

Appendix J - Biological Assessment and Evaluation

10/20/97

Routt National Forest

Revised Land and Resource Management Plan

Biological Assessment for Threatened and Endangered Species

Introduction

This Biological Assessment is prepared in compliance with Section 7. (Interagency Cooperation) of the Endangered Species Act and 50 CFR 402.12, Biological Assessments. It addresses the potential effects from implementing any of the alternatives proposed in the Routt National Forest's Final Environmental Impact Statement for the Revised Land and Resource Management Plan.

Legal and Administrative Framework

Federally listed threatened and endangered species are those plant and animal species formally listed by the U.S. Fish and Wildlife Service under authority of the Endangered Species Act of 1973, as amended. An endangered species is defined as one which is "in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as one "that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range ... " (FSM 2670.5 [81] and FSM 2670.5 [211], respectively). A proposed species is defined as one in which "information now in possession of the FWS [that] indicates that proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threats are not currently available to support proposed rules." (FSM 2670.5).

The U.S. Fish and Wildlife Service required, in a letter dated November 29, 1993 (updated May 1995), eight federally listed endangered species be analyzed during the Routt National Forest Land and Resource Management Plan Revision process:

- Black-footed ferret (*Mustela nigripes*)
- Peregrine falcon (*Falco peregrinus anatum*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Whooping crane (*Grus americana*)
- Colorado squawfish (*Ptychocheilus lucius*)
- Humpback chub (*Gila cypha*)
- Bonytail chub (*Gila elegans*)
- Razorback sucker (*Xyrauchen texanus*)

The whooping crane, Colorado squawfish, humpback chub, bonytail chub and razorback sucker are species that are analyzed in this biological assessment to evaluate possible (indirect) affects to listed species (or Secretary of the Interior-designated critical habitat) hundreds of miles downstream in the Colorado River system.

Since 1995, the U.S. Fish & Wildlife Service (USFWS) has documented the similar need to consider another set of listed species in the North Platte River system. These species occupy habitat in central Nebraska, hundreds of miles downstream from the headwaters of the North Platte River system. The Routt National Forest administers lands on the eastern slope of the continental divide (headwaters) in the North Platte River system.

These additional species are:

- Piping plover (*Charadrius melodus*)
- Least tern (*Sterna antillarum*)
- Whooping crane (*Grus americana*)
- Pallid sturgeon (*Scaphirhynchus albus*)
- Eskimo curlew (*Numenius borealis*)
- American burying beetle (*Nicrophorus americanus*)
- Ute ladies'-tresses orchid (*Spiranthes diluvialis*)
- Western prairie fringed orchid (*Platanthera praeclara*)

The inclusion of these species (addressed in this biological assessment) comprises the complete list, coordinated with USFWS and current with 50 CFR 17.11 & 17.12 (reprint October 31, 1996), for listed species applicable to the proposed federal action as of October 20, 1997.

Resource Protection Measures

Laws, policy, forest-wide direction, and standards and guidelines that maintain or enhance habitats for threatened and endangered species apply to all alternatives. A summary of the direction and standards and guidelines follows:

Meet the requirements of the Endangered Species Act, as amended.

1. Prepare biological assessments or evaluations for proposed projects and activities included in the Revised Plan.
2. Utilize appropriate informal and formal consultation procedures with the USFWS for all major construction activities and other management activities identified in the biological assessment as likely to affect federally listed, or proposed for listing, threatened and endangered species or critical habitat (CFR 50 CFR 17.7).
3. Maintain and/or enhance habitats for the recovery and conservation of federally listed threatened or endangered species. Implement national and regional Forest Service policy and direction for management of threatened, endangered, proposed, and candidate species (FSM 2670).

Forest-wide direction:

Goals and Objectives

1. Maintain or create habitats suitable for a stable or increasing population of federally listed threatened and endangered species and Forest Service, Region 2 sensitive species for the Routt National Forest, including the Colorado River cutthroat trout.

Forest-wide Standards and Guidelines (FWS&G)

Water and Aquatic

1. Do not remove naturally occurring debris from stream channels unless it is a threat to life, property, or important resource values, or otherwise covered by legal agreement.
2. Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.
3. Manage land treatments to maintain enough organic ground cover in each land unit to prevent harmful increased runoff.
4. In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those land treatments that maintain or improve long-term stream health.
5. Design and construct all stream crossings and other instream structures to pass normal flows, withstand expected flood flows, and allow free movement of resident aquatic life.
6. Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health.
7. Do not degrade ground cover, soil structure, water budgets, or flow patterns in wetlands.
8. Maintain enough water in perennial streams to sustain existing stream health. Return some water to dewatered perennial streams when needed and feasible.
9. Manage water-use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage to streams.
10. Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or ground water.
11. Apply runoff controls to disconnect new pollutant sources from surface and ground water.
12. Apply chemicals using methods which minimize risk of entry to surface and ground water.
13. To prevent conditions toxic to fish, avoid human-caused disturbances that result in suspended sediment peaks above 250 mg/l for more than one hour duration in any stream reach or of more than 500 mg/l at any point in time.

Biological Diversity

1. Develop prescriptions prior to timber harvest to identify the amount, size(s) and distribution of down logs and snags to be left on-site, as well as live, green replacement trees for future snags. On forest sites, retain snags and coarse woody debris (where materials are available) in accordance with the average minimums specified in Table 1-1.
2. Retain all soft (rotten) snags unless they are a safety hazard.

Range

1. Provide mitigation measures to protect national forest resources from animal damage control activities conducted by other governmental entities. Mitigation measures emphasize protection of public safety; threatened, endangered, or sensitive (TE&S) species; water quality; and other resource values. (Animal Damage Control of the Animal Plant Health Inspection Service (USDA) is responsible for completing the necessary National Environmental Policy Act (NEPA) analysis for predator control activities. This is consistent with Forest Service policy based on and agreed to in a Memorandum of Understanding Agreement between the Forest Service and APHIS-ADC signed in 1993. The MOU requires that predator control activities conducted by APHIS-ADC be consistent with Land and Resource Management Plan.)

Threatened, Endangered, Sensitive Species and Wildlife

2. Manage human disturbance at caves and abandoned mines where bat populations exist. When closing mines or caves for safety or protection reasons, reduce disturbance to resident bat populations and provide access for bats.
4. In areas where tall dense cover is desired for ground-nesting birds, retain adequate residual cover from previous growing seasons since some species begin nesting in April and May before spring growth.
5. Some bird species prefer to nest in undisturbed cover. In areas where these species are a primary consideration, manage livestock grazing to avoid adverse impacts to nesting habitat.
6. Protect known active and inactive raptor nest areas. Extent of the protection will be based on proposed management activities, human activities existing before nest establishment, species, topography, vegetative cover, and other factors. A no-disturbance buffer around active nest sites will be required from nest-site selection to fledging (generally March through July). Exceptions may occur when animals are adapted to human activity.
7. Where newly discovered threatened, endangered, proposed or sensitive species habitat is identified, conduct an analysis to determine if any adjustments in the forest plan are needed.
8. Manage activities to avoid disturbance to sensitive species which would result in a trend towards federal listing or loss of population viability. The protection will vary depending on the species, potential for disturbance, topography, location of important habitat components and other pertinent factors. Give

special attention during breeding, young rearing, and other times which are critical to survival of both flora and fauna.

9. Avoid disturbing threatened, endangered, and proposed species (both flora and fauna) during breeding, young rearing, or at other times critical to survival by closing areas to activities. Exceptions may occur when individuals are adapted to human activity or the activities are not considered a threat.

Real Estate - Land Adjustments

1. In land adjustment activities, give priority to acquiring lands that contain habitat identified by USFWS as necessary for the recovery of federally listed threatened and endangered species.
2. In land adjustment activities including land exchange, purchase, disposal, and donation, consider the following:
 - c. Acquire lands that contain resource values identified during scoping as important in contributing toward national forest system resource management goals and objectives as stated in the forest plan. Examples include: wetlands, riparian areas, essential wildlife habitat, threatened or endangered species habitat, sensitive species habitat, significant cultural resources, timber lands, rangelands, or other areas.

Biological Assessment

This section focuses on the predicted effects the alternatives will have on habitats and/or populations of federally listed species required by the USFWS to be evaluated.

Affected Environment - Bald Eagles

The bald eagle (*Haliaeetus leucocephalus*) is a large bird of prey inhabiting areas along coasts, rivers, and other large bodies of water throughout much of North America. The largest populations of bald eagles are resident to the coastal and inland waters of southeastern Alaska. Bald eagles from Alaska have been successfully introduced to areas in the lower states.

