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Kremmling Field Office
Resource Management Plan
Final
BIOLOGICAL ASSESSMENT

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ACRONYMS

AADT	Average Annual Daily Traffic
ACEC	Area of Critical Environmental Concern
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CDOW	Colorado Division of Wildlife
CPW	Colorado Parks and Wildlife (formally known as CDOW)
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CSU	Controlled Surface Use
DCH	Designated Critical Habitat
DOI	Department of the Interior
DPC	Desired Plant Community
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
GB	Greenback (Cutthroat Trout)
KFO	Kremmling Field Office
LAU	Lynx Analysis Unit
LAA	Likely to Adversely Affect
LCAS	Lynx Conservation Assessment Strategy
LCR	Lower Colorado River
LJ	Likely to Jeopardize the Continued Existence of the Proposed Species
NE	No Effect
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NJ	Not Likely to Jeopardize the Continued Existence
NLAA	Not Likely to Adversely Affect
NLAA-b	Not Likely to Adversely Affect-completely beneficial
NLAA-d	Not Likely to Adversely Affect-discountable
NLAA-i	Not Likely to Adversely Affect-insignificant
NSO	No Surface Occupancy
OHV	Off-Highway Vehicle
ORV	Off-Road Vehicle
PAC	Protected Activity Center
PBO	Programmatic Biological Opinion
PFC	Proper Functioning Condition
PRIA	Public Rangeland Improvement Act
RMA	Resource Management Area
RMP	Resource Management Plan
RMPPA	Resource Management Plan Planning Area
ROW	Right of Way
SIP	State Air Quality Implementation Plan
SISS	Stand Initiation Structural Stage (synonymous with currently unsuitable)

SRLA	Southern Rockies Lynx Amendment
SRMA	Special Recreation Management Area
SRMGA	Southern Rocky Mountain Geographic Area
T&E	Threatened and Endangered
TL	Total Length
USDI	United States Department of Interior
USFWS	U.S. Fish and Wildlife Service
VPD	Vehicles Per Day
WSA	Wilderness Study Area
WSR	Wild and Scenic River

INTRODUCTION

This biological assessment (BA), prepared for the Final Environmental Impact Statement (FEIS), describes the comprehensive analysis of the Proposed Plan/Final Approved Plan for the planning and management of public lands and resources administered by the Bureau of Land Management (BLM) in the Kremmling Resource Management Plan Planning Area (RMPPA), Colorado. The public lands and federal mineral estate within the Kremmling planning area is the subject of the planning effort and this document. This document, a component of the Resources Management Plan (RMP)/Environmental Impact Statement (EIS), is prepared in compliance with the National Environmental Policy Act (NEPA). The Act requires that an EIS be prepared for any federal actions that might significantly affect the human and natural environment. The preparation and adoption of an RMP by BLM is such a federal action.

Under provisions of the federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. Section 1531, et seq.), federal agencies are directed to conserve threatened and endangered (T&E) species and the habitats in which these species are found. Section 7(a)(1) states that all Federal agencies shall "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…." Thus, the conservation and recovery of threatened and endangered species is not simply the responsibility of the Fish and Wildlife Service, but of all Federal agencies. In order to meet this requirement, the BLM Kremmling Office (KFO) would implement protective stipulations, COAs, BMPs, mitigation, habitat restoration, and protections afforded through ACEC designations for federally listed species. For the full language on stipulations, COAs, and BMPs refer to the Draft Resource Management Plan (Appendix B, D, and E respectively) at http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/kfo-gsfo/kremmling.html.

Section 7(c) of the ESA requires the BLM Kremmling Office to complete a BA to determine the effects of implementing the RMP on listed species, based on compliance with Section 102 of NEPA. Federal agencies are required to consider, avoid or prevent adverse impacts to fish and wildlife species. Federal agencies are also required to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of T&E species or their critical habitat. The ESA requires action agencies, such as BLM, to not only consult or confer with the U.S. Fish and Wildlife Service (USFWS) when there is discretionary federal involvement or control over the action, but also to ensure that resources are afforded adequate consideration and protection. Formal consultation becomes necessary when the action agency requests consultation after determining that the proposed action is likely to adversely affect listed species or critical habitat, or the aforementioned federal agencies do not concur with the action agency's finding (USFWS, Consultation Handbook, 1998).

This programmatic BA provides documentation and analysis for the proposed action to meet the federal requirements and agreements set forth among the federal agencies. It addresses federally listed T&E species and it has been prepared under the 1973 ESA Section 7 regulations, in accordance with the 1998 procedures set forth by USFWS and the National Marine Fisheries Service (NMFS). The BLM KFO in coordination with the USFWS conducted an analysis regarding the effects of the FEIS Proposed Plan/Final Approved Plan on listed species. Site-specific evaluations would be conducted for activities authorized under the RMP and

consultation or conference would occur with the USFWS for those activities that may affect T&E or proposed species. In addition, BLM would evaluate site-specific activities that may affect Candidate and BLM Colorado Sensitive Species (Sensitive Species), in compliance with BLM Manual 6840. This BA will not address Candidate or Sensitive Species; these are addressed in the FEIS.

As part of this BA, BLM requests formal consultation for proposed actions that would lead to water depletion (consumption) in the North Platte and Colorado River systems. This consultation is required for the four federally listed species of fish in the upper Colorado River system: Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail chub (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*); and five federally listed species in the Platte River system: whooping crane (*Grus americana*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), and the Western prairie fringed orchid (*Platanthera praeclara*). The BLM also requests formal consultation on three listed plants: North Park Phacelia (*Phacelia formosula*), Osterhout milkvetch (*Astragalus osterhoutii),* and Penland Beardtongue (*Penstemon penlandii).*

In addition, informal consultation is requested for the federally listed Canada lynx (*Lynx canadensis*), Mexican spotted owl (*Strix occidentalis lucida*), and Greenback cutthroat trout (*Oncorhynchus clarki stomias*).

DESCRIPTION OF THE PLANNING AREA

The Kremmling RMPPA includes within its administrative boundary approximately 3.1 million acres of federal, state, county, and private lands. The area is bordered on the north by the State of Wyoming, on the west by the Routt National Forest, on the south by Interstate-70, and on the east by the Continental Divide. Of the 3.1 million surface acres within the RMPPA, approximately 378,884 acres (12 percent) are administered by BLM, 27 percent is privately owned, 6 percent is owned by the State of Colorado, and 55 percent is administered by other federal agencies. Additionally, 2.2 million acres in Eagle, Grand, Routt, Jackson, Larimer, and Summit Counties are underlain by federally owned minerals.

Bailey's (1995) description of North American ecoregions places the RMPPA in one ecological province - the Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province (M331). This Province is a transition from grass- and shrub-dominated areas to shrub- and tree-dominated areas. Juniper, shrub, and grass communities dominate at elevations between 8,000 and 9,000 feet. The middle elevations of pine and spruce forest are between 8,500 and 12,000 feet. Alpine tundra occurs only above 10,000 feet where cushion-type forbs and grass communities occur, as well as krummholz patches of spruce and fir. Riparian vegetation also varies according to elevation; however, willows and water-tolerant grasses, sedges, and rushes often dominate from the foothills to the alpine (Bailey 1995; Knight 1994). The climate of these areas is variable and dynamic because of factors, such as elevation, aspect, slope, and topographical change. Eastern and southern slopes are generally drier and warmer compared to western and northern slopes. As the elevation rises, the mean temperature decreases and the growing season shortens. Annual precipitation generally rises from 14 inches in the foothills to over 60 inches in the alpine area. Winter mountain snowpack could reach over 200 inches per year and provides a reservoir for lower elevation water users (Martner 1986; Knight 1994). Mountain ranges within the RMPPA considered part of this vegetation province include the Park Range, Medicine Bow Range, and Gore Range. These areas provide summer forage for wildlife and livestock, and important habitat for many nongame mammals, birds, and fish.

In addition, the Planning Area comprises of three distinct topographic regions: North Park, Middle Park, and the Laramie River Valley.

North Park is an intermountain basin or park (considered a "topographic depression," having a relatively flat interior surrounded by mountains). North Park is situated on the east side of the Continental Divide, and is the headwaters for the North Platte River. The lowest point in the park is 7,770 feet above sea level (on the North Platte River as it enters Wyoming). The average elevation for the basin floor ranges from between 8,000 feet to 8,500 feet. Most of the public lands in North Park are at elevations below 9,500 feet, and are located primarily in the central portion of the basin (BLM 1984b).

Middle Park differs from North Park, and traditional basins, in that its interior is mountainous. Middle Park is situated on the west side of the Continental Divide, and forms the headwaters for the Colorado River. The lowest point on the Colorado River within the Planning Area is 6,650 feet (near McCoy). Most of the public lands in Middle Park are also located in the central portions of the Park, at elevations between 7,000 feet and 9,500 feet (BLM 1984b).

The Laramie River region is located east of North Park, on the other side of the Medicine Bow Range. This region is a high mountain valley characterized by rolling foothills. The elevation in this part of the Planning Area varies from 7,700 feet (on the Laramie River at the Colorado/Wyoming border) to 8,500 feet on Bull Mountain (BLM 1984b).

Generally, the Planning Area's climate is characterized by long, cold winters and short, cool summers with low to moderate precipitation. The precipitation varies throughout the area; however, it is closely correlated to the elevation. The park floor areas receive the least precipitation, with the quantity increasing as elevation increases. Generally, the prevailing winds are westerly; however, they are greatly affected by local topography.

Seasonal temperature ranges in the area are drastic. Summer temperature extremes may reach the upper 90s (Fahrenheit), while winter temperature extremes may go to -50^{o} Fahrenheit (F). During the summer, higher elevation land may be 10 degrees, or more, cooler than the valleys or park floors. Winter inversions can cause the valleys to be much cooler than the surrounding higher areas. Daily fluctuations can be dramatic, especially during the early summer and early fall months. Daily temperatures may go from the 80s during the afternoon to near, or below, freezing (32^{o}F) at night (BLM 1984b).

CONSULTATION HISTORY

The Kremmling RMP/EIS replaces the management plan that was completed in 1984. Since the ROD was approved, the RMP has been amended four times—

- 1991–Amendment for Oil and Gas Leasing and Development
- 1991–Amendment for Muddy Creek Reservoir
- 1997–Amendment for Colorado Land Health Standards
- 1999-- Final Resource Management Plan Revised ROD
- 2000-- Amendment for Land Acquisition Land Use Priorities
- 2000-- Amendment for Upper Colorado River Special Recreation Management Area
- 2008– Amendment for Designation of Energy Corridors on BLM-administered Lands in the 11 Western States

Section 7 Consultation was not completed for the 1984 plan or any of the amendments. Several programmatic and project specific consultations have been completed for activities occurring in the RMPPA since the completion of the 1984 RMP.

The USFWS has been a cooperative agency on the Kremmling RMP/EIS since the revision began in 2007. USFWS provided input on planning issues, data collection and review and alternatives development. Correspondence regarding the preparation of the Biological Assessment is listed below.

- July 23th, 2012 Copy of the Draft BA sent to USFWS.
- August 24th, 2012 USFWS comments on the Draft BA received.
- Sept. 28, 2012 Copy of the 2nd Draft BA sent to USFWS.
- Oct 30, 2012 USFWS comments on the 2nd Draft BA received.
- January 18, 2013 Meeting with USFWS to discuss conservation measures.
- January 25, 2013 Draft conservation measures sent to USFWS.
- February 15, 2013 Final BA sent to USFWS.
- June 25, 2013 Final BO received from USFWS.

PROPOSED ACTION: PROPOSED RMP/FINAL APPROVED RMP

Activity Descriptions

The following discussion is a qualitative overview and summarization of the Kremmling RMP activity programs and potentially authorized activities of BLM that could affect endangered and threatened species now or in the foreseeable future. Manpower and budgetary restrictions, and changes in biological and technological information, may affect the extent to which the KFO may engage in the following program activities. Although many of the activities described in the sections below are likely to occur, the extent of each activity is undeterminable at this scale over the life of the plan. Site-specific analysis and determinations would be conducted on a case-by-case basis throughout the life of the plan. Detailed alternatives can be found in Chapter 2 of the Proposed RMP/Final EIS (Appendix A).

Air Quality

Management of air quality is through compliance with federal, state and local regulations. The federal government has established ambient air quality standards for criteria pollutants considered harmful to public health and the environment, and these have been accepted by the State of Colorado to comply with those standards. Regional haze regulations have been developed to maintain visibility on the least- impaired days and to improve visibility on the most-impaired days in mandatory federal Class I areas across the United States, which are defined as national parks larger than 6,000 acres, wilderness areas larger than 5,000 acres, national memorial parks larger than 5,000 acres, and international parks that existed as of August 1977. Actions authorized on BLM-administered lands and federal mineral estates would need to be conducted so as to comply with Clean Air Act requirements, including the applicable National Ambient Air Quality Standards (Section 109); the State Air Quality Implementation Plan (SIP) (Section 110); control of pollution from federal facilities (Section 118); prevention of significant deterioration, including visibility impacts on mandatory federal Class I areas (Section 160 et seq.); and conformity analyses and determinations (Section 176(c)). Section 118 of the Clean Air Act requires federal agencies to comply with all federal, state and local air pollution requirements. Section 176(c) prohibits federal agencies from taking any actions that contribute to a new violation of ambient air quality standards, that increase the frequency or severity of an existing violation, or that delay the attainment of a standard. It also requires federal agencies to conform to SIPs. BLM policy also provides requirements to minimize air quality impacts. For example, prescribed burns must comply with BLM Manual 7723 for air quality maintenance requirements to minimize air quality impacts from particulates such as smoke. Management actions for air quality included in the RMP include strategies to achieve desired air quality conditions.

Activities that could potentially occur under this program include gathering air quality data to monitor air quality components and conducting dust control measures. These activities may result in very limited ground and disruptive disturbances.

Soil Resources

Standards and goals under the Clean Water Act and the Colorado standards and guidelines require measures to minimize soil erosion. BLM complies through evaluation of management actions and implementation of best management practices (BMPs) on a site-specific basis.

Fragile soils areas and steep slopes are more susceptible to accelerated erosion, and these require specific management consideration. Management actions for soil resources included in this RMP include strategies to achieve desired conditions.

The goal of the soil resources program is to ensure that upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, landform, and geologic processes. Desired outcomes for achieving the management goal include ensuring that surface disturbances do not cause accelerated erosion on a watershed scale; and ensuring that on a landscape scale, canopy cover and ground cover are appropriate for the soil type, based upon current guidelines. Actions to meet the desired outcomes include and preventing surface occupancy on fragile soil areas and steep slopes, requiring professional geotechnical engineering and reclamation plans in areas having soils with severe or very severe erosion hazard, and applying restrictions on slopes between 25 and 40 percent. Soil erosion control measures may result in limited ground and disruptive disturbances.

Water Resources

Management of water quality is provided through compliance with federal, state and local regulations. The federal Water Pollution Control Act (Clean Water Act) of 1977, as amended, requires the restoration and maintenance of the chemical, physical and biological integrity of the nation's waters. The Clean Water Act places responsibility for protecting water quality with the states under the supervision of the Environmental Protection Agency (EPA). Standards and goals under the Clean Water Act and water quality management objectives developed by the states, as required by the 1987 Water Quality Act Amendments to the Water Pollution Control Act, were created to protect the quality of states' waters and to prevent, abate and control water pollution. The 1976 Federal Land Policy and Management Act (FLPMA) directs and requires BLM to comply with state water quality standards and manage public lands so as to preserve and protect certain lands in their natural condition. BLM is required to maintain water quality where it presently meets EPA-approved State of Colorado water quality standards and to improve water quality on public lands where it does not meet standards as defined by Section 303(d) of the Clean Water Act. Any water discharged on the surface by industry is controlled through National Pollutant Discharge Elimination System permits. Actions authorized on BLM lands must also comply with the mitigation requirements defined by the Office of Surface Mining regulations for coal leasing and by the U.S. Army Corps of Engineers Section 404 permit requirements.

Management actions would be conducted in conformance with the various regulations in the Clean Water Act, the Colorado Water Quality Control Act, FLPMA, and the Colorado standards and guidelines to achieve the water quality classifications and standards for surface and ground waters developed by the Colorado Water Quality Control Commission. Management actions for water quality for the RMPPA include strategies to achieve desired water quality conditions.

The goal for the water resources program is to protect watershed functions in the capture, retention, and release of water in quantity, quality, and timing in order to meet aquatic and terrestrial ecosystem needs. The desired outcomes to achieve the goal of the program are to: ensure that streams on BLM-managed public lands are in geomorphic balance with the water and sediment being supplied by the watershed; ensure that the water quality of all surface water and groundwater located on, or influenced by, BLM-managed public lands contributes to achieving the water quality standards; provide sufficient water quantity on BLM-managed public lands for

multiple-use and sustained-yield management and functioning, healthy riparian, wetland, aquatic, and upland systems. Actions to meet the desired outcomes include: improve dysfunctional streams caused by unnatural factors; modify management practices and/or stream restoration techniques, as appropriate, in order to address causal factors; prohibit surface occupancy on municipal watersheds, public water supplies, major river corridors, perennial, intermittent and ephemeral streams, water bodies, fisheries, and riparian areas; and file for water rights and water use permits in order to protect all water uses on BLM-managed public lands, as allowed by State water law,

Potential surface disturbing activities associated with the Water Management Program include but are not limited to the following actions: developing riparian/wetland exclosures; channel restoration using heavy equipment; and cutting, planting and seeding to restore function in riparian/wetland areas.

Vegetation

FLPMA and the Public Rangeland Improvement Act (PRIA) of 1978 clearly define the objectives and priorities for management of public land vegetation resources. Guidance contained in the Department of Interior regulations for *Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration* (43 Code of Federal Regulations [CFR] 4180) directs public land management toward the maintenance or restoration of the physical function and biological health of rangeland ecosystems. Regional standards of rangeland health and guidelines for livestock grazing management were developed for public land administered by BLM. The Colorado Standards and Guidelines are the minimal acceptable conditions for addressing the health, productivity and sustainability of rangelands.

The BLM's Riparian-Wetland Initiative for the 1990s establishes goals and objectives for managing riparian/wetland resources. Riparian areas would be managed to attain or maintain PFC. The PFC for different types of riparian/wetland systems is fully defined in BLM Technical Reference 1737-15, *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas*, and in BLM Technical Reference 1737-16, *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas*. PFC can be summarized as the minimum acceptable level of ecological status in which vegetation, landform and/or woody debris create a level of inherent resiliency that allows the stream or wetland system to be protected from erosive forces, capture sediment, provide for infiltration, and create appropriate habitat. Riparian areas would be maintained, improved, or restored to enhance forage conditions, provide wildlife habitat and improve stream and water quality. To achieve PFC, riparian areas would be managed to maintain dominance by those species capable of stabilizing soils and stream banks. All riparian areas would be assessed, as needed, to determine their existing condition and whether specific management actions are necessary for improvement.

There are numerous desired outcomes for the vegetation program, which vary by vegetation type. The overall goals are: maintain healthy, productive plant communities of native and other desirable species at viable population levels commensurate with the potentials for the species and the habitats and ensure that plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes (Public Land Health Standard 3); ensure that riparian systems associated

with both running water and standing water function properly, and have the ability to recover from major disturbances such as fire, severe grazing, or 100-year floods; and ensure that riparian vegetation captures sediment and provides forage, habitat, and biodiversity; that water quality is improved or maintained; and that stable soils store and release water slowly (Public Land Health Standard 2).

The desired outcome for forest and woodlands is to manage forests and woodlands in order to maintain or enhance ecological resiliency by improving the vigor of trees within stands, and by creating a more diverse age and size class structure across the landscape. Actions for achieving this desired outcome include: achieving diversity of age and size class, and improve vigor, by using treatments; apply silvicultural systems to stands appropriate to cover type; identify areas for current or potential old-growth conditions based upon structure and composition across the landscape; maintain or contribute toward the restoration or development of old-growth structure and composition; and retain stands with old-growth characteristics such as, but not limited to, large trees, standing-and-down dead trees, and multiple canopy layers.

The first desired outcome for rangeland vegetation is to manage sagebrush steppe, where needed, to transition from homogeneous stands of old sagebrush in order to create a more diverse age-class structure across the landscape, and to improve diversity and cover of understory species. Actions to achieve the desired outcome include achieving diversity of age class in sagebrush communities by using treatments (mechanical, chemical, biological treatments; and prescribed fire and wildand fire managed for multiple objectives) and reducing encroachment of pinyon, juniper, and other woody species in sagebrush steppe (also refer to Special Status Species – Greater Sage-Grouse And Sagebrush Biome)

The second desired outcome for rangeland vegetation is to manage mountain shrub communities in order to improve composition and structure, and to increase serviceberry, bitterbrush, and mountain mahogany. The action to achieve this is use vegetation manipulation, fencing, seeding, prescribed fire, and wildland fire managed for multiple objectives, and use restrictions in order to accomplish mountain shrub management objectives.

The third desired outcome for rangeland vegetation manage native grasslands in order to maintain ecological functions. Actions to achieve the desired outcome include using vegetation manipulation, fencing, seeding with native species, prescribed fire and wildland fire managed for multiple objectives, using restrictions in order to accomplish native grassland management objectives, and using restoration techniques, including, but not limited to, revegetation, fertilization, and/or soil amendments (such as those identified in KFO interim or long-term restoration plans or BMPs) in order to rehabilitate disturbed or degraded rangeland plant communities.

The desired outcome for riparian vegetation is to achieve riparian area PFC. Actions for achieving this include: manage for riparian/wetland values using management actions for improvement or protection. These actions may include, but are not limited to, implementing grazing management actions, plantings, recreation restrictions, structures (such as fencing), and upland water developments; monitoring in order to meet Public Land Health Standard 2, and collect data on riparian areas/wetlands; and applying NSO and CSU restrictions on perennial streams, water bodies, fisheries, and riparian Areas.

The desired outcome for weed management is prevent the establishment of, treat existing, and reduce/slow the spread of, noxious and invasive weeds across landscape and ownership boundaries. Actions for achieving this include: promote weed awareness and preventative behavior through public contact, volunteer programs, and educational materials; focus on areas of new infestations and, where possible, extirpate existing populations within priority treatment areas (ACECs, Special Status Species habitat, riparian areas/wetlands; springs/seeps, developed recreation sites, campgrounds, and campsites; roads and trails; WUI and big game winter ranges); use appropriate integrated vegetation treatments for the control of invasive/noxious weeds; treat monocultures of cheatgrass and other exotic communities where eradication is possible and establish desired vegetation by seeding; hold project proponents responsible for monitoring and controlling noxious weeds that result from any new facilities, and/or improvements or other surface disturbances authorized on BLM-managed public lands; and inventory/identify infested acres, beginning with the priority treatment areas. The KFO completed a Programmatic Integrated Weed Management Plan in 2008 to guide weed treatments within the RMPPA.

Surface disturbing and other disruptive activities associated with the vegetation program (including noxious and invasive weed control) include but are not limited to the following actions: plantings and seedings; biological treatments, including species-specific insects and livestock grazing; mechanical treatments, including cutting and thinning with handtools, brushbeating, cutting and thinning with machinery; and chemical treatments (including aerial).

Fish and Wildlife Habitat

Section 102.8 of FLPMA requires that public lands are managed to protect the quality of multiple resources and to provide food and habitat for fish, wildlife and domestic animals. PRIA also directs BLM to improve rangeland conditions with due consideration of the needs of wildlife and their habitats. Rangeland health regulations identify the need to foster productive and diverse populations and communities of plants and animals. The Sikes Act of 1974 is a congressional mandate for BLM to "plan, develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish, and game." In addition, executive orders for floodplain management and protection of wetlands provide further direction for protection and management of fisheries habitat.

BLM's role in the management of fish and other aquatic resources is to provide habitat that supports desired aquatic plants and animals. Plants, animals and their interactions with each other and the physical environment are part of the ecological processes that are important for the health and function of aquatic ecosystems, as well as of rangeland and forest ecosystems. Species manipulations, such as introductions and population management, are under the authority of CPW.

The overall goal for fish and wildlife habitat resources is to maintain healthy, productive plant and animal communities of native and other desirable species at viable population levels commensurate with the species' and habitats' potential. Ensure that plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes (Public Land Health Standard 3).Desired outcomes for achieving this goal are broken down by fisheries, wildlife, big game, migratory birds, cavity nesting species, raptors, and waterfowl and shorebirds.

The desired outcome for fisheries and other aquatic wildlife is to provide for a wide variety of aquatic species, and maintain and improve priority habitat requirements for highly valued species (coldwater sport fishes and Colorado River basin native fishes). In addition, priority habitats have been identified that include perennial water sources (streams, rivers, lakes, ponds, springs, seeps, wetlands, wet meadows, bogs, and fens) and riparian areas. Actions to achieve the desired outcome: identify limiting habitat factors based upon site characteristics and habitat capabilities using channel type and geology classifications (such as Rosgen). Upon identification of limiting factors, prioritize and fix those that can be fixed using proven river, stream, lake, and riparian methodologies or by changing management of other program activities in order to achieve the desired outcome; identify in-channel features that block aquatic organism movement and/or impair stream connectivity; replace, modify, or remove these impediments as they are identified, and as opportunities allow; apply NSO and CSU stipulations on perennial Streams, water bodies, fisheries, and riparian areas; and apply a TL on native fish and important sport fish during spring spawning periods of April 1 to August 1, and fall spawning periods from October 1 to November 30, in order to protect redds (egg masses) in the gravel and emerging fry of native fish populations.

The desired outcome for wildlife is to provide habitat for a wide variety of species, and maintain and improve priority habitat requirements for highly valued species (severe winter range, winter concentration areas, production areas, big game migration corridors, habitat for Greater sage-grouse; habitat for Birds of Conservation Concern; nesting and fledging habitat for raptors; and riparian and wetlands habitat at PFC for all species). Actions under the general wildlife section that will help achieve the desired outcome: allow the introduction, translocation, transplantation, restocking, augmentation, and re-establishment of native and naturalized fish and wildlife species, apply lease notices for high-value wildlife habitat, and apply a TL to wild turkey winter habitat.

The desired outcomes for big game species include minimize big game stress and disturbance from surface occupancy and surface-disturbing activities on winter ranges, winter concentration areas, severe winter ranges, migration corridors, and birthing areas; protect state wildlife areas from unnecessary surface occupancy and surface-disturbing activities; create optimum winter range and summer/transition habitat conditions for big game, targeting a ratio of 60 percent foraging habitat to 40 percent escape/hiding/thermal/birthing cover; Increase the diversity and abundance of grasses and forbs in the understory of transition and winter range habitats for the critical period of late fall through early spring; reduce habitat fragmentation and restore habitat connectivity on big game winter ranges, winter concentration areas, severe winter ranges, and movement corridors and help achieve CPW big game population objectives. There are many actions to achieve these desired outcomes (see Appendix A). Some of the more pertinent actions include designating wildlife core areas; protecting wintering big game species by closing areas to motorized and mechanized travel from December 15 to April 15; applying multiple NSO, TL, and CSU restrictions; and reducing the density of roads and trails.

Surface disturbing activities in big game crucial winter habitat would not be allowed during the period of December 1 to April 30. Surface disturbing and disruptive activities within big game crucial winter range would require the use of BMPs designed to reduce the amount of human presence and activity during the winter months. Big game birthing areas would be closed to surface disturbing activities from April 15 to June 30.

Fourteen areas, totaling 101,800 acres are designated as core wildlife areas. Core wildlife areas are areas of high habitat value for multiple species, including sage-grouse, elk, and mule deer. Surface occupancy would not be allowed via an NSO stipulation. Surface disturbing and disruptive activities within core wildlife areas would require the use of BMPs and COAs designed to reduce the amount of human presence and activity.

For migratory birds, the desired outcome is to provide healthy and productive habitat. To achieve that, BLM would examine habitat and population standards from sources such as Birds of Conservation Concern (BCC) Region Plans, State Partners-in-Flight Plans, and State Wildlife Action Plans for migratory birds; and avoid or minimize impacts to migratory birds by incorporating mitigation measures. In addition, a LN would be applied to oil and gas activities to avoid or minimize disruption of migratory bird nesting activity by siting or prioritizing vegetation clearing, facility construction, and concentrated operational activities (such as drilling, completion, utility installation) in order to avoid the involvement of higher value migratory bird habitats, during the core migratory bird nesting season (May 15 to July 15).

For cavity nesting species, raptors, and waterfowl and shorebirds, the desired outcome is to provide healthy and productive habitat. To achieve the desired outcome, BLM would broadly manage all forest types in order to provide an average snag retention density of 3 snags per acre, apply Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 2006 (Avian Power Line Interaction Committee 2006) and Avian Protection Plan (APP) Guidelines (APLIC and USFWS 2005) to new power line construction in order to prevent electrocution of raptors and apply stipulations to surface disturbing act ivies via NSOs, TLs, or COAs. Surface disturbing and other activities potentially disruptive to nesting raptors would be prohibited within distances and time periods necessary to allow raptors to complete breeding and nesting activities. The buffer distance is 0.25 mile from nests and the timing varies from February 1 to August 15, for different raptor species. NSO protections would also be provided 0.25 mile within nesting sites to preserve the integrity of the sites. In addition, a TL would be applied to shorebirds, waterbirds and waterfowl to prohibit surface use within 0.25 miles of production areas (Hebron Waterfowl Area, Junction Butte Wetlands, and MacFarlane Reservoir) from March 1 to July 31 in order to prevent disruption of nesting activity.

Activities associated with the fish and wildlife program include but are not limited to the following actions: habitat improvement projects (vegetation treatments), construction of artificial nest structures for raptors, guzzler development, modifying fences, road closures (permanent/seasonal), constructing exclosures, chemically removing non-native fish species and removing or replacing barriers to fish passage (e.g., culverts, instream structures).

Special Status Species

Special Status Species include animal or plant species that are formally designated by the USFWS as federally Endangered or Threatened, Proposed for listing, or are Candidates. They also include those species designated by the CPW as State Endangered or Threatened Species, and those identified as BLM Sensitive Species in the State of Colorado.

The ESA requires that Federal agencies ensure, in consultation with the USFWS, that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued

existence of any Endangered and Threatened Species, or result in the destruction or adverse modification of habitat of such species that is determined critical by the USFWS.

Responsibilities for management of federally Listed, Proposed, or Candidate Species are outlined in the ESA, as well as in the BLM Special Status Species Manual (Manual 6840; BLM 2008o). The policy for management of federally listed species is to not authorize, fund, or implement any actions that are likely to jeopardize the continued existence of listed species, or to destroy or adversely modify designated critical habitat, and to develop programs to conserve listed species.

The goal of Special Status Species management is to improve or provide habitat for the species that may occur on public lands in order to maintain viable populations of these species. Principal considerations include management of species habitat in order to ensure continued use by these species; identification of areas where other resource activities may conflict with Special Status Species, and their habitat requirements; and incorporation of programmatic consultations and conservation strategies.

Species discussed in this Section have been listed by the USFWS or by the State of Colorado, or have been placed on the Colorado BLM State Director's Sensitive Species List. The USFWS manages Threatened and Endangered Species and designated critical habitat, in cooperation with other Federal agencies, in order to support recovery. The BLM cooperates with the USFWS in order to determine and manage habitats to support the species. Candidate species are managed in a manner designed to maintain viable populations, with the objective of preventing the need for them to be listed by the Federal government. Under the ESA, federally listed Threatened and Endangered Species require specific management. The ESA requires a consultation with the USFWS (a Section 7 Consultation) on any actions taken that are planned to occur where these species reside. There are 48 federally Endangered, Threatened, BLM Sensitive, and BLM Species of Concern listed within the Planning Area.

All Federal Candidate Species, Proposed Species, and Delisted Species in the 5 years following delisting, will be conserved as BLM Sensitive Species. Species designated as BLM Sensitive Species must be native species found on BLM-managed public lands for which the BLM has the capability to significantly affect the conservation status of the species through management. It is BLM policy to provide Sensitive Species with the same level of protection that is given Federal Candidate Species. The major objective of this protection is to preclude the need for Federal listing.

SSS--Fish and Other Aquatic Wildlife

The goal of SSS--Fish and Other Aquatic Wildlife, is to prevent the need for listing of Proposed, Candidate, and Sensitive Species under the ESA; protect Special Status Species; and improve their habitats to a point where their special status recognition is no longer warranted (Public Land Health Standard 4). The BLM will take necessary actions in order to help delist the five federally listed fish species found within the Planning Area by following pertinent Recovery Plans and implementing actions and protections that assist in their recovery. To achieve this goal, the desired outcome is to protect occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species, and protect occupied habitat for BLM sensitive species necessary for the maintenance and recovery of proposed, candidate, and threatened or endangered species; and support BLM sensitive species and significant plant communities,

consistent with BLM policy on special status species management (BLM manual 6840, BLM 2008o). Actions to achieve the desired outcome include identifying limiting habitat factors based upon site characteristics and habitat capabilities using channel type and geology classifications (such as Rosgen); protecting BLM fish-bearing streams or stream segments by actively seeking minimum in-stream flow protection and, for lakes, minimum pool depths; assist, as appropriate, with the introduction, translocation, transplantation, restocking, augmentation, and re-establishment of Special Status fishes, in cooperation with the CPW and/or with the USFWS; designate the Kinney Creek ACEC in order to protect the Colorado River cutthroat trout, a Special Status Species; apply NSO and CSU stipulations on perennial Streams, water bodies, fisheries, and riparian areas; and apply a TL on native fish and important sport fish during spring spawning periods of April 1 to August 1, and fall spawning periods from October 1 to November 30, in order to protect redds (egg masses) in the gravel and emerging fry of native fish populations.

The desired outcome for BLM sensitive amphibians (great basin spadefoot, boreal toad, northern leopard frog, and wood frog) is to protect those species and their habitats. To achieve this, surface disturbing activities would be limited within an 0.5 mile buffer around all known or identified breeding sites in order to protect breeding habitats and breeding activities; and to maintain the functionality of important breeding habitats and allow for breeding activities to occur uninterrupted.

SSS-- Plants and Terrestrial Wildlife

The goal of SSS-- Plants and Terrestrial Wildlife, is to prevent the need for listing of Proposed, Candidate, and Sensitive Species under the ESA; protect Special Status Species; and improve their habitats to a point where their special status recognition is no longer warranted (Public Land Health Standard 4). To achieve this goal, the desired outcome is to promote the maintenance and recovery of federally Listed, Proposed, and Candidate Species (including sage-grouse) by protecting occupied and adjacent suitable habitat; and protect occupied habitat for all BLM Sensitive Species. There are many actions to achieve these desired outcomes (see Appendix A). Some of the more pertinent actions include prioritizing treatments in order to protect against invasion and establishment of noxious weeds or other aggressive exotic plants; Closing or relocating selected travel routes in order to protect Special Status Species and significant plant communities; pursuing land tenure adjustments in order to facilitate the conservation or recovery of Special Status Species; restore potential Special Status Species habitat to suitable habitat by applying treatments to historically occupied, degraded habitats; and applying multiple COA, LN, NSO, TL, and CSU restrictions to protect Special Status Species from surface disturbing activities.

For the purpose of reducing potential impacts on greater sage-grouse lek integrity, no surface occupancy (NSO) stipulations would be applied within 0.6 mile radius of a lek site. To prevent the disturbance of up to 75 percent of nesting birds, from March 1 to July 15 greater sage-grouse nesting and early brood-rearing habitat would be designated as a CSU and TL for oil and gas operations within a 4-mile radius of the perimeter of a lek. All surface disturbing activities would avoid nesting and early brood-rearing habitat within the 4-mile radius of the lek during this time period. The actual area to be avoided would be determined on a case-by-case basis dependent on applicable scientific research and site-specific analysis and in coordination with commodity users and other appropriate entities. All areas within 0.6 miles of active leks would be designated

as a ROW avoidance area. Winter habitat would be closed from December 1 to March 15. BMPs and COAs would be encouraged for surface disturbing activities. BLM may require implementation of some BMPs and COAs. As new BMPs are developed, they may be added to the list or replace some of the existing BMPs and/or COAs.

To protect large blocks of un-fragmented sagebrush habitat, the Proposed RMP includes the desired outcome to sustain the integrity of the sagebrush biome in order to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of Greater sage-grouse and other sagebrush-dependent species. To accomplish this, the BLM will allow no more than 3 percent of the surface area within Greater sage-grouse core areas to be disturbed at any one time; require development and approval of a Master Development Plan; encourage clustered development; avoid ROWs within sage-grouse core areas; and prohibit a net increase of acreage in roads.

