OF TECHNOLOGY

Prepared for: **Kaiser-Hill**
 Kaiser-Hill
 October 25, 2000

MAP ID: 2K-0085
 Original map contents are preserved. Logo and date have changed.



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