The bald eagle is federally listed as threatened (conterminous lower 48 states). The bald eagle's legal status for the state of Colorado is listed as threatened. It is estimated that approximately 650 bald eagles currently nest in the western United States, and between 4,500-6,000 winter in this area (Finch, 1992). In Colorado, the number of nesting bald eagles is estimated at approximately ten breeding pairs. Bald eagles are common migrants through northern Colorado. Their numbers and distribution vary from year to year, depending on severity of the winter and food availability.

There is no Secretary of the Interior-designated critical habitat for bald eagles on the Forest. Bald eagles have been observed on the Forest, rarely, and generally during spring and fall migrations. Winter habitat for bald eagles is lacking or very limited on the Forest. This is due primarily to the high elevations resulting in harsh weather and uncertainty of finding open water for foraging. Nesting habitat is also limited for the same reasons. No nests records have been documented on the Forest, recent or historical. However, recent active nests have been documented on the Yampa, Colorado, and Blue Rivers adjacent to the Forest.

Methods of Determination. A literature review was conducted for bald eagles. Local information was requested from Forest wildlife biologists, as well as state and other federal

agency biologists. Other sources of information included local bird surveys (the Audubon Society's Christmas count and a local annual bald eagle survey).

Environmental Consequences - Bald Eagles

Direct and Indirect Effects Common to All Alternatives

Bald eagles are not likely to be affected by the programmatic level activities proposed for any alternatives, at either the experienced or full implementation level. Projects proposed under this plan revision will be evaluated before implementation to assure that this determination is current and still valid. Appropriate informal or formal consultation will be initiated with the US FWS for all major construction activities and other proposed project-level activities identified in biological assessments as likely to affect bald eagles.

Although nesting bald eagles have not been documented on the Forest, the potential exists. Should a nesting be initiated, all alternatives would require no new disturbance (disturbance not existing at the time of nesting) within one-half mile of the nest during the nesting season.

The Northern States Bald Eagle Recovery Plan (USDI Fish and Wildlife Service 1983) recommended at least four to six over-mature trees be available as nest and perch sites per every 320 acres adjacent to rivers and lakes larger than 40 acres. It is also recommended that three or more large snags be within one-quarter mile of a potential nest site. All of the alternatives would provide these recommended levels if nesting is initiated in the future.

Affected Environment - Peregrine Falcons

The peregrine falcon (*Falco peregrinus*) was once widespread, ranging from coast to coast over North America. Currently it is rare in the eastern United States, but recovering in the west.

The peregrine falcon was first federally listed as endangered in 1970. It was listed again in 1984. Since 1977, experimental releases of young falcons, primarily through "hacking" (artificial rearing) and captive breeding, have increased peregrine numbers in the west. The Natural Heritage Program status of the peregrine falcon is globally rare and critically imperiled in Colorado and Wyoming.

Peregrines prefer to nest on open ledges or potholes on cliffs at least 200 feet high, although eyries (nesting sites) have been documented on much lower, less significant cliffs. Selected nesting cliffs are most frequently in mountainous areas near rivers, large streams, or lakes.

An important factor in eyrie selection is believed to be prey abundance and diversity. Small birds are a major food source for peregrines. Peregrines have been reported to travel as far as 17 miles on hunting forays, although 10 miles or less is more common.

Although numerous surveys have been conducted for peregrine falcons on the Forest, only one eyrie (Yampa District) has been reported. Since the early 1990s, there have been several documented sightings of peregrines on the Forest, but none of these sightings documented nesting activity or activity described as being suspicious for breeding with this one exception.

Methods of Determination A literature review was conducted for peregrine falcons in the area including the Forest. Additional information was requested from Forest Service and state biologists and Colorado Natural Heritage Program. Local bird survey data, such as the annual Christmas bird count and other local information, was also reviewed.

Environmental Consequences - Peregrine Falcons

Direct and Indirect Effects Common to All Alternatives

Due to the habitat requirements of peregrine falcons, conflicts with proposed management activities in the alternatives are considered minimal. Potential nests are normally located in steep rocky canyons away from most proposed Forest activities. The falcons' primary foraging areas are near streams and riparian habitat that are protected or restricted from most proposed management activities. Riparian habitat improvements would be emphasized in some alternatives, but effects on prey abundance and diversity would be negligible under all alternatives.

If additional peregrine eyries are established on the Forest, the following standard (#6 from the Threatened, Endangered, Sensitive Species and Wildlife, Forest-Wide Standards and Guidelines section of this document) would be implemented:

Protect known active and inactive raptor nest areas. Extent of the protection will be based on proposed management activities, human activities existing before nest establishment, species, topography, vegetative cover, and other factors. A no-disturbance buffer around active nest sites will be required from nest site selection to fledging (generally March through July). Exceptions may occur when animals are adapted to human activity.

Based on the recommendations of the American Peregrine Falcon Recovery Plan (USDI Fish and Wildlife Service 1988) the no-disturbance buffer for the peregrine falcon would be during the reproductive season (approximately February 1 - September 1).

Therefore, no effects to active eyries are anticipated for any of the alternatives.

All projects will require the completion of site-specific biological assessments before the project is implemented. Depending on the results of these site-specific biological assessments, informal or formal consultation would be initiated with the USFWS if the project was determined to "may, or likely to, adversely affect" peregrine falcons.

In addition, all of the laws, policy, forest-wide direction and forest-wide standards and guidelines would apply to any proposed projects (see the Resource Protection Measures section of this document).

Peregrine falcons would not be adversely affected by the actions proposed in any of the alternatives. This would be true with experienced or full implementation budget levels. Under any of the alternatives, the coordination and mitigation measures described above will be implemented.

Species Not Occurring On The Forest That Could Be Impacted Indirectly

Affected Environment - Black-footed ferret

Black-footed ferrets do not exist on the Forest. They are closely associated with prairie dog colonies. The ferrets range historically corresponded to the range of this prairie dog that at one time included most of the western states. The last known remnant ferret population was discovered near Meeteese, Wyoming in 1981. The population was removed for captive

breeding and reintroduction programs. Since the ferret's primary prey is prairie dogs, their decline is associated with the reduction and loss of prairie dog colonies.

There are no prairie dog colonies on the Forest. However, there are colonies on lands relatively close to the Forest boundary. None of these areas have been proposed for possible re-introduction sites and are currently too small to qualify.

Environmental Consequences - Black-footed ferret

Direct and Indirect Effects Common to All Alternatives

There is general agreement that the major threat to black-footed ferret habitat is eradication of prairie dog colonies. Because no prairie dog colonies occur on the Forest, no adverse effects are likely to occur under any of the alternatives. Should a prairie dog colony be located on the Forest in the future, forest-wide direction requires consideration for TE&S species when [with] activities that may consider control programs. Any future prairie dog control proposal would require both programmatic and site-specific analysis, as well as a biological assessment under all alternatives.

Because no prairie dog control program is proposed under any alternative, there would be no effects to black-footed ferret habitat.

Species Occurring Downstream In The Colorado And Platte River Drainages That Could Be Indirectly Affected

Affected Environment

Colorado River system species:

- Whooping crane* (*Grus americana*)
- Colorado squawfish (*Ptychocheilus lucius*)
- Humback chub (*Gila Cypha*)
- Bonytail chub (*Gila elegans*)
- Razorback chub (*Xrauchen texanus*)

Platte River system species:

- Piping plover (*Charadrius melodus*)
- Least tern (*Sterna antillarum*)
- Whooping crane (*Grus americana*)
- Pallid sturgeon (*Scaphirhynchus albus*)
- Eskimo curlew (*Numenius borealis*)
- American burying beetle (*Nicrophorus americanus*)
- Ute ladies'-tresses orchid (*Spiranthes diluvialis*)
- Western prairie fringed orchid (*Platanthera praeclara*)

* Whooping cranes are occasionally observed mixed with flocks of greater sandhill cranes flying near the Forest during spring and fall migrations.

Various laws prior to the Federal Land Policy and Management Act of 1976 provide for rights-of-way over public lands. The Forest Service has the responsibility for all existing grants and permits located on National Forest System lands, including their administration, amendment, and renewal, when authorized and appropriate.

The 1983 Plan contains provisions to protect aquatic habitats and stream channels. This Revised Plan proposes new provisions (standards) to prevent damage to perennial streams and recover currently dewatered perennial streams (Water and Aquatics section in Chapter 3 of the FEIS).

Environmental Consequences

Indirect Effects

Dams and water diversions can change channel dimensions, alter aquatic and riparian habitat, and obstruct fish migration in streams. When they occur, these impacts are both local and far-reaching. When combined with the effects of other dams and diversions, they can contribute to downstream dewatering and affect threatened and endangered species and their habitat.

The Forest Supervisor has the authority and the responsibility to assure that permits are consistent with the Revised Plan. As the various permits are amended, renewed, or issued, they will be analyzed for environmental effects and a determination made, in consultation with the USFWS, if additional mitigation measures or new terms and conditions are required to meet Forest Plan standards and guidelines. The degree of effects are currently undetermined.