To protect Canada Lynx habitat, the BLM will implement applicable conservation and restoration measures identified in the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). In addition, linkages areas will be protected from activities that would create barriers to movement and a CSU would be applied to established lynx linkage corridors and lynx habitat within LAUs.

Activities associated with the Special Status Species program include but are not limited to the following actions: habitat improvement projects (vegetation treatments), construction of artificial nest structures for raptors, guzzler development, modifying fences, road closures (permanent/seasonal), constructing exclosures, chemically removing non-native species and removing or replacing barriers to fish passage (e.g., culverts, instream structures).

Cultural, Heritage and Paleontological Resources

The National Historic Preservation Act of 1966 (NHPA), as amended (16 United States Code [U.S.C.] 470), mandates that federal agencies protect and preserve both prehistoric and historic cultural properties that are eligible or potentially eligible for inclusion on the National Register of Historic Places (NRHP). FLPMA charges BLM to (1) manage public land so as to protect the quality of scientific and other values and (2) ensure land and resources are periodically and systematically inventoried. Section 106 of NHPA requires that federal agencies take into account the potential adverse effects to historic properties in the area of potential affects (APE) of an undertaking. Section 110 of NHPA requires that federal agencies manage and protect the cultural resources located on their lands. BLM will follow the process identified in the National Programmatic Agreement (1998), agreed to with the National Council of State Historic Preservation Officers (SHPO) and the Advisory Council on Historic Preservation, and the Colorado Protocol (1998). The KFO will implement a proactive cultural resource program required under Section 110 of the NHPA. A reasonable amount of outreach/customer service work, Native American consultation, interpretation and environmental education, cultural resource inventories, data recovery and recordation efforts, restoration and protection of "at-risk" site efforts, and systematic monitoring of cultural sites treatments are to be completed annually. The level of proactive cultural resource program work would be determined annually within the constraints of available funds and staff.

BLM would identify and take into consideration Native American concerns when actions might affect cultural or religious values and areas of traditional use. Consultation with federally recognized tribes would take place on a case-by-case basis, in accordance with Executive Order 13175 Consultation and Coordination with Indian Tribal Governments and Section 106 of NHPA. Such consultation would occur prior to planned excavations or undertakings on BLM-administered lands, in compliance with the Native American Graves Protection and Repatriation Act. BLM would protect and preserve Native American religious and cultural rights and practices on federal lands, in accordance with the American Indian Religious Freedom Act. Significant paleontological sites are protected under FLPMA. FLPMA charges BLM to (1) manage public land so as to protect the quality of scientific and other values and (2) ensure that land and resources are periodically and systematically inventoried. Paleontological resources will be managed according to the BLM 8270 Handbook and the BLM Manual for the Management of Paleontological Resources.

The cultural resources program goals are to identify, preserve, and protect significant cultural resources in order to ensure appropriate uses by present and future generations, in accordance with Section 110 of the NHPA, and seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration, or potential conflict with other resource uses, by ensuring that all authorizations for land and resource uses comply with applicable laws, rules, regulations, policies, standards, and guidelines. Cultural use allocations include scientific use, conservation for future use, traditional use, public use, experimental use, or discharge from management. Desired outcomes for achieving these goals: preserve the existing character of the historic and associated physical landscapes; promote professional cultural resource research, public awareness, and education; protect the Windy Gap archaeological sites; protect, preserve, and mitigate significant cultural sites within, and near, the North Sand Hills SRMA; uphold Native American trust responsibilities, and accommodate traditional uses.

There are many actions for achieving these desired outcomes such as inventory, evaluate, mitigate, and protect cultural resources, review all Proposed Actions and coordinate with proponents early in the implementation planning process; prohibit surface occupancy or use within 100 meters of all known eligible cultural resources, traditional cultural properties, and listed National Register Sites/Districts, outstanding cultural resources to be nominated to the National Register of Historic Places (NRHP), interpreted and/or public use sites, and experimental-use sites; applying LNs to cultural resources and buried cultural resources; identify measures in order to proactively manage, protect, and use cultural resources, including traditional cultural properties; allow scientific research, traditional use by Native Americans, and public interpretation and education; and develop a protocol, in consultation with Native American Tribes, to streamline, focus, and facilitate consultations, information exchange, participation, and incorporation of tribal interests into research interpretation and resource management actions.

The paleontology goal is to preserve and protect significant paleontological resources (generally, vertebrate or noteworthy occurrences of invertebrate or plant fossils). The desired outcomes for achieving this is to ensure that paleontological resources are available for appropriate scientific and educational uses. Actions include providing opportunities for education about, and interpretation of, paleontological resources; and prohibiting surface occupancy or use within 100 meters of all known scientifically important paleontological resources.

Surface disturbing and other disruptive activities associated with the cultural and paleontology programs include but are not limited to the following actions: recording cultural resources and paleontological resources; conducting inventories for cultural and paleontological resources; developing interpretive sites; using handtools, power tools, heavy machinery (surface disturbing) to excavate cultural sites and collect paleontological sites; and fencing cultural resources.

Visual Resources

BLM-managed public lands contain many outstanding scenic landscapes. Visual resources in these landscapes consist of land, water, vegetation, wildlife, and other natural or human-made features visible on public lands. Roads, rivers, and trails on public lands pass through a variety of characteristic landscapes where natural attractions can be seen, and where cultural modifications exist. Visual resources contribute to the scenic or visual quality/visual appeal of the landscape.

The FLPMA mandates the protection of scenic values. In accordance with Section 102 of the FLPMA, public lands are to be managed in a manner that will protect the quality of scientific, scenic, historical, and archeological values. Where appropriate, the BLM is also required to preserve and protect certain public lands in their natural condition.

The VRM system provides an objective and systematic method for identifying and evaluating scenic values in order to determine the appropriate levels of management (BLM 1986a). It provides a way to analyze potential visual impacts on visual resources; apply visual design techniques in order to ensure that resource uses and management activities are in harmony with their surroundings; and meet the assigned VRM Class objectives. VRM is a tool to identify and map essential landscape settings in order to meet public and community preferences and recreational experiences today and into the future (see Table 1).

Table 1. BLM Visual Resource Management Class Descriptions

VRM Class	Class Objective
I	Preserve landscape character. This class provides for natural ecological changes, but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.
Rehabilitation Areas	Areas in need of rehabilitation should be flagged during the inventory process. The level of rehabilitation is determined through the RMP process by assigning the VRM approved for that particular area.

The BLM may attach additional mitigation through stipulations, Conditions of Approval (COAs), or through special design requirements designed to achieve VRM requirements. The BLM may also work with the proponent to modify the proposal or relocate it, or may deny the proposal. According to Washington Office (WO) Information Bulletin Number 98-135, visual design techniques and BMPs must be incorporated in order to mitigate the potential for short-term and long-term impacts resulting from all resource uses and management activities. Examples of management resource uses and activities include energy development, utility corridors, road construction, recreational activities and OHV use, wildland fires, mining, vegetation treatments, and increased urban infrastructure needs and associated development (such as roads, power lines, water tanks, and communication towers).

The goal of the Visual Resource program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. The desired outcome is to maintain visual quality and integrity in accordance with VRM classes. Under the Proposed Plan/Final Approved Plan VRM Management Classes are as follows: VRM 1 = 9,419 acres, VRM 2 = 98,347 acres, VRM 3 = 228,690 acres, and VRM 4 = 41,383 acres. Some of the actions include concentrating all new disturbances within existing ROWs or within 656 feet (200 meters) of existing disturbances in VRM Class II; co-locating communication towers, facilities, and associated structures with existing communication sites; prohibit surface occupancy or use in VRM Objective Class I Areas; and apply CSUs and COAs to ensure that project design does not exceed the contrast ratings by VRM Objective Classes.

Wildland Fire

According to the Federal Wildland Fire Management Policy and Program Review (updated in 2001), fire, as a critical natural process, would be integrated into land and resource management plans and activities on a landscape scale and across agency boundaries and such integration will be based upon the best available science. All uses of fire for resource management require a formal prescription. Management actions on wildland fire will be consistent with approved fire management plans. Wildland fire will be used to protect, maintain and enhance resources and will be, to the extent possible, allowed to function in its natural ecological role. The 2008 Northwest Colorado Fire Program Area Fire Management Plan defines a strategy for managing and prioritizing wildland fires and prescribing vegetation treatments for fuel hazard reduction and resource benefit. Management actions in this RMP for fire include landscape-level strategies to achieve the resource goals and desired outcomes. Management actions for the forestry resource, as well as fuels treatment actions, are in the vegetation section.

The goal for wildland fire is to give first priority to public and firefighter safety and to protection of property. BLM would integrate fire and fuels management in order to meet Public Land Health Standards; and natural and cultural resource objectives across landscapes, agencies, and political boundaries. BLM would recognize the role of wildland fire as an essential ecological process, and allow fire to play a natural role in the ecosystem where, or when, resource objectives, or both, can be met.

Desired outcomes are to allow for planned and unplanned ignitions in order to meet wildland fire and other resource management objectives and apply a full range of wildland fire management options, including full suppression, to wildland fire managed for multiple objectives. To meet the desired outcome, BLM would evaluate fuel conditions, fire danger, and hazards associated

with wildland fire and manage accordingly, using mechanical, chemical, and prescribed fire treatments, and wildland fire managed for multiple objectives.

Surface disturbing and other disruptive activities associated with the fire and fuels management program include but are not limited to the following actions: fire suppression, damage rehabilitation, prescribed burning, constructing firelines, use of off-road vehicles, use of hand tools and heavy equipment (includes bulldozers), use of chemical fire suppression agents (ground-based) and the use of fire retardant drops containing chemical dyes (aircraft dispersal).

Special Management Areas

Special management areas are those requiring special management considerations to ensure that public land and resources are protected from irreparable damage. These areas include Areas of Critical Environmental Concern (ACECs), Wilderness Study Areas (WSAs), Wild and Scenic Rivers (WSRs), and other special management areas such as watchable wildlife areas and lands with wilderness characteristics that are outside existing WSAs. Management of these areas would comply with the applicable regulations (43 CFR 1610, 6300, 8350) for activities that could occur within these areas. All management actions and recreation and resource uses would focus on protecting sensitive resources and the health and safety of the user.

Lands With Wilderness Characteristics Outside Existing WSAs

The goal is to provide appropriate levels of protection in areas that will be managed for wilderness characteristics (naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation) outside existing WSAs. The desired outcome for achieving this goal is to protect wilderness characteristics through specific actions. Approximately 544 acres would be protected using specific Management and Setting Prescriptions for BLM-managed public lands managed for wilderness characteristics. In addition, those acres would be closed to fluid mineral leasing and precluded from geophysical exploration.

Areas of Critical Environmental Concern (ACECs)

Eight ACECs (9,705 acres) would be managed to protect Special Status species, cultural, and paleontological values. Management actions have been tailored to the specific needs of each ACEC and the resources present (see Appendix A). All ACECs would be protected via an NSO, recommended for withdrawal from mineral location, closed to solid mineral leasing, mineral material sales, and coal leasing and no new motorized routes would be allowed (except for new administrative routes.)

Wilderness Study Areas

WSAs (9,400 acres of mineral estate in the KFO) are closed to all mineral development. Existing mining claims must meet the "non-impairment mandate" for WSAs. WSAs are managed according to the *Interim Management Policy for Lands Under Wilderness Review* until Congress makes decisions on WSAs. Off-highway vehicle (OHV) use within the Platte River Contiguous WSA and Troublesome WSA would be prohibited. Within the North Sandhills cross-country

motorized and mechanized travel would be allowed on 163 acres, and limited to designated routes on 509 acres.

Wild and Scenic Rivers

Colorado River Segments 4 and 5 (17 river miles on BLM) would be managed to protect the free-flowing nature, ORVs, and tentative classification, pending congressional action or for the duration of the Approved RMP. WSR suitability determination will be deferred, and BLM will adopt and implement the Stakeholder Management Plan. If monitoring indicates, the Stakeholder Management Plan is not adequately protecting the free-flowing nature, ORVs, and tentative classification, the BLM would initiate a process to evaluate suitability and determine if river segment 4 and segment 5 are suitable for inclusion in the NWSRS.

Continental Divide National Scenic Trail

The goal is to establish a trail alignment in the Muddy Pass area, and identify resources to enhance the Continental Divide National Scenic Trail. The desired outcome to meet the goal is to protect resources associated with potential trail alignments in order to support current and future efforts to establish a connecting trail segment in the Muddy Pass area. Public lands would be managed in the Muddy Pass area in order to retain their natural settings for the establishment of a one-quarter-mile-wide trail alignment for the CDNST, and a viewshed corridor of up to 5 miles wide along the trail alignment. The width of the viewshed corridor could be reduced by topographic or vegetation features that provide screening.

State or National Trails and Byways

The goal is to cooperatively identify, plan, implement and manage with other agencies or interest groups potential or proposed State or national trails and byways that may occur within the Planning Area. If BLM-managed public lands are included, or are considered for inclusion, in State or national trails corridors, those lands would be managed to retain their physical, social, and operational settings; and to support the conservation, protection, restoration, enjoyment, and appreciation of the resources, qualities and values of those corridors.

Watchable Wildlife Areas

Two Watchable Wildlife Areas (4,400 acres) would be managed to protect the area's wildlife resources and values so that those areas will not be disqualified from designation. Management actions have been tailored to the specific needs of WWAs and the resources present (see Appendix A). All WWAs would be protected via an NSO.

Cave Resources and Abandoned Mines

Cave resources and abandoned mines would be managed to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values in caves. Cave values, especially those defined as significant under the Federal Cave Resources Protection Act of 1988 (FCRPA) would be protected in order to provide opportunities for people to engage in caving, research, and scientific exploration. Surface occupancy or use above recreationally significant karst (cave) resources would be prohibited in order to protect sensitive karst recreation-tourism attractions,

associated recreation opportunities, and to maintain their social and economic productivity. Significant caves (if found within KFO) would be recommended for withdrawal from mineral entry.

Forestry

Forest communities would be managed for forest health with fire and other treatments, and product sales would be allowed. Harvesting forest products killed by wildfires and bark beetle attacks may be warranted when consistent with resource goals/objectives. Woodland communities would be managed for woodland health with fire and other treatments, and product sales would be allowed. Authorization to harvest forest or woodland products would be determined on a case-by-case basis.

The forestry goal is to use a variety of silvicultural techniques and harvest systems in order to manage for healthy forests and woodlands while, at the same time, offering a variety of forest products on a sustainable basis.

Surface disturbing and other disruptive activities associated with the Forest Management program include but are not limited to the following actions: timber harvesting; clearcuts (including stand replacement); selective cutting; slash disposal; site regeneration (natural); collection of firewood, posts, poles, Christmas trees, and wildings; logging operations (very limited within the RMPPA); cutting and removing diseased trees; lopping, scattering, roller chopping, or burning slash; and disease treatment sprayings.

Livestock Grazing

The Taylor Grazing Act of 1934 is the legislative authority that provides for livestock grazing on and the protection of public lands. FLPMA (passed in 1976) and PRIA (passed in 1978) also provide legislative authority for the management of livestock grazing on public land. FLPMA directs the management of public land for multiple use and sustained yield. PRIA directs improvement of rangeland conditions and provides for rangeland improvements including establishing habitat for wildlife. The Colorado Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management apply to all resource uses on public lands. These standards and guidelines address management practices at the grazing allotment management plan and watershed levels and are intended to maintain desirable conditions or to improve undesirable rangeland conditions within reasonable time frames. If it were determined that livestock grazing is a factor in not meeting the standards, appropriate management actions would be implemented (e.g. season of use changes, grazing duration changes, pasture rotations), as determined through cooperation among BLM, livestock operators, stakeholders, and interested members of the public. In areas where livestock grazing would not be compatible with other uses, grazing would not be permitted. Public lands found not to be suitable for livestock grazing, or public lands found to contain resource values that cannot be adequately protected from livestock impacts through mitigating measures, would not be allocated to livestock grazing.

The goal for livestock grazing is to apply flexible and sustainable livestock grazing, in accordance with Standards for Public Land Health and Guidelines for Livestock Grazing Management (BLM 1997a) in order to contribute to local economies, ranching livelihoods, and to the rural western character integral to many communities. The desired outcome is to meet the forage demands of livestock operations based upon current active preference (AUMs) while, at the same time, improving the quantity and quality of

forage available for livestock and wildlife. Under the range program, approximately 329,600 acres for livestock grazing, and approximately 39,100A UMs of livestock forage would be provided. Six allotments, totaling 8,759 acres, would be closed. Three new reserve allotments would be created that may be used for temporary, non-renewable livestock grazing in emergencies, or in order to manage vegetation.

Activities associated with the livestock management program include but are not limited to the following actions: livestock grazing authorizations (adjust season of use, distribution, kind, class, and numbers of livestock); construct exclosures; design, implement, and monitor grazing systems; construct, maintain, and modify fences; develop water facilities (catchments, reservoirs, springs, pipelines, instream structures and wells) and vegetation treatments (including prescribed fire, chemical, mechanical and biological treatments.

Recreation

FLPMA provides for the recreational use of public land as an integral part of multiple use management. Dispersed, unstructured activities typify the recreational uses occurring on most public lands. Policy guidelines in BLM Manual 8300 direct BLM to identify administrative units known as SRMAs when there is a distinct, primary recreation-tourism market, as well as a corresponding and distinguishing recreation management strategy. ERMAs are areas in which significant recreation opportunities and problems are limited and explicit recreation management is not required. Minimal management actions related to the BLM's stewardship responsibilities are adequate in these areas. The remaining public land is designated as a non- Recreation Management Area (non-RMA).

The overall goal for recreation is to produce a diversity of quality recreational opportunities that support outdoor-oriented lifestyles and add to participants' quality of life while, at the same time, contributing to the local economies. The desired outcomes for achieving this goal are to increase awareness, understanding, and a sense of stewardship in recreational activity participants so that their conduct safeguards cultural and natural resources; ensure that visitors are not exposed to unhealthy or unsafe human-created conditions (defined by a repeat incident in the same year, of the same type, in the same location, due to the same cause); achieve a minimum level of conflict between recreation participants in order to: 1) allow other resources and programs to achieve their RMP objectives; 2) curb illegal trespass and property damage; and 3) maintain a diversity of recreational activity participation; and increase collaboration with community partners in order to maintain appropriate activity-based recreational opportunities in community growth areas (BLM-managed public lands adjacent to, between, and surrounding communities; also referred to as WUI areas).

One ERMA would be designated, totaling 13,800 acres to address local recreation issues. A CSU would be applied to mitigate impacts from fluid minerals.

Under SRMAs, the desired outcome is to have specific outcome-focused objectives and recreation setting character conditions. The administrative, management, information, and monitoring framework can be found in Appendix N (Description of Recreation Resources) in the Proposed Plan/Final Approved Plan. Five SRMAs, totaling approximately 50,000 acres, would be designated for the protection of the recreation outcomes and setting prescriptions. Approximately 24,000 acres would be closed to oil and gas leasing; closed to non-energy solid

mineral leasing; closed to saleable mineral disposal; petitioned for withdrawal and designated a ROW avoidance area.

Activities associated with the recreation resources program include but are not limited to the following actions: restricting recreational use, permitting competitive recreation events, developing recreational trails, constructing recreation sites, maintaining developed and undeveloped recreation sites (campgrounds), placing boundary signs and interpretive markers and permitting commercial recreation uses.

Trails and Travel Management and Transportation Facilities

Access would be provided across public lands to landlocked private and state lands consistent with FLPMA. Management of OHV activities would be in accordance with Executive Order 11644, as amended by Executive Order 11989, and with applicable regulations (43 CFR 8340) that address OHV use on public lands. Designation and authorization of OHV use would be designed to protect resource values, promote safety of users and minimize conflict among various uses of public lands. Federal regulations (43 CFR Part 8340) and BLM planning guidance require BLM to designate all BLM-administered land as either open, limited, or closed in regard to OHV use. Vehicle closures do not apply to BLM ROWs, permitted uses, county or state roads, or other valid existing rights.

The goal of trails and travel management is to support the BLM's mission, achieves resource management goals and desired outcomes, and provides for appropriate public and administrative access. The desired outcome for achieving this goal includes maintaining a comprehensive Travel Management System that best meets the full range of public, resource management, and administrative access needs.

BLM would designate areas as open, limited, or closed to vehicle use (see Table 2). Designated roads and trails have been determined using comprehensive travel management planning and would be implemented throughout the RMPPA. Table 2 shows that most of the KFO Decision Area is Limited to designated roads and trails. Areas and routes open to over-the-snow travel must have a minimum average of 12 inches of snow in order to be considered open for public use.

Table 2. Off-Highway Vehicle Classifications

Classification	Acres
Open	200
Limited to existing roads and trails	0
Limited to designated roads and trails	360,300
Seasonally closed to OHV use	197,800
Closed to OHV use	8,400
Closed to over-the-snow vehicles	47,130

The goal for Transportation Facilities is to provide a transportation system that is manageable, maintainable, and that meets the need for managing resources and resource uses. The desired

outcome is to maintain BLM roads to identified maintenance intensity levels (appropriate intensity, frequency, and type of maintenance) consistent with public safety and Resource Management Plan objectives (see Table 3).

Table 3. Maintenance Intensity Classifications

Classification	Miles
Level 0: existing routes that will no longer be maintained and no longer be declared a route	0
Level 1: routes where minimum (low intensity) maintenance is required in order to protect adjacent lands and resource values. These roads may be impassable for extended periods of time.	17
Level 3: routes requiring moderate maintenance due to low-volume use (seasonally or year-round for commercial, recreation, or administrative access). Maintenance intensities may not provide year-round access; however, they are intended to, generally, provide resources appropriate in order to keep the route in use for most of the year.	119
Level 5: routes for high (maximum) maintenance due to year-round needs, high-volume traffic, or significant use. Also may include routes identified through management objectives as requiring high intensities of maintenance or to be maintained open on a year-round basis.	2

Activities that are likely to occur under this program include, but are not limited to: managing roads, routes and trails; designate, implement, and monitor open, limited and closed area for vehicle use; posting signs, maps and brochures; and allowing the use of motorized over-the snow vehicles.

Lands and Realty

Section 102 of FLPMA requires that public lands be retained in federal ownership unless disposal of a particular parcel will serve the national interest. Guidance provided by Sections 203 and 206 of FLPMA applies to all surface land tracts identified as available for disposal under the land use allocations. Retention and acquisition of land containing significant resource values will provide for the long-term protection and management of those values. Any acquired land or acquired interest in land would be managed for the purposes for which the land was acquired or in the same manner as adjacent or comparable public land.

Section 503 of FLPMA provides for the designation of ROW corridors and encourages use of in-common ROWs to minimize environmental impacts and the proliferation of separate ROWs. BLM policy, as described in BLM Manual 2801.13B1, is to encourage prospective applicants to locate their proposals within corridors.

The first lands and realty goal is to meet public needs for realty authorizations (such as ROWs, renewable energy sources, permits, and leases) when such needs are consistent with other resource values. The desired outcome for achieving this goal is to provide for the development of

transportation systems, utilities, communication sites, and renewable energy resources when development is consistent with management of other resource values. Approximately 191,300 acres would be designated as use authorization Avoidance Areas, including occupied habitat for Threatened or Endangered species; and active Greater sage-grouse leks with a 0.6-mile buffer. In addition, exclusion areas, totaling approximately 10,200 acres, would be designated.

The second lands and realty goal is provide for public ownership of lands (or interests in lands) with high-value resources or public values, or both, that facilitate effective BLM land management. To meet this goal, the desired outcome would apply certain criteria when considering land tenure adjustments and meet resource management needs by withdrawing lands from operation of the General Mining Law of 1872. BLM would retain approximately 450,100 acres of federal mineral ownership, including occupied habitat for Threatened and Endangered Species, Greater sage-grouse core areas, and wildlife critical winter range. In addition, approximately 18,200 acres would be petitioned for withdrawal from settlement, sale, location, or entry under the general land laws, including the mining laws.

Surface disturbing and other disruptive activities associated with the lands and realty program include but are not limited to the following actions: land exchanges; temporary use permits; and issuing ROWs for powerlines, communication sites, pipelines, roads, reservoirs, buried telephone and fiber optic lines, compressor stations and other facilities.

Energy and Minerals

All minerals and energy resource management actions would recognize all valid existing mineral rights and would ensure compliance with existing legal and regulatory requirements. The Mineral Leasing Act of 1920 (as amended), the Geothermal Steam Act of 1970 (as amended), and the Mining and Mineral Policy Act of 1970 declare that it is the continuing policy of the federal government to foster and encourage private enterprise in the development of domestic mineral resources. Section 102 of FLPMA directs management of public lands in a manner that recognizes the nation's need for domestic sources of minerals and other resources. Transmitted by Information Bulletin 2008-107, the BLM mineral policy states, among other items, that "…land use planning and multiple use management decisions will recognize that energy and mineral development can occur concurrently or sequentially with other resource uses, providing that appropriate stipulations or conditions of approval are incorporated into authorizations to prevent unnecessary or undue degradation, reduce environmental impacts and prevent a jeopardy opinion."

BLM would apply lease stipulations to new leases as necessary. These stipulations would notify the leaseholder that development activities might be limited, prohibited, or implemented with mitigation measures to protect specific resources. The stipulations would condition the leaseholder's development activities and would provide BLM with the authority to require mitigation or to deny some proposed exploration and development methods. The general types of resource protections in the land use plan include areas closed to oil and gas leasing, areas open to oil and gas leasing with standard terms and conditions, NSO, CSU and timing limitations. Lands managed for wilderness characteristics outside of WSAs, eligible WSR segments, State owned wildlife areas, the Upper Colorado River SRMA, the YMCA/Sheep Mountain Conservation Easement, the North Sand Hills SRMA, the Strawberry SRMA, WSAs, and municipal boundaries would be closed to oil and gas leasing. Leasing of solid minerals would comply with

the Mineral Leasing Act of 1920, the Federal Coal Leasing Amendments Act of 1976, and coal regulations and coal planning requirements.

The General Mining Law of 1872 gives miners the right to locate and develop mining claims on public lands that are open to mineral entry. In areas open to mineral location, mining claims can be filed, which allow the claims to be held and developed in accordance with applicable regulations (39 CFR 3809). Mining activities would also comply with other regulatory requirements, including limitations on air and water discharges, waste management, spill prevention, and endangered species. Mining of mineral materials would comply with applicable regulatory requirements (43 CFR 3600) and air and water quality protection regulations. A site-specific analysis would be performed before any exploration or extraction activity to identify and locate resource elements that require protection or mitigation measures. The following would be recommended for withdrawal from mineral location: WSAs, ACECs, the North Sand Hills SRMA, the Strawberry SRMA, the Upper Colorado River SRMA, developed recreation sites, proposed National Scenic trails, areas managed for wilderness characteristics outside of WSAs, the YMCA/Sheep Mountain Conservation Easement, and eligible segments in the NWSRS.

The goal for coal is to provide opportunities for the leasing, exploration, and development of coal in order to meet local and national energy needs. The desired outcome for achieving this goal is to facilitate environmentally sound exploration and development of coal resources, using the best available technology. Approximately 123,700 acres of Federal mineral estate within the McCallum Known Recoverable Coal Resource Area (KRCRA) would as open to consideration for coal leasing. However, a preliminary application of 20 unsuitability criteria revealed that 106,000 acres are unsuitable for surface mining.

The goal for fluid minerals is to provide opportunities for leasing, exploration, and development of fluid minerals (oil and gas, including coalbed methane) using balanced, multiple-use and sustained-yield management in order to meet local and national energy needs. The desired outcome for achieving this goal is to facilitate orderly, economic, and environmentally sound exploration and development of oil and gas resources in conjunction with other resource uses and objectives, using the best available technology.

Table 4. Oil and Gas Reasonably Foreseeable Development

Action	Total	Federal Wells
Wells Projected to be Drilled	370	192
Anticipated Surface Disturbance	2,960	1,536

The goal for locatable minerals, mineral materials, non-energy leasable minerals, and other minerals is to provide opportunities for development of locatable minerals, mineral materials, and non-energy leasable minerals while, at the same time, preventing unnecessary and undue degradation. The desired outcome for achieving this goal is to facilitate environmentally sound exploration and development of locatable minerals, mineral materials, and non-energy leasable minerals. COAs, BMPs, and SOPs would be applied to the leasing, exploration, and development of locatable minerals, mineral materials, and non-energy leasable minerals.

Surface disturbing and other disruptive activities associated with the minerals program include but are not limited to the following actions: applying dust control measures; constructing and reclaiming well pads, access roads, and reserve pits; constructing reservoirs associated with water disposal; constructing compressor stations; building pipelines associated with leases or units; installing power lines associated with leases or units; developing coal reserves; exploring for and develop locatable minerals (gold, silver, cobalt, etc.); mining for mineral materials (sand and gravel, decorative stone, aggregate); and conducting geophysical exploration.

SPECIES LIST

Table 5. Species List for Kremmling Resource Management Plan (Eagle, Grand, Jackson, Larimer, and Summit Counties).

Approved by FWS March 18, 2011. Updated February 4, 2013.

Category	Common Name	Scientific Name	Status	Recovery Plan or Outline? (Y/N)
Plants	North Park Phacelia	*Phacelia formosula*	Endangered	Y
	Osterhout milkvetch	*Astragalus osterhoutii*	Endangered	Y
	Penland Beardtongue	*Penstemon penlandii*	Endangered	Y
	Western prairie fringed orchid▲	*Platanthera praeclara*	Threatened	Y
Terrestrial Wildlife & Birds	Canada Lynx	*Lynx canadensis*	Threatened	Y
	North American wolverine	*Gulo gulo luscus*	Proposed	N
	Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	Y
	Least Tern (interior population) ▲	*Sterna antillarum*	Endangered	Y
	Piping Plover▲	*Charadrius melodus*	Threatened	Y
	Whooping Crane▲	*Grus americana*	Endangered	Y
Aquatic Species	Pallid Sturgeon▲	*Scaphirhynchus albus*	Endangered	Y
	Colorado Pikeminnow*	*Ptychocheilus lucius*	Endangered	Y
	Razorback Sucker*	*Xyrauchen texanus*	Endangered	Y
	Bonytail*	*Gila elegans*	Endangered	Y
	Humpback Chub*	*Gila cypha*	Endangered	Y
	Greenback cutthroat trout#	*Oncorhynchus clarki ssp. stomias*	Threatened	Y

* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.
▲ Water depletions in the North Platte, South Platte and Laramie River Basins may affect the species and/or critical habitat associated with the Platte River in Nebraska.
Recent genetic tests identified cutthroat population as GB linage, therefore, consultation is an interim measure until genetic and taxonomic issues are resolved.

SPECIES NOT CARRIED FORWARD

North American Wolverine (Gulo gulo luscus)

The ESA requires BLM to conference with the FWS on actions that are likely to jeopardize a proposed species or cause destruction or adverse modification to proposed critical habitat. Since the BLM is generally not in a position to determine jeopardy, BLM policy is to confer on all discretionary actions that are determined to be May Affect, Likely to Adversely Affect. Conversely, BLM policy is to not confer on actions determined Not Likely to Adversely Affect.

The FWS identified climate change as the primary threat to wolverine along with lesser impacts from dispersed recreation. No critical habitat is being proposed at this time. None of the actions proposed in the Final RMP for the Kremmling Field Office are expected to result in a May Affect, Likely to Adversely Affect determination. Therefore, the North American wolverine is not carried forward for further analysis.

EVALUATED SPECIES

North Park Phacelia (*Phacelia formosula*)

Listing Status: Federal—Endangered, September 1982

Species Description

North Park Phacelia is a biennial herb 1.52 - 2 dm high, with a single upright stem. Leaves are deeply divided (lanceolate or oblanceolate), 5-7 cm long pinnate with leaflets 5-10 mm long, and 3-5 mm wide. Phacelia formosula bears violet-purple flowers in a coiled, scorpion tail-like cluster.

Life History

Phacelia formosula grows on barren exposures where the Coalmont Formation forms outcrops of sandy soil or ledges. The species grows most abundantly on steep, sparsely vegetated, and erodible slopes, such as on the sides of deeply cut ravines. Relatively flat areas may support the species in low numbers if the soil is nearly pure sand and mostly devoid of vegetative cover. Precipitation comes as snow in winter and rain during summer convective storms. Since snow is often blown away in this area, summer storms are probably critical for the species. Soils are Lithic Torriorthents. Slopes and aspects are variable and elevation ranges from 8000 to 8200 feet. Information on soil moisture and pH are lacking.

Germination occurs in spring, and leafing in late spring to early summer. Fruiting occurs from July to August and seed dispersal is from July to September. Pollen is dispersed by insects, seeds are dispersed by wind, water, and possibly ants. Since the species is a biennial the climate two years prior to any seed crop is the dependent variable. Two years after a year with good precipitation, assuming the intervening year is not harsh enough to kill vegetative rosettes, the species should produce a good seed crop. Seeds apparently remain viable for at least two years.

Population Distribution

Known from Jackson and possibly Larimer counties, Colorado. The species is found within about 60 square miles in North Park, from Michigan Creek west to the North Platte River, Jackson County, Colorado, and potentially in an additional six square miles in the Laramie River Valley, Larimer County. Estimated range is 738 square kilometers (285 square miles), calculated in GIS by drawing a minimum convex polygon around the known occurrences (NatureServe. 2012).

Environmental Baseline

There are 11 occurrences documented in the Colorado Natural Heritage Program database. Two of the 11 occurrences have not been observed in over 20 years (as of 2006). Three of the 11 (not the historical records) are tentatively identified as Phacelia formosula in the Laramie River Valley. The Colorado Natural Heritage Program estimates the population size at about 4,100 individuals, however this number is substantially lower than numbers estimated by the BLM. In 2004, the BLM counted over 15,000 plants in only two occurrences. Although there are no data to indicate a specific trend, the species seems to be stable within its limited available habitat (NatureServe. 2012).

Threats

Motorized recreation is considered to be the primary threat to the species at this time (CNHP Scorecard 2006). Habitat is susceptible to erosion. Other threats include livestock trampling/ trailing, grazing, and coal, oil and gas development. In the Laramie River Valley, ORV and livestock use occur but do not appear to be negatively affecting the plants (Doyle personal observation 2004).

Management Status and Recovery and Conservation Planning

Recovery Plan completed March 21, 1986. No Critical habitat has been identified for this species. A Conservation Action Plan (CAP) was completed in 2008 and updated in 2011. The CAP identifies conservation strategies for the North Park phacelia, based on an assessment of the plants' viability and threats by participants of three workshops held in May 2008, August 2008 and July 2010.

Kremmling milkvetch (*Astragalus osterhoutii*)

Listing Status: Federal—Endangered, July 1989

Species Description

Kremmling milkvetch is a pale green perennial, herbaceous plant of the Fabaceae family. It is described as succulent and tall (up to 39 inches [in] [99 cm]) with linear leaflets, 2 to 4 in (5 to 10 cm) long, with 7 to 15 leaflets, each up to 0.2 in (0.5 cm) long, on several bright green stems, with 12 to 25 large (1 in) white flowers in a cluster or raceme. Seed pods are linear and stipitate (stalked) pods, 0.8 to 5 in (2 to 13 cm) long and 1.2 to 1.6 in (3 to 4 cm) diameter, compressed laterally and hang freely (BLM 2005b, Anderson and Jordan 1992). Diagnostic characteristics include linear, filiform, or narrowly oblong leaflets with white flowers and pods that are not

sulcate (grooved lengthwise) (Weber and Wittmann 2001). Pollination occurs by bees (Anderson and Jordan 1992). Flowering occurs in June through August (Spakman et al. 1997).

Life History

Kremmling milkvetch is restricted to highly seleniferous grayish-brown clay soils derived from Niobrara, Pierre, and Troublesome Formation shales at approximately 7,500 ft elevation. The species grows on relatively flat areas and barren knolls and on denuded clay hills, in gulches, at the foot of gullied bluffs, and in disturbed areas along roads and borrow sites (BLM 2005a). While it has been observed to grow on the Troublesome Formation soils, it appears more vigorous on soils of the Niobrara and Pierre formations. The species is often associated with and growing through sagebrush (Spakman *et al*. 1997), but is interspersed in grassy inclusions with relatively sparse cover of shrubs within the sagebrush community. Principal associated species include Indian ricegrass, western wheatgrass, blue grama, bottlebrush squirreltail, shortstem buckwheat, Hood's phlox, broom snakeweed, mat penstemon, Wyoming big sagebrush, fringed sage, little rabbitbrush, and gray horsebrush (BLM 2005a).

Population Distribution

Kremmling milkvetch is endemic to the Muddy and Troublesome Creek drainages near the town of Kremmling in Grand County, Colorado. The estimated range of the species is approximately 65 square miles.

Environmental Baseline

There are only 6 occurrences documented in the Colorado Natural Heritage Program database. One of the 6 occurrences has not been observed in over 20 years. Total occupied habitat is estimated at 800 acres. Total estimated sum of individuals is 11,400. The Federal Register states that there are 25,000 to 50,000 individuals (NatureServe. 2012). Although there are no data to indicate a specific trend, the species seems to be stable within its limited available habitat.

Threats

Presently, the major threat is from habitat destruction from all-terrain vehicles going off road. Other threats include road maintenance (including weed control and road widening), and mineral extraction/mining. Past occurrences have been impacted by habitat loss due to creation of Wolford Mountain Reservoir. Mineral extraction is becoming a more imminent threat because of increased demands from mining interests. The primary pollinator is a ground bumble bee which could also be impacted by surface disturbance and inundation (NatureServe 2012).

Management Status and Recovery and Conservation Planning

Recovery Plan completed September 30, 1992. No Critical habitat has been identified for this species. A Conservation Action Plan (CAP) was completed in 2008 and updated in 2011. The CAP identifies conservation strategies for the Kremmling milkvetch, based on assessments of the plants' viability and threats by participants of an initial conservation action planning workshops held in June 2008 and a July 2010.

Penland Beardtongue (*Penstemon penlandii*)

Listing Status: Federal—Endangered, July 1989

Species Description

Penland beardtongue is a short, perennial herb up to 10 in (25 cm) tall from a loosely branched woody caudex, arising from a short rhizome with long, ropy roots (Weber 1986). The flowering stems are erect with linear, revolute leaves and clumped, pubescent stems. Inflorescence is striking, containing 5 to 15 bi-colored flowers of blue lobes and violet throats, 0.5 to 0.6 in (1.3 to 1.4 cm) long. Fruit is a small brown capsule. Diagnostic characteristics include linear leaves, 0.04 to 0.08 in (0.1to 0.2 cm) wide, involute or folded and up to 2 in (5 cm) long; cauline leaves are somewhat reduced (Weber 1986, Weber and Wittmann 2001). Flowering occurs in June and July and fruiting occurs in August through September (Spakman et al. 1997). Although the pollination aspects are not as well studied as Kremmling milkvetch, Penland beardtongue is visited regularly by numerous native bee species (Tepedino et al. 1999), including one undescribed penstemon specialist with a first-known occurrence west of the Great Plains (Anderson and Jordan 1992).

Life History

The species is an obligate selenophile, restricted in this area to the Troublesome Formation of seleniferous shales (Weber 1986). It is most closely related to Penstemon paysoniorum of southwestern Wyoming, a species also restricted to seleniferous soils (Weber 1986). As indicated for Kremmling milkvetch, it is hypothesized that these disjointed populations are remnants of Wyoming flora that extended into Colorado during glacial periods (Anderson and Jordan 1992). At this location, it occurs on strongly seleniferous clay-shales of the Troublesome Formation, on steep barren hillsides with sparse plant cover; for example, sagebrush badlands (Spakman et al. 1997). The vegetation cover of sagebrush and mats of mat-forming beardtongue (Penstemon caespitosus) and Easter daisy (Townsendia leptotes) increases at the expense of Penland beardtongue where the soils have been mixed by erosion (Weber 1986). Optimum habitat includes runoff channels shaded by deep cuts (BLM 2007). Weber (1986), in describing the species, hypothesized that plants germinated from seed washed down slope into runoff channels in the shade afforded by the cut-banks. Weber thought the function of the well-developed, short rhizomes is not so much to furnish nodes for vegetative reproduction, but to give the plant stability against being dislodged by high runoff events.

Population Distribution

Penland beardtongue is endemic to Grand County and is only known from two locations along Troublesome Creek, less than two miles apart. The populations of Penland beardtongue occur on barren hillside habitat, mostly east of CR2 and west of Sulphur Gulch. Suitable habitat occurs sporadically in areas near this population, but surveys have not located other populations (BLM 2005a).

Environmental Baseline

This species is most prominent on barren hillsides in soil conditions that restrict most other plant species. This aspect is reflected by the lack of weedy species: only two non-native plant species

(tower mustard [*Arabis glabra*] and orchard grass [*Dactylis glomerata*]) have been recorded during population density counts at 30 sites in Penland beardtongue habitat.

Penland beardtongue is considered to be rare, with only two known populations of this species along Troublesome Creek (Anderson and Jordan 1992). In 1992, the Recovery Plan reported approximately 5,500 individuals for the area at this location (Anderson and Jordan 1992). However, this number is low compared to more recent surveys, including one in 2005 by the Colorado Natural Heritage Program where 1,200 plants were reported for a 1-acre area (Culver et al. 2005), and a survey conducted by the Denver Botanic Gardens in 2008. In this later study, 12,829 plants were estimated for a 1-hectare (2.47 acres) macroplot and within this area counts in 35 x 50 m² plots, resulted in an equivalent density of 5,221 plants per acre (Neale et al. 2008). Surveys conducted in 2009 counted 7,070 plants on 14.03 acres (Hettinger and Murphy 2009), or an equivalent of 504 per acre. Subsequent in-depth transect (50 x 2 m) counts at 30 sites in areas determined to be suitable habitat indicated a much higher density, with an average of 6,776 plants per acre (Hettinger and Murphy 2010). This density is more similar to the results of Neale et al. (2008). Based on field studies in 2009 and 2010 and on aerial photography interpretation, 196 acres of suitable habitat occur within the contiguous population polygon east of Troublesome Creek (467 acres total delineated for the population). Thus, approximately 1,328,096 plants occur in this area—based on an average of 6,776 plants per acre. Although there are no data to indicate a specific trend, the species seems to be stable within its limited available habitat.

Threats

The primary threat is considered to be off-road vehicle use as existing roads and trails run through the main population. County Road 2 also runs through the main population, hence road widening and weed control are threats to that occurrence.

Management Status and Recovery and Conservation Planning

Recovery Plan completed September 30, 1992. No Critical habitat has been identified for this species. A Conservation Action Plan (CAP) was completed in 2008 and updated in 2011. The CAP identifies conservation strategies for the Penland beardtongue, based on assessments of the plants' viability and threats by participants of an initial conservation action planning workshops held in June 2008 and a July 2010.

Canada Lynx (*Lynx canadensis*)

Listing Status: Federal—Threatened, March 2000

Species Description

The lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail (McCord and Cardoza 1982). The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back and grayish-white or buff-white fur on the belly, legs and feet. Summer pelage of the lynx is more reddish to gray-brown (Koehler and Aubry 1994). Adult males average 22 pounds in weight and 33.5 inches in length (head to tail) and females average 19 pounds and 32 inches

(Quinn and Parker 1987). The lynx's long legs and large feet make it highly adapted for hunting in deep snow.

Life History and Population Dynamics

The following information is from the Southern Rockies Lynx Amendment (SRLA) Biological Opinion (USFWS 2008).

Habitat

Lynx habitat in the Southern Rocky Mountains is usually found in the subalpine and upper montane forest zones, typically between 8,000 and 12,000 feet in elevation. Upper elevation subalpine forests are dominated by subalpine fir and Engelmann spruce. As the subalpine zone transitions down to the upper montane, spruce-fir forests begin to give way to a predominance of lodgepole pine, aspen, or mixed stands. Engelmann spruce and/or subalpine fir may retain dominance on cooler, more mesic mid-elevation sites, intermixed with aspen, lodgepole pine and Douglas-fir. White fir appears in the San Juan Mountains, Sangre de Cristo Range and Wet Mountains in southern Colorado. The lower montane zone is dominated by ponderosa pine, pinyon pine/juniper communities and Douglas-fir, with pine typically dominating on lower, drier, more exposed sites, and Douglas-fir occurring on moister and more sheltered sites. Although the lower montane zone is generally below occupied lynx habitat, montane forests can be important as connective travel habitat; it may facilitate lynx dispersal and movements between blocks of lynx habitat, and may provide some foraging opportunities during those movements.

In the Southern Rocky Mountains, most lynx habitat forest types occur on federal public lands, including National Parks, BLM and National Forest System lands. Forests in the SRLA area are naturally patchy, with many openings and breaks in forested canopies and lynx habitat is often present within a habitat mosaic of vegetation types, rather than as simple vegetation types. Spruce-fir, lodgepole pine, white fir, aspen-conifer mix, and mesic Douglas-fir may all provide foraging and/or denning habitat for lynx. Also potentially important in many parts of the SRLA area are the high elevation sagebrush and mountain shrub communities found adjacent to or intermixed with forested communities, affording potentially important alternate prey resources and travel habitat. Riparian and wetland shrub communities (e.g., willow, alder, serviceberry) found in valleys, drainages, wet meadows, and moist timberline locations may also support important prey resources, as well as travel corridors. Many parts of the Southern Rockies have a shortage of dense, early successional forest stands, particularly in lodgepole pine.

Lynx habitat in southern Wyoming and Colorado is somewhat geographically isolated from the rest of the Rocky Mountain chain by the vast sagebrush and desert shrub expanses of the Wyoming Basin, the Red Desert in Wyoming and similar vegetation patterns in the Green and Colorado River plateaus in western Colorado and eastern Utah. This geographic isolation may have long-term implications for the maintenance of lynx populations in the Southern Rocky Mountain Geographic Area (SRMGA), as lynx from the northern meta-populations may not be able to easily disperse into this area. However, lynx are capable of long-distance dispersals, as shown by 33 of the 218 reintroduced lynx that moved from Colorado to Wyoming, Montana, and Nebraska.

Studies in northern Wyoming (Beauvais 2001) and a more limited study in Colorado found that snowshoe hares (*Lepus americanus*), the primary prey base of the lynx, have a strong affinity for the higher elevation mature to late-successional spruce-fir forests. The Wyoming study showed that hares are out-competed by other species in early successional stages (less than 15 years of age); however, these altered conditions probably were not yet providing hare habitat. In Colorado, Dolbeer and Clark (1975) reported higher survival of snowshoe hares in mature spruce-fir forests and mixed spruce-fir/lodgepole pine forests, which contained dense undercover, than in open lodgepole stands lacking understory. The Colorado study was conducted in a very limited area, and did not sample younger sapling stage stands (15 to 40 years) to compare hare densities with those that were reported for mature and late-successional spruce-fir forests. Therefore, it remains somewhat unclear what role early-successional forests play in providing snowshoe hare habitat in the SRMGA; however, it is generally accepted that they are of more value than mid-successional stages, especially in lodgepole pine, based on literature from the northern boreal forests. Extensive pure stands of aspen may not provide quality habitat for hares due to deficiencies in winter habitat characteristics. Some of these pure aspen stands have not been mapped as lynx habitat in this portion of the SRMGA, as they are not in close enough proximity to winter or denning habitats and, therefore, would not be expected to provide the required components for lynx home ranges.

Lynx habitat in the Southern Rockies is naturally fragmented due to alpine tundra, open valleys, shrubland communities, and dry vegetation types associated with southerly and westerly exposures or lower montane zone elevation. Because of the southerly latitude, lynx habitats (spruce-fir, lodgepole pine and mixed aspen-conifer forests) are typically found in elevational bands along the flanks of mountain ranges or on high plateaus. Although fragmented, lynx habitat remains generally interconnected through numerous mountain chains and intervening low elevation forests and brushlands. Important topographic features and vegetative communities link these fragmented forested landscapes of habitat together, providing for movement of individuals within and between Lynx Analysis Units (LAUs). Connectivity may be provided by narrow forested mountain ridges or plateaus that connect more extensive mountain habitats, or by wooded riparian communities that provide travel ways across open valley floors between mountain ranges. Lower elevation ponderosa pine, pinyon-juniper woodlands, or shrublands may also serve the same function.

Home Range and Dispersal

Individual lynx maintain large home ranges generally range between 12 to 83 square miles (Koehler 1990; Aubry et al. 2000; Squires and Laurion 2000; Squires et al. 2004; Vashon et al. 2005a). The size of lynx home ranges varies depending on abundance of prey, the animal's gender and age, season, and the density of lynx populations (Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry et al. 2000; Mowat et al. 2000; Vashon et al. 2005). When densities of snowshoe hares decline, for example, lynx enlarge their home ranges to obtain sufficient amounts of food to survive and reproduce. Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the species' range are generally large compared to those in the core of the range in Canada (Koehler and Aubry 1994; Apps 2000; Squires and Laurion 2000). In the Southern Rockies, lynx home ranges include 15 to 50 square miles (Reudiger et al. 2000).

The primary factor driving lynx behavior and distribution is the distribution of snowshoe hare, their primary prey. Lynx are highly mobile and have a propensity to disperse long distances, particularly when prey becomes scarce (Mowat et al. 2000). Cover is important to lynx when searching for food (Brand et al. 1976). Lynx have been observed (via snow tracking) to avoid large openings (Koehler 1990; Staples 1995) during daily movements within the home range, seeming to prefer to move through continuous forest, using the highest terrain available such as ridges and saddles (Koehler 1990; Staples 1995). Lynx often hunt along edges (Mowat et al. 2000). Kesterson (1988) and Staples (1995) reported that lynx hunt along the edges of mature stands within a burned forest matrix, and Major (1989) found that lynx hunt along the edge of dense riparian willow stands. In Montana, lynx prefer to forage in spruce-fir forests with high horizontal cover, abundant hares, and large diameter trees during the winter (Squires et al. 2006). Lynx tend to avoid sparse, open forest and forest stands dominated by small-diameter trees during the winter.

Lynx also make long distance exploratory movements outside their home ranges (Aubry et al. 2000; Moen et al. 2004). Areas or habitats used by lynx during dispersal or exploratory movements are poorly understood at this time. Evidently, lynx are able to traverse expanses of diverse habitat types and conditions during their movements. Dispersing lynx may colonize suitable but unoccupied habitats, augment existing resident populations, or disperse to unsuitable or marginal habitats where they cannot survive. Lynx are capable of dispersing extremely long distances (Mech 1977; Washington Department of Wildlife 1993); for example, a male was documented traveling 370 miles (Brainerd 1985). Lynx disperse primarily when snowshoe hare (*Lepus americanus*) populations decline (Ward and Krebs 1985; Koehler and Aubry 1994; O'Donoghue et al. 1997; Poole 1997). Subadult lynx disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges. During the early 1960s and 1970s, numerous lynx were documented in atypical habitat, such as in North Dakota. In those years, harvest returns indicated unprecedented cyclic lynx highs for the 20th century in Canada (Adams 1963; Harger 1965; Mech 1973; Gunderson 1978; Thiel 1987; McKelvey et al. 2000b). Many of these unusual observations were probably dispersing animals that either were lost from the population or later returned to suitable habitat.

Diet

Snowshoe hares are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of the lynx (Koehler and Aubry 1994). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus, Dendragapus* spp., *Lagopus* spp.), flying squirrel (*Glaucomys sabrinus*), ground squirrel (*Spermophilus parryii, S. Richardsonii*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), mice (*Peromyscus* spp.), voles (*Microtus* spp.), shrews (*Sorex* spp.), fish, and ungulates as carrion or occasionally as prey (Saunders 1963; van Zyll de Jong 1966; Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Koehler 1990; Staples 1995; O'Donoghue et al. 1998). The primary winter prey species of lynx in Colorado are the snowshoe hare and red squirrel, with other mammals and birds forming a minor part of the winter diet (Shenk 2004). Winter food items in Montana include snowshoe hare (96 percent), red squirrel and grouse (Squires and Ruggiero 2007).

During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet (Brand et al. 1976; O'Donoghue et al. 1998a; Apps 2000; Mowat et al. 2000). However, a diet of red squirrels alone might not be adequate to ensure

lynx reproduction and survival of kittens (Koehler 1990). In northern regions, when hare densities decline, the lower quality diet causes sudden decreases in the productivity of adult female lynx and decreased survival of kittens, which causes the numbers of breeding lynx to level off or decrease (Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997). Relative densities of snowshoe hares at southern latitudes are generally lower than those in the north, and differing interpretations of the population dynamics of southern populations of snowshoe hare have been proposed (Hodges 2000b).

Most research has focused on the winter diet of the lynx. Summer diets are poorly understood throughout the range of lynx. Mowat et al. (2000) reported through their review of the literature that summer diets have less snowshoe hare and more alternate prey species, possibly because of a greater availability of other species. In summer, lynx broaden their habitat use from older, multi-storied forest stands to include younger forest stands with an abundance of shrub cover (Squires et al. 2006). The researchers assumed "this shift in habitat use [by lynx] during summer is due to hares being abundant in young forest stands with deciduous vegetation providing high horizontal cover." Mature forests also provide snowshoe hare habitat as openings are created in the canopy when trees succumb to disease, fire, wind, ice, or insects, and the understory develops (Squires et al. 2006).

Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Primary forest types that support snowshoe hare are subalpine fir, Engelmann spruce, Douglas-fir, and lodgepole pine in the western United States, and spruce/fir, pine, and deciduous forests in the eastern United States (Hodges 2000b). Snowshoe hares prefer boreal forest stands that have a dense horizontal understory to provide food, cover and security from predators (Wolfe et al. 1982; Monthey 1986; Koehler and Aubrey 1994). Snowshoe hares feed on conifers, deciduous trees and shrubs (Hodges 2000b). Snowshoe hare density is correlated to understory (horizontal) cover between approximately 3 to 10 feet above the ground or snow level (Hodges 2000b). Generally, earlier successional forest stages support a greater density of horizontal understory and more abundant snowshoe hares (Buehler and Keith 1982; Wolfe et al. 1982; Koehler 1990; Hodges 2000b; Homyack 2003; Griffin 2004). Mature, multistoried stands also can have adequate dense understory to support abundant snowshoe hares (Hodges 2000a; Hodges 2000b; Griffin 2004, Squires et al. 2006).

Den Site Selection

Lynx use a variety of types of large woody debris, such as downed logs, root wads, and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; Koehler and Brittell 1990; Mowat et al. 2000; Squires and Laurion 2000; Squires et al. 2006; Merrill and Schenk 2006). During the first few months of life, kittens are left alone at these sites when the female lynx hunts. Downed logs and overhead cover provide protection of kittens from predators, such as owls, hawks and other carnivores. Denning habitat that is in or near foraging habitat is likely to be most functional. The hunting range of females is restricted at the time of parturition, and their need to feed kittens requires an abundance of prey. Lynx, like other felids, frequently move their kittens until they are old enough to hunt with their mother. Multiple nursery sites are used that provide kittens with overhead cover and protection from predators and the elements.

The age of the forest stand does not seem as important for denning habitat as the amount of horizontal structure available, e.g., downed, woody debris (Mowat et al. 2000), which provides hiding cover and shelter for kittens. Den sites may be located within older regenerating stands (>20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests. Tip-up mounds (root wads) were the most common predictor of den sites (M. McCullough, pers. comm. 2007 *in* NRLA BA). In Montana, lynx selected den sites with higher horizontal cover than elsewhere in the animal's home range (Squires et al. 2006). Seventy-three percent of lynx dens were found in mature, mesic forests. Dens were also located in regenerating mesic forests (18 percent) and boulder fields (7 percent). In Washington, lynx used lodgepole pine (*Pinus contorta*), spruce (*Picea* spp.), and subalpine fir (*Abies lasiocarpa*) forests older than 200 years with an abundance of downed woody debris for denning (Koehler 1990). A den site in Wyoming was located in a mature subalpine fir/ lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 2000). Den sites in Colorado were located on steep slopes (mean 30 degree slope) at high elevations (ranging between 10,226 and 11,765 feet) with a dense understory of coarse woody debris (Merrill and Shenk 2006).

Recruitment

Breeding occurs through March and April in the north (Quinn and Parker 1987). Kittens are born in May to June in south-central Yukon (Slough and Mowat 1996). The male lynx does not help with rearing young (Eisenberg 1986). Slough and Mowat (1996) reported yearling females giving birth during periods when hares were abundant; male lynx may be incapable of breeding during their first year (McCord and Cardoza 1982).

In northern study areas during the low phase of the hare cycle, few if any live kittens are born and few yearling females conceive (Brand and Keith 1979; Poole 1994; Slough and Mowat 1996). However, Mowat et al. (2000) suggested that in the far north, some lynx recruitment occurs when hares are scarce and this may be important in lynx population maintenance during hare lows.

During periods of hare abundance in the northern taiga, litter size of adult females averages four to five kittens (Mowat et al. 1996). In Montana, the average litter size in the Seeley Lake study area was 2.3 kittens, and 3.2 kittens in the Purcell Mountains (Squires et al. 2006). Koehler (1990) suggested that the low number of kittens produced in north-central Washington was comparable to northern populations during periods of low snowshoe hare abundance. In his study area, two radio-collared females had litters of three and four kittens in 1986, and one kitten in 1987 (the actual litter size of one of the females in 1987 was not determined) (Koehler 1990). In Wyoming, one female produced four kittens in 1998 and the same female produced two kittens in 1999 (Squires and Laurion 2000).

Habitat Connectivity

It is suggested in the *Ecology and Conservation of Canada Lynx* (Ruggiero et al. 2000) that lynx in the contiguous United States may exist as several smaller, but effectively isolated metapopulations. An example of this is the boreal forests in Colorado and Utah that are separated from the larger areas of boreal forest in northern Wyoming by at least 100 kilometers. Metapopulation stability depends not only on habitat quality, but also on successful dispersal between isolated habitat patches. The likelihood of subpopulation persistence declines with

increasing fragmentation and isolation. That does not mean that more isolated, and therefore more vulnerable, subpopulations are unimportant. In addition, these subpopulations may contain valuable genetic, physiological or behavioral adaptations that allow them to persist (Hickenbottom et al. 1999). Lynx and snowshoe hare habitats are more prone to a metapopulation structure in the western forests due to fragmented landscapes and heterogeneous distribution of topographic, climatic and vegetative conditions. This condition is further exacerbated by the presumably greater human-caused fragmentation of lynx habitat in the south (Buskirk et al. 2000).

Ruggiero et al. (2000) indicates that we know little about the degree of connectivity or its role in the viability of lynx, but assumes that connectivity plays an important role. Protecting, maintaining and improving lynx habitat afforded by the various conservation measures contributes to the conservation of lynx and population viability. Maintaining habitats to provide for dispersal movements and interchange among individuals and subpopulations may be the most important provision for maintenance of population viability contained in the Lynx Conservation Assessment Strategy (LCAS). An interconnected ecosystem can be essential to maintain the ability of subpopulations to expand and colonize new habitats, to recolonize areas where subpopulations have been locally extirpated, to provide population support to declining populations, to allow individuals to find mates among neighboring subpopulations, and to effect dispersal and genetic interchanges (Noss and Cooperrider 1994).

Highways and their continued expansion into mountain towns and resorts increase the amount of fragmentation occurring in these long, linear landscapes. This fragmentation effect further erodes the potential for lynx to effectively cross some of these potential barriers (Ruediger et al. 2000). High-speed, high-volume highways can result in lynx road-kills, fragment and restrict lynx habitat use, impair home range effectiveness, inhibit local and dispersing movements that may lead to reduced habitat connectivity, and the decline of some wildlife populations and species over time due to genetic isolation (Forman and Alexander 1998, Service 2000; Alexander et al. 2004; Clevenger et al. 2002; Forman et. al. 2003). When traffic volume increases, highways often evolve from gravel roads to paved two lane roads, and from two lane highways to more problematic four lane and interstate highways, which have the most adverse effects to wildlife movements. Critical points in development of highways occur when gravel forest or backcountry roads are paved, which results in higher speeds, higher traffic volumes and increased human developments. The result of this progression of upgrades to the roads is the mortality of individuals attempting to cross the highway and potential sub-population isolation, both of which result in a slow decline in the population and ultimately can affect viability for some of the low-density carnivores such as lynx (Ruediger et al. 2000).

The Service (2000) found that lynx are impacted by high traffic volume on roads that bisect suitable lynx habitat and by the associated suburban developments. The finding determined that the impact of high traffic volume was low except in the Southern Rockies Ecosystem. With respect to highway traffic volumes and wildlife impacts, Canadian studies suggest that 2,000-3,000 vehicles per day (VPD) are problematic and $\geq$ 4,000 VPD are more serious threats to mortality and habitat fragmentation (Ruediger et al. 2000). These conclusions were based upon the general observations and the professional judgment of Clevenger (Parks Canada) and Alexander (Univ. Calgary; Nov. 15, 2004, pers. comm., T. Clevenger, Parks Canada, cited in Ruediger et al. 2000), who have conducted some of the most thorough studies (e.g., Clevenger et

al. 2002, Alexander et al. 2005) of wildlife highway mortality and mitigation in North America. Alexander et al. (2005) concluded that movement was impaired for carnivores, including lynx, when traffic ranged from 300-500 VPD (winter traffic counts). However, the traffic data appear to be estimates of average annual daily traffic (AADT) for the road sections in their study, where year-long AADT may be 3,000-5,000 VPD AADT (assumes a ratio of 10:1 – AADT: winter traffic counts, as discussed in the study). Also, the Alexander et al. (2005) study measured carnivores in general and was not specific to lynx.

Mortality

Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Quinn and Parker 1987; Koehler 1990), and human-caused mortality. Significant lynx mortality due to starvation has been demonstrated in cyclic populations of the northern taiga, during the first two years of hare scarcity (Poole 1994; Slough and Mowat 1996). Various studies show that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths. Trapping mortality may be additive rather than compensatory during the low period of the snowshoe hare cycle (Brand and Keith 1979). Hunger-related stress, which induces dispersal, may increase the exposure of lynx to other forms of mortality such as trapping and highway collisions (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986).

Paved roads have been a mortality factor in lynx translocation efforts within historical lynx ranges. In New York, 18 translocated lynx were killed on highways (Brocke et al. 1990). Translocated animals may be more vulnerable to highway mortality than resident lynx (Brocke et al. 1990). Eleven lynx have been killed on two- and four-lane Colorado highways following their release as part of a reintroduction effort (K. Broderdorp, pers. comm. 2007). Twelve resident lynx were killed on highways in Canada and Alaska (Staples 1995; Gibeau and Heur 1996; T. Clevenger, pers. comm. 1999 *in* NRLA BO; Alexander, pers. comm. 1999 *in* NRLA BO). Lynx were killed on graveled, high-speed forest roads in flatter terrain in Maine (Mark McCollough, U.S. Fish and Wildlife Service, pers. comm. 2006 *in* NRLA BO).

Predation on lynx by mountain lion (*Puma concolor*), coyote (*Canis latrans*), wolverine (*Gulo gulo*), gray wolf (*Canis lupus*), and other lynx has been confirmed (Berrie 1974; Koehler et al. 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997; Apps 2000; Squires and Laurion 2000; Squires et al. 2006). Squires et al. (2006) reported 15 lynx mortalities in their Montana study area, greater than 90 percent of which were due to mountain lion predation. Observations of such events are rare, and the significance of predation on lynx populations is unknown.

Interspecific Relationships with other Carnivores

The two major competition impacts to lynx are likely exploitation (competition for food) and interference (avoidance). Several predators (birds of prey, coyote, gray wolf, mountain lion, bobcat, and wolverine) consume snowshoe hares and therefore compete at some level with lynx for prey. Lynx have adaptations for surviving in areas that have cold winters with deep, soft snow for extended periods; these adaptations provide lynx a competitive advantage in hunting snowshoe hare over a number of potential competitors, such as bobcats (*Lynx rufus*) or coyotes (*Canis latrans*) (McCord and Cardoza 1982; Buskirk et al. 2000; Ruediger et al. 2000; Ruggiero et al. 2000). In one paper, coyotes were theorized to most likely pose local or regionally

important exploitation impacts to lynx, and coyotes and bobcats were deemed to possibly impart important interference competition effects on lynx (Buskirk et al. 2000). Mountain lions were described as interference competitors, possibly impacting lynx during summer and in areas lacking deep snow in winter, or when high elevation snow packs develop crust in the spring. Long-term snow conditions presumably limit the winter distribution of potential lynx competitors such as bobcats (McCord and Cardoza 1982) or coyotes. Further, bobcats and coyotes have a higher foot load (more weight per surface area of foot), which causes them to sink into the snow more than lynx. Therefore, bobcats and coyotes cannot efficiently hunt in soft or deep snow and are at a competitive disadvantage to lynx.

Exploitation competition may contribute to lynx starvation and reduced recruitment. During periods of low snowshoe hare numbers, starvation accounted for up to two-thirds of all natural lynx deaths in the Northwest Territories of Canada (Poole 1994). As described previously, major predators of snowshoe hare include lynx, northern goshawk, great horned owl, bobcat, coyote, red fox, fisher, and mountain lion. In southern portions of snowshoe hare range, predators may limit hare populations to lower densities than in the taiga (Dolbeer and Clark 1975; Wolff 1980; Koehler and Aubry 1994).

Based on only anecdotal evidence, Parker et al. (1983) discussed competition between bobcats and lynx on Cape Breton Island. Lynx were found to be common over much of the island prior to bobcat colonization. Concurrent with the colonization of the island by bobcats, lynx densities declined and their presence on the island became restricted to the highlands, the one area where bobcats did not become established.

Population Dynamics

Lynx populations in the contiguous United States occur at the southern periphery of a widely-distributed metapopulation whose core is located in the northern boreal forest of central Canada (McCord and Cardoza 1982; Quinn and Parker 1987; McKelvey et al 2000). The boreal forest of central Canada is vast and extends into Alaska. Lynx in the contiguous United States are at the southern margins, or periphery, of its range. Here, the southernmost extent of the boreal forest that supports lynx occurs in the in the Northeast, western Great Lakes, northern and southern Rockies, and northern Cascades (Ruediger et al. 2000).

The center of North American lynx range is in north-central Canada. Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (Ruggiero et al. 2000). These forests are generally described as boreal forests. Boreal forests provide optimal habitat for snowshoe hares. In North America, the distribution of lynx is nearly coincident with that of snowshoe hares (Bittner and Rongstad 1982; McCord and Cardoza 1982). Lynx survivorship, productivity and population dynamics are closely related to snowshoe hare density in all parts of its range. In the extensive boreal forests of Canada, snowshoe hares reach peak densities of roughly four to six hares per hectare (or 1.6 to 2.4 per acre) and decline to about 0.1 to 1 per hectare (0.04 to 0.4 per acre) during cyclic lows (Krebs et al. 1995, Slough and Mowat 1996, Hodges 2000a). A minimum density of snowshoe hares (greater than 0.5 hares per hectare or 1.2 hares per acre) (Ruggiero et al. 2000) distributed across a large landscape is necessary to support survival of lynx kittens and recruitment into and maintenance of a lynx population.

In Canada and Alaska, lynx populations undergo extreme fluctuations in response to the cycling of snowshoe hare, enlarging or dispersing from their home ranges and ceasing the recruitment of young into the population after hare populations decline (Mowat et al. 2000). However, in the contiguous United States, the boreal forest transitions into other vegetation communities and becomes more patchily distributed. As a result, the southern boreal forests generally support lower snowshoe hare densities, hare populations do not appear to be as highly cyclic as snowshoe hares further north, and lynx densities are lower compared to the northern boreal forest. Although snowshoe hare populations in the southern portion of the range (i.e., in the contiguous United States) may fluctuate, they do not show strong, regular population cycles as in the north (Hodges 2000a). In the contiguous United States, the degree to which regional local lynx population fluctuations are influenced by local snowshoe hare population dynamics is unclear.

In the contiguous United States, the boreal forest transitions into other vegetation communities and becomes more naturally patchily distributed (fragmented) and provides much less productive hare habitat. Thus, lynx populations here are naturally limited by the low availability of snowshoe hares, as suggested by large home range size, high kitten mortality due to starvation and greater reliance on alternate prey. These characteristics appear to be similar to those exhibited by lynx populations in Canada and Alaska during the low phase of the population cycle (Quinn and Parker 1987, Koehler 1990, Aubry et al. 2000). This similarity to the lynx populations in Canada and Alaska during the low phase is likely due to the inherently patchy distribution of lynx and hare habitat in the contiguous United States and correspondingly lower densities of hares.

Lynx population dynamics may emanate from the core in Canada to the southern periphery in the contiguous United States, as evidenced by a lagged correlation of lynx trap records and observations in the United States (related to cyclic highs in lynx populations in Canada) (McKelvey et al. 2000b; Mowat et al. 2000). In Canada, the Hudson Bay Company maintained fairly accurate annual lynx pelt data across the range of lynx, which reflect dramatic population cycles. In the Great Lakes Geographic Area, population dynamics in recent decades appear to be strongly driven by immigration from Canada (McKelvey et al. 2000b). However, in other areas and time periods it is not known to what extent the correlation is due to immigration from Canada, population responses to the same factors controlling northern populations, or a combination of the two.

A lack of accurate historic data limits our understanding of lynx population dynamics in the contiguous United States and precludes drawing definitive conclusions about lynx population trends. Historically, formal surveys designed specifically to detect lynx were rarely conducted. Many reports of lynx (e.g., visual observations, snow tracks) have been collected incidentally to other activities, but cannot be used to infer population trends. Long-term trapping data have been used to estimate population trends for various species. In the United States however, trapping returns are strongly influenced by trapper effort, which varies between years and, therefore, may not accurately reflect population trends. Another important problem to note is that the trapping records of many states do differentiate between bobcats and lynx, referring to both as "lynxcats." Overall, the available data are too incomplete to infer much beyond simple occurrence and distribution of lynx in the contiguous United States (McKelvey et al. 2000).

Lynx are highly mobile and have a propensity to disperse long distances, particularly when prey becomes scarce (Mowat et al. 2000). Lynx also make long distance exploratory movements outside their home ranges (Aubry et al. 2000; Moen et al. 2004). Areas or habitats used by lynx during dispersal or exploratory movements are poorly understood at this time. Dispersing lynx may colonize suitable but unoccupied habitats, augment existing resident populations, or disperse to unsuitable or marginal habitats where they cannot survive. Numerous lynx mortality records exist from anomalous habitats or habitats where no records support evidence (either current or historical) of a reproducing population (McKelvey et al. 2000). Many of these records correspond to post-population peaks in Canada, with some lag time for immigration (McKelvey et al. 2000). We find no evidence of lynx populations becoming established in such areas.

The USFWS suspects that some areas in the contiguous United States naturally act as "sources" of lynx (recruitment is greater than mortality) that are able to disperse and potentially colonize other patches (McKelvey et al. 2000). Other areas may function as "sinks" (mortality is greater than recruitment) where lynx are lost from the overall population. Sink habitats are most likely those places on the periphery of the southern boreal forest where habitat becomes more fragmented and more distant from larger lynx populations. Fluctuations in prey populations may cause some habitat patches to change from being sinks to sources, and vice versa. The ability of naturally dynamic habitat to support lynx populations may change as the habitat undergoes natural succession following natural or manmade disturbances (i.e., fire, insects, clear-cutting).

Individual lynx maintain large home ranges (reported as generally ranging between 31 to 216 km^2 [12 to 83 mi^2]) (Koehler 1990; Aubry et al. 2000; Squires and Laurion 2000; Vashon et al. 2005). Thus, a lynx population can only persist in a large boreal forested landscape that contains appropriate forest types, snow depths and high snowshoe hare densities. In the Northeast, lynx are most likely to occur in areas that support deep snow (greater than 268 centimeters [106 inches] annual snowfall) associated with regenerating boreal forests in landscapes 100 square kilometers (40 square miles) or greater in area (Hoving et al. 2005). We assume areas with smaller patches of boreal forest are unlikely to provide a sufficient amount of habitat suitable to support a lynx population.

Lynx populations in the contiguous United States seem to be influenced by lynx population dynamics in Canada (Thiel 1987; McKelvey et al. 2000). Many of these populations in Canada are directly interconnected to U.S. populations and are likely a source of emigration into contiguous United States lynx populations. Therefore, we assume that retaining connectivity with larger lynx populations in Canada is important to ensuring long-term persistence of lynx populations in the U.S. We assume that, regionally, lynx within the contiguous United States and adjacent Canadian provinces interact as metapopulations and, therefore, assessments of population viability must be made at this larger scale and not solely based on populations within the contiguous United States.