Direct and Indirect Effects on Threatened and Endangered Plant Species

There are no federally listed plant species known or suspected to occur on the Routt National Forest.

Cumulative Effects - Threatened and Endangered Species

All of the listed species addressed in this assessment occur primarily on public and private lands outside the boundaries of the Forest. Consequently, potential effects associated with implementation of projects or management activities proposed in the alternatives will primarily be indirect but could possibly affect listed species or their habitat surrounding the Forest.

Migratory species such as the bald eagle and peregrine falcon would not be affected by decisions in this Revised Plan when they reside (as transient migrants) on the Forest. No management requirements or protection measures prescribed in this Revised Plan could provide replacement habitat or compensate for loss of habitat on non-Forest Service administered lands.

Species, such as the whooping crane and several of the listed fish species, that occupy habitat downstream could be affected by water depletions from upstream sources, including the Routt National Forest. By continuing to monitor and track forest water depletions in close coordination with the USFWS, no effects to downstream listed species are expected.

Vegetative manipulation occurs in various alternatives considered in the forest plan revision. Timber harvest is the predominate means of planned vegetative change. Staff hydrologists analyzed and evaluated these varying levels of vegetative change to determine if there were any predicted increases to water yield (Schnackenberg 1997). Estimations were made for the baseline water yield from a schema using USFS gage stations data from undisturbed basins. All revision alternatives were considered. The average annual water yield is predicted to be less than 0.1 percent of baseline for the first decade and 0.2 percent for the fifth decade. This increase appears to be negligible and is well within one standard deviation of the baseline water

yield. The summary of the analysis is that none of the alternatives will deliver a noticeable increase in water production in either the Colorado River system or the Platte River system (Schnackenberg 1997). Consequently, the determination is reached that there is no impact (beneficial) on listed species in the Colorado River and Platte River systems.

Incremental increases over time from individual past, current, and proposed management activities could cumulatively affect stream channel stability and downstream and off-Forest fish and wildlife habitat. Alternatives proposing the greatest number of road miles would have the highest potential of creating adverse cumulative effects. Alternative E proposes to construct the most miles of road, followed by alternatives A, G, D, C, B, and F.

By implementing the standards and guidelines and mitigation measures prescribed in the Revised Plan, the activities proposed would not significantly contribute to cumulative adverse effects to listed species when combined with the actions of other agencies and landowners. Consequently, no cumulative effects to listed species would be expected under any of the proposed alternatives at either the experienced or full implementation budget levels.

Determination of Effects on Listed Species

In summary, this biological assessment arrives at the determination that none of the alternatives evaluated in the revision of the Routt National Forest Land and Resource Management Plan are likely to adversely affect any listed species or critical habitat designated by the Secretary of Interior. No proposed species or proposed Secretary of the Interior critical habitat has been identified by the USFWS or (action proposing) agency as being associated with this federal action. Therefore, no Section 7, Endangered Species Act (ESA) conferencing (for proposed species) is necessary.

This determination has basis in a thorough evaluation of all land allocations or levels of management activities prescribed or permitted in any of the alternatives. The rationale for this determination is based primarily on two considerations:

The minimal potential for direct, indirect, or cumulative effects to listed species or their habitat requirements within the planning area (Routt National Forest) or larger USFWS definitional "Action Area" (50 CFR 402.2) ... resulting from actions permitted in the alternatives.

The quantity and specificity of mitigation measures and cooperation and coordination requirements that would be implemented under all of the alternatives. Section 7, Endangered Species Act, consultations will be utilized, as appropriate, on a project-by-project basis, subsequent to the selection and implementation of a chosen alternative for the forest plan revision.

A preferred alternative has emerged from the field of alternatives for the Regional Forester (Rocky Mountain Region) to consider for selection. This is Alternative C. A set of planning documents, which elaborates Alternative C as modified, and all other prospective alternatives, accompanies this biological assessment.

Collateral Purpose of this Biological Assessment

This biological assessment has been used in determining whether formal consultation or conference is necessary [50 CFR 402.12 (a)]. Given that the determinations for all addressed species culminated as "not likely to adversely affect", this biological assessment is submitted to appropriate official of USFWS for concurrence with this determination. This is intended as a ESA, Section 7, 50 CFR 402.13, Informal Consultation.

This procedure is also within Forest Service policy regarding Formal Consultation for "Forest Plans" (FSM 2771.45c - Formal Consultation - 1., paragraph 2.). In this preparation, a clear rationale of no effect has been documented in the biological assessment (sic) and accompanying documents. This eliminates the need for formal consultation (for a forest plan revision) and relegates the consultation process to an "informal consultation," pending the outcome of concurrence by the USFWS reviewing official.

Literature Cited

- Finch, D.M. 1992. Threatened, Endangered, and Vulnerable Species of Terrestrial Vertebrates in the Rocky Mountain Region. USDA-Forest Service General Technical Report RM-215. Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.
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- USDI Fish and Wildlife Service. 1988. American Peregrine Falcon Recovery Plan (Rocky Mountain Southwest Population). Denver, CO.

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Document: Biological Evaluation

Project: Routt Forest Plan Revision

Abstract

A Biological Evaluation (BE) has been prepared to evaluate the potential programmatic effects of the Routt National Forest, Land and Resource Management Plan Revision on the following Region 2 sensitive species:

MAMMALS

spotted bat
lynx
ringtail
pygmy shrew
Townsend's big-eared bat
marten
fringed-tailed myotis
dwarf shrew
wolverine

REPTILES/AMPHIBIANS

Northern leopard frog
wood frog
tiger salamander
boreal western toad

INVERTEBRATES

Rocky Mountain capshell snail
Cockerell's striate disc snail

PLANTS

Harrington beardtongue
Purple lady's slipper
Rabbit Ears gillia
Hanging Garden Sullivantia
roundleaf sundew
livid sedge
Colorado tansy-aster

BIRDS

Northern goshawk
greater sandhill crane
olive-sided flycatcher
Columbian sharp-tailed grouse
ferruginous hawk
white-faced ibis
merlin
osprey
flamulated owl
loggerhead shrike
fox sparrow
black swift
black-backed woodpecker
three-toed woodpecker
golden-crowned kinglet
purple martin
pygmy nuthatch
boreal owl
black tern
Lewis' woodpecker
long-billed curlew

FISH

Colorado River cutthroat trout

A "may adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide" determination is concluded for all species.

No preventable adverse cumulative effects from Federal actions are anticipated for any of the species evaluated in this evaluation.

Introduction

Sensitive species are those plant and animal species, designated by the Regional Forester, whose population viability is a concern on National Forests within the region. Sensitive species may also be those species whose current populations and/or associated habitats are reduced or restricted or their habitats and/or populations are considered vulnerable to various management activities, and special emphasis is needed to ensure they do not move towards listing as threatened or endangered.

A description of each species and what is known of the current and historical distribution of that species on the Forest is included. Sighting locations on the Forest were mapped on the GIS computer mapping system with assistance from the Colorado Natural Heritage Program and the Colorado Division of Wildlife, among others. The sighting records are included in the planning record.

Sensitive species known to occur, suspected to occur, or which have occurred on the Forest were refined from the Regional Forester's list, based on information obtained from the Colorado Division of Wildlife, Colorado Natural Heritage Program, local Forest Service offices, and others. A complete species list, including other species of concern, appears in the Biological Diversity Report prepared in conjunction with the Revised Plan.

Forest-wide Mitigation and Protection Measures

For the preferred alternative, the general forestwide protection measures apply. In addition, specific protection requirements apply for specific species or groups of species. These protection measures are assigned to each sensitive species for the Forest based on the following:

Forest-wide direction:

Goals and Objectives (FWD-GO)

Forest-wide Standards and Guidelines (FWS&G)

Standards or guidelines designed to protect a specific species or group of species will be included by number of that standard. For example:

Townsend's big-eared bat = FWS&G (TES) #2

Forest-wide Standard number 2 which states, "Manage human disturbance at caves and abandoned mines where bat populations exist. When closing mines or caves for safety or protection reasons, reduce disturbance to residing bat populations, and provide bat access."

The following are those protection and mitigation measures specific to the Routt National Forest Revised Plan that address sensitive species or assemblages (similar groups) of sensitive species under all of the proposed alternatives.

Forest-wide direction:

Goals and Objectives (FWD-GO)

1. Maintain or create habitats suitable for a stable or increasing population of federally listed threatened and endangered species and Forest Service sensitive species for the Routt National Forest, including the Colorado River cutthroat trout.

Forest Wide Standards and Guidelines (FWS&G)

Administrative (Plan, p. 1-24)

2. In land adjustment activities, give priority to acquiring lands that contain habitat identified by U.S. Fish and Wildlife Service as necessary for the recovery of federally listed threatened and endangered species.