Status and Distribution

The historical and present range of the lynx north of the contiguous United States includes Alaska and that part of Canada that extends from the Yukon and Northwest Territories south across the United States border and east to New Brunswick and Nova Scotia. In the contiguous United States, lynx historically occurred in the Cascades Range of Washington and Oregon; the Rocky Mountain Range in Montana, Wyoming, Idaho, eastern Washington, eastern Oregon,

northern Utah, and Colorado; the western Great Lakes Region; and the northeastern United States region from Maine southwest to New York (McCord and Cardoza 1982; Quinn and Parker 1987). A thorough discussion and interpretation of lynx records through time is found in the USFWS final rule (March 24, 2000, 65 FR 16052) and clarification of BLM findings (July 2003; 68 FR 40076).

The distribution of lynx in North America is closely associated with the distribution of North American boreal forest (Agee 2000). In Canada and Alaska, lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 2000; McKelvey et al. 2000b). The range of lynx extends south from the classic boreal forest zone into the subalpine forest of the western United States, and the boreal/hardwood forest ecotone in the eastern United States (Agee 2000; McKelvey et al. 2000b). Forests with boreal features (Agee 2000) extend south into the contiguous United States along the Cascade and Rocky Mountain Ranges in the west, the western Great Lakes Region, and along the Appalachian Mountain Range of the northeastern United States. Within these general forest types, lynx are most likely to persist in areas that receive deep snow (Ruggiero et al. 2000). Lynx are rare or absent from the wet coastal forests of Alaska and Canada (Mowat et al. 2000).

At its southern margins in the contiguous United States, forests with boreal features, or southern boreal forests, become naturally fragmented as they transition into other vegetation types. Southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of lynx range. Many southern boreal forest habitat patches within the contiguous United States cannot support resident populations of lynx and their primary prey species.

The complexities of lynx life-history and population dynamics, combined with a general lack of reliable population data for the contiguous United States, makes it difficult to ascertain the past or present population status of lynx in the contiguous United States. It is difficult to determine with certainty whether reports of lynx in many states were (1) animals dispersing from northern populations that were effectively lost because they did not join or establish resident populations, (2) animals that were a part of a resident population that persisted for many generations, or (3) a mixture of both resident and dispersing animals.

The final rule determining a threatened status for the lynx in the contiguous United States summarized lynx status and distribution across four regions that are separated from each other by ecological barriers consisting of spans of area lacking lynx habitat (March 24, 2000, 65 FR 16052). These distinct regions are the Northeast, the Great Lakes, the Northern Rocky Mountains/Cascades, and the Southern Rocky Mountains. While these regions are ecologically unique and discrete, the lynx is associated with only the southern boreal forest in each and, with the exception of the Southern Rocky Mountains Region, each area is geographically connected to the much larger population of lynx in Canada.

Southern Rocky Mountains Region (Colorado, southeastern Wyoming)—Colorado represents the extreme southern edge of the range of the lynx. A majority of the lynx occurrence records in Colorado and southeastern Wyoming were associated with Rocky Mountain conifer forest. The occurrences in the Southern Rockies were generally at higher elevations (8,000-12,000 feet) than were all other occurrences in the West (Ruediger et al. 2000).

The southern boreal forest of Colorado and southeastern Wyoming is isolated from boreal forest in Utah and northwestern Wyoming by the Green River Valley and the Wyoming basin (Findley and Anderson 1956 in McKelvey et al. 2000b). We believe that these areas likely reduce opportunities for genetic interchange with the Northern Rocky Mountains/Cascades Region and Canada (Halfpenny et al. 1982; Koehler and Aubry 1994). However, although habitats in the Southern Rockies are far from source populations and more isolated, it is still possible that dispersers could arrive in the Southern Rocky Mountains during highs in the population cycle.

A resident lynx population likely occurred historically in the Southern Rocky Mountains Region, based on the records of lynx in Colorado and the persistence of contiguous habitat in southeastern Wyoming with the Colorado habitat. This resident population may have been extirpated, which led the CPW to undertake a reintroduction effort that is currently in progress.

Environmental Baseline

Verified records after the 1920s are rare in southern Wyoming and in Colorado, with central Colorado being the core area of lynx records until the early 1970s. A statewide lynx verification program was conducted in Colorado from 1978-1980 and concluded that a viable but low-density lynx population persisted in Eagle, Pitkin, Lake and Clear Creek Counties, with evidence of lynx occurrence in Grand and Park Counties. Lack of evidence from other parts of lynx range in Colorado may have been due to lack of adequate surveys. While the surveys did not cover the entire state, they were sufficient to conclude that lynx at that time were rare in the Southern Rockies.

A program to re-establish a lynx population in Colorado began in 1999. CPW released a total of 218 lynx in the San Juan Mountains of southwestern Colorado from 1999 to 2006. Mortality of released lynx was caused by starvation or disease, human-induced (vehicle collisions or gunshot) and unknown causes (Devineau et. al 2011). This mortality pattern can be expected from reintroduced animals due to unfamiliarity with the area and large-scale movements often characteristic of reintroduced animals. Highway mortality ranks as one of the highest human-caused mortalities factors for the Colorado lynx reintroduction overall, and the highest human-caused mortality factor since release protocols were adjusted, which reduced the deaths caused by starvation after the first year of the reintroduction effort. By adjusting the release protocol, CPW substantially reduced the number of starvation deaths.

Reproduction was documented, from 2003-2006 and again in 2009 and 2010 (CDOW 2010). In 2006, a female lynx that was born in Colorado gave birth to a litter of kittens, documenting the first recruitment of a Colorado-born lynx into the Colorado breeding population. The current core area, as identified by the CPW, for lynx in Colorado is from the New Mexico border to the north to Gunnison, west to Taylor Mesa and east to Monarch Pass.

Although re-introduced lynx have passed through the KFO, no lynx are currently known to exist on BLM lands within the RMPPA.

Lodgepole Pine and Bark Beetles

Lodgepole pine stands make up approximately 67 percent of the total forest and woodland acres within the KFO Planning Area. The vast majority of these stands are between 110 years and 150

years in age, and are in a mature or over-mature condition. Species composition and age-class in these stands range from almost pure stands of single-aged lodgepole pine to stands dominated by lodgepole pine containing a sizable component of other species (mainly aspen and subalpine fir; however, they also contain Douglas-fir, limber pine and Engelmann spruce). Many of these stands are overstocked, and exhibit the smaller diameters indicative of stands in this condition.

The age and density of these stands has, in many cases, contributed to a decrease in stand vigor, as well as to a reduced resistance to insect and disease infestations. Colorado is experiencing the largest outbreak of mountain pine beetle (MPB) in its recorded history. The current epidemic began during the late 1990s, resulting from a combination of stand conditions, drought, and warmer winters. Data compiled from annual aerial forest health surveys from 1996 to 2009 disclose the extent of the MPB epidemic. As of 2009, it was estimated that this landscape-changing event had affected more than 2.9 million acres of lodgepole and ponderosa pine forests within the State of Colorado. At current rates of spread and intensification of tree mortality, the MPB will likely kill the majority of Colorado's large diameter lodgepole pine trees by the year 2014.

The KFO administers public land in several of the Colorado counties hardest hit by the MPB epidemic. The data show that approximately 1.5 million acres in Grand, Jackson, and Larimer Counties have been infested with MPB. With the possible exception of recently regenerated stands, most, if not all, lodgepole pine communities on publicly administered lands within the Planning Area have been impacted by the epidemic. Mortality rates in most stands with an 8.0 inch or greater average diameter are estimated to be between 80 percent and 95 percent. Many stands with smaller average diameters are also experiencing significant mortality. Thus, the MPB epidemic has left many of the lynx LAUs in the Planning Area in an unsuitable condition (> 30% in SISS).

In 2013, the KFO updated the Lynx LAU boundaries adjacent to the Medicine Bow-Routt National Forests (MBR). The LAU boundaries were refined based on new information and improved criteria developed by the MBR. Due to this new information, we no longer have lynx habitat in LAUs adjacent to the MBR. Using GIS, a vegetation layer (2003) was used to identify Englemann spruce-subalpine fir stands within the KFO. Only a few areas were identified: west of Kremmling and in the Troublesome Wilderness Study Area (WSA). Aerial photos (2007) and a stereoscope were then used by the KFO Forester to further examine these areas and found that the majority of these areas were lodgepole pine stands with small pockets of spruce-fir (< 10%). Based on BLM staff expertise, it is believed that KFO overall has small, isolated pockets of spruce-fir, that would not support Canada lynx. In addition, it is believed that KFO does not meet the other criteria for primary lynx habitat: Lodgepole pine stands above 8,800 feet that have greater or equal to 10% spruce-fir and/or aspen stands that have greater or equal to 5% spruce-fir. The Lynx Linkage Zones remain unchanged.

Threats

The final rule (March 24, 2000; 65 FR 16052) concluded that the primary factor threatening the lynx DPS was the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in Federal land management Plans. The Service concluded that the lack of Plan guidance for conservation of lynx, as evidenced by the fact that, at the time of listing, Plans allowed or directed actions that cumulatively adversely affect lynx, was a significant threat to the contiguous United States DPS of lynx. The remanded determination in

the clarifications of findings of the final rule (July 2003; 68 FR 40076) affirmed the findings in the final rule.

Potential risk factors to lynx in the Southern Rockies include: conversion or alteration of native plant communities, fire suppression and hazardous fuels reductions, grazing, pre-commercial thinning, recreational uses, roads and trails, timber management, highways, predation, predator control, shooting and private land development.

These factors have varying effects on lynx, depending upon the nature, location, duration and timing of the activity. Some present more likelihood of risks to lynx, others are relatively benign in effects. In non-developed areas, a number of these factors would not affect lynx. Importantly, the rather substantial risks to lynx habitat that are often associated with some vegetation management actions (e.g. timber management and pre-commercial thinning) typically do not arise in areas in non-developed areas. Factors affecting lynx mortality, including those associated with highways, predator control, and private land development activities generally are not an issue in non-developmental areas. Factors such as shooting, while not entirely eliminated, are lessened significantly in non-developmental areas due to limited access for people. The Service's final rule listing the lynx determined that Forest roads were not known to negatively impact resident lynx populations (March 24, 2000; 65 FR 160052). However, in the Southern Rockies, high volume highways have resulted in eleven known mortalities since 1999 (Shenk 2006).

Management Status and Recovery and Conservation Planning

Recovery outline completed September 14, 2005 and Critical Habitat designated November 9, 2005 with an update in February 2009. No Critical Habitat is designated in Colorado.

In August 2000 the Bureau and the Service signed a Canada Lynx Conservation Agreement. The intent of this Agreement is to (1) coordinate assessment and planning efforts between the two agency signatories and with other appropriate entities (e.g., USFS, NPS, state and tribal agencies) to assure a comprehensive approach to conserving lynx; (2) use the Science Report and LCAS (Ruediger et al. 2000), together with locally specific information, as appropriate, as the basis for these actions; (3) use the Science Report and LCAS, together with locally specific information as appropriate, as the basis for streamlining ESA Section 7 consultation between the Bureau and the Service; and (4) utilize the best available scientific and commercial data during the Section 7 consultation process. The Conservation Agreement specifies that "the LCAS will be used and referenced in all determinations of effect for lynx." (Federal Register 50 CFR Part 17, Endangered and Threatened Wildlife and Plants, Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule, Final Rule; Federal Register, March 24, 2000, Vol. 65, No. 58, pp. 16051–16086; and the LCAS) (Ruediger et al. 2000).

Conservation measures are binding measures the Bureau shall implement to facilitate the conservation of lynx. LAUs typically encompass both lynx habitat (may or may not be in suitable condition) and other areas (such as lakes, low-elevation ponderosa forest, and alpine tundra). These conservation measures generally apply only to habitat within LAUs. However, their use in areas of potential habitat not fitting the criteria of an LAU is encouraged.

Mexican Spotted Owl (Strix occidentalis lucida)

Listing Status: Federal—Threatened, March 1993

Species Description

The spotted owl is mottled in appearance with irregular white and brown spots on its abdomen, back and head. The spots of the Mexican spotted owl are larger and more numerous than in the other two subspecies, giving it a lighter appearance. *Strix occidentalis* translates as "owl of the west"; *lucida* means "light" or "bright." Unlike most owls, spotted owls have dark eyes. Several thin white bands mark an otherwise brown tail (BISON 2002, USFWS 1995a).

Based on plumage characteristics, adult male and female spotted owls are similar; however, the sexes can be readily identified by voice (Ganey 1990). Juveniles, subadults and adults can be distinguished by plumage characteristics (Forsman 1981, Moen et al. 1991). Juvenile spotted owls (hatchling to approximately five months) have a downy appearance. Subadults (5 to 26 months) possess adult plumage but have pointed rectrices with white tips (Forsman 1981, Moen et al. 1991). The rectrices of adults (>27 months) have rounded and mottled tips. Although the spotted owl is often referred to as a medium-sized owl, it ranks among the largest owls in North America. Of the 19 owl species in North America, only four are larger than the spotted owl (Johnsgard 1986).

Life History and Population Dynamics

The Mexican spotted owl inhabits diverse forest types scattered across an even more physically diverse landscape. The Mexican spotted owl is one of three recognized subspecies of the spotted owl and is the subspecies that occurs in Colorado. The other two subspecies are the northern (*S. o. caurina*) and the California spotted owl (*S. o. occidentalis*). The Mexican subspecies is geographically isolated from both the California and northern subspecies.

The following information is from the final designation of critical habitat for the Mexican spotted owl (69 FR 53182).

The owl occupies a broad geographical area, but does not occur uniformly throughout its range (USFWS 1995a). Instead, the owl occurs in disjunct localities that correspond to isolated mountain systems and canyons. The owl is frequently associated with mature mixed-conifer, pine-oak and riparian forests. Mature mixed-conifer forests are mostly composed of Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), limber pine (*Pinus flexilis*), or blue spruce (*Picea pungens*). Pine-oak forests are mostly composed of ponderosa pine (*Pinus ponderosa*) and Gambel oak (*Quercus gambellii*). Riparian forests are dominated by various species of broadleaved deciduous trees and shrubs. These riparian forests can be important linkages between otherwise isolated subpopulations of owls.

Owls are also found in canyon habitat dominated by vertical-walled rocky cliffs within complex watersheds including tributary side canyons. Rock walls include caves, ledges and other areas that provide protected nest and roost sites. Canyon habitat may include small isolated patches or stringers of forested vegetation including stands of mixed-conifer, ponderosa pine, pineoak, pinyon-juniper, and/or riparian vegetation in which owls regularly roost and forage. Owls are usually found in areas with some type of water source (i.e., perennial stream, creeks, springs,

ephemeral water, small pools from runoff, and reservoir emissions). Even small sources of water such as small pools or puddles create humid conditions.

Owls are highly selective for roosting and nesting habitat, but forage in a wider array of habitats. Roosting and nesting habitat exhibit certain identifiable features, including large trees (those with a trunk diameter of 12 inches (30.5 centimeters) or more (i.e., high tree basal area)), uneven aged tree stands, multi-storied canopy, a tree canopy creating shade over 40 percent or more of the ground (i.e., moderate to high canopy closure), and decadence in the form of downed logs and snags (standing dead trees). Canopy closure is typically greater than 40 percent mixed-conifer dominated by Douglas fir, pine-oak and riparian forests with high tree diversity are important to the owl.

Owl foraging habitat includes a wide variety of forest conditions, canyon bottoms, cliff faces, tops of canyon rims, and riparian areas. It has been reported that owls forage more frequently in unlogged forests containing uneven aged stands of Douglas fir and white fir, with a strong component of ponderosa pine, than in managed forests. The primary owl prey species are woodrats (*Neotoma* spp.), peromyscid mice (*Peromyscus* spp.) and microtine voles *(Microtus* spp.*).*

Courtship begins in March and eggs are laid in late March or, more typically, early April. Incubation begins shortly after the first egg is laid, and is performed entirely by the female. Female spotted owls generally incubate for approximately 30 days. During incubation, the female leaves the nest only to defecate, regurgitate pellets, or receive prey delivered by the male, who does nearly all of the foraging. The eggs usually hatch in early May (Bison 2002). Females brood their young almost constantly early in the nesting period, leaving their nests for only brief periods during the night. The owl's attention to the young decreases over the nesting season (Delaney and Grubb 1999). Nestling owls fledge from four to five weeks after hatching, from early to mid-June in most cases (Bison 2002). Owlets often leave the nest before they can fly, simply jumping from the nest onto surrounding tree branches or the ground. Within a week after leaving the nest, most owlets can make short, clumsy flights between trees. Three weeks after leaving the nest, owlets can hold and tear up prey on their own, and by late July most have become proficient at pouncing on crawling insects (Forsman et al. 1984). The young depend on their parents for food during the summer and will eventually disperse out of the natal area in the fall.

Juvenile owls disperse in September and October, into a variety of habitats ranging from high-elevation forests to pinyon-juniper woodlands and riparian areas surrounded by desert grasslands. Observations of long-distance dispersal by juveniles provide evidence that they use widely spaced islands of suitable habitat that are connected at lower elevations by pinyon-juniper and riparian forests. As a result of these movement patterns, isolated populations may have genetic significance to the owl's conservation. Owls have been observed moving across open low desert landscapes between islands of suitable breeding habitat. Owl movements were also observed between ''sky island'' mountain ranges in New Mexico. Therefore, contiguous stands or islands of suitable mixed-conifer, pine-oak and riparian forests are important to the owl (69 FR 53182).

Status and Distribution

The USFWS listed the Mexican spotted owl as threatened on March 16, 1993 (58 FR 14248) without critical habitat. A final rule designating critical habitat for the owl was published on June 6, 1995 and successfully challenged in court (60 FR 29914). On 31 Aug 2004, the USFWS published the final rule designating critical habitat for the owl. Over 8.6 million acres of critical habitat is designated within Arizona, Colorado, New Mexico, and Utah (69 FR 53182). No critical habitat has been designated within the Kremmling Management Area (RMA).

The Mexican spotted owl occurs from southern Utah and Colorado south through the mountains of Arizona, New Mexico, west Texas, and into the mountains of central Mexico. Gaps remain in BLM's knowledge of the distributional pattern of the Mexican spotted owl within this range, however. This is especially true in Mexico, where very little of the geographic range of the owl has been surveyed. Consequently, although the owl appears to be widely distributed in Mexico, we do not know whether its range is fairly continuous throughout the Sierra Madre and associated highlands, or whether it is restricted to scattered mountain ranges.

Information gaps also exist in the United States. For example, several mountain ranges in west-central Arizona remain unsurveyed and numerous canyon systems that may contain spotted owl habitat in southern Utah have not been surveyed for owls. Despite these gaps, it is apparent that the Mexican spotted owl is widely but patchily distributed throughout its range in the United States, with distribution reflecting the availability of forested mountains and canyons and, in some cases, rocky canyon lands.

Prior to 1988, only scattered records of Mexican spotted owls in the United States existed and most of those records were from the southern mountains of Arizona. Those records indicated that the owls occupied both deciduous and coniferous forests and were often associated with rocky canyons (Ganey. 1988). Prior to 1990, only a few records of Mexican spotted owls in Colorado existed (Johnson 1997). Systematic searches for spotted owls began in 1989 in Colorado. Two breeding populations were located in the state: three adult birds at Mesa Verde National Park and 46 birds in 16 sites in the south-central mountains. The larger portion of those were on the southern massif of the Pikes Peak formation and a smaller number in the Wet Mountains (Johnson 1997). Systematic searches of appropriate habitats in southwestern and south-central mountains have produced only a few records of apparently transient birds (Boyle 1998).

The current Mexican spotted owl distribution is similar to its historic range, with a few exceptions. This owl has not been reported recently along major riparian corridors in Arizona and New Mexico. Surveys conducted to locate spotted owls in northern Colorado near Fort Collins and Boulder where historical records exist from the early 1970s and 1980s have been unsuccessful. Surveys conducted in the Book Cliffs of east-central Utah, where owls were recorded in 1958, have also been unsuccessful (USFWS 1995a). In the United States, 91 percent of the owls known to exist between 1990 and 1993 occurred on lands administered by the US Forest Service and 2 percent occurred on lands administered by BLM (USFWS 1995a).

Environmental Baseline

A reliable estimate of the number of Mexican spotted owls in Colorado is not currently available due to limited information. The owls breed sporadically and do not nest every year (USFWS 1995a). The first recorded spotted owl in Colorado was collected in June 1873 by C. Aiken in El

Paso County (Johnson 1997). Since then, four additional specimens were collected: one from Snowmass (Pitkin County) in November 1903; two from El Paso County, one in May 1919 (Bailey and Niedrach 1965), another in April 1992; and one from Lakewood (Jefferson County) in December 1958. In addition, 30 observations (including three photographs) of Mexican spotted owls have been reported at 23 locations in Colorado (Johnson 1997). Fourteen of those observations occurred in the Rocky Mountains or in residential areas on the plains immediately east of the Rocky Mountains, and nine were on the Colorado Plateau in southwestern Colorado. Of those observations on the Colorado Plateau, six were in the Mesa Verde-Cortez vicinity, one was near Durango and two were in the mountains to the east of Durango (Johnson 1997). The first apparent evidence of breeding by Mexican spotted owls in Colorado was two juveniles in a roadside zoo taken from a nest in Park County in 1941 (Johnson 1997). A second recorded breeding included two fledgling owls in Mesa Verde National Park, Montezuma County in 1979 (Birders Handbook 1988). The closest known locations of Mexican spotted owls to the RMPPA occur in Utah, in canyons near the Green River.

The Kremmling RMPPA is located within the Southern Rocky Mountain – Colorado recovery unit of the Mexican spotted owl. Mexican spotted owls typically occupy narrow canyons and river corridors on the Colorado Plateau. No nesting or roosting areas have been documented in the RMPPA. The closest known occupied MSO habitat occurs approximately 50 miles from the RMPPA in Jefferson County. Very limited potential for Mexican spotted owl habitat exists within the Kremmling RMPPA where BLM has surface jurisdiction. No habitat inventories or owl surveys have been completed within the RMPPA.

Threats

Historical and current anthropogenic uses of Mexican spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities reduce the quality of Mexican spotted owl nesting, roosting and foraging habitat and may cause disturbance during the breeding season.

Management Status and Recovery and Conservation Planning

Draft Recovery Plan completed June 28, 2011 and Critical Habitat designated August 31, 2004. No Critical Habitat is within the RMPPA. The Recovery plan calls for three categories of land protection: (1) protected = 600-acre areas around occupied or recently occupied owl sites, plus forests within the owl's range that are over 40 degrees in slope, (2) restricted areas = mixed conifer and pine-oak forests outside protected areas, where logging can take place if conducted in a manner compatible with the owl's habitat, and (3) other areas = remaining forested lands. USFWS and USFS are to work together in carrying out the recovery plan.

North Platte River and Colorado River Species

Introduction

Three avian, five fish, and one plant species, occurring as residents or migrants in the Platte River and Colorado River basins (inclusive of major tributaries) have experienced material declines in abundance, distribution, and the availability of suitable habitats since the turn of the 20th century. The reasons for these declines are multifarious, but the two most pervasive and encompassing reasons are (1) the effects of water developments, including dam construction,

diversion, and consumptive use of water, and concomitant changes in river flow and channel characteristics; and (2) introductions of non-native aquatic species.

Water developments such as dams, reservoirs, and irrigation diversions have altered natural surface water hydrographs (timing, magnitude, and duration). Altered hydrographs can indicate negative effects on the ecosystems of river-dependent species such as the interior least tern and pallid sturgeon. Changes in the relative magnitudes of regulated flows before nesting versus during nesting have resulted in more frequent inundation of the nests of federally listed avian species (e.g., piping plover and interior least tern). Too little water at certain times of the year can subject federally listed birds to excessive predation during periods of nesting and roosting (Gordon et al. 1992); this condition can also limit the availability of forage fish to the pallid sturgeon. In addition, reductions in the magnitude and frequency of high flows can adversely impact the characteristics of flood-prone areas and wetlands and the ecological benefits they provide to federally listed species: these conditions can allow vegetation to encroach on less vegetated areas, the result of which is a narrowing of relatively open channels (Gordon et al. 1992). Finally, in the lower Platte River, pallid sturgeon may lose important migratory cues that were probably influenced by historically unregulated higher flows in the spring of the year; relatively low spring flows have negatively impacted habitat conditions for pallid sturgeon that were dependent on historical levels of sediment transport and deposition and on the influx of greater amounts of organic material.

Habitat alterations and habitat fragmentation due to dams, reservoirs, and regulated flows have resulted in changes in habitat availability, habitat distribution, and habitat quality. In addition, introductions of nonnative fishes, such as rainbow trout, brown trout, and channel catfish, have resulted in competitive exclusion and diminished abundance of native fishes in much of their historic ranges. Similar impacts have reduced populations of federally listed fishes in the upper Colorado River Basin, such as the Colorado pikeminnow. Finally, the inundation or diminution of wetland habitats due to flow regulation and reduced water availability can negatively impact wetland plants. In the RMPPA, water depletions, though they occur hundreds of miles upstream, can affect population abundance and the availability of suitable habitats for federally listed birds, fishes, and one plant in the Platte River and upper Colorado River basins.

The Bureau has historically authorized several types of activities and associated infrastructure within the RMPPA that constitute water depletions in both the North Platte and Colorado River basins—a depletion to river flows occurs when tributary surface water or groundwater is removed from its source (to the extent that some of the water is not returned to its source) to be used elsewhere for a beneficial use. These activities include the development of livestock watering facilities, irrigation projects, wetlands, reservoirs for recreational fisheries, habitat restoration projects, as well as fire suppression and oil and gas development.

Consultation History

Colorado River Basin

Fluids

In 2008, BLM prepared a Programmatic Biological Assessment (PBA) that addresses water depleting activities associated with BLM's fluid minerals program in the Colorado River Basin

in Colorado. In response to BLM's PBA, the FWS issued a Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006) on December 19, 2008, which determined that BLM water depletions from the Colorado River Basin are not likely to jeopardize the continued existence of the Colorado pikeminnow, humpback chub, bonytail, or razorback sucker, and that BLM water depletions are not likely to destroy or adversely modify designated critical habitat.

A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin was initiated in January 1988. The Recovery Program serves as the reasonable and prudent alternative to avoid jeopardy and provide recovery to the endangered fishes by depletions from the Colorado River Basin. The PBO addresses water depletions associated with fluid minerals development on BLM lands, including water used for well drilling, hydrostatic testing of pipelines, and dust abatement on roads. The PBO includes reasonable and prudent alternatives developed by the FWS which allow BLM to authorize oil and gas wells that result in water depletion while avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat. As a reasonable and prudent alternative in the PBO, FWS authorized BLM to solicit a one-time contribution to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) in the amount equal to the average annual acre-feet depleted by fluid minerals activities on BLM lands. This contribution was ultimately provided to the Recovery Program through an oil and natural gas trade association. Depletions associated with fluid minerals development would be covered by this PBO and water use values will be entered into the KRFO fluid minerals water depletion log that is submitted to the Colorado State Office at the end of each fiscal year.

Other Activities

In 2008, BLM prepared a Programmatic Biological Assessment (PBA) that addresses water depleting activities in the Colorado River Basin. In response to BLM's PBA, the FWS issued a Programmatic Biological Opinion (PBO)(#ES/GJ-6-CO-08-F-0010) on February 25, 2009, which determined that water depletions from the Colorado River Basin resulting from BLM actions described in the PBO are not likely to jeopardize the continued existence of the Colorado pikeminnow, humpback chub, bonytail, and razorback sucker or result in the destruction or adverse modification of their critical habitat. The PBO addresses internal and external BLM projects including impoundments, diversions, water wells, pipelines, and spring developments. The FWS determined that projects that fit under the umbrella of the PBA would avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletion impacts to the Upper Colorado River Basin if they deplete relatively small amounts of water (less than 125 AF) and BLM makes a one-time contribution to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) in the amount equal to the average annual acre-feet depleted by each project. The PBO instructed BLM to make an annual payment to the National Fish and Wildlife Foundation (NFWF) to cover all BLM authorized actions that result in water depletions. Depletions associated with internal and external BLM projects outside of the fluid minerals program would be covered by this PBO and water use values will be entered into the KRFO water depletion log that is submitted to the Colorado State Office at the end of each fiscal year.

North Platte River Basin

The BLM participates in the Platte River Recovery Implementation Program (PRRIP) to address water depletions associated with BLM actions in the North Platte River Basin. PRRIP was established in 2006 and is designed to assist in the conservation and recovery of the target species and their associated habitats along the central and lower Platte River in Nebraska. The PRRIP was signed by the states of Colorado, Nebraska, and Wyoming to provide a streamlined ESA-compliance mechanism for all historic and most new water-related activities in the Platte River basin. As part of the Agreement, each state and the federal government (DOI) developed "depletion plans" specifying how they would ensure that water development activities result in no new depletions in the central Platte River. For Federal actions and projects participating in the Program, the PRRIP Final Environmental Impact Statement (FEIS) and the June 16, 2006 PBO serve as the description of the environmental baseline and consequences for the effects of the Federal actions on the listed target species, whooping crane critical habitat, and other listed species in the central and lower Platte River addressed in the PBO. The primary water-depleting activities that BLM completes are spring developments, pipeline construction, pond construction, and well drilling. The Service determined in the PBO that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the continued existence of the endangered whooping crane, interior least tern, and pallid sturgeon, or the threatened northern Great Plains population of the piping plover. Further, the Service found that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the threatened western prairie fringed orchid associated with the central and lower reaches of the Platte River in Nebraska, and was not likely to destroy or adversely modify designated critical habitat for the whooping crane. The Service also determined that the PBO Federal Action would have no effect to the endangered Eskimo curlew. There has not been a confirmed sighting since 1926 and this species is believed to be extirpated in Nebraska. Lastly, the Service determined that the PBO Federal Action, including the continued operation of existing and certain new water-related activities, was not likely to adversely affect the endangered American burying beetle.

In 2010, the BLM entered into a Memorandum of Agreement with the USFWS to provide a mechanism for offsetting federal new depletions in the Platte River Basin of Colorado that is consistent with the PRRIP. Under the Agreement, the BLM will consult with the Service on proposed new and expanded water-related activities in the Laramie River Basin of Colorado on a yearly basis. Based on that information, the BLM will have the option of seeking to offset the adverse effects of depletions associated with those activities specified in the 2009 Federal-Colorado-SPWRAP Agreement, to the extent that adequate offsetting credit remains in the 87.5 acre-foot "account" provided under that Agreement at the time of consultation. For new BLM federal water-related activities in Jackson County, North Platte River Basin of Colorado, the BLM will consult with the Service on a yearly basis also, providing a characterization of the depletion and its purpose (agricultural, recreational, environmental). BLM will have the option of seeking to offset the adverse effects of depletions associated with those activities for the duration of the PRRIP's first increment relative to the PRRIP target species and designated critical habitat, by means of those activities specified in the 2009 Federal-Colorado-SPWRAP-Jackson County Agreement, to the extent that adequate offsetting credit remains in the 87.5 acre-foot "account" provided under that Agreement at the time of consultation, and to the extent that no more than 100 acre-feet of aggregate federal new depletions in Jackson County are being

addressed under the Federal-Colorado-SPWRAP-Jackson County Agreement for exclusively "piscatorial, wildlife, and environmental" purposes. The BLM made a one- time payment to the Service in 2010 to allow the BLM to seek ESA coverage for effects on the target species of new depletions associated with new federal water-related activities in the Platte River Basin of Colorado. Federal depletions would be covered by this PBO and water use values will be entered into the KRFO water depletion log that is submitted to the Colorado State Office and the USFWS prior to February 1st of each year.

Potential New Depletions

Most foreseeable future water depletions (e.g., stock water development, wells at campgrounds) are likely to be minor (<5 acre-ft/yr). New projects that affect the timing or quantity of water will be consulted on through the appropriate processes. Water development projects may consist of small impoundments designed to capture runoff events. These projects are associated with livestock management activities and wetland creation. Channel restoration projects such as headcut remediation structures may have increased evaporation in the impoundment upstream.

Within the Colorado River Basin, 22 conventional gas wells on federal mineral estate are anticipated. Within the North Platte River Basin 163 conventional gas wells and 10 coalbed methane wells on federal mineral estate are anticipated . Well construction activities include well drilling and completion operations, hydrostatic testing for local pipelines, and dust abatement.

Land and Reality actions such as Rights-of-Ways for diversion ditches and small reservoir projects may occur based on private use of water that requires the crossing of public lands. Large reservoirs would most likely include direct consultation by the proponent.

North Platte River Species

Federally listed species in the Platte River that may be affected by water depletions resulting from Bureau-authorized actions within the RMPPA are listed in Table 6.

Table 6. Federally Listed Species That Are Native to the Platte River and May Be Affected by Water Depletions Resulting From Bureau–authorized Actions Within the RMPPA.

Common Name	Scientific Name	ESA Status	**Designated** Critical Habitat
Western prairie fringed orchid	Platanthera praeclara	Threatened	No
Least Tern (interior population)	Sterna antillarum	Endangered	No
Piping Plover	Charadrius melodus	Threatened	No
Whooping Crane	Grus americana	Endangered	No
Pallid Sturgeon	Scaphirhynchus albus	Endangered	No

Western prairie fringed orchid (*Platanthera praeclara*)

Listing Status: Federal—Threatened, September 1989

Species Description

The Western prairie fringed orchid (WPFO) is a perennial forb with large and showy inflorescences. Plants are usually about 12 to 34 inches (30–85 cm) tall and have 2 to 5 relatively thick, elongate, glabrous leaves (Sheviak and Bowles 1986). The WPFO reproduces primarily by seed, with flowering occurring between late June and mid-July and seed dispersal (wind and water) in mid-September. Flowering patterns are often erratic, and certain information suggests that the plant commonly undergoes periods of dormancy (Bowles 1983). The species is self-compatible, but pollination is required for fruit and seed production. Two species of hawkmoths have been identified as pollen vectors for the orchid (Cuthrell and Rider 1993).

Life History

The WPFO is associated with sedge meadows, primarily within the tallgrass prairie biome (Nebraska and the Great Plains). Across its range, this species is generally found in fire- and grazing-adapted grassland communities, most often on unplowed calcareous prairies and sedge meadows. It has also been documented in successional plant communities on disturbed sites. Maintenance of functional dynamic tallgrass prairie is key to survival of species.

Population Distribution

Historically, the WPFO was found in tallgrass prairies west of the Mississippi river, from southern Canada to Oklahoma. The current distribution of this species includes Minnesota; Iowa; Missouri; Nebraska; North Dakota; and Manitoba, Canada. It is believed to be extirpated from South Dakota and Oklahoma. The WPFO is associated with wetlands. Orchid populations shift in time and space in response to water levels (Hoff et al. 1999).

Environmental Baseline

There are 172 population sites remaining in 7 states, and 1 population complex in Manitoba, Canada (NatureServe 2012 and USFWS 2002e). The largest populations occur in the northern part of the range in Manitoba, Minnesota, and North Dakota. The Sheyenne National Grassland is not tributary to the Platte River (USDA FS, Sheyenne Ranger District 1999). There are an unknown number of populations located on Platte River in the targeted recovery area. The WPFO or its habitat does not occur within Colorado.

Threats

The major factor contributing to the decline of this species is the conversion of native prairie to croplands.

Management Status and Recovery and Conservation Planning

Recovery Plan approved in 1996 (USFWS 1996). No Critical habitat has been designated for the WPFO. The recovery plan emphasizes the need for actions that prevent further declines in orchid populations and habitat quality. This plan includes protection goals for existing habitat and delisting criteria. The recovery plan direction focuses on protection of existing habitat.

Interior Least Tern (*Sterna antillarum*)

Listing Status: Federal—Endangered in the United States, except within 50 miles of the coast, June 1985

Species Description

Least terns (all currently recognized subspecies and populations) are the smallest members of the subfamily Sterninae and family Laridae of the order Charadriiformes, measuring about 0.7–0.8 inches (21–24 cm) long, with a wingspread of 1.7 feet (51 cm). Sexes are alike, characterized by a black-capped crown, white forehead, grayish back and dorsal wing surfaces, snowy white undersurfaces, legs of various orange and yellow colors depending on the sex, and a black-tipped bill whose color also varies depending on sex. Immature birds have darker plumage than adults, a dark bill, and dark eye stripes on their white foreheads (Watson 1966, Davis 1968, Boyd and Thompson 1985).