In land adjustment activities including land exchange, purchase, disposal, and donation, consider the following:

Consider the effect of land adjustments on sensitive species habitat. Avoid land adjustments which could result in a trend toward federal listing or loss of population viability for any sensitive species. Sensitive species habitat can be conveyed if conveyance would not result in a trend toward federal listing, adverse impacts to the population viability of the species, or if effects could be mitigated.

Acquire lands that contain resource values identified during scoping as important in contributing toward National Forest System resource management goals and objectives as stated in the Revised Plan. Examples include: wetlands, riparian areas, essential wildlife habitat, threatened or endangered species habitat, and other areas.

Biological Diversity (Plan, p. 1-8)

1. Develop prescriptions prior to timber harvest to identify the amount, size(s), and distribution of down logs and snags to be left on-site, as well as live, green replacement trees for future snags. On forest sites, retain snags and coarse woody debris (where materials are available) in accordance with the average minimums specified in Table 1-1.

2. Retain all soft (rotten) snags unless they are a safety hazard.

Range (Plan, p. 1-9)

2. Phase out season-long grazing systems that allow for livestock grazing use in an individual unit during the entire vegetative growth period, except where determined to achieve or maintain the desired plant community.

Threatened, Endangered, Sensitive Species and Wildlife (Plan p. 1-14)

2. Manage human disturbance at caves and abandoned mines where bat populations exist. When closing mines or caves for safety or protection reasons, reduce disturbance to residing bat populations, and provide bat access.

4. In areas where tall dense cover is desired for ground-nesting birds, retain adequate residual cover from previous growing seasons since some species begin nesting in April and May before spring growth.

5. Some bird species prefer to nest in undisturbed cover. In areas where these species are a primary consideration, manage livestock grazing to avoid adverse impacts to nesting habitat.

6. Protect all active and inactive raptor nest areas. Extent of the protection will be based on proposed management activities, human activities existing before nest establishment, species, topography, vegetative cover and other factors. A no-disturbance buffer around active nest sites will be required from nest-site selection to fledging (generally March through July). Exceptions may occur when animals are adapted to human activity.

7. Where newly discovered threatened, endangered, proposed, or sensitive species habitat is identified, conduct an analysis to determine if any adjustments in the forest plan are needed.

8. **Manage** activities to avoid disturbance to sensitive species which would result in a trend toward Federal listing or loss of population viability. The protection will vary depending on the species, potential for disturbance, topography, location of important habitat components, and other pertinent factors. Give special attention during breeding, young rearing, and other times which are critical to survival of both flora and fauna.

Monitoring of Habitat

See the discussion in the FEIS regarding monitoring of population trends of terrestrial and aquatic species found on the Forest. The Monitoring and Evaluation Chapter (4) of the Revised Plan provides a monitoring schedule, and the 1998 Monitoring Plan of Operation also provides some discussion.

Habitat Complexes

In order to efficiently disclose anticipated effects of the alternatives on sensitive species, the 42 individual species were grouped by general habitat preference. Current habitat composition, structural stage, and pattern were used to analyze effects by alternative. Effects were estimated at both the experienced and full implementation budget levels. Significant differences in effects between the two budget levels are noted.

The species are distributed by those habitat complexes they prefer to use. The habitat complexes are described in the vegetation section of the FEIS. If the species does not easily fit within one or more complexes, the unique habitat it is associated with is included (i.e., caves and mine shafts for bats). Refer to the wildlife section of the FEIS for a discussion of the habitat complexes and how they compare to the historical range of natural variation for the Forest. Species use of the habitat complexes are from Finch 1992 and Hoover and Wills 1984.

The habitat complexes include only the appropriate habitat structural stages, (i.e. for late successional spruce/fir only the later structural stages 4b, 4c, and 5 were considered as potential old growth). All structural stages, except the seedling sapling stage, (i.e. SS1), were evaluated for lodgepole pine. For the aspen community, all structural stages 3 and 4 were considered (see the vegetation section of the FEIS for discussion of vegetative habitat structural stages.)

Forested Habitat Complexes

Mature Conifer Habitat

Late successional spruce/fir includes habitat structural stages 4b, 4c, and 5.

Species known or suspected to occur on the Forest:

Black-Backed and Three-Toed Woodpeckers

Distribution: The black-backed woodpecker (*Picoides arcticus*) is limited to the northern coniferous forests of North America. Resident, often locally, from western and central Alaska, southern Yukon, northern Manitoba, central Labrador, and Newfoundland south to southeastern British Columbia, through the Cascades, Siskiyou, and Warner Mountains and Sierra Nevada of Washington and Oregon to central California and west central Nevada, through Montana to northwestern Wyoming and southwestern South Dakota, and to southwestern and central Alberta, southeastern Manitoba, northern Minnesota, north central Michigan, northern New York, and northern New England. (DeGraaf et al. 1991).

The blacked-backed woodpecker's presence on the Forest is suspected, but not confirmed.

The three-toed woodpecker (*Picoides tridactylus*) is distributed circumboreally. Resident, often locally, from northwestern and central Alaska, northern Manitoba, northern Quebec and

Newfoundland, western and southern Alaska, central Washington and southern Oregon, in the Rocky Mountains to eastern Nevada, central Arizona, and south central New Mexico, southwestern and central Alberta, southern Manitoba, northeastern Minnesota, central Ontario, northern New York, northern New England, and southern Quebec (DeGraaf et al 1991).

The three-toed woodpecker is a documented species on the Forest.

Natural History: Black-backed woodpeckers occur most often in lower elevation stands composed of pine and mixed conifer (lodgepole pine, ponderosa pine, Douglas-fir, and larch). They often nest near water. The nest cavity is excavated in live or dead trees with heart-rot or in the sapwood of dead pines and smaller diameter trees. Trees used for nesting averaged 11 inches diameter breast height (dbh) (Goggans et al. 1989). The black-backed woodpecker is associated with trees characterized by scaly or flaky bark.

Home range size for the black-backed woodpecker varied from 178 to 810 acres for birds in lodgepole pine (Goggans et al. 1989). Birds selected for single-storied mature to overmature stands in their home range and against single-storied seedlings, saplings, poles, small sawtimber, and plantation cuts. The proportions of mature to overmature and unlogged areas was very large in this study. Fifty-nine percent of the home ranges consisted of mature and overmature trees.

Three-toed woodpeckers can be found in woodland muskegs and open or dense stands of pine, spruce, and fir (Finch 1992). Their numbers will swell for 3 to 5 years in burned stands and then decline to pre-fire population levels (*id.*). They nest in dead trees or dead limbs with decayed heartwood in live trees. Their annual diet consists of 65% spruce beetle (99% in the winter) (DeGraaf et al. 1991).

These woodpeckers are heavily dependant upon snag habitat for nesting, foraging and roosting. Management of this species is tied to the maintenance of forest diseases and other mortality, such as fire, that leads to infestations and heartrot.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7, #8

Marten

Distribution: Marten (*Martes americana*) range from Alaska, across Canada to the northeastern United States and south along the major mountain ranges in the western United States. Marten are relatively common on the Forest at higher elevations.

Natural History: Marten prefer late successional stands of mesic, conifer-dominated forest, preferably spruce-fir, but also occupy lodgepole pine, Douglas-fir and occasionally cottonwood riparian areas. This species is considered a conifer old growth obligate. Over 30% canopy cover is thought necessary for suitable marten habitat, with an optimum of 40-60% for resting and foraging. They tend to avoid habitats that lack overhead cover, although studies in Colorado have shown them to forage 0.8-3.2 km from the nearest forest stand. Use of habitat is related to food availability, especially in winter, when they often search in rock talus for food. Marten feed on small mammals, especially red-backed voles, red squirrels, some birds, insects, fruits, and berries.

Dens are key habitat components. Dens may be at considerable height from the ground in a hollow tree (often an abandoned woodpecker hole) lined with grass, leaves, and mosses. They may also be on, or under, the ground. Dens on the ground are usually associated with rock

piles or hollow logs; therefore, snags, woody forest floor debris, brush, rock slides, and/or rock outcrops are important habitat components for this species (Clark and Stromberg 1987; Finch 1992; Oakleaf et al. 1992; Martin and Barrett 1983; Ruggerio et al. 1994).

Ruggerio et al. (1994) suggest that, based on changes in patterns of distribution and abundance of martens, this species is not secure throughout its range. However, they also concluded that the martens' geographic range in the Rocky Mountains is apparently similar to presettlement times.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7

Northern Goshawk

Distribution: Goshawks (*Accipiter gentilis*) breed in coniferous, deciduous, and mixed forests throughout much of North America (Reynolds et al. 1991). The goshawk is currently documented as occurring on the Routt National Forest.