Life History

The interior least tern is piscivorous, feeding in shallow waters of rivers, streams, and lakes. Other least terns also feed on crustaceans, insects, mollusks and annelids (Whitman 1988). The terns usually feed close to their nesting sites. Fish prey is small–sized, and important genera include Fundulus, Nortopis, Campostoma, Pimephales, Gambusia, Blonesox, Monrone, Dorosoma, Lepomis and Carpiodes (Grover 1979, Hardy 1957, Rumancik 1988, 1989; Schulenberg et al. 1980, Smith and Renken 1990, Wilson et al. 1989). Fishing occurs close to the riverine colony. Terns nesting at sand and gravel pits and other artificial habitats may fly up to 2 miles (3.2 km) to fish.

Least terns throughout North America nest in areas with similar habitat attributes. The riverine nesting areas of interior least terns are sparsely vegetated sand and gravel bars within a wide unobstructed river channel, or salt flats along lake shorelines. Nesting locations usually are at the higher elevations and away from the water's edge because nesting starts when the river flows are high and small amounts of sand are exposed. The size of nesting areas depends on water levels and the extent of associated sandbars.

Population Distribution

The species prefers sandbars of rivers, inland islands, expansive sand and gravel beaches, and salt plains in Oklahoma. For nesting, the species prefers river sandbars. The least tern (interior variety) breeds near the following river basins: Colorado River; Red River; Platte River, MO; and the Mississippi River; from southern South Dakota, western Iowa, northwestern Indiana, to central Oklahoma, Louisiana, New Mexico, and Texas. These birds winter along the Pacific Ocean near Baja, CA, and along the Gulf Coast to South America. The interior least tern does not occur in the RMPPA.

Environmental Baseline

Despite the breadth of research conducted for the least tern, the demography of this species is poorly known, and association of wintering areas with various breeding populations remains uncertain (Thompson et al. 1997).

Threats

Loss of gravel and sandbars along rivers due to flow regulation threatens least tern populations. In addition, human disturbance in nesting areas negatively affects nesting success.

Management Status and Recovery and Conservation Planning

Recovery Plan completed September 19, 1990. No Critical habitat has been identified for this species. The recovery plan emphasizes the need for actions that protect existing habitat, increase population size, and assesses the current distribution and population trends. This plan includes protection goals for existing habitat and delisting criteria.

Piping Plover (Charadrius melodus)

Listing Status: Federal—Threatened, December 1985

Species Description

The piping plover is a small, stocky, sandy-colored bird resembling a sandpiper. The adult has yelloworange legs, a black band across the forehead from eye to eye, and a black ring around the base of its neck. Like other plovers, it runs in short starts and stops. When still, the piping plover blends into the pale background of open, sandy habitat on outer beaches, where it feeds and nests. The bird's name derives from its call notes, plaintive bell-like whistles which are often heard before the birds are seen.

Life History

Piping plovers prefer exposed, sparsely vegetated, sandy shores and islands within shallow lakes and ponds. In addition they can be found in expansive, open, sandy areas that have tufts of grass. Winter habitats are beaches, lagoon margins, and areas of rubble substrate.

Population Distribution

This species breeds in south-central Alberta and Manitoba to eastern Montana and central and eastern Nebraska. In addition the birds breed in the Great Lakes region, from northern Michigan and southern Ontario to the shores of Lake Michigan and Lake Ontario. Piping plovers winter in eastern Texas and in other coastal locations along the Atlantic seaboard, from South Carolina to Florida. The Piping plover does not occur in the RMPPA.

Environmental Baseline

There have been no comprehensive surveys since 1996. The current trend is relatively stable to increasing but trend varies with region. International censuses in 1991 and 1996 revealed a rangewide increase of 7.7 per cent over that five-year period, from 5488 individuals to 5913 individuals.

In the Great Plains region, as of 1993, plovers were declining more than 7 percent annually (Ryan et al. 1993). International censuses in 1991 and 1996 revealed a 17.4 per cent increase in Canadian Great Plains populations and a 21.4 per cent decline in U.S. populations. Overall, there

was a small decline over the five year period, from 3469 to 3284 individuals (Flemming 1994, Plissner and Haig 2000).

Threats

Flood abatement activities, such as water diversions that permit shoreline vegetation to flourish, and human activity in general threaten piping plover habitats and populations. Alterations of water flow change the structure of sandbars preferred for nesting (though the birds nest on sandy shores as well), and irregular flows may flood nests or leave the sandbar connected to the shore and more vulnerable to predation.

Management Status and Recovery and Conservation Planning

Recovery Plan for the Great Lakes and Northern Great Plains completed May 12, 1988. The Recovery Plan contains detailed, state by state, descriptions of current research and management activities. Critical Habitat has been designated for the species, however none exists in Colorado.

Whooping Crane (*Grus americana*)

Listing Status: Federal—Endangered except where nonessential experimental populations occur in Colorado, Indiana, Florida, New Mexico, Utah, and the western half of Wyoming, March 1967.

Species Description

The whooping crane stands 5 feet (1.5 m) tall and has a long sinuous neck and long legs. Its snowy-white body feathers are accented by jet-black wingtips and a red and black head with a long pointed beak. The whooping crane's wings measure about 7 feet (2.1 m) across. The whooping crane is named for its call, which has been described as a shrill bugle-like trumpeting.

Life History

Whooping cranes use a variety of habitats during migration (Howe 1987, 1989; Lingle 1987; Lingle et al. 1991), including croplands (for feeding) and large palustrine (marshy) wetlands (for roosting). Whooping cranes also roost in riverine habitat, most notably the Platte River, Middle Loup River, and Niobrara River in Nebraska; Cimarron River in Oklahoma; and the Red River in Texas (USFWS confirmed sighting records). Cranes roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Population Distribution

Presently, the distribution of the whooping crane is limited as a result of habitat loss and extremely low population size. Whooping cranes breed near Wood Buffalo National Park (Northwest Territories and Alberta). The birds winter near Arkansas National Wildlife Refuge (Texas Gulf Coast), and on occasion they venture northeast into Louisiana. Migrating between these locations, whooping cranes use the Platte River flyway. The whooping crane does not occur in the RMPPA.

Environmental Baseline

The total wild population in February 2006 was estimated at 338. Fewer than 250 are mature in the only self-sustaining population. The February 2006 population included: 215 individuals in the only self-sustaining Aransas-Wood Buffalo National Park Population that nests in Wood Buffalo National Park and adjacent areas in Canada and winters in coastal marshes in Texas; 59 captive-raised individuals released in an effort to establish a non-migratory Florida Population in central Florida; and 64 individuals introduced between 2001 and 2005 that migrate between Wisconsin and Florida in an eastern migratory population. The last remaining wild bird in the reintroduced Rocky Mountain Population died in the spring, 2002. The captive population contained 135 birds in February, 2006, with annual production from the Calgary Zoo, International Crane Foundation, Patuxent Wildlife Research Center, Species Survival Center, and the San Antonio Zoo. The total population of wild and captive whooping cranes in February, 2006, was 473 (NatureServe 2012).

Historically, the population size may have been as high as 10,000. A low point came in the mid-1900s when there were fewer than 50 whooping cranes in North America prior to 1968, with an all-time low of 21 as recently as 1954. Annual growth of the population during the past 65 years has averaged 4.5% per year (CWS and USFWS 2007).

Threats

Primary threats to the whooping crane population due to human activities include draining wetland habitats, coastline development, and human activity near breeding and nesting sites.

Management Status and Recovery and Conservation Planning

Recovery Plan completed on February 11, 1994. Critical Habitat has been designated for the species, however none exists in Colorado.

Pallid Sturgeon (Scaphirhynchus albus)

Listing Status: Federal—Endangered, September 1990

Species Description

The pallid sturgeon is one of the largest (30–60 inches, [76–152 cm]) fishes found in the Missouri-Mississippi River drainage, with specimens weighing up to 85 pounds (39 kg). It is usually light brown on the dorsal surface and white underneath. It has a flattened, shovel-shaped snout. Fleshy chin barbels are located at about 1/3 distance between the mouth and snout, with the inner barbels about 1/2 the length of the outer barbels. The pallid has a long, slender, flattened and armored region from the dorsal fin to the tail fin (caudal peduncle), which has a long upper lobe. There are no bony plates on the belly.

Life History

The pallid sturgeon is native to the Missouri and Mississippi Rivers and therefore adapted to the predevelopment habitat conditions that existed in these large rivers. These conditions generally can be described as large, free-flowing, warm water turbid habitat, with a diverse assemblage of physical habitats that were in a constant state. The Service has not designated Critical habitats for

the pallid sturgeon.

Population Distribution

Pallid sturgeons are found almost exclusively in the headwaters of the Missouri River (in the vicinity of Fort Benton/Great Falls, MT) downstream to the Mississippi River near New Orleans, LA. In addition the pallid sturgeon is found in the Platte River near its confluence with the Missouri River. The pallid sturgeon does not occur in the RMPPA.

Environmental Baseline

The estimated population size ranges from 2500 to 100,000 individuals. The upper Missouri River supports a small, declining, wild population of a couple hundred adults; recruitment is very low or absent. The lower Missouri River contains a small wild population of probably fewer than 200 adults, with sporadic or limited recruitment. Population size in the Atchafalaya River may be a few thousand. Population size in the largest segments of the range--the Mississippi River--is unknown (USFWS 2007). According to Duffy et al. (1996), the total range-wide population size may be as few as 6,000 individuals or as many as 21,000.

Threats

Modification of the pallid sturgeon's habitat by human activities has blocked fish movement, destroyed or altered spawning areas, reduced food sources or the ability to obtain food, altered water temperatures, reduced turbidity, and changed the hydrograph of the river system. Overfishing, pollution, and hybridization that occur due to habitat alterations also have probably contributed to the species' population decline.

Management Status and Recovery and Conservation Planning

Recovery Plan completed November 7, 1993. Critical Habitat has been designated for the species, however none exists in Colorado.

Colorado River Basin Species

Four endangered fish found in the Colorado River in Colorado may be affected by Bureau-authorized actions within the RMPPA (see Table 7).

Table 7. Federally Listed Species That Are Native to the Colorado River Basin and May be Affected By Water Depletions Resulting From Bureau–authorized Actions Within the RMPPA.

Common Name	Scientific Name	ESA Status	**Designated** Critical Habitat
Colorado Pikeminnow	Ptychocheilus lucius	Endangered	No
Razorback Sucker	Xyrauchen texanus	Endangered	No
Bonytail	Gila elegans	Endangered	No
Humpback Chub	Gila cypha	Endangered	No

Colorado Pikeminnow (*Ptychocheilus lucius*)

Listing Status: Federal—Endangered, March 1967

Species Description

The Colorado pikeminnow is the largest cyprinid fish endemic to the Colorado River system (Tyus 1991). Its common name was recently changed from Colorado squawfish by the American Fisheries Society (Nelson et. al 1998). This species can reach a maximum length of approximately 6 feet total length (TL) and a maximum weight of 80 pounds (Miller 1961). Young are silvery and usually have a dark, wedge-shaped spot at the base of the caudal fin. Adults are strongly counter shaded with a dark, olive back and a white belly.

Life History

The following information is from the Colorado Pikeminnow Recovery Goals (2002).

The Colorado pikeminnow is a long-distance migrator; adults move hundreds of kilometers to and from spawning areas and require long sections of river with unimpeded passage. Adults require pools, deep runs, and eddy habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, form gravel and cobble deposits used for spawning, and rejuvenate backwater nursery habitats. Spawning occurs after spring runoff at water temperatures typically between 18 and 23°C. After hatching and emerging from spawning substrate, larvae drift downstream to nursery backwaters that are restructured by high spring flows and maintained by relatively stable base flows. Flow recommendations have been developed that specifically consider flow-habitat relationships in habitats occupied by Colorado pikeminnow in the upper basin and were designed to enhance habitat complexity and to restore and maintain ecological processes.

Colorado pikeminnow live in warm-water reaches of the Colorado River mainstem and larger tributaries, and require uninterrupted stream passage for spawning migrations and dispersal of young. The species is adapted to a hydrologic cycle characterized by large spring peaks of snowmelt runoff and low, relatively stable base flows. High spring flows create and maintain inchannel habitats, and reconnect floodplain and riverine habitats, a phenomenon described as the spring flood-pulse (Junk et al. 1989; Johnson et al. 1995). Throughout most of the year, juvenile, subadult, and adult Colorado pikeminnow utilize relatively deep, low-velocity eddies, pools, and runs that occur in nearshore areas of main river channels (Tyus and McAda 1984; Valdez and Masslich 1989; Tyus 1990, 1991; Osmundson et al. 1995). In spring, however, Colorado pikeminnow adults utilize floodplain habitats, flooded tributary mouths, flooded side canyons, and eddies that are available only during high flows (Tyus 1990, 1991; Osmundson et al. 1995). Such environments may be particularly beneficial for Colorado pikeminnow because other riverine fishes gather in floodplain habitats to exploit food and temperature resources, and may serve as prey. Such low-velocity environments also may serve as resting areas for Colorado pikeminnow. River reaches of high habitat complexity appear to be preferred. Because of their mobility and environmental tolerances, adult Colorado pikeminnow are the most widely distributed life stage. During most of the year, distribution patterns of adults are stable (Tyus 1990, 1991; Irving and Modde 2000), but distribution of adults changes in late spring and early summer, when most mature fish migrate to spawning areas (Tyus and McAda 1984; Tyus 1985, 1990, 1991; Irving and Modde 2000). High spring flows provide an important cue to prepare

adults for migration and also ensure that conditions at spawning areas are suitable for reproduction once adults arrive. Specifically, bankfull or much larger floods mobilize coarse sediment to build or reshape cobble bars, and they create side channels that Colorado pikeminnow sometimes use for spawning (Harvey et al. 1993).

Colorado pikeminnow spawning sites in the Green River subbasin have been well documented. The two principal locations are in Yampa Canyon on the lower Yampa River and in Gray Canyon on the lower Green River (Tyus 1990, 1991). These reaches are 42 and 72 km long, respectively, but most spawning is believed to occur at one or two short segments within each of the two reaches. Another spawning area may occur in Desolation Canyon on the lower Green River (Irving and Modde 2000), but the location and importance of this area has not been verified. Although direct observation of Colorado pikeminnow spawning was not possible because of high turbidity, radiotelemetry indicated spawning occurred over cobble-bottomed riffles (Tyus 1990). High spring flows and subsequent post-peak summer flows are important for construction and maintenance of spawning substrates (Harvey et al. 1993).

After hatching and emerging from the spawning substrate, Colorado pikeminnow larvae drift downstream to backwaters in sandy, alluvial regions, where they remain through most of their first year of life (Holden 1977; Tyus and Haines 1991; Muth and Snyder 1995). Backwaters and the physical factors that create them are vital to successful recruitment of early life stages of Colorado pikeminnow; it is the early life stages of Colorado pikeminnow in backwaters that have received much research attention (e.g., Tyus and Karp 1989; Haines and Tyus 1990; Tyus 1991; Tyus and Haines 1991; Bestgen et al. 1997). It is important to note that these backwaters are formed after cessation of spring runoff within the active channel and are not floodplain features. Colorado pikeminnow larvae occupy these in-channel backwaters soon after hatching. They tend to occur in backwaters that are large, warm, deep (average, about 0.3 m in the Green River), and turbid (Tyus and Haines 1991). Recent research (Day and Modde 1999; Trammell and Chart 1999) has confirmed these preferences and suggested that a particular type of backwater is preferred by Colorado pikeminnow larvae and juveniles. Such backwaters are created when a secondary channel is cut off at the upper end, but remains connected to the river at the downstream end. These chute channels are deep and may persist even when discharge levels change dramatically. An optimal river-reach environment for growth and survival of early life stages of Colorado pikeminnow has warm, relatively stable backwaters, warm river channels, and abundant food (Muth et al. 2000).

Young Colorado pikeminnow remain near nursery areas for the first 2–4 years of life, then move upstream to recruit to adult populations and establish home ranges (Osmundson et al. 1998). Adult Colorado pikeminnow remain in home ranges during fall, winter and spring and may move considerable distances to and from spawning areas in summer. Individuals move to spawning areas shortly after runoff in early summer, and return to home ranges in August and September (Tyus 1990; Irving and Modde 2000).

Status and Distribution

The Colorado pikeminnow is currently listed as endangered under the ESA (16 U.S.C. 1531 et. seq.). It was first included on the *List of Endangered Species* issued by the USFWS on March 11, 1967 (32 FR 4001) and was considered endangered under the provisions of the Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa). It was included in the United States *List of*

Endangered Native Fish and Wildlife issued on June 4, 1973 (38 FR No. 106) and received protection as endangered under Section 4(c)(3) of the ESA. The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374). The latest version of the Colorado pikeminnow recovery plan was approved on August 1, 2002 (USFWS 2002a).

The Colorado pikeminnow is endemic to the Colorado River Basin, where it was once widespread and abundant in warm-water rivers and tributaries (Kirsch 1889; Jordan and Evermann 1896; Tyus 1991; Quartarone 1993). It was common in the lower basin in California and Arizona, where it was commercially harvested in the early 1900s (Minckley 1973). Numbers in the lower basin declined in the 1930s (Miller 1961), with few caught in the 1960s (Minckley 1973), and the last specimens reported in the mid-1970s (Moyle 1976; Minckley 1985).

The species was first reported in the upper basin in 1825 by Colonel William H. Ashley (Morgan 1964) and it was common to abundant in the Green and upper Colorado rivers and their tributaries (Banks 1964; Vanicek 1967; Holden and Stalnaker 1975; Seethaler 1978). It was found from Rifle, Colorado, downstream in the mainstem upper Colorado River (Beckman 1963); from Delta, Colorado, downstream on the Gunnison River (Burdick 1995); and from Paradox Valley downstream on the Dolores River (Lynch et al. 1950). In the Green River, it was reported as far upstream as Green River, Wyoming (Ellis 1914; Baxter and Simon 1970); from Craig, Colorado, downstream on the Yampa River; from Rangely, Colorado, downstream and in the White, lower Price, and Duchesne rivers (Tyus and Haines 1991; Cavalli 1999; Muth et al. 2000).

Colorado pikeminnow are presently restricted to the Upper Colorado River Basin and inhabit warm water reaches of the Colorado, Green and San Juan rivers and associated tributaries. The Colorado pikeminnow recovery goals (USFWS 2002a) identify occupied habitat of wild Colorado pikeminnow as follows:

The Green River from Lodore Canyon to the confluence of the Colorado River, the Yampa River downstream of Craig, Colorado, the Little Snake River from its confluence with the Yampa River upstream into Wyoming, the White River downstream of Taylor Draw Dam and Kenney Reservoir, the lower 89 miles of the Prices River, the lower Duchesne River, the Upper Colorado River from Palisade, Colorado, to Lake Powell, the lower 34 miles of the Gunnison River, the lower mile of the Dolores River and the San Juan River downstream from Shiprock, New Mexico to Lake Powell. Natural reproduction of Colorado pikeminnow is currently known from the Green, Yampa, upper Colorado, Gunnison, and San Juan rivers. The Colorado pikeminnow does not occur in the RMPPA.

Environmental Baseline

Pikeminnow found in the Yampa River are part of the Green River population. The Yampa River is considered occupied from the town of Craig, downstream to the confluence with the Green River. Two principal spawning sites have been identified in the Green River subbasin (Tyus 1990). One site is near Three Fords Canyon in Gray Canyon of the lower Green River and one site is in the Lower Yampa. Young produced in the lower Yampa River drift downstream and nurse primarily in alluvial backwaters upstream of Desolation/Gray Canyons.

The USFWS has identified water, physical habitat and the biological environment as the primary constituent elements of critical habitat for Colorado pikeminnow. This includes a quantity of water of sufficient quality delivered to a specific location in accordance with a hydrologic regime required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited by Colorado pikeminnow or potentially suitable for spawning, feeding, nursery use, or corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year flood plain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation and competition are important elements of the biological environment.

Threats

The primary threats to Colorado pikeminnow are stream flow regulation and habitat modification; competition with and predation by nonnative fishes; and pesticides and pollutants (USFWS 2002a). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding and sheltering. These impairments are described in further detail below.

Stream flow regulation includes mainstem dams that cause the following adverse effects to Colorado pikeminnow and its habitat:

1. block migration corridors;
2. changes in flow patterns reduced peak flows and increased base flows;
3. release cold water, making temperature regimes less than optimal;
4. change river habitat into lake habitat; and
5. retain sediment that is important for forming and maintaining backwater habitats.

In the Upper Basin, 435 miles of Colorado pikeminnow habitat has been lost by reservoir inundation from Flaming Forge Reservoir on the Green River, Lake Powell on the Colorado River, and Navajo Reservoir on the San Juan River. Cold water releases from these dams have eliminated suitable habitat for native fishes, including Colorado pikeminnow, from river reaches downstream for approximately 50 miles below Flaming Gorge Dam and Navajo Dam. In addition to main stem dams, many dams and water diversion structures occur in and upstream from critical habitat that reduce flows and alter flow patterns, which adversely affect critical habitat. Diversion structures in critical habitat divert fish into canals and pipes where the fish are permanently lost to the river system. It is unknown how many endangered fish are lost in irrigation systems, but in some years, in some river reaches, majority of the river flow is diverted into unscreened canals. The high spring flows which maintain habitat diversity, flush sediments from spawning habitat, increase invertebrate food production, form gravel and cobble deposits important for spawning, and maintain backwater nursery habitats have been reduced by flow regulation of dams and by water diversions (McAda 2002; Muth et al. 2000).

Predation and competition from nonnative fishes have been clearly implicated in the population reductions or elimination of native fishes in the Colorado River Basin (Dill 1944; Osmundson and Kaeding 1989; Behnke 1980; Joseph et al. 1977; Lanigan and Berry 1979; Minckley and Deacon 1968; Meffe 1985; Propst and Bestgen 1991; Rinne 1992). Data collected by Osmundson and Kaeding (1991) indicated that during low water years nonnative minnows capable of preying on or competing with larval endangered fishes greatly increased in numbers.

More than 50 nonnative fish species were intentionally introduced in the Colorado River Basin prior to 1980 for sport fishing, forage fish, biological control, and ornamental purposes (Minckley 1982; Tyus et al. 1982; Carlson and Muth 1989). Nonnative fishes compete with native fishes in several ways. The capacity of a particular area to support aquatic life is limited by physical habitat conditions. Increasing the number of species in an area usually results in a smaller population of most species. The size of each species population is controlled by the ability of each life stage to compete for space and food resources and to avoid predation. Some life stages of nonnative fishes appear to have a greater ability to compete for space and food and to avoid predation in the existing altered habitat than do some life stages of native fishes. Tyus and Saunders (1996) cite numerous examples of both indirect and direct evidence of predation on razorback sucker eggs and larvae by nonnative species.

Threats from pesticides and pollutants include accidental spills of petroleum products and hazardous materials; discharge of pollutants from uranium mill tailings; and high selenium concentration in the water and food chain (USFWS 2002a). Accidental spills of hazardous material into critical habitat can cause immediate mortality when lethal toxicity levels are exceeded. Pollutants from uranium mill tailings cause high levels of ammonia that exceed water quality standards. High selenium levels may adversely affect reproduction and recruitment (Hamilton and Wiedmeyer 1990; Stephens et al. 1992; Hamilton and Waddell 1994; Hamilton et al. 1996; Stephens and Waddell 1998; Osmundson et al. 2000).

Management Status and Recovery and Conservation Planning

Recovery plan completed August 28, 2002. Critical habitat was designated in 1994 within the 100-year floodplain of Colorado pikeminnow's historical range; however, none exists within the RMPPA.

Razorback Sucker (*Xyrauchen texanus*)

Listing Status: Federal—Endangered, October 1991

Species Description

The razorback sucker is the only sucker with a sharp-edged dorsal keel behind its head. Razorback suckers are large in size and slightly compressed laterally. These fish have reached lengths of over 3 feet and weigh as much as 10 pounds in the Lower Colorado River Basin (Bestgen 1990, Minckley et al. 1991). Fish in the upper Colorado River basin tend to be smaller than those in the Lower Colorado River Basin. Mature female razorback sucker are generally larger than males throughout the entire range of the species. In riverine habitats, razorback sucker mature in 3 to 6 growing seasons (McAda and Wydoski 1980).

Life History

The following information is from the Razorback Sucker Recovery Goals (2002c).

The razorback sucker evolved in warm-water reaches of larger rivers of the Colorado River Basin from Mexico to Wyoming. Habitats required by adults in rivers include deep runs, eddies, backwaters, and flooded off-channel environments in spring; runs and pools, often in shallow

water associated with submerged sandbars in summer; and low-velocity runs, pools and eddies in winter. Spring migrations of adult razorback sucker were associated with spawning in historic accounts and a variety of local and long-distance movements and habitat-use patterns have been documented. Spawning in rivers occurs over bars of cobble, gravel and sand substrates during spring runoff at widely ranging flows and water temperatures (typically greater than 14^{o}C). Spawning also occurs in reservoirs over rocky shoals and shorelines. Young require nursery environments with quiet, warm, shallow water such as tributary mouths, backwaters, or inundated floodplain habitats in rivers, and coves or shorelines in reservoirs. Flow recommendations have been developed that specifically consider flow-habitat relationships in habitats occupied by razorback sucker in the upper basin and were designed to enhance habitat complexity and to restore and maintain ecological processes (see section 4.1). The following is a description of observed uses in various parts of the Colorado River Basin.

Adult razorback sucker tend to occupy different habitats seasonally (Osmundson et al. 1995), and can do well in both lotic and lentic environments (Minckley et al. 1991). In rivers, they usually are captured in lower velocity currents, more rarely in turbulent canyon reaches (Tyus 1987; Lanigan and Tyus 1989; Tyus and Karp 1990; Bestgen 1990; Minckley et al. 1991). An exception may be in the San Juan River, where hatchery-reared, radio-tagged adults preferred swifter mid-channel currents during summer–autumn base-flow periods (Ryden 2000). In the upper basin, bottomlands, low-lying wetlands, and oxbow channels flooded and ephemerally connected to the main channel by high spring flows appear to be important habitats for all life stages of razorback sucker (Modde et al. 1996; Muth et al. 2000). These areas provide warm water temperatures, low-velocity flows and increased food availability (Tyus and Karp 1990; Modde 1997; Wydoski and Wick 1998).

Razorback sucker breed in spring, when flows in riverine environments are high. During that time of year, researchers in the upper basin have documented movement of adults into flooded bottomlands and gravel pits, backwaters and impounded tributary mouths near spawning sites (Holden and Crist 1981; Valdez and Wick 1983; Tyus 1987; Osmundson and Kaeding 1989; Tyus and Karp 1990; Modde and Wick 1997; Modde and Irving 1998; Osmundson et al. 1995). Temperature is an important aspect of habitat for razorback sucker. Thermal preference for adults is 22.9–24.8°C, based on electronic shuttle box studies; lower avoidance temperature is 8.0–14.7°C and upper avoidance temperature is 27.4–31.6°C (Bulkley and Pimentel 1983).

During breeding season (mostly April–June), when river flows are high, adult razorback sucker congregate in flooded bottomlands and gravel pits, backwaters and impounded tributary mouths near spawning sites (Holden and Crist 1981; Valdez and Wick 1983; Tyus 1987; Osmundson and Kaeding 1989; Tyus and Karp 1990; Osmundson et al. 1995; Modde and Wick 1997; Modde and Irving 1998). Within the last 20 years, relatively large aggregations of razorback sucker have been observed in these types of environments, usually upstream of areas with broad floodplains (Tyus et al. 1982; Valdez et al. 1982; Modde et al. 1996; Muth 1995). Razorback sucker adults occupy such habitats both before and after spawning, presumably for feeding, resting, gonadal maturation, and other activities associated with their reproductive cycle (Tyus and Karp 1990; Osmundson and Kaeding 1991; Modde and Wick 1997; Modde and Irving 1998). On the upper Colorado River, peak use of backwater and gravel pit habitats occurred in June (Osmundson et al. 1995). Ryden (2000) recorded somewhat similar behavior among introduced razorback sucker in the San Juan River, where radiotelemetered adults chose habitats warmer than the main

channel in March–April; eddies during the ascending limb of the hydrograph in May; and low-velocity habitats along the river margin, including inundated vegetation, during the highest flows in June. The fish moved back into eddies on the descending limb of the hydrograph in July.

Spawning has not been observed directly in the upper basin, but aggregations of ripe razorback sucker indicate that spawning occurs in broad alluvial, flat-water regions over large gravel-cobble bars and coarse sand substrates at water temperatures of 6–19°C in velocities <1.0 meters/second and depths of <1.0 meter (McAda and Wydoski 1980; Tyus 1987; Tyus and Karp 1990; Bestgen 1990; Snyder and Muth 1990). Studies suggest a linkage between egg survival and cleansing of substrates by high spring flows. Eggs deposited on substrates with moderate to high sediment have lower survival because of suffocation (Wick 1997). Young razorback sucker are thought to occupy shallow, warm, low-velocity habitats in littoral zones, backwaters and inundated floodplains and tributary mouths downstream of spawning bars. This inference is based on the few larval and young juveniles collected in the upper basin, observations of hatchery-reared fish and analogy with other native fish in the Colorado River system (Sigler and Miller 1963; Taba et al. 1965; Minckley 1973; Tyus 1987; Modde 1996, 1997; Muth et al. 1998). Young-of-year appear to stay in these sheltered habitats for several weeks after hatching, then disperse to deeper water (Minckley et al. 1991). In lakeside rearing ponds in the lower basin, juvenile razorback sucker hide during the day in dense aquatic vegetation, under debris and in rock cavities (U.S. Bureau of Reclamation 1996).

During non-reproductive times of the year (summer–winter), adult razorback sucker in lotic environments have been found in deeper eddies, slow runs, backwaters, and other types of pool habitats with silt or sand substrate, depths ranging from 0.6 to 3.4 m, and velocities ranging from 0.3 to 0.4 m/s (Valdez et al. 1982; Tyus 1987; Tyus et al. 1987; Tyus and Karp 1990; Minckley et al. 1991; Osmundson et al. 1995).

Status and Population Distribution

The razorback sucker was listed as endangered under the ESA on October 23, 1991. The marked decline in populations of razorback sucker has been attributed to construction of dams and reservoirs, introduction of nonnative fishes, removal of large quantities of water from the Colorado River system, and degraded water quality (Miller 1961, Minckley and Deacon 1991). The decline of razorback sucker populations was first reported following a period of dam construction throughout the Colorado River basin. Dams have fragmented and inundated riverine habitat; released cold, clear waters; altered ecological processes; affected seasonal availability of habitat; and blocked fish passage. Stream flow regulation and habitat modification, primarily from dams, are listed as the two primary threats to the continued persistence of this species in the recovery goals (USFWS 2002c).

Historically, the razorback sucker occupied the mainstem Colorado River and many of its tributaries from northern Mexico through Arizona and Utah into Wyoming, Colorado and New Mexico. In the late 19th and early 20th centuries, it was reported as being abundant in the Lower Colorado River Basin and common in parts of the Upper Colorado River Basin, with numbers apparently declining with distance upstream (Jordan and Evermann 1896; Minckley et al. 1991).

In the lower basin, razorback sucker were found in abundance in the lower Colorado River (LCR) from the delta in Mexico north to what is now Lake Mohave in Arizona, and in the Gila,

San Pedro, Verde, and Salt rivers (Miller 1961; Minckley 1983; Minckley et al. 1991). Early accounts place these fish in the Gila River from its confluence with the Colorado River (Evermann and Rutter 1895) almost to the Arizona-New Mexico border (Minckley 1973), and in the San Pedro River as far south as Tombstone, Arizona. Archaeological remains document occurrence in the Verde River as far upstream as Perkinsville, Arizona (Miller 1961). Razorback sucker were so numerous in the Salt River above Lake Roosevelt, in Saguaro Lake, and in irrigation canals near Phoenix, Arizona, that they were removed by the wagon load and sold commercially for food and fertilizer (Minckley 1983). Large numbers were also taken from the Salton Sea of southern California (Evermann 1916).

Although razorback sucker occupied the mainstem Colorado River in the reach now inundated by Lake Mead and in the Grand Canyon, few records exist; this is possibly because these regions were relatively remote and inaccessible for sampling (Minckley et al. 1991). Only 10 razorback sucker were documented from the Grand Canyon between 1944 and 1995 (Valdez 1996), and the species is considered to be transient through this region to reach more suitable habitats upstream and downstream (Bestgen 1990; Douglas and Marsh 1998). A number of hybrids between flannelmouth sucker and razorback sucker are reported from Grand Canyon (Suttkus et al. 1976; Maddux et al. 1987; Valdez and Ryel 1995; Douglas and Marsh 1998).

Historic distribution of razorback sucker in the upper basin included the Colorado, Green and San Juan River drainages (Minckley et al. 1991; Holden 1999; Muth et al. 2000). Evidence suggests that the species was common and possibly locally abundant in the lower, flat-water reaches of the Green and Colorado rivers and in the lower reaches of some tributaries (Minckley et al. 1991; Muth et al. 2000). This species was reported from the White, Duchesne, Little Snake, Yampa, and Gunnison rivers (Burdick 1995) and, although evidence is sparse and anecdotal, as far up the San Juan River drainage as the Animas River (Jordan 1891; Minckley et al. 1991; USFWS 1998). The razorback sucker does not occur in the RMPPA.

Environmental Baseline

In the Upper Colorado River Basin, the razorback sucker has declined in distribution and abundance until it is now found in small numbers only in the middle Green River, between the confluences of the Duchesne and Yampa rivers, and in the lower reaches of those two tributaries (Tyus 1987; Bestgen 1990). According to Modde and Irving (1998), tag capture and telemetry data support the hypothesis that razorback sucker in the middle Green River constitute a single reproductive population. Known spawning sites are located in the lower Yampa River and in the Green River near Escalante Ranch between river kilometer 492 and 501, but other, less-used sites are probable (Tyus and Karp 1990; Modde and Wick 1997; Modde and Irving 1998).

Threats

The abundance and distribution of the razorback sucker have been dramatically reduced because of water developments such as dams and water diversions. Dams have altered the timing, magnitude and duration of flows that characterize the variation in annual runoff in unaltered, large rivers; altered flows resulting from dam operation can also affect the abundance and distribution of spawning and rearing habitats preferred by the razorback sucker. Historical water depletions and any new water depletions are likely to negatively affect population and habitat conditions downstream, although assessing the effects on species viability may be difficult. In addition, the introduction of non-native trout to the historical habitats of the razorback sucker has

almost eliminated their recruitment and survival (Minckley et al. 2003). Incidental catch by recreational anglers may pose a threat resulting from stress-caused direct and delayed mortality.

Management Status and Recovery and Conservation Planning

Recovery Plan completed December 23, 1998. Critical habitat was designated in 1994 within the 100-year floodplain of the razorback sucker's historical range, however none exists within the RMPPA.

Bonytail (Gila elegans)

Listing Status: Federal—Endangered, April 1980

Species Description

The bonytail chub is a large cyprinid fish endemic to the Colorado River basin (Valdez and Clemmer 1982). Bonytails are medium sized (less than 600 mm) in length. Adult bonytails are gray or olive colored on the back with silvery sides and a white belly. Adult bonytails have an elongated body with a long, thin caudal peduncle. The head is small and compressed compared to the rest of the body. The mouth is slightly overhung by the snout and there is a smooth low hump behind the head that is not as pronounced as on the humpback chub. Adults attain a maximum size of about 550 mm total length (Bozek et al. 1984) and 1.1 kg in weight (Vanicek 1967).

Life History

The following information is from the Bonytail Recovery Goals (2002d).

Little is known about the specific habitat requirements of bonytail because the species was extirpated from most of its historic range prior to extensive fishery surveys. The bonytail is considered adapted to mainstem rivers where it has been observed in pools and eddies. Similar to other closely related *Gila* spp., bonytail in rivers probably spawn in spring over rocky substrates; spawning in reservoirs has been observed over rocky shoals and shorelines. It is hypothesized, based on available distribution data, that flooded bottomland habitats are important growth and conditioning areas for bonytail, particularly as nursery habitats for young. Flow recommendations have been developed that specifically consider flow-habitat relationships within historic habitat of bonytail in the upper basin, and were designed to enhance habitat complexity and to restore and maintain ecological processes (see section 4.1). The following is a description of observed habitat uses in various parts of the Colorado River Basin.

It has been suggested that the large fins and streamlined body of the bonytail is an adaptation to torrential flows (Miller 1946; Beckman 1963). Of five specimens captured recently in the upper basin, four were captured in deep, swift, rocky canyon regions (i.e., Yampa Canyon, Black Rocks, Cataract Canyon, and Coal Creek Rapid), but the fifth was taken in a reservoir (Lake Powell). Also, all fish taken from the lower basin since 1974 were caught in reservoirs. Specimens encountered in reservoirs are believed to be inhabiting their former habitats now inundated by these impoundments. Vanicek (1967), who handled numerous bonytail, detected no difference in habitat selection from roundtail chub. These fish were generally found in pools and eddies in the absence of, although occasionally adjacent to, strong currents and at varying depths

generally over silt and silt-boulder substrates. No quantitative data are available for the habitat of this species. It is hypothesized, based on historic and present distributions, that flooded bottomlands provide important nursery, growth and conditioning habitats for bonytail. Adult bonytail captured in Cataract Canyon and Desolation/Gray Canyons were sympatric with humpback chub in shoreline eddies among emergent boulders and cobble, and adjacent to swift current (Valdez 1990).

Natural reproduction of bonytail was last documented in the Green River in Dinosaur National Monument for the year classes 1959, 1960 and 1961 (Vanicek and Kramer 1969). Ripe spawning fish were captured from mid-June to early July at a water temperature of 18°C. Spawning by bonytail and roundtail chub was believed to be spatially separated because ripe adults of both species were never captured in the same net.

Jonez and Sumner (1954) described the spawning act of bonytail in Lake Mohave. Approximately 500 bonytail were observed spawning over a gravel shelf up to 30 feet in depth. Each female had three to five male escorts and adhesive eggs were broadcast over the gravel shelf. A gill net in the spawning area captured 42 males and 21 females ranging from about 280 to 350 mm (fork length); a 300 mm female contained an estimated 10,000 eggs. Vanicek (1967) reported wild bonytail of age groups V–VII in spawning condition. Hamman (1985) found that hatchery-reared bonytail began to sexually mature at age two.

Little is known of the food habits of the bonytail. McDonald and Dotson (1960) reported that "Colorado chub" were largely omnivorous with a diet of terrestrial insects, plant matter and fish. Several chubs were observed feeding on floating masses of debris washed by heavy rainfall. Vanicek (1967) reported that "Colorado chubs" fed mainly on terrestrial insects (mostly adult beetles and grasshoppers), plant debris, leaves, stems, and woody fragments.

Status and Distribution

The bonytail is currently listed as endangered under the ESA, under a final rule published on April 23, 1980 (45 FR 27710). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374). The latest version of the recovery plan for this species was approved on August 1, 2002 (USFWS 2002b).

Currently no self-sustaining populations of bonytail exist in the wild and very few individuals have been caught throughout the basin. Captures of wild adult bonytail have occurred in Lakes Powell, Mohave and Havasu, as well as in rivers of the Upper Colorado River Basin. Of the 34 adult bonytail captured in Lake Mohave between 1976 and 1988 (Minckley et al. 1989), 11 were used as the original brood stock (Hamman 1981, 1982, 1985). Progeny of these fish have been released into several locations in upper and lower basin habitats, with variable survival rates. Approximately 130,000 hatchery-produced F_1 and F_2 fish were released into Lake Mohave between 1981 and 1987 as part of an effort by the USFWS to prevent extinction and promote eventual recovery of the species. Younger bonytail of adult size and spawning ability have been collected from the reservoir in the 1990s along with the old adults of the founder population. It is unknown whether these younger adults are from the original stockings or a result of natural reproduction. Releases of hatchery-reared adults into riverine reaches in the upper basin have resulted in low survival (Chart and Cranney 1993), with no evidence of reproduction or recruitment. Recent releases into repatriated, predator-free riverside ponds near Parker, Arizona,

have produced up to three year classes (Pacey and Marsh 1998;). Since 1977, only 11 wild adults have been reported from the upper basin (Valdez et al. 1994), but no upper basin fish have been transferred to hatchery facilities.

Environmental Baseline

Surveys from 1964 to 1966 found large numbers of bonytail in the Green River in Dinosaur National Monument, downstream of the Yampa River confluence (Vanicek and Kramer 1969). Surveys from 1967 to 1973 found far fewer bonytail (Holden and Stalnaker 1975). Few bonytail have been captured after this period and the last recorded capture in the Green River was in 1985 (USFWS 2002d). A stocking program is being implemented to reestablish populations in the Upper Colorado River Basin.

Threats

The primary threats to bonytail are stream flow regulation and habitat modification; competition with and predation by non-native fishes; hybridization with other native *Gila* species; and pesticides and pollutants (USFWS 2002d). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding and sheltering. The threats to bonytail in relation to flow regulation and habitat modification, predation by non-native fishes, and pesticides and pollutants are essentially the same threats identified for the Colorado pikeminnow. Threats to bonytail in relation to hybridization are essentially the same threats identified for the humpback chub.

Management Status and Recovery and Conservation Planning

Recovery Plan completed September 4, 1990. Critical habitat was designated in 1994 within the 100-year floodplain of the bonytail's historical range; however, none exists within the RMPPA.

Humpback Chub (*Gila cypha*)

Listing Status: Federal—Endangered, March 1967

Species Description

The humpback chub is a large cyprinid fish endemic to the Colorado River basin (Miller 1946). Adults have a pronounced dorsal hump, a narrow, flattened head, a fleshy snout with an inferior-subterminal mouth, and small eyes. The body tapers very suddenly from the dorsal fin to the insertion of the caudal fin. Its coloration is silvery with a brown or olive back. Adults attain a maximum size of about 1 ½ feet and about 2 ½ pounds in weight (Valdez and Ryel 1997). The fish is omnivorous, feeding on aquatic arthropods, smaller fishes and algae.

Life History

The following information is from the Humpback Chub Recovery Goals (2002b).

The humpback chub evolved in seasonally warm and turbid water and is highly adapted to the unpredictable hydrologic conditions that occurred in the pristine Colorado River system. Adults require eddies and sheltered shoreline habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas,

rejuvenate food production, and form gravel and cobble deposits used for spawning. Spawning occurs on the descending limb of the spring hydrograph at water temperatures typically between 16 and 22°C. Young require low-velocity shoreline habitats, including eddies and backwaters, that are more prevalent under base-flow conditions. Flow recommendations have been developed that specifically consider flow-habitat relationships in habitats occupied by humpback chub in the upper basin, and were designed to enhance habitat complexity and to restore and maintain ecological processes (see section 4.1). The following is a description of observed habitat uses in various parts of the Colorado River Basin.

Humpback chub live and complete their entire life cycle in canyon-bound reaches of the Colorado River mainstem and larger tributaries. These reaches are characterized by deep water, swift currents and rocky substrates (Valdez et al. 1990). Subadults use shallow, sheltered shoreline habitats, whereas adults use primarily offshore habitats of greater depths (Valdez and Ryel 1995; Karp and Tyus 1990; Childs et al. 1998; Chart and Lentsch 1999). In the Grand Canyon, nearly all fish smaller than 100 mm TL were captured near shore, whereas most fish larger than 100 mm TL were captured in offshore habitats (Valdez and Ryel 1995). Highest densities of subadults in the Colorado River in the Grand Canyon were from shorelines with vegetation, talus and debris fans (Converse et al. 1998).

As young humpback chub grow, they exhibit an ontogenic shift toward deeper and swifter offshore habitats. In Westwater Canyon during summer, fish smaller than 40 mm TL used low velocity areas, including backwaters and shorelines. Later in summer and fall, as fish attained sizes of 40–50 mm TL, their habitat use shifted toward higher-velocity, flowing-water habitats (Chart and Lentsch 1999). Karp and Tyus (1990) reported similar habitat use by larger humpback chub, noting that fish 88–228 mm TL in the Yampa and Green rivers used habitats consisting of rocky shoreline runs and small shoreline eddies. Average depths selected by larvae, young-of-year, juveniles, and adults in the upper basin were 0.4, 0.6, 0.7, and 3.1 meters, respectively (Valdez et al. 1990), and average velocities were 0.03, 0.06, 0.18, and 0.18 meter/second, respectively. Dominant substrates were silt and sand for Young-of-year, and boulders, sand and bedrock for juveniles and adults.

In the LCR, larval and early juvenile humpback chub used shallow, low velocity habitats, different than those used by young of other native species, indicating resource partitioning (Childs et al. 1998). Gorman (1994) found that juveniles or early stages less than 50 mm TL occupied near-benthic to mid-pelagic positions in shallow, nearshore areas that were less than 10 cm deep and had low-velocity flow, small substrate particle sizes, moderate cover, and vertical structure. Larger juveniles or fish 50–100 mm TL used similar habitats of moderate depth (less than 20 cm) that had small to large substrate particle size, moderate to high cover and vertical structure. Juveniles (100–150 mm TL) used shoreline and offshore areas of moderate to deep water (less than 30 cm during the day; less than 20 cm at night) that had slow currents, small and large substrate particle size, moderate to high levels of cover, and vertical structure.

Little is known about spawning habitats of adult humpback chub during high spring-runoff flows. Habitats where ripe humpback chub have been collected are typically deep, swift and turbid. As a result, spawning in the wild has not been directly observed. Gorman and Stone (1999) reported that ripe male humpback chub in the LCR aggregated in areas of complex habitat structure (i.e., matrix of large boulders and travertine masses combined with chutes, runs

and eddies, 0.5–2.0 m deep) and were associated with deposits of clean gravel. Valdez and Ryel (1995, 1997) reported that during the spring, adult humpback chub in the Colorado River in the Grand Canyon primarily used large recirculating eddies, occupying areas of low velocity adjacent to high-velocity currents that deliver food items. They also reported that adults congregated at tributary mouths and flooded side canyons during high flows.

In the Upper Colorado River Basin during spring runoff, spawning adult humpback chub appear to utilize cobble bars and shoals adjacent to relatively low-velocity shoreline habitats that are typically described as shoreline eddies (Valdez et al. 1982; Karp and Tyus 1990; Valdez et al. 1990; Valdez and Ryel 1995, 1997). Tyus and Karp (1989) reported that humpback chub in the Yampa River occupy and spawn in or near shoreline eddy habitats. They also hypothesized that spring peak flows were important for reproductive success because availability of these habitats is greatest during spring runoff; loss or reduction of spring peak flows could potentially reduce availability of spawning habitat.

The humpback chub is an obligate warm-water species that requires relatively warm temperatures for spawning, egg incubation and survival of larvae. Highest hatching success is at 19–20°C, with an incubation time of 3 days, and highest larval survival is slightly warmer at 21–22°C. Humpback chub are broadcast spawners with a relatively low fecundity rate, compared to cyprinids of similar size (Carlander 1969). Male to female ratios for mainstem adults captured near the LCR, based on external morphological examination of papillae and expression of gametes, ranged by sample from 41:59 to 53:47, for an overall average of 49:51 (Valdez and Ryel 1995). Observed male to female ratio of humpback chub in Westwater Canyon was 58:42 (Chart and Lentsch 1999).

Unlike larvae of other Colorado River fishes (e.g., Colorado pikeminnow and razorback sucker), larval humpback chub show no evidence of long-distance drift (Robinson et al. 1998). At hatching, larvae have nonfunctional mouths and small yolk sacs (Muth 1990). The larvae swim up about 3 days after hatching but tend to remain close to spawning sites. Robinson et al. (1998) found small numbers of larvae drifting in the LCR from May through July, primarily at night.

The presence of juveniles in populations with complete size structure suggests successful reproduction in all or portions of the six populations; i.e., Black Rocks (Kaeding et al. 1990), Westwater Canyon (Chart and Lentsch 1999), the LCR in the Grand Canyon (Douglas and Marsh 1996, Gorman and Stone 1999), Cataract Canyon (Valdez 1990), Desolation/Gray Canyons (Chart and Lentsch 2000), and Yampa Canyon (Karp and Tyus 1990). Reproduction in the mainstem Colorado River in the Grand Canyon is precluded by cold-water temperatures, and the only documented evidence of reproduction (i.e., post-larvae) is in a thermal riverside spring located 72 km downstream of Glen Canyon Dam (Valdez and Masslich 1999). The large size structure of the humpback chub aggregation associated with this spring indicates little or no recruitment (Valdez and Ryel 1995).

Status and Distribution

The humpback chub is currently listed as endangered under the ESA. It was first included in the *List of Endangered Species* issued by the USFWS on March 11, 1967 (32 FR 4001) and was considered endangered under provisions of the Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa). The humpback chub was included in the United States *List of Endangered*

Native Fish and Wildlife issued on June 4, 1973 (38 FR No. 106) and received protection as endangered under Section 4(c)(3) of the ESA. The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374). The latest humpback chub recovery plan was approved on August 1, 2002 (USFWS 2002b).

Historic abundance of the humpback chub is unknown; historic distribution is surmised from various reports and collections that indicate the species presently occupies about 68% of its historic habitat of about 756 km of river. The species exists primarily in relatively inaccessible canyons of the Colorado River Basin and was rare in early collections (Tyus 1998). Common use of the name "bonytail" for all six Colorado River species or subspecies of the genus *Gila* confounded an accurate early assessment of distribution and abundance (Holden and Stalnaker 1975; Valdez and Clemmer 1982; Minckley 1996). Of three closely related and sympatric *Gila* species, the roundtail chub (*G. robusta*) and bonytail (*G. elegans*) were described in 1853 by Baird and Girard (Sitgreaves 1853; Girard 1856), but the humpback chub was the last big-river fish species to be described from the Colorado River Basin in 1946 (Miller 1946).

Extensive human alterations throughout the basin prior to faunal surveys may have also depleted or eliminated the species from some river reaches before its occurrence was documented. It is surmised that the humpback chub speciated from a *G. robusta*-like form in canyons of northern Arizona (i.e., Grand Canyon) about 3–5 million years ago (Miller 1946; Uyeno and Miller 1965; Holden 1968; Minckley et al. 1986) during the mid-Pliocene and early Pleistocene epochs. Earliest evidence of the species are skeletal remains from 4,000-year old flood deposits in Stanton's Cave in Grand Canyon (Miller 1955; Euler 1978; Miller and Smith 1984), from a 750–1,100-year old archeological site in Catclaw Cave near present-day Hoover Dam (Miller 1955; Jones 1985), and from 1,000-year old archeological sites in Dinosaur National Monument, Colorado (Tyus 1998).

Humpback chub were first reported in the Upper Colorado River Basin in the 1940s from Castle Park, Yampa River, Colorado, in June and July 1948 (Tyus 1998). Pre-impoundment surveys of Flaming Gorge Dam on the Green River in 1958–1959 (Bosley 1960; Gaufin et al. 1960; McDonald and Dotson 1960) treated all *Gila* as "bonytail," which were common downstream of Green River, Wyoming. Humpback chub were reported from Hideout Canyon in the upper Green River (Smith 1960), although a checklist of fish killed by a massive rotenone operation from Hideout Canyon to Brown's Park in September 1962 stated that "no humpback chub were collected" (Binns 1967). Post-impoundment investigations (Vanicek et al. 1970) reported three humpback chub from the Green River downstream of Flaming Gorge Dam, and one each from Echo Park, Island Park and Swallow Canyon. Specimens were collected in Desolation Canyon on the Green River in 1967 (Holden and Stalnaker 1970), in Yampa Canyon in 1969 (Holden and Stalnaker 1975), in Cross Mountain Canyon of the Yampa River in the 1970s, and an individual specimen was reported from the White River in Utah in the 1950s (Sigler and Miller 1963). Seven suspected humpback chub were captured in the Little Snake River, a tributary of the Yampa River, in 1988 (Wick et al. 1991). Surveys downstream of Flaming Gorge Dam, including Lodore Canyon, have not yielded humpback chub in that region of the Green River, despite warmer dam releases (Holden and Crist 1981; Bestgen and Crist 2000).

Five specimens were reported from Lake Powell in the late 1960s (Holden and Stalnaker 1970) following completion of Glen Canyon Dam in 1963 and impoundment of the upper Colorado

River through Glen, Narrow and Cataract canyons. Reproducing populations of humpback chub were first reported from Black Rocks, Colorado in 1977 (Kidd 1977), and from Westwater and Cataract canyons, Utah, in 1979 (Valdez et al. 1982; Valdez and Clemmer 1982).

Six humpback chub populations are currently identified: (1) Black Rocks, Colorado; (2) Westwater Canyon, Utah; (3) LCR and Colorado rivers in the Grand Canyon, Arizona; (4) Yampa Canyon, Colorado; (5) Desolation/Gray Canyons, Utah; and (6) Cataract Canyon, Utah (see Figure 1 in section 3.1.2; Valdez and Clemmer 1982; U.S. Fish and Wildlife Service 1990a). Each population consists of a discrete group of fish, geographically separated from the other populations, but with some exchange of individuals. River length occupied by each population varies from 3.7 km in Black Rocks to 73.6 km in Yampa Canyon.

Environmental Baseline

Karp and Tyus (1990) captured 130 humpback chub in Yampa Canyon within Dinosaur National Monument. Between 1986 and 1989, 39 humpback chub in breeding condition were captured from this area (Karp and Tyus 1990). In the Yampa system, these fish have been captured in Cross Mountain Canyon (Wick et al. 1981). The humpback chub does not occur in the RMPPA.

Threats

The primary threats to the humpback chub are stream flow regulation and habitat modification; competition with and predation by non-native fishes; parasitism; hybridization with other native *Gila* species; and pesticides and pollutants (USFWS 2002b). The existing habitat, altered by these threats, has been modified to the extent that it impairs essential behavior patterns, such as breeding, feeding and sheltering. Threats to humpback chubs in relation to flow regulation and habitat modification, predation by non-native fishes and pesticides and pollutants are essentially the same threats identified for the Colorado pikeminnow.

The humpback chub population in the Grand Canyon is threatened by predation from non-native trout in the Colorado River below Glen Canyon Dam. This population also is threatened by the Asian tapeworm reported in humpback chubs in the Little Colorado River (USFWS 2002b). No Asian tapeworms have been reported in the Upper Basin populations.

Hybridization with the bonytail and the roundtail chub where they occur together is recognized as a threat to the humpback chub. A larger proportion of roundtail chubs have been found in Black Rocks and Westwater Canyon during low flow years (Kaeding et al. 1990; Chart and Lentsch 1999), which increase the chances for hybridization.

Management Status and Recovery and Conservation Planning

Recovery Plan completed August 19, 1990. Critical habitat was designated in 1994 within the 100-year floodplain of the humpback chub's historical range; however, none exists within the RMPPA.

Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*)

Listing Status: Federal-Threatened March 1967

Background

As prized sport fish and one of only two salmonids native to Colorado, cutthroat trout have long held the interest of anglers and managers alike (Behnke 2002, Trotter 2008). Ever since greenback cutthroat trout (Oncorhynchus clarkii. stomias) were listed as endangered under the Endangered Species Act in 1974, there has been strong interest in developing methods to distinguish them from closely related subspecies with confidence. Prior to recent molecular testing, phenotypic traits associated with greenback cutthroat trout were larger spots, and higher scale counts above the lateral line and in the lateral series when compared to Colorado River cutthroat trout (O. c. pleuriticus; Behnke 1992). However, these two subspecies cannot be separated consistently on the basis of those characteristics (Behnke 1992, Behnke 2002). As a result, geographic range had become the default approach for establishing subspecies designation. Early molecular work did not distinguish between these two subspecies (Behnke 2002), but in 2007 Metcalf et al. used mitochondrial and nuclear molecular markers to suggest that indeed there was a genetic basis for separating greenback from Colorado River cutthroat trout. The primary concern raised by that paper was five of the nine greenback cutthroat trout populations they examined actually displayed genetic fingerprints more similar to cutthroat trout of Trappers Lake origin than they did with many of the other greenback populations such as those found in Severy Creek. This was particularly troubling since mechanisms were in place to deliver Trappers Lake fish to the East Slope. From 1903 through 1938, at least 80 million pure Colorado River cutthroat trout were produced at Trappers Lake (Rogers 2012). Millions more were produced on the south slope of Pikes Peak (Rogers and Kennedy 2008). Although the fate of many of those fish remains a mystery, it is clear that they were stocked in virtually every county east of the Divide that would support trout (Metcalf et al. 2012).

A finding of Metcalf et al. (2007) that attracted less attention was the discovery of a "greenback" cutthroat trout population west of the Continental Divide near Gunnison in West Antelope Creek. Intensive survey work since that time indicated that in fact the West Antelope Creek population is not unique, and that populations with similar genetic fingerprints are pervasive across Colorado's western slope (Rogers 2010). That finding lead the Recovery Team to question whether the West Antelope Creek fish were really greenback cutthroat trout as suggested by Metcalf et al. (2007), or whether they simply represented diversity within Colorado River cutthroat trout (Rogers 2010). In an effort to avoid confusion, trout with this genetic fingerprint are hereafter referred to as Lineage GB, while cutthroat trout displaying the genetic signature commonly associated with those from Trappers Lake are referred to as Lineage CR.

The native distribution of different lineages of cutthroat trout in Colorado was clarified greatly with recent work published by a University of Colorado led research team that examined DNA from 150 year old museum specimens collected prior to large scale stocking activities (Metcalf et al. 2012). This work funded by the Greenback Cutthroat Trout Recovery Team, confirmed that indeed, Lineage GB is at least native to the Colorado, Gunnison basin. Additional work suggests they were likely found in the Dolores basin as well (Rogers 2010), with every other remaining major basin represented by its own distinct lineage. Since the subspecies were described using phenotypic characters (Cope 1871), and recent court cases have affirmed that visual characteristics should be central to the description of taxa (Kaeding 2003), the Recovery Team launched an additional research project with the Larval Fish Lab at Colorado State University to explore if distinct phenotypes can be predicted from these underlying genetic fingerprints.

While the taxonomy of these fish continues to be resolved, the U.S. Fish and Wildlife Service is urging federal agencies to treat Lineage GB cutthroat trout as if they are greenback cutthroat trout. If an action may affect a Lineage GB population, then initiation of Section 7 consultation is appropriate (USFWS 2009). The Service also believes that implementation of the CRCT Conservation Strategies (CRCT Coordination Team 2006) in place to conserve and protect Colorado River cutthroat trout populations will also adequately protect any that happen to display the Lineage GB genetic fingerprint. Agencies should therefore include these activities in their Biological Assessments as conservation measures for Lineage GB populations (USFWS 2009).

Species Description

Like other cutthroat trout, Greenback cutthroat trout are a small salmonid (trout and salmon) fish. Greenbacks are native to the headwaters of the South Platte River drainage. It is one of three subspecies of cutthroat that are currently recognized in Colorado. Adult greenbacks are greenish brown to olive colored on the back with silvery to yellow sides and a white belly (red during spawning). They have a crimson slash under the lower jaw and low numbers of large spots concentrated toward the caudal fin (USFWS 1998).

Life History

Greenbacks, like all cutthroat subspecies, inhabit clear, well oxygenated, cold-water streams and lakes with adequate spawning habitat present in the spring of the year. Spawning generally occurs when water temperatures reach 5ºC-8ºC. Greenbacks feed on a wide variety of organisms but their primary source of food is aquatic and terrestrial insects. Size and growth of greenbacks varies, based on elevation and population size. However, greenbacks typically do not reach a large size, with a maximum weight of 1 to 2 pounds (USFWS 1998).

Population Distribution

Greenback distribution and numbers of fish declined rapidly beginning in the 1800s. By 1973, when the ESA was passed into law, greenbacks were believed to only exist in two small headwater streams (Como Creek and South Fork, Cache La Poudre River). The subspecies was listed under the ESA as endangered in 1973 and downlisted to threatened in 1978 (USFWS 1998). Based on recent genetic testing and stocking research, current distribution is believed to be one stream (Bear Creek) in the Arkansas River drainage near Colorado Springs, Colorado (Metcalf et al. 2012). Cooperative efforts between the CPW, USFS, BLM, USFWS and Rocky Mountain National Park have led to a large recovery effort for the greenback cutthroat trout. As of November 2012, 60 populations of Lineage GB cutthroat trout have been identified in western Colorado (Rogers 2012b).

Environmental Baseline

Within the Planning Area, three streams are currently identified as being Lineage GB: Antelope Creek (on State, private, and National Forest System lands, immediately upstream and adjacent to BLM-managed public lands), Spruce Creek (primarily on BLM-managed public lands and private lands), and Trail Creek (on National Forest System and private lands containing federal minerals managed by the BLM). This is considered outside of their "native range;" however, based upon the best available science, these lineageGB populations are considered Greenback cutthroat for the purposes of ESA compliance.

Antelope Creek is a small perennial stream that originates on USFS lands, flows across state land, and then across intermingled public and private lands. The stream segments where the lineage GB population is recorded is about 3 miles upstream of BLM-managed public lands. The entire 11.5 mile distance has an instream flow decreed for 1.5 cfs, but the stream is heavily appropriated for irrigation. Just upstream from the public lands, a irrigation ditch generally diverts the entire stream's flow during the late spring and summer months. During these months, the upstream stream habitat is disconnected from public lands. This upper segment has few pools and a fairly high width to depth ratio, resulting in a very shallow stream. Lower public segments receive some irrigation return flow and ditch seepage. The lower segment's summer flows are below the recommended instream flow, but the stream is narrow, well shaded, and stream temperatures remain cool. Water quality and stream temperature monitoring on the lower segments indicate the stream is meeting the state's Water Quality Standards and is fully supporting the designated uses. The public lands are within an allotment management plan that continues to improve the overall allotment and stream conditions, which are considered to be meeting the Land Health Standards.

Spruce Creek is a higher elevation stream that originates on public lands in a large meadow area that contained several beaver ponds. The beaver ponds were blown out in 2007, and although there is some ponded water, currently the ponds' capacity is much less. The stream then enters a more confined drainage with a spruce/fir overstory, before widening again on private lands. The entire stream segment (18.5 miles) is protected by a 0.5 cfs instream flow and there are no diversions on the public segment of stream (1.5+ miles) or on the mainstem private segment for most of its length. The stream habitat is fairly good, with a vigorous riparian community, but pool habitat and low flows limit the overall production. The stream has had limited water quality sampling, but is considered to be fully supporting its designated uses (secondary contact recreation, water supply, agriculture), but that there is insufficient information for aquatic life, coldwater 1. Spruce Creek was sampled for fish in 2005 and 2006. Cutthroat trout was the only species present and they appeared to be in good health. A variety of age classes were present with an average length of 15cm. The public portion of Spruce Creek is meeting the Colorado Land Health Standards and management will be adapted to insure that the area continues to meet the standards over time.

Once Trail Creek leaves USFS lands, the gradient decreases and the terrain is less confined, allowing for irrigation. There appear to be at least five ditches diverting water from the stream, with the senior right being located in section 25. This right is only for 2.0 cfs, and in 2012, a call was placed on the stream June 6 to allow the right to be fully exercised. A ditch located downstream in section 35 has a right for 5.7 cfs, with an additional, more junior right of 4.0 cfs. The junior right is limited to diverting from April 1st to June 15th. The two ditches combined average 12 cfs in diversions, with a maximum diversion of 20 cfs, a minimum of 1 cfs. Although the total decreed water rights on the stream total more than 25 cfs, it appears that the average diverted is about 24 cfs. There is no instream flow right on the stream. There is no known sampling data from Trail Creek. It is classified for primary contact recreation, water supply, agriculture, and aquatic life, coldwater, class 1. There are no known impairments or water quality concerns, and the stream has not been identified as failing to support all of its designated uses.

Threats

The primary threat to greenback cutthroat trout is the presence and stocking of non-native salmonids for sport fishing, resulting in predation and competitive exclusion, as well as potential for hybridization with other Oncorhynchus species or subspecies. Other threats include climate change, improper livestock grazing, water diversions, disease, and toxicity. Specific to the planning area, additional threats to Lineage GB cutthroat include oil and gas development and potential for large wildfires.

Management Status and Recovery and Conservation Planning

Recovery Plan completed March 1, 1998. Critical habitat has not been designated for this species.

EFFECTS ANALYSIS AND DETERMINATIONS

This BA analyzes the impacts of a proposed, discretionary federal action. A federal action is defined as anything authorized, funded, or carried out by a federal agency. Direct impacts are those effects on the species or its habitat that are caused by an action and that occur at the same time and place as the action. Indirect impacts are those effects on the species or its habitat caused by an action, occurring later in time or further removed in distance than direct impacts, but that are still reasonably foreseeable. The analysis of all impacts includes the effects of interrelated and interdependent actions.

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 BA. 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 ESA.

Cumulative impacts, as stated in NEPA guidance, are defined 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 nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Assessments of proposed actions on public lands require an analysis of past and present impacts on T&E species and associated habitats for compliance with the ESA.

The exact cumulative effect on T&E species is not known because of the lack of specific information on future state, local, or private actions in the planning area. Because most impacts to Special Status Species are human related (e.g., recreational use), or the result of human activities (e.g., livestock grazing, mineral development, housing development), and the human pressures in the planning area may be expected to change over the foreseeable future, the scope and scale of the impacts are not known.

The cumulative effects of actions under these BLM programs and their activities may have local impacts to T&E populations. If impacts occur, a determination of "may affect" will be given when the cumulative effect is obligatory. In addition, analysis completed at the site-specific project level includes determinations of insignificant, discountable, beneficial, and adverse effects for each T&E species that may occur or have the potential to occur, or have habitat present within the project area. A determination of "may affect" would result in a request for a special consultation with the USFWS to ensure that appropriate mitigation is conducted to prevent taking of the species.

The potential for RMP activities to occur would depend on the availability of habitats, presence of the species affected and proposed project parameters. The threshold of the RMP activities would be determined on a case-by-case basis, based on the project's parameters. The determination of "likely to adversely affect" is based on the best scientific judgment available at the time of the decision that implementation of some of the RMP activities could result in adverse effects to the species or their critical habitat.

Mitigation for T&E species would include no loss of critical habitats or their function. "Habitat function" means the arrangement of habitat features and the capability of those features to sustain species, populations and diversity of wildlife over time (a quantitative measure of habitat). Sites warranting this level of protection cannot be replaced or mitigated. Other extremely significant sites or habitats may also be designated as irreplaceable. Recommendations to include additional sites within this category would be evaluated on a case-by-case basis and must be approved by the USFWS.

Where noncritical, but crucial, habitats are present and restoration or replacement may not be possible, mitigation must be within the same location, have the same essential features and support the same species. Habitat in this category directly limits a community, population, or subpopulation and restoration or replacement may not be possible. Some modification of habitat characteristics may occur, provided habitat function is maintained (i.e., the location, essential features and species supported are unchanged). These modifications would be evaluated as part of the consultation with the USFWS.

Factors considered when analyzing impacts include proximity of the action to the species or habitat of concern, geographic distribution of the action disturbance, timing of the action, nature of the action effect, action disturbance frequency, duration of the affecting action, action disturbance intensity, and action disturbance severity.

The BA process is focused primarily on adverse impacts to the species of concern. Even though impacts may have beneficial and detrimental effects on the subject species in the long or short term, the effects determination of the assessment will be based on and controlled by the likelihood of adversely affecting the species. In other words, for a BA, the impacts analysis is *not* an averaging process.

Manpower and budgetary restrictions, and changes in biological and technological information may affect the extent to which the KFO may engage in the following program activities. Therefore, the likelihood of these potentially authorized activities occurring is largely undeterminable at this scale, over the life of the plan. Site-specific analysis and determinations would be conducted on a case-by-case basis throughout the life of the plan.

Effects Determinations

Threatened and Endangered Species

- **No effect (NE)**—the appropriate conclusion when BLM determines its proposed action would not affect listed species. The principal factor in this determination is that the species and "suitable habitat" for the species does not exist in the analysis area. In this situation, no further contact with the USFWS is required.
- **May affect, is not likely to adversely affect (NLAA-b, -i, -d)**—the appropriate conclusion when effects on listed species are expected to be discountable (-d), or insignificant (-i), or completely beneficial (-b). This type of effect requires informal Section 7 consultation with the USFWS and concurrence with the determination.
- **May affect, is likely to adversely affect (LAA)—**the appropriate conclusion if any adverse effect to the listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species, but also is

likely to cause some adverse effects, the proper effect determination for the proposed action is "likely to adversely affect" the listed species. A "likely to adversely affect" determination requires formal Section 7 consultation with the USFWS.

Proposed Species (includes Nonessential Experimental Populations)

- **Is not likely to jeopardize proposed species (NJ)**—the appropriate conclusion when the action agency identifies situations in which the proposed action is not likely to jeopardize the continued existence of the proposed species. If this determination is reached, an informal conference with the USFWS would be conducted on a case-by-case basis.
- **Is likely to jeopardize proposed species (LJ)**—the appropriate conclusion when the action agency identifies situations in which the proposed action is likely to jeopardize the continued existence of the proposed species. If this determination is reached, a formal conference with the USFWS is required.

Coordination/Conservation Measures

As part of the affected environment for the KFO RMP/EIS, Section 7(a)(1) of the ESA requires the federal agency (i.e., BLM) to use all of its authorities in furthering the purposes of the Act by implementing programs for the conservation of listed T&E species. Those conservation programs that are adopted need to be incorporated into the approved RMP. These actions would be implemented at a large-scale and/or at a project-specific level.

Conservation recommendations serve the following purpose: (1) they can present ways BLM can assist species conservation in furtherance of statutory responsibilities; (2) they can minimize or avoid the adverse impacts of a proposed action on a Special Status Species; and (3) they can identify and recommend studies aimed at improving the understanding of a species' biology or ecology.

Listed T&E and Special Status Species management can be addressed in four primary ways:

(1) Through Conservation Actions identified as part of a species listing package; as Reasonable and Prudent measures recommended in the Biological Opinion (BO) from the USFWS in response to a BA; and through species protection measures determined through collaborative interagency and multidiscipline efforts.

(2) The *Standards for Public Land Health and Guidelines for Livestock Grazing Management for Public Lands* Administered by the BLM in the State of Colorado. As stated, the "Standards describe conditions needed to sustain public land health, and relate to all uses of the public lands," whereas the Guidelines "are the management tools, methods, strategies, and techniques (e.g., best management practices) designed to maintain or achieve healthy public lands as defined by the standards." The development and application of these standards and guidelines are intended to achieve the following five fundamentals of public land health:

(1) upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form and geologic processes;

(2) riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods;

(3) healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and

habitat's potential;
(4) special status, T&E species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities; and
(5) the water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado.

These fundamental goals are achieved through inventory of the natural resources; appropriate management actions aimed at these resources; monitoring and evaluation of the effectiveness of these management actions; and land management adjustments, as necessary.

(3) *Special Status Species Management, BLM Manual 6840* directs field office managers to implement Special Status Species programs within their area of jurisdiction by:
(1) conducting and maintaining current inventories for Special Status Species on public lands;
(2) providing for the conservation of Special Status Species in preparing and implementing recovery plans with which BLM has concurred, interagency plans, and conservation agreements;
3) ensuring that all actions comply with the ESA, its implementing regulations, and other directives associated with conserving Special Status Species;
(4) coordinating field office activities with federal, state, and local groups to ensure the most effective program for Special Status Species conservation;
(5) ensuring actions are evaluated to determine whether Special Status Species objectives are being met;
(6) ensuring all actions authorized, funded, or carried out by BLM follow the interagency consultation procedures as outlined in 50 CFR, Part 402; and
(7) ensuring results of formal Section 7 consultations, including T&E in incidental take statements, are implemented.

(4) BLM is required to implement measures that would be used to avoid, minimize, or mitigate potential impacts to T&E and Special Status Species associated with implementation of the proposed RMP/FEIS. Additional environmental protection measures specifically designed for other resources, such as soils, vegetation, wetlands, and visual resources, also avoid, minimize, or mitigate potential impacts to T&E and Special Status Species. The KFO biologist will identify site-specific minimization/mitigation measures at the project level (e.g., during application for permit to drill [APD] and ROW application review processes) to protect T&E and Special Status Species. To ensure compliance with minimization/mitigation measures presented in this BA and in project applications, BLM and/or a project proponent, in coordination with BLM, will assess potential impacts to T&E species during construction and/or implementation of those projects. These impacts will be assessed on a case-by-case basis during field development. Project-wide minimization/mitigation measures may be waived on a case-by-case basis by BLM if a thorough analysis determines that the resource(s) for which the measure was developed will not be impacted.

All the proposed applicant-committed mitigation/environmental protection measures identified in this BA will be implemented on all federal lands managed under the Proposed RMP. Implementation of these measures on state and private lands, where split estate exists and a

federal nexus occurs, will also be required to comply with this BA. Development activities on all lands will be conducted in accordance with all appropriate federal, state, and county laws, rules, and regulations.