Natural History: This large raptor has adapted to a variety of forested habitats and vegetative community types. It is a generalist in habitat requirements (Reynolds et al. 1992). Preferred habitat during the breeding season is older, tall forests, where goshawks can maneuver in and below the canopy while foraging and where they can find large trees in which to nest (Reynolds 1989). In the Rocky Mountains, goshawks frequently nest in dense stands of mature lodgepole pine or quaking aspen stands (Jones 1979). Because of its relatively large body size and wing span, the goshawk does not often use dense, young forest stands.

A goshawks nesting home range may be up to 6,000 acres. Reynolds et al. (1991) identified three main components needed within this home range for southwestern forests. The nest area is 30 acres or more in size and may include more than one nest. Nest areas contain one or more stands of large, old trees with a dense canopy cover. Most goshawks have alternate nest areas within their home range that may be used in different years. The post fledging-family area (PFA) is approximately 420 acres and surrounds the nest area. Because of its size, the PFA typically includes a variety of forest types and conditions. It represents an area of concentrated use by the family from the time the young leave the nest until they are no longer dependent on the adults for food (up to two months). These areas are important for fledglings, since they provide hiding cover and prey on which to develop hunting skills. PFAs have patches of dense trees, developed herbaceous and/or shrubby understories, and habitat attributes such as snags, downed logs, and small openings that provide necessary habitat for many goshawk prey species. The foraging area is approximately 5,400 acres in size and surrounds the PFA. Hunting goshawks use available habitats opportunistically. This suggests that choice of foraging habitat may be as closely tied to prey availability as to habitat structure and composition. Goshawks hunt from tree perches by scanning lower portions of the forest (on the ground and in the lower canopy) for prey. Because of visual limitations in dense forest environments, an open understory enhances detection and capture of prey; also, because of their size, goshawks prey on the larger forest birds such as woodpeckers, jays, and grouse, as well as squirrels and chipmunks. The majority of these prey species reside mainly on the ground and in lower portions of the tree canopy.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #6, #7, #8

Boreal Owl

Distribution: The boreal owl (*Aegolius funereus*) is circumpolar in distribution. It is found in boreal, mainly coniferous, forest in both North America and Eurasia. Until the 1960s, the species was believed to be only a rare, winter migrant south of Canada. Since then, nesting populations of this owl have been found in Minnesota, Washington, and in the Rocky Mountains as far south as northern New Mexico (Finch 1992).

This small forest owl is currently documented to occur on the Forest, although there is very little information on population densities or nesting locations. Surveys are currently being conducted on the Forest (personal communication, Pat Medina).

Natural History: The boreal owl is associated with relatively inaccessible tracts of high-elevation coniferous forest, especially mature to old-growth spruce and fir (Reynolds et al. 1989).

Throughout its range in the Rocky Mountain west, the boreal owl has mainly been found in higher-elevation conifers, primarily spruce-fir, but also in lodgepole pine and Douglas-fir habitats immediately adjacent to the spruce-fir zone (Hayward et al. 1987; Ryder et al. 1987; Reynolds et al. 1989). Roosting and foraging habitat during winter appears less restricted than in summer. In winter, they may move down in elevation and roost in protected forested areas (Hayward et al. 1987; Spahr et al. 1991).

Boreal owls are currently well-distributed across a large geographic range. There is a long-term concern about the reduction in habitat from even-aged timber harvest and catastrophic fires (Hayward and Vernor 1994).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7, #8

Olive-Sided Flycatcher (*Contopus borealis*)

Distribution: This long-distant Neotropical migrant breeds across Alaska, Canada, and the western and northeastern continental United States and winters in northern South America (Finch 1992). This small flycatcher is considered a summer resident on the Forest.

Natural History: Olive-sided flycatchers prefer tall conifers and mixed woods near edges, clearings and wooded streams (DeGraaf et al. 1991). They are most often observed perching, singing, or flycatching for insects at or near the tops of tall trees or snags. They forage by "hawking" flying insects from snags, tree tops, and on high exposed limbs and therefore inhabit stands with a low canopy cover percentage. Burned areas with residual tall snags are favored (DeGraaf et al. 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8,

Pygmy Shrew

Distribution: Pygmy shrews (*Sorex hoyi montanus*) range from the taiga of Alaska, across Canada and the northern United States, and in scattered populations in the Rocky Mountains

and southward in the Appalachian Mountains to North Carolina. U.S. populations are restricted to the northern Rocky Mountains, the Great Lakes, and New England, with isolated populations in the southern Rockies (i.e., northern Colorado). Local region records are from west of Fort Collins, Rabbit Ears Pass, Grand County, and near Gothic in Gunnison County. The pygmy shrew is currently documented as occurring on the Forest.

Natural History: In Colorado, pygmy shrews occupy damp spruce-fir and lodgepole pine forests, sphagnum bogs, moist meadows, and other wet areas at high elevations (Finch 1992).

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Golden-Crowned Kinglet

Distribution: The golden-crowned kinglet (*Regulus satrapa*) ranges widely from southern Alaska south throughout Canada, to southern California in both the coastal and interior ranges, through the Rocky Mountain states to Mexico, and in much of the eastern United States. Habitat is abundant and well-distributed over the entire Forest for this species, and they are currently documented as occurring.

Natural History: The golden-crowned kinglet is fairly non-specific in its requirements, needing only dense, shrubby undergrowth. It utilizes a wide variety of habitats throughout its range, including the undergrowth of deciduous or coniferous forests, brushy woodland edges, woodland thickets, burned coniferous and logged/thinned forests, riparian woodlands, willow thickets (especially with adjacent coniferous forest), and montane coniferous scrub. Nests are usually on the ground, occasionally in a shrub, and are well-concealed by surrounding tangles of vegetation. It feeds primarily on insects in summer and on seeds of weeds and some grasses in winter (DeGraaf et al. 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Purple Lady's Slipper (*Cypripedium fasciculatum*).

This member of the Orchid family is found on the Forest. It occurs in openings or densely shaded areas of conifer forests, in duff under lodgepole pine, and less frequently, under spruce/fir forests (Spackman et al. 1997).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Species with documented historical occurrences on or within the vicinity of the Routt National Forest, but not likely to currently occur:

Wolverine

Distribution: Wolverine (*Gulo gulo luscus*) have historically occurred throughout Canada and Alaska, the northwestern United States, the Pacific coast, the Rocky Mountains, and the Dakotas (Finch 1992).

There have been several unconfirmed sightings on the Forest over the last decade.

Natural History: Wolverine inhabit high mountain forests of dense conifer, and further north, tundra. The wolverine is very solitary; not much is known about its natural history. Wolverine prey upon a variety of mammals, as well as scavenge for carrion and supplement their diet with roots and berries. Wilderness areas of sufficient size to support wide-ranging individuals are important for the maintenance of viable wolverine populations.

Wolverines in the western conterminous U.S. exist in small populations in largely inaccessible areas. The Colorado population, if it still exists, may be isolated by the Wyoming and Central Rocky Mountain basins (Ruggerio et al. 1994).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Lynx

Distribution: Lynx (*Felis lynx canadensis*) ranges into the Rocky Mountains of Wyoming, Colorado, and Utah. They formerly occurred throughout Alaska, Canada, and the northern half of the United States (Finch 1992). Presently, the U.S. Fish and Wildlife Service is able to confirm the presence of Canada lynx only in Alaska, Montana, Washington, Wyoming, and Maine. This decline and regional extirpation has been linked to historical overtrapping and land use changes. The U.S. Fish and Wildlife Service believes that the states of Idaho, Michigan, Minnesota, Wisconsin, Utah, and Colorado probably have lynx, but that they are extremely rare (USDI-FWS 1997).

There are no confirmed sightings in recent years, and could be extirpated from the Routt National Forest.

Federal Status: A Distinct Population Segment: The U.S. Fish and Wildlife Service has recently determined that the Canada lynx in the contiguous United States constitutes a distinct population segment under the federal Endangered Species Act (USDI-FWS 1997). The U.S. Fish and Wildlife Service first determined that the Canada lynx in the contiguous United States is significant under the new vertebrate population policy, published February 7, 1996 (61 CFR

4722), thus allowing the Canada lynx population in the contiguous United States to qualify as a distinct population segment to be considered for listing under the federal Endangered Species Act of 1973, as amended (*id.*). Two reasons were given for the distinct population segment determination: 1) an isolated population fragment subject to varying management practices and 2) distinct habitat and population ecology. (USDI-FWS 1997)

Federal Status: Listing Warranted but Precluded: The U.S. Fish and Wildlife Service, having determined that the Canada lynx population in the contiguous United States constituted a distinct population segment suitable for listing under the federal Endangered Species Act of 1973, as amended, then concluded that listing the population as either threatened or endangered is warranted but precluded by work on other species having higher priority for listing (USDI-FWS 1997). The U.S. Fish and Wildlife used five standard criteria to reach this conclusion (according to section 4(a)(1) of the Act, with accompanying regulations (50 CFR part 424): 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial, recreation, scientific, or education purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or man-made factors affecting its continued existence. (USDI-FWS 1997)

Natural History: Lynx utilize large, interior tracts of subalpine, coniferous forest, preferring areas with dense trees, intermittent bogs, rocky outcrops, small clearings, brush undergrowth, and deep snow in winter. Lynx abundance, reproduction, survival, and demography are highly dependent on the snowshoe hare, its most common prey species. Lynx are mostly solitary, with home ranges from 10 to 240 square kilometers.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Mature Conifer Habitat and Associated Sensitive Species:

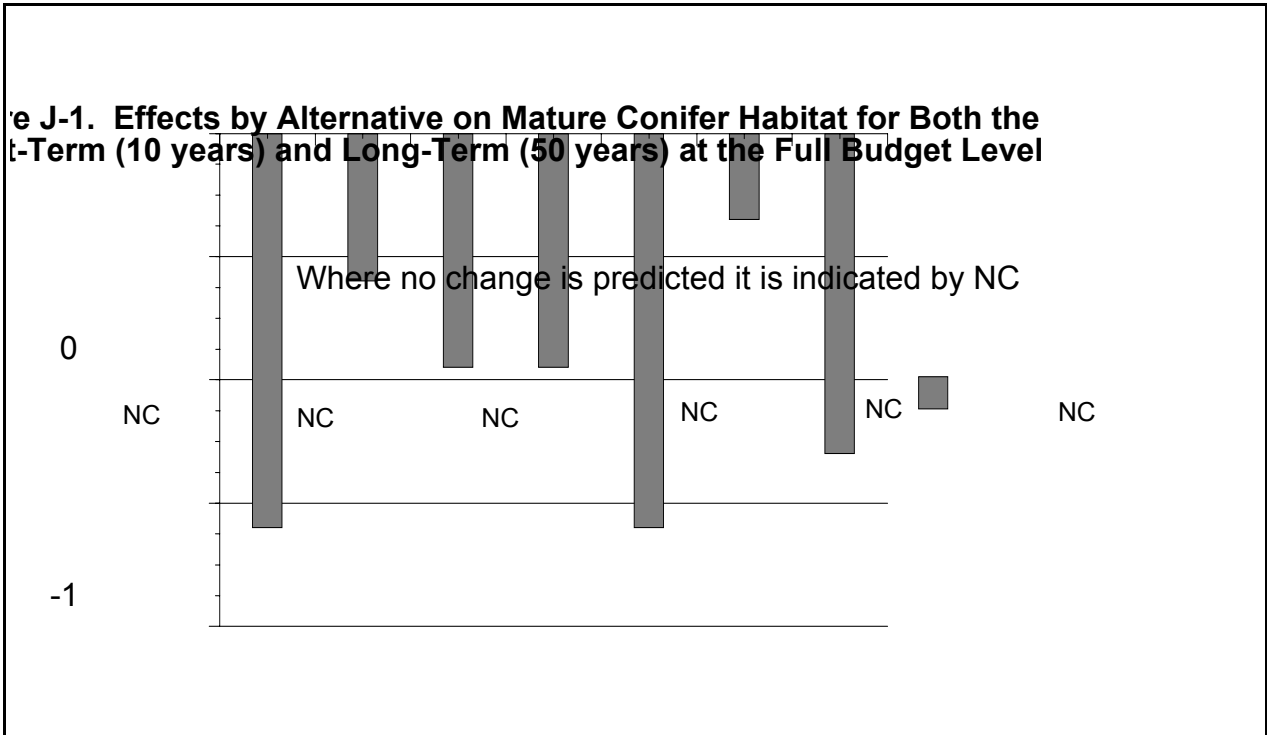
Projected direct and indirect effects by alternative, for the short term and long term, on the predicted percentage change in composition and structure of late successional habitat is displayed in Figure J-1. This habitat is well-distributed across the Forest. Clearcutting and overstory removal harvesting will be minimal.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

A reduction in the acreage burned on the Forest since the late 1890s has led to an increase in late successional habitat, most notably of subalpine fir. Under the historical fire disturbance regime, spruce/fir stands were probably characterized as younger, patchier stands. They also appeared to be, on average, larger in size.

Species associated with mature conifer may have more abundant habitat available today than historically.

Species that require, or take advantage of, post-fire conditions (olive-sided flycatcher, black-backed woodpecker, Lewis's woodpecker) have experienced a reduction in this type of habitat.



The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

The greatest potential cumulative effect to sensitive species over time on National Forest System lands and non-Forest System lands would be human-induced disturbance and the displacement of species and habitat associated with road construction. In addition to timber management, other permitted activities, such as hydropower development, water projects, and minerals development, often require road construction for implementation. Roads constructed for these and other activities add to the total road density both on and off the Forest.

Road closures and planned obliterations following project completion would partially mitigate these effects. However, it is reasonable to assume that the alternatives proposing the most miles of road over time would pose the greatest risk of adverse cumulative effects to sensitive species. The alternatives with the most miles of road proposed would be E, followed by A, G, D, C, B, and F.

Summary of Effects by Alternative

As is disclosed in Figure J-1, the composition and structure pattern of mature spruce/fir would not be significantly altered under any of the alternatives. This habitat currently composes about 23% of the Forest. The management activities in the various alternatives maintain mature spruce/fir habitat within 2% of current composition.

An analysis of the 29 proposed geographic areas on the Forest indicates this habitat (Figure J-2) is well-distributed over the Forest and will not change significantly between alternatives.

Compared to historical averages, patch sizes are smaller with less acreage in early structural stages. This is related to the function and severity of large stand-replacing fire. This pattern trend towards older structural stages, and smaller stand sizes would not vary among alternatives.

The function of late successional habitat (Figure J-3) was analyzed specifically on how it related to connectivity and corridors. GIS computer mapping was used to evaluate effects of the alternatives on connectivity and travel corridors for specific areas of concern on the Forest. These areas appear to be fragmented due to natural barriers, such as open river valleys, or human-created barriers, such as main highways or other large developments. Generally, the Forest's late successional habitat would remain well-distributed (Figure J-3) and would provide adequate travel corridors and habitat linkages under all alternatives. However, eleven areas of concern were identified. The alternatives were evaluated to determine how many of these eleven areas would be adversely affected if the alternatives were implemented. Alternative G would affect all eleven, A would impact ten, E would impact nine, C would impact eight, B and D would impact six, and Alternative F would impact two. These impacts would be primarily due to proposed harvest and roading in or near the connecting corridors. The complete analysis and maps are included in the Routt National Forest Biological Diversity Report, Appendix D.

The effects of the alternatives to the purple lady's slipper will be minimal. The purple lady's slipper exists in scattered populations across the Forest. Since application of the standards and guidelines will be consistent under all alternatives, effects at the programmatic level are minimal. Any effects to individual populations will be mitigated at the project level under all alternatives.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area nor cause a trend to federal listing or a loss of species viability rangewide"** is made for the black-backed and three-toed woodpeckers, the marten, northern goshawk, boreal owl, olive-sided flycatcher, pygmy shrew, golden-crowned kinglet, purple lady's slipper, wolverine, and lynx for any of the proposed alternatives.

Aspen Habitat

Habitat structural stages 3, 4, and 5.

Species known or suspected to occur on the Forest:

Purple Martin (*Progne Subis*)

Distribution: This Neotropical migrant breeds from southern Canada to northern Mexico, but populations are small and isolated in the Rocky Mountain states. It winters in South America. Due to its small, disjunct populations, its dependence on woodpecker cavities or nest boxes, and its restricted breeding localities in Colorado, the purple marten is classified as a sensitive species (Finch 1992). There are current documented occurrences of this species on the Forest, but population status is undetermined.

Natural History: The purple martin inhabits deciduous riparian woodlands, aspen stands, open coniferous forests, burns with snags, woodland edges, and urban areas. The western population of the purple martin typically nest in tree holes excavated by woodpeckers, in eaves of buildings, or in natural tree hollows. In southwestern and west-central Colorado, they reside locally in pure forests of mature aspen, nesting alone or in loose colonies in woodpecker cavities.

Mitigation and protection measures:

FWD-GO #1

FWS&G (BioD) #1, #2

FWS&G (TES) #7, #8

Merlin

Distribution: The merlin (*Falco columbarius*), or pigeon hawk, is a small compact falcon that summers over much of the western U.S. and winters in northern South America (Finch 1992). This species is unconfirmed but suspected to occur on the Forest during the summer.