These protective measures will be implemented for individual BAs within the Kremmling Field Office. Protective measures identified for individual species in the BAs will likely be the most appropriate measures for species conservation. For statewide programmatic BAs/BOs, a final decision that includes the approval of the State Director, Colorado's BLM, and concurrence by the USFWS is required before implementation in this planning area.

EFFECTS DETERMINATIONS BY SPECIES

North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue

All three of these endangered plant species are endemic to the RMPPA and occur on barren or sparsely vegetated hillsides. North Park Phacelia is found in Jackson and possibly Larimer counties, Colorado. Both Kremmling milkvetch and Penland beardtongue are endemic to Grand County, Colorado.

Conservation Planning

For any population of North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue, separate Section 7 consultation would be completed at the project level. Conservation measures would be developed during the consultation process to protect this species and its habitat. Examples of conservation measures can be found in the Summary of Species-Specific Coordination and Conservation Measures Section (page 109) of this BA. This list is not comprehensive and new conservation measures may be developed during consultation. In addition, an NSO of 200m from the edge of occupied habitat and an NSO on ACECs would help protect habitat for these species. Surveys not associated with specific projects would be conducted in suitable habitat as funding and time allows.

Effects Determination for BLM-Administered Programs

Air Quality

The air quality program *may affect but is not likely to adversely affect (NLAA-d)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue for all activities. This determination was reached because the air quality program will follow regulations designed to support continued air quality, resulting in little or no changes to occupied plant habitat.

Soil Resources

The soil program *may affect but is not likely to adversely affect (NLAA-d)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. The goals and desired outcomes for the soil resources program will protect sensitive soil areas. All actions for soil resources would protect and enhance any occupied and suitable plant habitat and prevent any future sensitive soil loss or erosion issues. To prevent impacts to these species, surveys would be required before implementing soil reclamation projects in suitable habitat.

Water Resources

The watershed and water quality program *may affect, is not likely to adversely affect (NLAA-d)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Primary goals of this program include maintaining or improving surface water quality and quantity, integrity of streams and associated riparian values on public lands. All actions for water resources would protect and enhance any occupied and suitable plant habitat. To prevent impacts to North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue, surveys would be required before implementing any water projects in suitable habitat.

Vegetation
Vegetation management goals and objectives *may affect, are not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. The overall goal of providing an array of habitats that support biodiversity and viable populations of native plant and animal species would likely benefit potential plant habitat. Surveys would be required before any vegetation treatment was conducted in suitable habitat. Occupied habitat would be avoided if any plants were found in the treatment area.

Fish and Wildlife Habitat
The fish and wildlife habitat program *may affect, is not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Fish and wildlife projects would be designed to enhance habitats to support wildlife and fish and would not adversely affect plant species.

Special Status Species
The special status species program *may affect, is not likely to adversely affect* (NLAA-b) the North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Protecting occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species and improving their habitats to a point where their special status recognition is no longer warranted would benefit the North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Management actions would have long term, positive impacts on these species and their habitats.

Cultural and Heritage and Paleontological Resources
The cultural, heritage and paleontological resources programs *may affect, but are not likely to adversely affect (NLAA-d)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Conducting cultural resources surveys within areas occupied by listed plant species could affect individual plants and, to some degree, habitat. To avoid such impacts, ground disturbing cultural resources surveys will not be conducted within occupied plant habitat unless it is a requirement under NHPA, which would be necessary if other significant ground disturbing activities are proposed within the area. If NHPA requirements must be met, a Section 7 consultation will be conducted prior to any ground disturbing activities taking place. Discovery of cultural sites could benefit plant species because such sites and associated habitat would be protected from disturbance.

Visual Resources
The visual resource program may affect, is not likely to adversely affect (NLAA-i) North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. The primary goal of this program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. Projects would be designed to maintain visual quality and integrity in accordance with VRM classes and would not adversely affect plant species.

Wildland Fire
The wildland fire program *may affect, is not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Actions from this program would have an insignificant effect on this species. BLM will implement fire management practices and protection (plant locations will be made known to resource advisors of wildfires) to enhance the conservation of federally listed plant species (e.g., fire refueling or fire camps would not be

established in listed plant habitat, fire retardant would not be used in occupied habitat, to the extent this will not jeopardize firefighters or public safety). Fire retardant would not be used in occupied habitat. Section 7 emergency consultation will be conducted for wildfires when needed. There is no occupied or suitable plant habitat located in primary focus areas for fuels management. Therefore it is very unlikely that prescribed fire and/fuels activities would occur in occupied or suitable habitat of North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue.

Special Management Areas

The special management areas program *may affect, is not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Special management designations (e.g. ACECs) would further protect populations from surface disturbing activities and related impacts, which would benefit occupied and potential habitat areas.

Cave Resources and Abandoned Mines

The management of cave resources and abandoned mines would have *no effect (NE)* on North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. These species do not occur in the vicinity of any known caves or abandoned mines. If these features were identified, the goal would be to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values, which could benefit occupied and potential habitat areas.

Forestry

The forestry program would have *no effect (NE)* on North Park Phacelia and Kremmling Milkvetch. The forestry program may affect, is likely to adversely affect (LAA) Penland Beardtongue. This species may be directly and indirectly affected by actions occurring from the forestry program due to one access road (BLM 2757) that travels though the Penland Beardtongue population. Direct impacts may occur if a vehicle pulls off the road within the population or needs to move over to allow another vehicle to pass. If vehicles moved off the road in the vicinity of the plant population, some plants may be crushed or damaged. Indirect effects could result if sufficient dust is generated whereby leaves of Penland beardtongue were coated to the extent that air exchange and photosynthesis are reduced and plant vitality is thereby reduced. A detailed analysis of impacts can be found in the Black Mountain Biological Assessment (2011). As a result of this BA, conservation measures were developed to reduce speeds and prevent vehicles from pulling over in occupied habitat. If future forestry actions were to occur along this access route, Section 7 consultation would be initiated at the project level.

Livestock Grazing

Livestock grazing management may affect, is not likely to adversely affect (NLAA-i) North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. The livestock grazing program manages resources to prevent the over use of rangelands and to meet the Standards for Public Land Health. The primary threats to listed plant species resulting from the implementation of the livestock grazing program are surface-disturbing actions, such as the construction of fences, water pipelines, cattle guards, wells, livestock ponds, and actual grazing activities. The construction of fences or livestock ponds and the placement of salt and mineral supplements, have the potential to impact listed plant species by concentrating cattle in occupied habitat, thereby resulting in reduced habitat quality. Non-structural grazing projects could include seeding, mowing, mechanical removal of brush, and herbicide spraying. Mowing and herbicide

use could result in the direct mortality of populations and viable habitat. The alteration of habitat could result in adverse impacts to listed plant species habitat and habitat for the pollinators of listed plant species. These threats would be avoided and/or minimized through the use of inventories, clearances, and mitigation measures (e.g locating water sources and salt licks away from occupied and suitable habitat). A Section 7 consultation will be conducted for any permit renewals in allotments containing occupied habitat for these species.

Adjusting livestock season of use could benefit listed plant species. Many plant species appear to be especially susceptible to livestock grazing-related impacts during the spring, when the plants are sprouting, flowering, and fruiting. BLM permits authorizing livestock grazing contain terms and conditions that specify livestock numbers, and season-of-use, in order to ensure that an area is properly grazed. The ability to adjust livestock numbers due to unforeseen conditions (such as drought) also benefits listed plant species.

Recreation

Recreation activities *may affect, are not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Recreation resource management actions could result in direct and indirect habitat loss in areas where recreational facilities are developed and in areas of concentrated human activity. Dispersed recreation (hiking, hunting, fishing, cross-country skiing, mountain biking, and camping) is permitted on most BLM-managed lands in Colorado and generally has limited or negligible effects on vegetation condition or habitat values. Effects are greater in recreational areas located in riparian corridors, water bodies and where overnight human occupancy is permitted. In general, recreation resource management actions involve localized habitat alteration of limited extent and any activities that could occur within occupied and potential habitat for SSS plant species would not be permitted until a survey and potentially a Section 7 consultation is conducted. Occupied habitat would be evaluated to ensure that casual use is not impacting individual plants or habitat.

Trails and Travel Management and Transportation Facilities

The transportation and access and travel management program *may affect are likely to adversely affect (LAA)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. OHV use, route maintenance, and building new routes could potentially affect occupied and potential habitat for these species. Impacts resulting from OHV use on listed plant species could involve habitat disturbance and increased access for illegal collectors. OHV use within or near occupied habitats could lead to direct mortality of individuals (through the crushing of plants) and indirect mortality (through increases in erosion, dust, compaction, and sedimentation). The increasing use of OHVs on BLM-managed public lands could also transport noxious and invasive weed seeds from infested areas to un-infested areas. Surface disturbance (such as crushing of vegetation, soil disturbance) associated with OHV use could increase susceptibility to weed establishment within occupied habitat, and could modify localized soil conditions until they are unsuitable for establishment by listed species. These impacts could decrease listed plant vigor and productivity, and alter community plant composition. The Final Plan also allows motorists to pull off designated routes as much as 300 feet on either side of the centerline (for camping). This could result in adverse impacts to listed plant species, and to their habitat. However, areas occupied by listed plants are generally unattractive for camping and annual monitoring has not indicated that this is an issue. If future monitoring indicated a problem with this action, measures could be taken to mitigate or eliminate impacts (e.g. signing areas or designating as “no camping”).

In the Final Approved Plan, all habitats occupied by listed species will be classified as limited to designated roads and trails. This would reduce and/or eliminate user-created routes, and would reduce identified impacts within and adjacent to occupied habitats. The protective COAs under the Final Plan would directly, and indirectly, protect listed plants from new road- and trail-related impacts. Site-specific relocation restrictions for surface disturbing activities would help protect listed plant species. The intensity and scope of impacts would be substantially reduced under the Final Plan because no cross country travel would be allowed. The Final Plan also calls for decommissioning approximately six miles of routes in occupied habitat (Table 8). These actions would decrease erosion potential, and would reduce the risk, magnitude, and intensity of identified impacts.

Table 8. Vehicle Classifications in Occupied Habitat for North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue

Classification	Miles
Full Size Vehicle (current use)	3.1
County Road (current use)	0.5
ATV	0.25*
Decommission/Closed	6.2
Administrative (no public use)	1.4

*Note: These routes are located in historic A. osterhoutii habitat. The plants were last observed in 1993 and 1982, and were likely mis-identified.

Lands and Realty

The lands and realty program *may affect, is not likely to adversely affect (NLAA-i)* North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. New ROWs would avoid occupied habitat for listed plants to the extent possible, however development may still be allowed. In addition, existing ROWs, including ongoing maintenance and operations, would continue under the Final Plan. Surveys would be conducted in suitable habitat before any surface disturbing activities are conducted for newly proposed and existing ROWs. If listed species are found, all disruptive activities would be delayed until specific protective measures are developed and Section 7 consultation is completed. Bureau administered public lands that contain identified habitat for these species will not be exchanged unless it benefits the species.

Energy and Minerals

The energy and minerals program may affect, is not likely to adversely affect (NLAA-i) North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue. Surface disturbing activities in suitable habitat would be preceded by a current year survey. If any species are found, BLM would require the lessee to avoid activities that would adversely affect these species and Section 7 consultation would be completed. Stipulations, BMPs, conditions of approval, and conducting surveys before ground disturbance, would continue to avoid and/or minimize impacts and protect habitat for these species. An NSO of 200m from the edge of occupied habitat and an NSO on ACECs would help protect habitat for these species.

Determinations Summary

Under the KFO RMP, the following impacts have been determined for North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue.

Air Quality—NLAA-d
Soil Resources—NLAA-d
Water Resources—NLAA-d
Vegetation—NLAA-i
Fish and Wildlife Habitat—NLAA-i
Special Status Species— NLAA-b
Cultural, Heritage and Paleontological Resources— NLAA-d
Visual Resources— NLAA-i
Wildland Fire— NLAA-i
Special Management Areas—NLAA-i
Cave Resources and Abandoned Mines— NE
Forestry—LAA for Penland Beardtongue and NE for North Park Phacelia, Kremmling Milkvetch
Livestock Grazing—NLAA-i
Recreation—NLAA-i
Trails and Travel Management and Transportation facilities—LAA
Lands and Realty—NLAA-d
Energy and Minerals—NLAA-i

Canada Lynx

Lynx have historically occurred in the RMPPA, but are now primarily restricted to higher elevations in the central portion of Colorado. Lynx reintroductions have occurred in the San Juan Mountains in southwestern Colorado and these lynx, or perhaps others, have been known to move through the RMPPA as they disperse. Therefore, lynx will be treated as occurring within the Kremmling RMPPA in areas of suitable habitat. Suitable habitat consists primarily of BLM parcels adjacent to U.S. National forest, within LAUs. There are four linkage areas within the RMPPA.

Conservation Planning

BLM will assess the potential impacts of actions proposed for implementation within lynx habitat at the project level. Any such actions within lynx habitat will implement the LCAS conservation measures and other necessary measures to avoid or minimize effects to ensure the level of effects are insignificant, discountable and/or beneficial. Although BLM is not a signatory to the Southern Rockies Lynx Amendment, new information and guidelines from this document would be utilized to minimize effects to lynx and their habitat. To protect lynx, a Controlled Surface Use restriction would be placed on Established Lynx Linkage Corridors and Lynx Habitat within LAUs. Section 7 consultation would be completed at the project level for any action that 'may affect' Canada lynx or their habitat.

There are no COAs or BMPs designed specifically for lynx, however, the guidelines/conservation measures listed in the Summary of Species-Specific Coordination and Conservation Measures Section (page 110) are most pertinent to lynx habitat on BLM managed lands within the KFO. This list is not comprehensive and additional conservation measures or other modified version may be applied for any given BLM authorized activity up on further analysis, review and/or Section 7 consultation with USFWS.

Effects Determination for BLM-Administered Programs

Air Quality
The air quality program *may affect but is not likely to adversely affect (NLAA-d)* the Canada lynx, based on BLM's air quality compliance efforts and the limited duration of diminished air quality that may arise from any of the proposed activities within or near lynx habitat; air quality issues are not likely to impact the lynx.

Soil Resources
The soil program *may affect, is not likely to adversely affect (NLAA-d)* the Canada lynx. The goal of the soil program, to maintain or restore soil conditions, is not expected to negatively affect the lynx. Any rehabilitation or mitigation of soil resources may initially disrupt lynx habitat use, but long term affects would enhance lynx habitat structure and ecosystem health.

Water Resources
The extent of water resource management activities is limited; therefore, they *may affect, are not likely to adversely affect (NLAA-d)* the Canada lynx. Water resource management actions that focus on restoration or maintenance of stable ecological conditions within watersheds and in riparian and stream environments can result in a wide range of habitat enhancements, including improved water quality, enhanced forage and cover, and reduction in the extent and intensity of land disturbance resulting from other resource management actions. Construction of water resource management actions may result in short-term, localized habitat disturbance primarily along streams, and longer term habitat enhancement as a result of improved water quality and stabilization of stream bank, channel and associated riparian habitats; all of which would provide long term beneficial results for lynx, their habitat and their prey.

Vegetation
The vegetation management program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Planning actions to promote DPCs would emphasize wildlife habitat and maintain or enhance habitat for special status species. DPCs to support the life history of lynx would provide appropriate cover for lynx and their prey. Preventing the spread of noxious weeds and eradicating invasive species may initially disrupt lynx if treatment activities occur within lynx habitat; but the result of the activities will benefit lynx by providing native vegetation and returning to a more natural ecosystem. All land actions will be conducted using best management practices with the least amount of impact to the surrounding area.

Fish and Wildlife Habitat
The fish and wildlife habitat program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Upland, riparian and wetland habitats are managed for optimum wildlife population levels, and for the protection of T&E species in coordination with the CPW and the USFWS. Wildlife habitat management actions generally result in habitat modifications to restore successional trends or stable ecological conditions to benefit target species. Actions to protect high value wildlife habitats and to enhance habitat would provide long-term positive affects to the lynx. The protection of stream, wetland and riparian habitats results in maintenance of cover and forage values for lynx and their prey. Habitat protection in riparian corridors also preserves vegetative cover, which may facilitate the passage of lynx across open landscapes between forested areas.

Special Status Species

The special status species program may affect, is not likely to adversely affect (NLAA-b) the Canada lynx. Protecting occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species and improving their habitats to a point where their special status recognition is no longer warranted would benefit the Canada lynx. Management actions would have long term, positive impacts on this species and its habitat.

Cultural, Heritage and Paleontological Resources

Any activity permitted under the cultural, heritage and paleontological resource programs *may affect, is not likely to adversely affect (NLAA-d)* the Canada lynx. Cultural resource protection actions are not presently occurring within lynx habitat on BLM lands. Any such future actions are likely to be limited in extent and are not likely to affect lynx habitat suitability or movements.

Areas determined to contain fossils of significant scientific value are protected through physical protection measures and designation of Research Natural Areas, which limit surface disturbance and habitat alteration. Such actions are not currently occurring on BLM lands where lynx habitat exists; any future actions of this kind are likely to be limited in extent and are not likely to affect lynx habitat suitability or movements.

Visual Resources

The visual resource program may affect, is not likely to adversely affect (NLAA-i) the Canada lynx. The primary goal of this program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. Projects would be designed to maintain visual quality and integrity in accordance with VRM classes and would not adversely lynx.

Wildland Fire

The fire program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. The goal of the wildlife fire program is to create an integrated approach to fire and resource management to meet land health standards, recognize the role of wildland fire as an essential ecological process, and allow fire to play a natural role in the ecosystem when, resource objectives, or both, can be met. This goal is consistent with the direction in the LCAS to restore fire as a natural ecological process in lynx habitat. The proposed action adheres to programmatic and project planning standards recommended in the LCAS. The proposed action is not expected to have adverse, individual or population level impacts, nor would it jeopardize the recovery of the species.

Direct mortality of lynx from wildland or prescribed fire is not likely because lynx are highly mobile and individuals are expected to leave wildland fire and planned event project areas. Adverse effects to lynx and their habitat resulting from planned and unplanned events are expected to be negligible and of a short-term duration. Lynx may avoid planned treatment areas during project activities but this avoidance would not result in a long-term reduction in habitat effectiveness or population viability. Changes in vegetative structure resulting from fire are unlikely to adversely alter habitat effectiveness in the long-term because they would be within the historic range of fire impacts on lynx habitat.

Wildfire may result in short term decreases in habitat suitability for lynx and their prey due to reduced cover and forage values in areas where intensive burns of mid-successional and younger-aged stands occur. Wildfire may remove mature forest cover and dead and down

materials that are essential elements of denning habitat for lynx. Longer term benefits of fire may include increases in the extent of early successional forest stands on burned areas and on sites where fire creates smaller openings in the forest canopy, resulting in increased availability of forage for lynx prey. Direct impacts to the species as a result of prescribed and wild fire can include degradation or loss of habitat as a result of burning or removal of vegetation. Construction and use of roads and fire lines may cause additional disturbance and fragmentation of habitat.

Prescribed fire, particularly associated with salvage logging, in MPB infested areas is likely to occur over the life of the plan. Many of the LAUs within the Decision Area are currently in an unsuitable condition (>30% SISS). However, most of the prescribed fire projects within the KFO Decision Area are small scale and do not result in additional lynx habitat in an unsuitable condition. Prescribed fire projects within lynx LAUs are designed to remove dead and dying trees and avoid impacts to snowshoe hare habitat.

Since the initiation of the counterpart regulations for National Fire Plan projects in 2003 (68 FR 68264), the KFO has completed four salvage projects within lynx habitat and only one included prescribed fire. All four projects met the conditions under the Alternative Consultation Agreement (ACA) and resulted in NLAA determinations. In 2010, the use of the Interagency Southern Rockies Lynx Project Decision Screens were approved and the ACA terminated in 2011. Since 2010, the KFO has completed zero prescribed fire projects within lynx habitat. Therefore, it is reasonable to assume that most future projects, if any, in lynx habitat within the KFO will continue to result in a NLAA determination. Any prescribed fire projects that may affect lynx habitat would be consulted on at the project level.

The following conservation measures would be used to ensure effects from wildfire suppression and fuels management: 1) Prescribed fire activities would not create permanent travel routes that facilitate snow compaction. Construction of permanent firebreaks on ridges or saddles would be avoided; 2) Conduct prescribed fire activities to restore ecological processes and maintain or improve lynx habitat; 3) Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx; 4) Projects (habitat improvements, fuels reductions, harvests) would be designed to retain and improve recruitment of an understory of small diameter conifers and shrubs preferred by hares; 5) In aspen stands, the BLM would ensure habitat improvement projects or harvests favor regeneration of aspen.

Special Management Areas

The management of special management areas *may affect, is not likely to adversely affect (NLAA-d)* the Canada lynx. Section 202(c)(3) of FLPMA mandates giving priority to the designation and protection of ACECs and other special management areas. Management and conservation efforts to protect the ecological integrity of special management areas could provide protection to lynx; particularly in WSAs.

Cave Resources and Abandoned Mines

The management of cave resources and abandoned mines would have no effect (NE) on the Canada lynx. Lynx do not occur in the vicinity of any known caves or abandoned mines. If

these features were identified, the goal would be to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values, which could benefit suitable lynx habitat areas.

Forestry

The forestry program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Treatments in forested areas will likely be a mix of commercial forest product sales and fuels-related treatments aimed at maintaining an overall viable stand and reducing the threat of large fires in the area. The annual allowable harvest is 2.3 million board feet (MBF) within the Planning Area. Harvest levels have averaged approximately 2.0 MBF per year, or 200 acres to 300 acres, treated per year in the last 5 years. Within lands identified for intensive forest management, approximately 33 percent overlaps with Lynx Analysis Units (LAUs) in the KFO. Potential adverse impacts to Canada lynx could include loss of habitat, increased human access to remote habitats due to new road construction, increased noise, and increased human activity. All of these activities could result in habitat loss or fragmentation, displacement of individuals, reduction in prey, or direct mortality of individuals. Human activities associated with forestry and woodland actions could increase noise and visual stimulations in habitats. These factors could result in lynx leaving the area.

Conservation measures would guide forestry treatments in lynx habitat to ensure suitable habitat for lynx and their prey species is maintained. These include: 1) Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx; 2) Projects would be designed to retain and improve recruitment of an understory of small diameter conifers and shrubs preferred by hares; and 3) In aspen stands, the BLM would ensure habitat improvement projects or harvests favor regeneration of aspen.

Salvage logging in MPB infested areas is likely to occur over the life of the plan. Many of the LAUs within the Decision Area are currently in an unsuitable condition (>30% SISS). However, most of the salvage projects within the KFO Decision Area are small scale and do not result in additional lynx habitat in an unsuitable condition. Salvage projects within lynx LAUs are designed to remove dead and dying trees and avoid impacts to snowshoe hare habitat.

Since the initiation of the counterpart regulations for National Fire Plan projects in 2003 (68 FR 68264), the KFO has completed four salvage projects within lynx habitat. All four projects met the conditions under the Alternative Consultation Agreement (ACA) and resulted in NLAA determinations. In 2010, the use of the Interagency Southern Rockies Lynx Project Decision Screens were approved and the ACA terminated in 2011. Since 2010, the KFO has completed one project within lynx habitat and utilized the screens to come to a NLAA determination. Therefore, it is reasonable to assume that most future projects in lynx habitat within the KFO will continue to result in a NLAA determination. Any forestry action that may affect lynx habitat would be consulted on at the project level.

Livestock Grazing

The livestock grazing program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Grazing management actions include periodic adjustments of livestock stocking rates and seasonal use, and range improvements (water developments, fencing and vegetation manipulation through prescribed burning, seeding and mechanical and chemical control) in

accordance with resource condition and *Standards and Guidelines*. Guidelines include: periodic rest or deferment from grazing during the critical [plant] growth periods, adequate [plant] recovery and regrowth periods and opportunity for seed dissemination and seedling establishment.

Snowshoe hare densities and overwinter survival appear to be positively correlated with understory density (Adams 1959, Wolff 1980, Litvaitis et al. 1985). Livestock may compete with snowshoe hares for forage resources (Ruediger et al. 2000). Browsing or grazing also could impact plant communities that connect patches of lynx habitat within a home range. Conversely, appropriate grazing management can rejuvenate and increase forage and browse in key habitats such as riparian areas. Managing grazing to meet Public Land Health Standards would adequately minimize the potential for adverse effects of grazing to lynx. In addition, several guidelines adopted from the SRLA BO would reduce potential impacts from grazing. These guidelines include: 1) manage livestock grazing to allow regeneration in fire- and harvest-created openings; 2) contribute to the long-term health and sustainability of aspen; 3) maintain or achieve a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes in riparian areas and willow cars; 4) contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes in shrub-steppe habitats.

Recreation

The recreation program *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Recreation resource management actions can result in direct and indirect habitat loss in areas where recreational facilities are developed and in areas of concentrated human activity. Dispersed recreation (hiking, hunting, fishing, cross-country skiing, mountain biking, and camping) is permitted on most BLM-managed lands in Colorado and generally has limited or negligible effects on vegetation condition or habitat values to lynx and lynx prey. Due to the low susceptibility of lynx to displacement by humans, dispersed recreation presents low risk of adverse effects, except possibly for disturbance near den sites. The likelihood that dispersed recreation on or off trails would occur in proximity to a den site, and/or that the dispersed recreation activities occurring would actually disturb a lynx den site or, in other ways, adversely affect lynx is so low as to be discountable (USFWS 2008).

Dispersed winter recreational uses and activities, such as snowmobiling, cross-country skiing, and snowshoeing are increasing within higher elevation environments. These activities are unlikely to have direct adverse effects on lynx, "but are more likely to impart indirect effects." (Ruediger et al. 2000). Most investigations indicate that lynx do not alter their behavior to avoid human activities (Staples 1995; Roe et al. 1999; Aubry et al. 2000; Mowat et al. 2000). However, understanding of the indirect effects is imprecise. Individuals of the species may react differently depending on numerous factors involving human interaction (USFWS 2008). Dispersed winter recreation on BLM lands within mapped habitat would have minimal impacts to lynx. Use of these areas in the winter is very low, as most winter recreation takes place on adjacent U.S. National Forests.

The potential for adverse effects of recreational resource management actions to lynx is perhaps greatest from developed recreational areas; however developed recreation is limited and does not intersect with lynx habitat. Effects are greater in recreational areas located in riparian corridors,

water bodies and where overnight human occupancy is permitted. In general, recreation resource management actions involve localized habitat alteration of limited extent and are not likely to affect lynx habitat suitability or movements.

Trails and Travel Management and Transportation Facilities

Activities associated with the transportation and access and travel management programs *may affect, but are not likely to adversely affect* (*NLAA-i*) the Canada lynx. Lynx are known to have been killed by vehicle-collisions in Colorado, Minnesota, Maine, New York and Idaho. High traffic volumes and speed may impede or create barriers to lynx movement, and may increase the likelihood of lynx mortality through vehicle collision. Unpublished data from the SRLA BO (USFWS 2008) suggests that even where traffic volume and speeds may be considered low, mortality of lynx on any road is possible. Preliminary information suggests that lynx do not avoid roads (Ruggiero et al. 2000), except at high traffic volumes (Apps 2000). Unlike paved highways, BLM roads rarely receive motorized use at levels that create barriers or impediments to lynx movements. In addition, lower speeds and low volumes of traffic on these roads would reduce risks to lynx. The risk of a vehicle related mortality of lynx on BLM lands would be low. Winter use of OHVs in lynx habitat may disturb individuals using this habitat. However, snowmobile use is of low intensity in mapped lynx habitat and has minimal effect on cover and forage resources for lynx prey. Human disturbances, loss of habitat and increase in road access commonly associated with OHV use is not likely to affect lynx or lynx habitat within the RMPPA because of topographic features, steep terrain and limited access. Although snow compaction may facilitate movement of lynx competitors into habitat where deep snow would normally preclude them, there is no evidence that snow compaction results in increased competition to the level that it has an adverse impact on lynx or lynx populations (USFWS 2008), especially in areas where there is minimal compaction. Extensive compacted conditions may result in the breakdown of the competitive advantage that lynx usually retain in deep snow environments; however this would only occur in areas where snow mobiles are used extensively, such as Rabbitt Ears Pass (Kurt Broderdorp, personal communication).

In the Final Approved Plan, lynx linkages and LAUs will be classified as limited to designated roads and trails. This would reduce and/or eliminate user-created routes, and would reduce identified impacts within lynx linkages and LAUs. The intensity and scope of impacts would be substantially reduced under the Final Plan because no cross-country travel would be allowed. Over-the-snow travel would be limited to a minimum depth of 12 inches. The Final Plan also calls for decommissioning approximately 80 miles of routes in linkages and LAUs (Table 9).

Table 9. Vehicle Classifications in Lynx Linkages and LAUs

Classification	Miles	
	Linkages	LAUs
Full Size Vehicle (current use)	116	54
County Road (current use)	0	5
ATV	1	0
Decommission/Closed	32	33
Administrative (no public use)	33	21
Mechanized	2	8
Foot/Horse	7	30

Lands and Realty

The lands and realty program *may affect, but is not likely to adversely affect (NLAA-i)* the Canada lynx. BLM may grant ROWs on public lands under its administration for development of facilities that benefit the public, including linear realty actions for utility or transportation corridors. ROW actions may result in short and long term habitat modification resulting from vegetation clearing and construction of access roads, pipelines and electrical transmission lines, which could result in temporary displacement of animals during maintenance and construction, but would not affect habitat over the long term. Adjustments in land ownership could result in the transfer of ownership of lands containing possible lynx habitat, however, this would only occur if it was a benefit to the species.

Energy and Minerals

The energy and minerals program within the Kremmling RMPPA *may affect, is not likely to adversely affect (NLAA-i)* the Canada lynx. Development of locatable and salable minerals can cause direct and indirect impacts to lynx and their habitats; however, a CSU restriction would be placed on Established Lynx Linkage Corridors and Lynx Habitat within LAUs. Oil, gas, coal, and other mineral leasing and development could occur in areas in and adjacent to lynx habitat within the RMPPA. Activities could lead to an increase in road density. In addition, light, noise and visual stimulation from energy and mineral projects could lead to disturbance of individuals utilizing suitable habitat. As a result of these activities, lynx could be displaced from suitable habitats. To date, no oil and gas activities have occurred in lynx linkages or LAUs with the KFO.

Table 10 shows that most of lynx linkages and LAUs are in low to moderate potential for oil and gas activities and none of the linkages or LAUs are located in high potential. In addition, 65% of the total federal mineral estate that the BLM manages in linkages and LAUs are covered by one or more NSO stipulations. Therefore it is reasonable to assume that very little of these areas would be impacted by the energy and minerals program.

Table 10. Percent of Federal Mineral Estate managed by the BLM in Lynx Linkages and LAUs that are High, Moderate, Low, and No Oil and Gas Potential.

Oil and Gas Potential	Percent	
	Linkages	LAUs
High	0	0
Moderate	16	5
Low	38	52
None	46	43

Determinations Summary

Under the KFO RMP, the following impacts have been determined for Canada lynx:

Air Quality—NLAA-d
Soil Resources—NLAA-d
Water Resources—NLAA-d
Vegetation—NLAA-i
Fish and Wildlife Habitat—NLAA-i

Special Status Species— NLAA-b
Cultural, Heritage and Paleontological Resources—NLAA-d
Visual Resources— NLAA-i
Wildland Fire—NLAA-i
Special Management Areas—NLAA-d
Cave Resources and Abandoned Mines—NE
Forestry—NLAA-i
Livestock Grazing—NLAA-i
Recreation—NLAA-i
Trails and Travel Management and Transportation facilities —NLAA-i
Lands and Reality—NLAA-i
Energy and Minerals—NLAA-i

Mexican Spotted Owl

Mexican Spotted Owls have not been documented in the RMPPA. Very limited potential for Mexican spotted owl habitat exists within the Kremmling RMA. Surveys would be conducted in any area determined to be suitable habitat for owls (within time and budget constraints). If owls are found to occupy habitat within the RMPPA, Protected Activity Centers (PAC) would be established. PACs would be managed using conservation measures found in the Summary of Species-Specific Coordination and Conservation Measures Section (page 111).

Conservation Planning

If any PACs are established within the RMPPA, a no surface occupancy would be applied to these areas. Other surface disturbing activities within protected or restricted habitats, such as prescribed fires and fuels reduction, may still occur. Permitted activities in suitable habitat that are not surface disturbing would avoid the Mexican spotted owl breeding season, which runs from March 1 through August 31. Casual use could still occur in these areas unless evaluations determine that seasonal closures are needed. Section 7 consultation would be completed at the project level for any action that 'may affect' Mexican spotted owl or suitable habitat.

Effects Determination for BLM-Administered Programs

Air Quality

The air quality program *may affect, is not likely to adversely affect (NLAA-d)* the Mexican spotted owl, based on BLM's air quality compliance efforts and the limited duration of diminished air quality that may arise from any of the proposed activities within or near Mexican spotted owl habitat; air quality issues are not likely to impact the Mexican spotted owl.

Soil Resources

The soil program *may affect, is not likely to adversely affect (NLAA-d)* the Mexican spotted owl for the following activities: reclaiming areas to achieve natural erosion rates to the extent practicable and applying mitigation to limit soil erosion and related undesirable conditions with special emphasis in highly erodible areas. These management actions would create greater habitat stability and functionality and any soil moving activities would be conducted with the Mexican spotted owl conservation measures enforced.

Water Resources

The extent of water resource management activities is limited; therefore, with measures in place, they *may affect, are not likely to adversely affect (NLAA-d)* Mexican spotted owl habitat suitability or habitat utilization. Construction of water resource management actions may result in short-term, localized habitat disturbance primarily along streams, and longer term habitat enhancement as a result of improved water quality and stabilization of stream bank, channel and associated riparian habitats. Implementation of any such actions within a PAC will avoid the breeding season and will follow established conservation measures to ensure actions have a discountable/negligible effect on owl roosting and foraging habitat and behavior. If a proposed water resource management action cannot be implemented under or satisfy these conditions, then a Section 7 consultation will be initiated.

Vegetation

The vegetation management program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Actions regarding DPCs would emphasize wildlife habitat and maintain or enhance habitat for special status species. DPC actions would encourage healthy vegetation throughout the RMPPA. Preventing the spread of noxious weeds and eradicating invasive species may initially cause owls to relocate during treatment activities, but the result of the activities would benefit prey species by providing native forage vegetation and support the overall health of the ecosystem. Vegetation management actions would not occur during nesting or winter roosting time periods and actions removing roosting habitats would be prohibited. Noise and human activity associated with these activities may displace owls temporarily; however, implementation of management actions and conservation measures outlined in the Kremmling RMP would reduce these effects to an insignificant level. Habitat rehabilitation from treatments would have a beneficial effect on the owl.

Fish and Wildlife Habitat

Fish and wildlife habitat management *may affect is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. The RMP goal for this program is to maintain healthy, productive plant and animal communities of native and other desirable species at viable population levels and ensure that plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations and ecological processes. Management actions would have long term, positive impacts on the owl's habitat.

Special Status Species

The special status species program *may affect, is not likely to adversely affect* (NLAA-b) the Mexican spotted owl. Protecting occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species and improving their habitats to a point where their special status recognition is no longer warranted would benefit the Mexican spotted owl. Management actions would have long term, positive impacts on this species and its habitat.

Cultural, Heritage and Paleontological Resources

Cultural, heritage and paleontological resources management *may affect, are not likely to adversely affect (NLAA-d)* the Mexican spotted owl. The goal of the cultural and paleontological resource management program is to identify, preserve, and protect significant resources. Field surveys may disturb nesting birds, depending on their timing and location, and digs and site protective measures may disturb nesting birds and degrade or destroy their habitat. However,

those actions qualify as a discretionary federal action and would trigger BLM's obligation under Section 7 of the ESA to consult if the action may affect the species.

Visual Resources

The visual resource program may affect, is not likely to adversely affect (NLAA-i)) the Mexican spotted owl. The primary goal of this program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. Projects would be designed to maintain visual quality and integrity in accordance with VRM classes and would not adversely affect the owl's habitat.

Wildland Fire

The fire and fuels management program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Direct impacts to the species as a result of prescribed and wild fire can include degradation or loss of habitat as a result of burning or removal of vegetation. Construction and use of roads and fire lines may cause additional disturbance and fragmentation of habitat. Smoke may result in the abandonment of nests and habitat.