Natural History: Merlin inhabit the prairie-parkland habitat of the northern Great Plains and forest edges, bogs, and lakes in the boreal and moist Pacific Coastal forests. They generally nest in trees from 5 to 60 feet above ground, often in old stick nests of crows, raves, magpies or other raptors, in or near open areas, and generally near water. They will occasionally nest on the ground, on the bare ledge of a cliff, or in tree cavities. They prey almost entirely on small to medium-sized birds and will also eat large insects, scorpions, spiders, toads, small snakes, bats, and small mammals (DeGraaf et al. 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #6, #8

Direct, Indirect and Cumulative Effects on Aspen Habitat and Associated Sensitive Species

There would be no significant direct or indirect effects by alternative, for the short term and long term, on the predicted percentage change in composition and structure of aspen habitat.

There is no protection or consideration afforded to Forest Service designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of

their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

The principle disturbance agents of aspen over the last several hundred years on the Forest have been wildfire and decay fungi. Due to a reduction of fire-induced rejuvenation on the Forest, the overall age of aspen stands has increased dramatically. There are far more late seral and climax aspen stands now than existed prior to the creation of the Routt National Forest near the end of the 19th century.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

Summary of Effects by Alternative

There would be no significant change in the aspen habitat complex over the short term or long term resulting from the proposed alternatives. Currently aspen acreage is estimated at about 259,000 acres or about 19% of the Forest (Figure J-4). This compares with an estimate of 20-25% historically. Aspen composition, structure, function, and pattern would not vary significantly by alternative. Aspen stands will continue to be older and smaller than the historical average, due to decreases in large stand-replacing fires. The alternatives would not alter this trend. Management direction under all alternatives is to maintain aspen, even at the expense of other late successional cover types. An analysis of the 29 proposed geographic areas indicate that aspen would remain well-distributed over the Forest, with 19 of the 29 geographic areas composed of 10% or more mature aspen habitat.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the purple martin and merlin for any of the proposed alternatives.

Lodgepole Pine

Due to ponderosa pine being very limited on the Forest, it has been included with lodgepole pine for purposes of this analysis.

Habitat structural stages 3, 4, and 5.

Species known or suspected to occur on the Forest:

Pygmy Nuthatch

Distribution: The pygmy nuthatch (*Sitta pygmaea*) ranges from southern interior British Columbia, northern Idaho, western Montana, central Wyoming, and southwestern South Dakota south to Baja California, Mexico, southern Nevada, central and southeastern Arizona, central New Mexico, western Texas, and western Oklahoma (DeGraaf et al. 1991).

This species is currently found in the vicinity of the Routt National Forest, but is otherwise not known to be present on the Forest. Because of substantial potential habitat and the fact that it is difficult to identify, this species has been included on the Forest list. No surveys have been conducted for pygmy nuthatch on the Forest.

Natural History: This small forest bird prefers open pine communities throughout the west. They prefer pine forests with dead trees for cavity nest sites. They usually excavate their nest cavity near the top of a dead pine where the wood is well-rotted or in the underside of a dead branch about 5 to 60 feet above the ground, often at least 25 feet from the ground. They will occasionally nest in aspen snags. Their diet consists of about 80% insects and spiders (DeGraaf et al. 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Flammulated Owl

Distribution: Flammulated owls (*Otus flammeolus*) range from southern British Columbia, southern Idaho, and northern Colorado south to southern California, southern Arizona, southern New Mexico, western Texas and Mexico. They winter in Mexico, casually north to southern California (DeGraaf et al 1991).

The flammulated owl has been documented on the Forest and is considered to be a likely breeder.

Natural History: This small migratory forest owl is associated primarily with the dry pine belt, foraging primarily in late successional stands of ponderosa pine that are pure or mixed with oak, pinyon pine, true fir, Douglas-fir or aspen. Flammulated owls depend on woodpeckers to provide nesting cavities. They feed almost exclusively on small invertebrates. (DeGraaf et al. 1991)

Flammulated owls appear to be holding their own. They are currently occupying all of their historic range in what appears to be good numbers (Hayward and Vernor 1994).

Mitigation and protection measures:

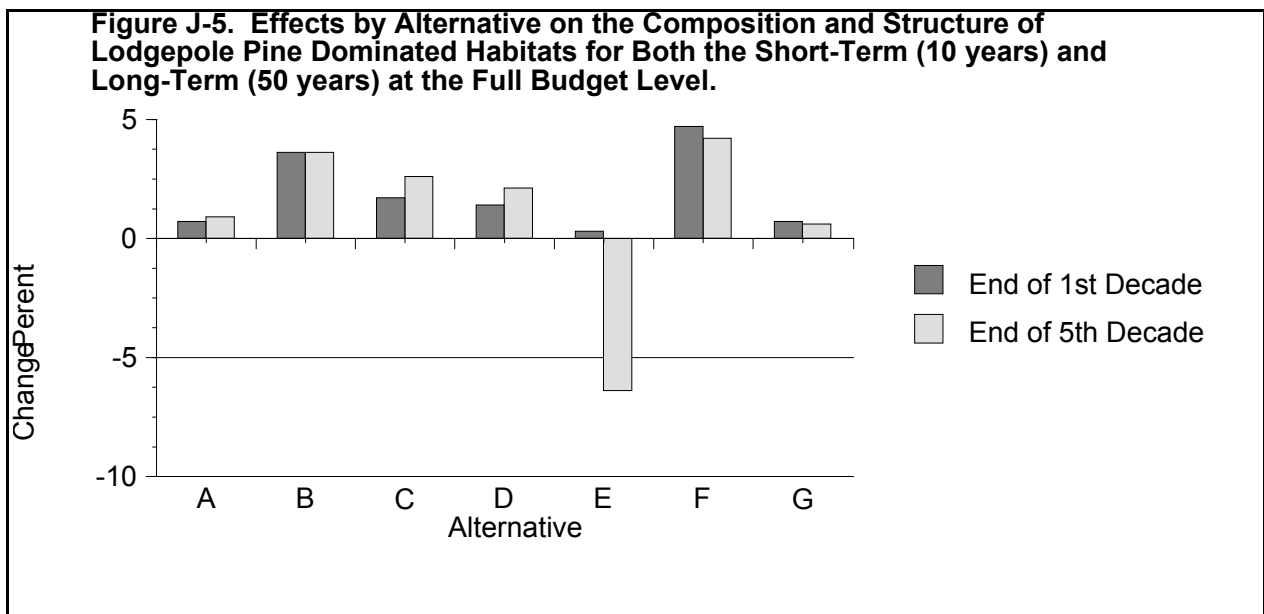
FWD-GO #1

FWS&G (BioD) #1, #2

FWS&G (TES) #7, #8

Direct, Indirect and Cumulative Effects on Lodgepole Pine Habitat and Associated Sensitive Species

The projected direct and indirect effects on the composition and structure of lodgepole pine-dominated habitats over the short and long term are displayed in Figure J-5. The figure displays the predicted percentage change in composition and structure of lodgepole pine habitat forestwide.



There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affect the overall viability and distribution of these species from a cumulative effects perspective.

The reduction in fire since the late 1800s accounted for the decrease in lodgepole habitat across the forest. In addition, past harvesting on the Forest has often removed lodgepole pine in favor of spruce.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

Summary of Effects by Alternative

Lodgepole pine-dominated habitat would increase slightly forestwide under all alternatives, except Alternative E. Under Alternative E, the habitat would decrease by 6% for the short-term. This decrease in mature lodgepole would be the result of timber harvest. Projected decreases would be less than 5% under all alternatives over the long-term.

Lodgepole pine is currently at the low end of historical composition, at about 28% of the total Forest. Historically lodgepole was estimated to comprise between 35%-45% of the Forest. Patch sizes have decreased over time, with fewer large, stand-replacing wild fires. Patch sizes are not predicted to change under implementation of any of the proposed alternatives. An analysis of 29 proposed geographic areas showed a range of between 1%-64% in total acreage of lodgepole pine stands (Figure J-6). This was expected since lodgepole pine is far more common on the east side of the Forest and would not change significantly between alternatives.

No effects to ponderosa pine habitats are anticipated with any of the alternatives. Ponderosa pine currently accounts for less than 1% of the Forest and would not vary significantly by alternative.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the pygmy shrew and the flammulated owl, for any of the proposed alternatives.

Mixed Deciduous/Shrublands Habitat

Species known or suspected to occur on the Forest:

Ringtail

Distribution: Ringtails (*Bassariscus astutus*) range throughout most of the southwestern United States. In the Rocky Mountain Region they are found in western Colorado and southern Wyoming, typically at lower elevations near perennial water sources (Finch et al 1992). Ringtails reach the northernmost edge of their range in the Lower Green River Basin and along the North Platte River, south of Seminoe Reservoir (Clark and Stromberg 1987). Ringtails are not known to be present on the Forest, but have been documented within the vicinity of the Forest boundary.