Prescribed burning and associated activities may also affect the Mexican spotted owl by changing the owl's habitat structure (snags, downed logs, woody debris, multi-storied canopies, dense canopy cover, etc.), which could result in owls relocating to new areas. In addition, these activities may change the structure of the owl's prey species' habitat and have an effect on the abundance and composition of these species. Although these activities may have adverse effects on prey species and their habitat in the short term, the actions may increase the diversity of vegetative conditions and result in a more diverse and productive prey base over time.

To ensure that adverse impacts do not occur from prescribed fires or fuels reduction activities, BLM will first engage in separate Section 7 consultations prior to implementation of any such activities. In addition, emergency consultation would be initiated if fire suppression activities occur in suitable MSO habitat.

Special Management Areas

Management of special areas *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl and its habitat. Special management areas generally prohibit actions that alter the relevant and important values for which they were designated. Activities may be permitted with timing and other restrictions, thus the overall management of would have very little impact on the owl.

Cave Resources and Abandoned Mines

The management of cave resources and abandoned mines would have no effect (NE) on the Mexican spotted owl and its habitat. Owls do not occur in the vicinity of any known caves or abandoned mines. If these features were identified, the goal would be to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values, which could benefit occupied and potential habitat areas.

Forestry

The forestry program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Activities associated with timber management including cutting, hauling and removal of trees may cause adverse impacts to identified Mexican spotted owl habitats. Timber harvest

activities will not be allowed within any PACs and any such activities proposed within the area will require a Section 7 consultation.

Livestock Grazing

Livestock grazing *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl due to control, monitoring and standards employed for the grazing program to avoid/minimize degradation of habitat. The RMP desired outcome for this program area is to meet the forage demands of livestock operations based upon current active preference (AUMs) while, at the same time, improving the quantity and quality of forage available for livestock and wildlife. Most Mexican spotted owl habitat is on steep slopes with limited forage potential. However, livestock grazing and associated vegetation treatments to increase livestock forage could cause short-term impacts to Mexican spotted owl habitats.

Livestock, if not properly managed, can directly affect the small mammal prey species utilized by Mexican spotted owls by trampling burrows, compacting soil and competing for food, or indirectly by altering the structure or species composition of the vegetation in a manner that influences habitat selection by small mammals. Owls eat primarily small mammals and obligate herbivores can be the most likely to experience adverse effects from grazing. Rodents, especially voles, are vulnerable to grazing impacts because they rely on grasses and forbs for food and cover (USFWS 2004). However, moderate to light grazing can benefit some plant species and maintain certain seral stages important to the prey species (BLM 2005).

The RMP calls for a number of planned actions, including increased monitoring and livestock use adjustment where over utilization and/or deteriorated range conditions exist. A number of range improvement projects are identified in the plan. Those activities are subject to meeting the Standards for Public Land Health, which requires the protection of threatened and endangered species and their habitats. Section 7 consultation would be completed at the project level for any action that 'may affect' MSO or their habitat.

Recreation

The recreation program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Recreation activities could result in disturbances to soil and vegetation and may spread weeds, all of which may degrade owl habitat. Since vehicle traffic would be limited to existing or designated routes, impacts from vehicles, especially OHVs, would be reduced. Casual use, such as hiking or camping would have minimal disturbances to soil and vegetation.

An increase in human presence and noise associated with recreation activities can disturb Mexican spotted owls. Raptors are generally most sensitive to disturbances near the nest site during the breeding season. Recreation may cause nest or territory abandonment, reduced productivity, increased predation and/or disrupted nesting, roosting, or foraging behavior. Disturbances at foraging sites may influence owl ability to capture food and this in turn may lead to reduced fitness of adults. Since no nesting or roosting areas have been documented in the RMPPA and there are currently no PACs, recreation activities are not expected to adversely affect spotted owl breeding, nesting or foraging activities. If PACs are designated, seasonal closures to casual use (such as hiking) would be evaluated and implemented if needed.

Trails and Travel Management and Transportation Facilities

The transportation and access and travel management program may affect, is not likely to adversely affect (NLAA-i) the Mexican spotted owl. Vehicle travel could lead to surface and vegetation disturbances and an increase in invasive plant species, all of which would degrade habitat for owl. However, limiting travel to existing routes would help minimize this impact. Vehicle travel may also lead to an increase in human presence and may disturb any owls in the area. Since no nesting or roosting areas have been documented in the RMPPA and there are currently no PACs, travel management activities are not expected to adversely affect owl breeding, nesting or foraging activities. If PACs are designated, travel management would be evaluated and seasonal closures implemented if necessary.

Lands and Realty

The lands and realty program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Land exchanges and/or disposals within Mexican spotted owl habitats may indirectly impact the species. This is a federal action that would trigger Section 7 consultation, if Mexican spotted owl or their habitats are affected.

Realty actions, such as ROWs, have the potential to impact MSO and their habitat. Since no surface occupancy would be allowed within a PAC, impacts from ROWs would be unlikely. Any ROW that is proposed in suitable habitat but not within a PAC would require separate Section 7 consultation.

Energy and Minerals

The energy and minerals program *may affect, is not likely to adversely affect (NLAA-i)* the Mexican spotted owl. Development of locatable and salable minerals can cause direct and indirect impacts to the owl and their habitats; however, no surface occupancy would be allowed within owl protected activity centers and therefore would have little effect on owl habitat.

Determinations Summary

Under the KFO RMP, the following impacts have been determined for the Mexican spotted owl:

Air Quality—NLAA-d
Soil Resources—NLAA-d
Water Resources—NLAA-d
Vegetation—NLAA-i
Fish and Wildlife Habitat—NLAA-i
Special Status Species— NLAA-b
Cultural, Heritage and Paleontological Resources—NLAA-d
Visual Resources— NLAA-i
Wildland Fire—NLAA-i
Special Management Areas—NLAA-i
Cave Resources and Abandoned Mines—NE
Forestry—NLAA-i
Livestock Grazing—NLAA-i
Recreation—NLAA-i
Trails and Travel Management and Transportation facilities—NLAA-i
Lands and Realty—NLAA-i
Energy and Minerals—NLAA-i

North Platte River and Colorado River Species

No Critical habitat has been designated within the RMPPA for any of the North Platte River and Colorado River species (Western prairie fringed orchid, Least Tern (interior population), Piping Plover, Whooping Crane, Pallid Sturgeon, Colorado Pikeminnow, Razorback Sucker, Bonytail, and Humpback Chub). However, water depletions resulting from Bureau-authorized actions within the RMPPA may affect these species.

Conservation Planning

Actions in the RMP that would protect North Platte River and Colorado River species downstream from the RMPPA include an NSO on major river corridors within 2,500 feet of the high water mark to protect riparian habitat. Any action that may affect these species or their habitats would require a separate consultation at the project level. Additional conservation measures are listed in the Summary of Species-Specific Coordination and Conservation Measures Section (page 112).

Effects Determination for BLM-Administered Programs

Air Quality

The air quality program *may affect, is not likely to adversely affect (NLAA-d)* the North Platte River and Colorado River species. This determination was reached because the air quality program will follow regulations designed to support continued air quality, resulting in little or no changes to North Platte River and Colorado River species.

Soil Resources

The soil program *may effect, is not likely to adversely affect (NLAA-d)* the North Platte River and Colorado River species. The goals and objectives for the soil resources program will protect sensitive soil areas and rehabilitate areas of heavy erosion. All actions for soil resources may initially have short term impacts during rehabilitation activities from temporary runoff, but long term effects would protect and enhance North Platte River and Colorado River species habitat downstream from the RMPPA by preventing any future soil loss or erosion issues

Water Resources

The water resources program *may effect, is not likely to adversely affect (NLAA-d)* the North Platte River and Colorado River species. Goals for this program include maintaining or improving surface water quality and quantity, the integrity of streams, and the associated riparian values on public lands. Using BMPs to limit disturbance in and near streams and riparian/wetland systems would provide added protection to these species. Establishing an NSO on major river corridors, perennial streams, water bodies, fisheries, and riparian areas would ensure that damage to riparian ecosystems would be avoided and prevent habitat loss and runoff, which could reduce water quality conditions if the NSOs are not established.

Vegetation

The vegetation program *may effect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Actions regarding DPCs could initially disrupt water quality during management actions, but will provide long-term habitat health; this will lead to healthy water quality and functioning vegetation systems. Preventing the spread of noxious weeds and eradicating invasive species, when done within riparian systems, would use removal actions,

which would not harm aquatic species. The results of preventing the spread of noxious weeds and eradicating invasive species could promote a healthy riparian corridor with native vegetation that could provide shade, cover and lead to improved water quality for these species downstream from the RMPPA. All vegetation management actions will be conducted using best management practices with the least amount of impacts to water and riparian resources.

Fish and Wildlife Habitat

The fish and wildlife habitat program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Providing a wide array of aquatic habitats that support biodiversity and viable populations of species would support the North Platte River and Colorado River species. All other management actions for fish and wildlife would not cause any long-term harm to these species or their habitat that occurs downstream of the RMPPA.

Special Status Species

The special status species program *may affect, is not likely to adversely affect* (NLAA-b) the North Platte River and Colorado River species. Protecting occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species and improving their habitats to a point where their special status recognition is no longer warranted would benefit the North Platte River and Colorado River species. Management actions would have long term, positive impacts on these species and their habitats downstream of the RMPPA.

Cultural and Heritage and Paleontological Resources

The cultural and heritage resources program is determined to have *no effect (NE)* on the North Platte River and Colorado River species, due to the limited interaction between the cultural program and fish habitat. The cultural and heritage and paleontological resource programs do not require water resources and temporary campgrounds used during excavation would not be located within riparian habitats.

Visual Resouces

The visual resource program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. The primary goal of this program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. Projects would be designed to maintain visual quality and integrity in accordance with VRM classes and would not adversely affect the these species or their habitats downstream of the RMPPA.

Wildland Fire

The wildland fire and fuels program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Fire management actions could result in short term impacts, such as soil runoff or sedimentation following a prescribed fire, but over the long term soil stability would improve and healthy native successional habitat would appear leading to improved water quality. If a severe wildland fire occurs within an area where fire is unwanted, suppression activities would be used; the exception is in areas containing T&E species, where suppression activities would be carefully considered to not disrupt any species by using varying types of suppression or limited suppression techniques. If water from the North Platte or Colorado Rivers is used for aerial fire suppression, BLM will conduct an emergency consultation with the USFWS.

Special Management Areas
The special management areas program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. ACEC designation, WSAs, and WSR management would protect these species downstream by limiting or prohibiting activities that could result in negative impacts on riparian or water resources.

Cave Resources and Abandoned Mines
The management of cave resources and abandoned mines would have *no effect* (*NE)* on the North Platte River and Colorado River species. Riparian and water resources within the RMPPA do not occur in the vicinity of any known caves or abandoned mines. If these features were identified, the goal would be to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values, which could benefit fish habitat downstream of the RMPPA.

Forestry
The forestry program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Forestry practices on BLM managed lands are conducted in a manner to minimize sediment runoff into water bodies. Short-term impacts of sediment runoff and decreased water quality could occur, but the effects would be minimal to none for these species. No water depletions are expected to occur under the forestry program and short impacts would be mitigated through BMPs and site specific design features.

Livestock Grazing
Livestock grazing *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM lands. Managing rangelands and riparian areas using *Standards and Guidelines* should result in minimal impacts to these species and their habitats downstream.

Recreation
The recreation program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. There would be five SRMAs which could increase the amount of concentrated recreation along the North Platte and Colorado Rivers. Most of the recreation would not cause serious damage to soils or riparian areas and would not result in disturbance to water resources to the degree habitat would be altered or impacted downstream of the RMPPA.

Trails and Travel Management and Transportation Facilities
The transportation, access and travel management program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Transportation and off-road vehicle (ORV) routes could result in increased runoff and soil erosion. Increased runoff and soil erosion could affect water quality and spawning gravels, which could negatively impact these species downstream of the RMPPA. The closure of ORV routes where erosion occurs would reduce possible negative impacts from transportation and ORV management.

Lands and Realty
The lands and realty program *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. ROW access and development may occur, however, water and riparian areas would be avoided. If ROWs are located in or near these areas, short-term impacts of sediment runoff and decreased water quality could occur. No water depletions

are expected to occur under the lands and realty program and short impacts would be mitigated through BMPs and site specific design features.

Energy and Minerals

Energy and mineral development *may affect, is not likely to adversely affect (NLAA-i)* the North Platte River and Colorado River species. Most of the impacts from energy and mineral development on aquatic organisms or their habitat results from surface disturbance. Drilling or mining activities and site access (road building) removes vegetation, thereby increasing localized surface water runoff and soil erosion into streams, which can result in degraded water quality. However, major river corridors, perennial streams, water bodies, fisheries, and riparian areas are identified as No Surface Occupancy for oil and gas leasing, which would reduce potential impacts to these species and their habitat downstream of the RMPPA.

Water Depletions

Water depletions allowed under the RMP, *may affect, are likely to adversely affect (LAA)* the North Platte River and Colorado River species. Water depletions from the North Platte River and Colorado River Basin are a major factor in the decline of these species. The USFWS determined that any depletion will jeopardize the continued existence of these species and will likely contribute to the destruction or adverse modification of critical habitat. The Recovery Program was established specifically to offset the negative effects of water depletions to the endangered fish populations and to act as the Reasonable and Prudent Alternative for these depletions.

Activities associated with several programs could lead to water depletions. Water development projects that would lead to water depletions include: impoundments, diversions, water wells, pipelines, and spring developments. Activities associated with fluid minerals development, such as well drilling, hydrostatic testing of pipelines and dust abatement on roads, would lead to water depletions. Most foreseeable future water depletions (e.g., stock water development) are likely to be minor.

The Colorado BLM has completed Programmatic Consultations that addressed water depletions, The USFWS issued Programmatic Biological Opinions (PBO), which determined that BLM water depletions from the North Platte River and Colorado River Basins are not likely to jeopardize the continued existence of the Western prairie fringed orchid, Least Tern (interior population), Piping Plover, Whooping Crane, Pallid Sturgeon, Colorado Pikeminnow, Razorback Sucker, Bonytail, and Humpback Chub and that BLM water depletions are not likely to destroy or adversely modify designated critical habitat. As a reasonable and prudent alternative in the PBOs, the USFWS authorized BLM to either make or solicit a one-time contribution to the Recovery Implementation Program for Endangered Fish Species in the Platte River Basin and Upper Colorado River Basin in the amount equal to the average annual acre-feet depleted by fluid minerals activities or other water depleting activities on BLM lands (see the *Consultation History* section on page 51 for more detail).

Any projects that do not fit under the PBOs would require separate consultation.

Determinations Summary

Under the KFO RMP, the following impacts have been determined for Western prairie fringed orchid, Least Tern (interior population), Piping Plover, Whooping Crane, Pallid Sturgeon, Colorado Pikeminnow, Razorback Sucker, Bonytail, and Humpback Chub.

Air Quality—NLAA-d
Soil Resources—NLAA-d
Water Resources—NLAA-d
Vegetation—NLAA-i
Fish and Wildlife Habitat—NLAA-i
Special Status Species— NLAA-b
Cultural, Heritage and Paleontological Resources—NE
Visual Resources— NLAA-i
Wildland Fire—NLAA-i
Special Management Areas—NLAA-i
Cave Resources and Abandoned Mines—NE
Forestry—NLAA-i
Livestock Grazing—NLAA-i
Recreation—NLAA-i
Trails and Travel Management and Transportation facilities—NLAA-i
Lands and Realty—NLAA-i
Energy and Minerals—NLAA-i
Water Depletions—LAA

Greenback Cutthroat Trout

Cutthroat trout of greenback lineage are known to reside in three streams within the RMPPA. Spruce Creek is primarily on BLM-managed public lands and private lands, Antelope Creek is on State and National Forest System lands, immediately upstream and adjacent to BLM-managed public lands, and Trail Creek is on National Forest System and private lands containing federal minerals managed by the BLM. No Critical habitat has been designated for this species.

Conservation Planning

Actions in the RMP that would protect greenback cutthroat trout include NSOs on major river corridors, perennial streams, water bodies, fisheries, and riparian areas to protect riparian habitat. Any action that may affect these species or their habitats would require a separate consultation at the project level. Additional conservation measures are listed in the Summary of Species-Specific Coordination and Conservation Measures Section (page 112).

Effects Determination for BLM-Administered Programs

Air Quality

The air quality program *may affect, is not likely to adversely affect (NLAA-d)* the greenback cutthroat trout. This determination was reached because the air quality program will follow regulations designed to support continued air quality, resulting in little or no changes to greenback cutthroat trout species or their habitats

Soil Resources
The soil program *may effect, is not likely to adversely affect (NLAA-d)* the greenback cutthroat trout. The goals and objectives for the soil resources program will protect sensitive soil areas and rehabilitate areas of heavy erosion. All actions for soil resources may initially have short term impacts during rehabilitation activities from temporary runoff, but long term effects would protect and enhance greenback cutthroat trout habitat by preventing any future soil loss or erosion issues.

Water Resources
The water resources program *may effect, is not likely to adversely affect (NLAA-d)* the greenback cutthroat trout. Goals for this program include maintaining or improving surface water quality and quantity, the integrity of streams, and the associated riparian values on public lands. Using BMPs to limit disturbance in and near streams and riparian/wetland systems would provide added protection to these species. Establishing an NSO on major river corridors, perennial streams, water bodies, fisheries, and riparian areas would ensure that damage to riparian ecosystems would be avoided and prevent habitat loss and runoff, which could reduce water quality conditions if the NSOs are not established.

Vegetation
The vegetation program *may effect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Actions regarding DPCs could initially disrupt water quality during management actions, but will provide long-term habitat health; this will lead to healthy water quality and functioning vegetation systems. Preventing the spread of noxious weeds and eradicating invasive species, when done within riparian systems, would use removal actions, which would not harm aquatic species. The results of preventing the spread of noxious weeds and eradicating invasive species could promote a healthy riparian corridor with native vegetation that could provide shade, cover and lead to improved water quality for this species. All vegetation management actions will be conducted using best management practices with the least amount of impacts to water and riparian resources.

Fish and Wildlife Habitat
The fish and wildlife habitat program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Providing a wide array of aquatic habitats that support biodiversity and viable populations of species would support the greenback cutthroat trout. All other management actions for fish and wildlife would not cause any long-term harm to this species or its habitat that occurs downstream of the RMPPA.

Special Status Species
The special status species program *may affect, is not likely to adversely affect* (NLAA-b) the greenback cutthroat trout. Protecting occupied and suitable habitat for federal proposed, candidate, and threatened or endangered species and improving their habitats to a point where their special status recognition is no longer warranted would benefit the greenback cutthroat trout. Management actions would have long term, positive impacts on this species and its habitats.

Cultural and Heritage and Paleontological Resources
The cultural and heritage resources program is determined to have *no effect (NE)* on the greenback cutthroat trout, due to the limited interaction between the cultural program and fish

habitat. The cultural and heritage and paleontological resource programs do not require water resources and temporary campgrounds used during excavation would not be located within riparian habitats.

Visual Resouces
The visual resource program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. The primary goal of this program is to protect the open spaces, the natural aesthetics, and the scenic vistas that are considered a social, economic, and environmental benefit. Projects would be designed to maintain visual quality and integrity in accordance with VRM classes and would not adversely affect this species or its habitat.

Wildland Fire
The wildland fire and fuels program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Fire management actions could result in short term impacts, such as soil runoff or sedimentation following a prescribed fire, but over the long-term soil stability would improve and healthy native successional habitat would appear leading to improved water quality. If a severe wildland fire occurs within an area where fire is unwanted, suppression activities would be used; the exception is in areas containing T&E species, where suppression activities would be carefully considered to not disrupt any species by using varying types of suppression or limited suppression techniques. If fire suppression activities are conducted in or adjacent to occupied habitat, BLM will conduct an emergency consultation with the USFWS.

Special Management Areas
The special management areas program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. ACEC designation, WSAs, and WSR management would protect this species by limiting or prohibiting activities that could result in negative impacts on riparian or water resources.

Cave Resources and Abandoned Mines
The management of cave resources and abandoned mines would have *no effect* (*NE)* on the greenback cutthroat trout. Riparian and water resources within the RMPPA do not occur in the vicinity of any known caves or abandoned mines. If these features were identified, the goal would be to preserve the biotic, mineralogical, paleontological, hydrologic, and cultural values, which could benefit greenback cutthroat trout habitat within RMPPA.

Forestry
The forestry program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Forestry practices on BLM managed lands are conducted in a manner to minimize sediment runoff into water bodies. Short-term impacts of sediment runoff and decreased water quality could occur, but the effects would be minimal for this species. Short-term impacts would be mitigated through BMPs and site specific design features.

Livestock Grazing
Livestock grazing *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. The objective of livestock grazing management is to maintain or improve forage production and range condition as a sustainable resource base for livestock grazing on BLM lands. Managing rangelands and riparian areas using *Standards and Guidelines* should result in

minimal impacts to this species and its habitat. A Section 7 consultation will be conducted for any permit renewals in allotments containing occupied habitat for these species.

Recreation

The recreation program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. There would be five SRMAs, which could increase the amount of concentrated recreation along some riparian areas. Most of the recreation would not cause serious damage to soils or riparian areas and would not result in disturbance to water resources to the degree habitat would be altered or impacted.

Trails and Travel Management and Transportation Facilities

The transportation, access and travel management program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Transportation and off-road vehicle (ORV) routes could result in increased runoff and soil erosion. Increased runoff and soil erosion could affect water quality and spawning gravels, which could negatively impact this species. The closure of ORV routes where erosion occurs would reduce possible negative impacts from transportation and ORV management. In addition, NSOs, COAs and BMPs would re-locate surface disturbing activities, including new routes, away from perennial streams and riparian areas.

Lands and Realty

The lands and realty program *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. ROW access and development may occur, however, water and riparian areas would be avoided. If ROWs are located in or near these areas, short-term impacts of sediment runoff and decreased water quality could occur. Short-term impacts would be mitigated through BMPs and site specific design features.

Energy and Minerals

Energy and mineral development *may affect, is not likely to adversely affect (NLAA-i)* the greenback cutthroat trout. Most of the impacts from energy and mineral development on aquatic organisms or their habitat results from surface disturbance. Drilling or mining activities and site access (road building) removes vegetation, thereby increasing localized surface water runoff and soil erosion into streams, which can result in degraded water quality. However, major river corridors, perennial streams, water bodies, fisheries, and riparian areas are identified as No Surface Occupancy for oil and gas leasing, which would reduce potential impacts to this species and its habitat.

Determinations Summary

Under the KFO RMP, the following impacts have been determined for greenback cutthroat trout.

Air Quality—NLAA-d
Soil Resources—NLAA-d
Water Resources—NLAA-d
Vegetation—NLAA-i
Fish and Wildlife Habitat—NLAA-i
Special Status Species— NLAA-b
Cultural, Heritage and Paleontological Resources—NE
Visual Resources— NLAA-i

Wildland Fire—NLAA-i
Special Management Areas—NLAA-i
Cave Resources and Abandoned Mines—NE
Forestry—NLAA-i
Livestock Grazing—NLAA-i
Recreation—NLAA-i
Trails and Travel Management and Transportation facilities—NLAA-i
Lands and Realty—NLAA-i
Energy and Minerals—NLAA-i

SUMMARY OF 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 BA. 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 ESA.

Certain activities that will take place on public lands within the planning area are likely to contribute to climate change through greenhouse gas (GHG) emissions or other climate drivers. For example, oil and gas operations, mineral development, prescribed fire, large wildfires, and recreational use of OHVs would produce GHGs and contribute to climate change. In addition, while the extraction of coal would emit greenhouse gases through equipment used for extraction purposes, the burning of that coal in coal-fired power plants would produce significantly more greenhouse gases. Several BLM activities include surface disturbance, and wind erosion from disturbed areas and fugitive dust from use of roads and trails has the potential to darken snow packs, resulting in faster snowmelt. Vegetation treatments and commercial and personal harvest of woodland products would result in GHG emissions as well as loss of carbon stocks. Motor vehicle use by BLM, users, or other publics in the implementation of the management alternatives would produce GHG emissions. Agricultural activities on BLM lands, including cattle-rearing, also generate GHGs.

It is also likely that certain management actions outlined in this RMP would mitigate contributions to climate change by resulting in maintaining or improving the health of rangelands, woodlands and wetlands. Healthy, vigorous vegetative systems can help reduce the amount of GHGs in the atmosphere by converting CO_2 gasses into oxygen and sequestering GHGs in biomass (carbon sinks).

The exact cumulative effect on T&E species is not known because of the lack of specific information on future state, local, or private actions in the planning area. All of the BLM-managed RMP areas discussed in this BA are interspersed with parcels of state and/or privately owned land. As such, activities within these non-BLM managed lands have the potential to affect natural resources within BLM-managed areas. This is particularly true on private lands, where the impacts of land uses on T&E species may not be analyzed and avoidance or mitigation techniques (e.g., rotational grazing, seasonal NSO restrictions, and riparian habitat protection) may not be applied.

Future land uses within state and private lands within or near the BLM RMPPA are likely to include energy and mineral development; livestock grazing; recreational use (e.g., OHV use, camping); residential, urban, industrial and agricultural development; and power line, water line, gas line, and communication line development. Quantified data on the future extent of these state and private land activities are difficult to obtain, but some level of these activities are reasonably certain to occur. Where these future activities on lands not managed by the BLM interface with Special Status Species habitat, they will cumulatively add to the existing and future impacts of activities authorized by the RMP discussed in this BA.

SUMMARY OF EFFECTS DETERMINATIONS

Table 11 summarizes the effects determinations for threatened and endangered species in the planning area.

Table 11. Summary of Effects Determinations

Species / Program	NP Phacelia, Kremmling Milkvetch, and Penland Beardtongue.	Canada Lynx	Mexican Spotted Owl	North Platte and Colorado River Fish Species	Greenback Cutthroat Trout
Air Quality	NLAA-d	NLAA-d	NLAA-d	NLAA-d	NLAA-d
Soil Resources	NLAA-d	NLAA-d	NLAA-d	NLAA-d	NLAA-d
Water Resources	NLAA-d	NLAA-d	NLAA-d	NLAA-d	NLAA-d
Vegetation	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Fish and Wildlife Habitat	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Special Status Species	NLAA-b	NLAA-b	NLAA-b	NLAA-b	NLAA-b
Cultural, Heritage and Paleontological Resources	NLAA-d	NLAA-d	NLAA-d	NE	NE
Visual Resources	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Wildland Fire	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Special Management Areas	NLAA-i	NLAA-d	NLAA-i	NLAA-i	NLAA-i
Cave Resources and Abandoned Mines	NE	NE	NE	NE	NE
Forestry	NE and LAA (Pepe)	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Livestock Grazing	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Recreation	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Trails and Travel Management and Transportation facilities	LAA	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Lands and Realty	NLAA-d	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Energy and Minerals	NLAA-i	NLAA-i	NLAA-i	NLAA-i	NLAA-i
Water Depletions	N/A	N/A	N/A	LAA	N/A

SUMMARY OF SPECIES-SPECIFIC COORDINATION AND CONSERVATION MEASURES

It is the intent of the BLM to strive toward actions that have no effect to listed species or effects that are insignificant, discountable, and/or beneficial. When this is not possible, implementing the following species-specific conservation strategies is intended to minimize adverse impacts that are likely to result from implementing the management actions provided in the RMP. This section discusses conservation measures that are specific to each species. Proposed protections are conservation measures provided in the Kremmling Final RMP/EIS. In addition, BLM has already committed to implementing many conservation measures; many of these measures are from the statewide BAs and Biological Evaluations for the individual species. BLM would also consider implementing any appropriate stipulations, conditions of approval, and best management practices to further protect the species and its habitat (see Appendix B, D, and E). In the event new populations of a species are discovered, the measures within this BA would apply until such time that further investigation and subsequent consultation with the USFWS result in more appropriate management prescriptions. The measures identified below are not comprehensive. Additional conservation measures or modified versions may be applied for any BLM-authorized activity upon further analysis, review, and/or Section 7 consultation with USFWS.

North Park Phacelia, Kremmling Milkvetch, and Penland Beardtongue

Surveys would be conducted in suitable habitat before project approval. If any populations of North Park Phacelia, Kremmling Milkvetch, or Penland Beardtongue are discovered, separate Section 7 consultation would be completed at the project level. Conservation measures would be developed during the consultation process to protect these species and its habitat. Examples of conservation measures are listed below.

- All BLM-issued minerals leases would include a notification that T&E species may be present on the lease and that mitigation/conservation measures may need to be developed. Additional conditions of approval beyond the 60-day notice and 200-meter limit (consistent with lease rights) would potentially be required when listed or candidate species occur within the action area.
- Surface disturbing activities in occupied or suitable habitat would be preceded by a current year survey and a separate Section 7 consultation, if necessary.
- The BLM would stipulate and implement fugitive dust control methods on permitted actions and activities occurring on public lands through the NEPA process to prevent and/or minimize any adverse effects on federally listed plants.
- Protective stipulations for federally listed plants would also include appropriate measures to protect specific, pollinating species where known and identified by the USFWS.
- Projects that remove topsoil in areas of suitable habitat for listed plants would set aside and replace the topsoil when groundwork is completed to preserve the seed bank and associated mycorrhizal species.
- When possible, re-vegetation would be limited to native species that will not compete with the rare species at that site to avoid introducing competitive species. Re-vegetation projects would require a site-specific plan for areas with listed plant species, to be developed in consultation with the USFWS.

- "Translocation" will not be used as a rationale to defend a "not likely to adversely affect" or a "no effect" finding for any federally listed plant species.
- Prior to any land tenure adjustments in known habitat for North Park Phacelia, Kremmling Milkvetch, or Penland Beardtongue, the Bureau will survey to assess the habitat boundary and retain that area in federal ownership. Bureau administered public lands that contain identified habitat will not be exchanged or sold, unless it benefits the species.
- To the extent practicable, all proposed ROW projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 200m from any occupied habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will initiate consultation with the Service.
- Travel management plans would include management direction to avoid and/or minimize adverse impacts on North Park Phacelia, Kremmling Milkvetch, or Penland Beardtongue.
- When possible, recreational site development would not be authorized in occupied habitat.
- Grazing would be managed within occupied habitat from June through July for the Kremmling Milkvetch and Penland Beardtongue and July through August for North Park Phacelia to allow plants to bloom and go to seed if monitoring indicates that livestock use is impacting the reproduction of listed plants. Management could include, but is not limited to, fencing (permanent or temporary), water improvements to help livestock distribution, and modification of dates for allotment use.
- A Section 7 consultation will be conducted for any grazing permit renewals in allotments containing occupied habitat for these species.
- Use data collected to ensure all livestock management practices and operations (e.g., grazing intensity, distribution, confinement, location of salt, and range improvements), will be implemented to benefit or not adversely impact federally listed plants.
- BLM would implement fire management practices and protection (plant locations would be made known to resource advisors of wildfires) to enhance the conservation of federally listed plant species (e.g., fire refueling or fire camps would not be established in listed plant habitat, to the extent this will not jeopardize firefighters or public safety). Fire retardant would not be used in occupied habitat.

Canada Lynx

BLM will assess the potential impacts of actions proposed for implementation within lynx habitat at the project level. Any such actions within lynx habitat will implement the LCAS conservation measures and other necessary measures to avoid or minimize effects. Although BLM is not a signatory to the Southern Rockies Lynx Amendment, new information and guidelines from this document would be utilized to minimize effects to lynx and their habitat. To protect lynx habitat, a Controlled Surface Use restriction would be placed on Established Lynx Linkage Corridors and Lynx Habitat within LAUs. Section 7 consultation would be completed at the project level for any action that 'may affect' Canada lynx or their habitat. The guidelines/conservation measures listed below are most pertinent to lynx habitat on BLM managed lands within the KFO.

- Prescribed fire activities would not create permanent travel routes that facilitate snow compaction. Construction of permanent firebreaks on ridges or saddles would be avoided.
- Prescribed fire activities would consider design features to restore ecological processes and maintain or improve lynx habitat.

- Vegetation would be managed to mimic or approximate natural succession and/or disturbance processes while maintaining, where feasible and beneficial, the habitat components necessary for the conservation of lynx.
- Projects (habitat improvements, fuels reductions, harvests) would consider design features to retain and improve recruitment of an understory of small diameter conifers and shrubs preferred by hares.
- In aspen stands, the BLM would ensure habitat improvement projects or harvests favor regeneration of aspen.
- Where possible, new permanent roads and trails would be situated away from forested stringers within LAUs and linkages that are likely to adversely affect lynx.
- Road densities and permanent facilities would be minimized in lynx linkages.
- In fire created openings, livestock grazing would be managed so impacts do not prevent shrubs and trees from regenerating.
- Livestock grazing in aspen stands would be managed to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.
- Livestock grazing in riparian areas and willow cars would be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
- Shrub-steppe habitats would be managed to maintain or achieve mid seral or higher condition in the elevational ranges that encompass forested lynx habitat,

Mexican Spotted Owl

- The BLM will work with CPW and USFWS to identify suitable Mexican spotted owl habitat on BLM lands. Surveys, according to USFWS protocol, would be required prior to any disturbance related activities that have been identified to have the potential to impacts Mexican spotted owl in suitable habitat, unless current species occupancy and distribution information is complete and available.
- Trees greater than 9 inches diameter at breast height (DBH) should not be removed within suitable Mexican spotted owl “steep slope” and “canyon” habitats. Thinning of trees less than 9 inches DBH, fuels treatments and prescribed fires are allowed on a case-by-case basis to reduce fire hazard and improve habitat condition for owl prey. Habitat components that should be retained include snags (as appropriate), large logs (greater than or equal to 12 inches DBH), grasses, forbs, and shrubs. Exception: removal of trees, downed woody debris, snags, and other key habitat variables would be allowed if it is determined to be compatible with owl habitat management objectives as documented through environmental analysis.
- Livestock grazing in protected and restricted Mexican spotted owl habitats would meet BLM Colorado’s Standards for Public Land Health within key habitat areas (riparian areas, meadows and oak types) to provide for adequate levels of plant cover and forage for owl prey species. Monitoring in such areas should occur to determine current level of use and detect any change in the relative composition of herbaceous and woody plants.
- If any suitable habitat is found to be occupied by Mexican spotted owls, a Protected Activity Center (PAC) would be designated to protect important habitat.
- If a PAC is designated in the RMPPA, a No Surface Occupancy would be applied to the entire area.
- Permitted activities, such as prescribed fires, fuels reduction, new Special Recreation Permits, etc., may occur within a PAC, if it is not likely to impact nest success. Separate Section 7 consultation would be required.
- No new facilities or trails would be permitted within PACs that are likely to impact nest success.

- Travel management within PACs would be evaluated and seasonal closures implemented, if necessary.
- The presence and intensity of existing recreational activities (hiking, climbing, OHV use) within PACs would be evaluated on a case-by-case basis. Seasonal closures would be implemented if necessary.
- Within "restricted" habitats (as defined in the recovery plan), management priority should be placed on reducing risks to Mexican spotted owl habitat. Forest habitats would be managed on an uneven-aged system.

North Platte River and Colorado River Species

- The BLM will continue to abide by the Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006), and (PBO)(#ES/GJ-6-CO-08-F-0010) for Colorado River water depletions.
- The BLM will continue participation in the Platte River Recovery Implementation Program (PRRIP).
- The BLM will continue to abide by the June 16, 2006 PBO and the 2010 Memorandum of Agreement with the USFWS for North Platte River water depletions.

Greenback (Lineage GB) Cutthroat Trout

- As a member of the greenback cutthroat trout recovery team, BLM will continue to monitor and improve habitat, and work cooperatively with partner agencies to implement actions that ultimately lead to the removal of Lineage GB cutthroat trout from the Endangered Species list.
- The BLM will maintain or enhance habitat for all known genetically pure Lineage GB cutthroat trout populations.
- The BLM will prohibit in-channel work in all occupied native cutthroat trout (Lineage CR and Lineage GB) streams during spring spawning periods of April 1 to August 1.
- A Section 7 consultation will be conducted for any grazing permit renewals in allotments containing occupied habitat for Lineage GB trout.
- BLM will avoid surface occupancy and/or permanent surface disturbance within a minimum buffer distance of 325 horizontal feet for all occupied Lineage GB and Lineage CR waters in order to protect water quality, fish habitat, and aquatic and riparian habitat. For perennial streams, the buffer will be measured from the ordinary high-water mark (bank-full stage).
- Stream crossings would be designed to avoid and/or minimize adverse impacts to occupied Lineage GB and Lineage CR waters, to protect water quality, fish habitat, aquatic and riparian habitat.

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