Natural History: Ringtails utilize a wide variety of habitats: talus cliffs, rocky canyons, chaparral, scrub oak, pinyon-juniper, riparian woodlands, and occasionally evergreen forests. Their dens are made in cliffs, rock outcrops, hollow trees, logs, buildings, and burrows of other animals. Ringtails are very seldom seen due to their nocturnal habits. Open water and denning requirements are critical features for the ringtail.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7, #8

Columbian Sharptailed Grouse

Distribution: This grouse is a resident (locally) from central Alaska and central Yukon to northern Ontario and west-central Quebec, south to eastern Oregon, central Utah, central Colorado, central Nebraska, central New Mexico, central Wisconsin, northern Michigan, and southern Ontario (DeGraaf 1991).

Natural History: Fragmented populations of the Columbian sharptailed grouse (*Tympanuchus phasianellus*) breed in mountain shrub communities of western Colorado (Finch 1992) and are found on the Forest. In Colorado, broods are often reared in grass/forb mountain meadows, and the quality of brood habitat can be affected by heavy livestock grazing.

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #1

FWS&G (TES) #4, #5, #8

Harrington Beardtongue (*Penstemon harringtonii*)

This penstemon grows on pinyon/juniper and sagebrush-dominated slopes (Spackman et al. 1997). It has not been documented on the Forest but does occur in the vicinity.

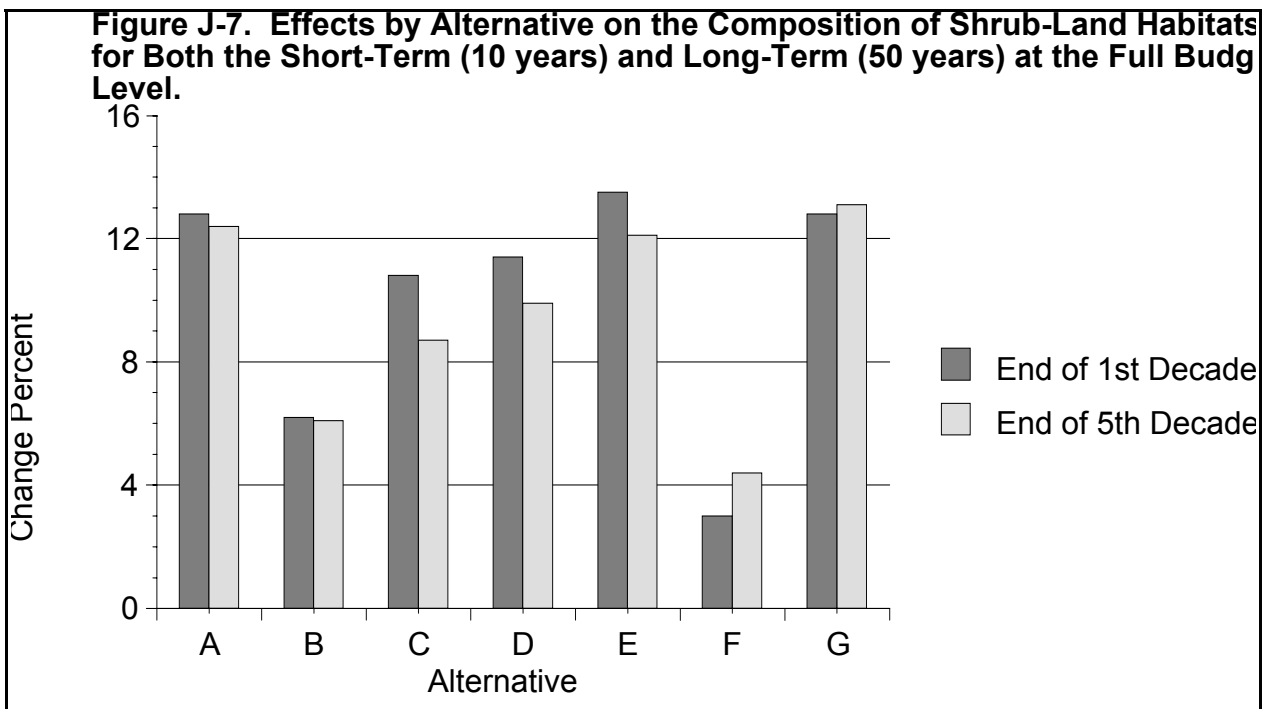
Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Mixed Deciduous/Shrublands Habitat and Associated Sensitive Species

The projected direct and indirect effects on shrub habitats from the proposed alternatives for the short and long term are displayed in Figure J-7. The figure displays the predicted percentage change in shrub composition forestwide.



There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. This is particularly true of riparian and grassland-associated species. Management of these lands significantly affect the overall viability and distribution of these species, from a cumulative effects perspective.

The current estimate of 68,000 acres accounts for about 5% of the Forest. This habitat appears to be at the high end of the historical range. Estimates are that about 90% of shrub species identified almost 100 years ago are still present today. The older stands, particularly oak brush, that originated from fire are likely to decrease in the future due to intensive fire suppression over the last several decades.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

Summary of Effects by Alternative

Under all of the proposed alternatives, shrub habitat would be maintained within 14% of existing acreage (approximately 68,000 acres or 5% of the Forest) at the full budget level. Alternatives G, A, and E would result in the most increase, primarily from acres harvested for timber. Alternatives B and F would result in less acreage being converted to shrubs at implementation of the full budget level. Effects on shrub composition and distribution would be similar under the experienced budget level for the short term and would result in less shrub habitat over the long term.

The predicted increase in shrub habitat is primarily due to forested cover types, mostly lodgepole pine, being temporarily converted to shrub land as a result of timber harvest. Current shrub-associated sensitive species would not likely benefit. These particular species are not forest-associated and would not be expected in the vicinity of timber harvests.

An analysis of 29 proposed geographic areas indicates that currently shrubs comprise between 1% and 12%. Compared to the Forest average of 5%, this indicates that this habitat is well-distributed over the Forest and is currently at its high historical range of 2%-4%. The shrub structure is not expected to change significantly under any of the alternatives.

Harrington beardtongue has not been documented on the Forest. The allocations and management area prescriptions proposed in any of the alternatives would not affect the known populations of this plant. If this species should be documented on the Forest, application of the standards and guidelines will protect populations from detrimental effects. In general, the greatest potential threats to known populations of sensitive plants would be from proposed recreation developments and associated loss of habitat.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the ringtail and Columbian sharptailed grouse, and Harrington beardtongue, for any of the proposed alternatives.

Non-Forested Communities

Riparian/Wetlands Habitat

Species known or suspected to occur on the Forest:**Greater Sandhill Crane**

Distribution: In the west, the greater sandhill crane (*Grus canadensis*) breeds from the Arctic coast south in scattered populations to northeast California and west to northern Colorado (Finch 1992).

Natural History: This crane nests locally, including the Routt National Forest, in marshes, mountain meadows, and riparian habitats. The cranes winter in large river drainages in the Southwest.

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #4, #8

Fox Sparrow (*Passerella iliaca*)

Distribution: Larger than the common house sparrow, this species varies widely in color pattern over its range. Fox sparrows have been documented as occurring on the Forest, and there have been documented reports of this species wintering in north central Colorado.

Natural History: This species is fairly nonspecific in its habitat requirements, needing only dense, shrubby undergrowth. It will inhabit a variety of habitats throughout its range, including the undergrowth of deciduous or coniferous forests, brush woodland edges, woodland thickets, chaparral, burns, cut over areas, scrub, riparian woodlands, willow thickets, and montane coniferous scrub. Fox sparrows commonly nest on the ground, or in a bush or tree. They prefer conifers for nesting. They feed primarily on insects in summer and on seeds of weeds and some grasses in winter (DeGraaf et al. 1991)

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Tiger Salamander

Distribution: Confined to North America, ranging from Alaska and Canada to the central plateau of Mexico (Baxter and Stone 1980).

In Colorado, tiger salamanders (*Ambystoma tigrinum*) have a wide habitat tolerance, having been documented in ponds, lakes, reservoirs, and stock ponds. Surveys have been conducted on the Forest for this species.

Natural History: Tiger salamanders are found in virtually any habitat, providing the terrestrial substrate is suitable for burrowing and a body of water nearby is suitable for breeding. Terrestrial adults are usually found underground, in self-made burrows or in those made by rodents or other animals. Tiger salamanders documented on the Routt National Forest have been primarily found in lakes and active and inactive beaver ponds.

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Boreal Western Toad

Distribution: The boreal western toad (*Bufo boreas boreas*) ranges from southeastern Alaska, south through the Rocky Mountains to northern New Mexico. West of the Rocky Mountains, this toad can be found in grasslands and dry habitats to sea level (Stebbins 1966). In Colorado and Wyoming, it is usually found in springs, streams, ponds and lakes, foothill woodlands, mountain meadows, and moist subalpine forest.

Western boreal toads have been extensively surveyed on the Forest, with many documented sightings. A boreal toad recovery plan was developed by the Colorado Division of Wildlife. In July 1994, the U.S. Fish and Wildlife Service published a petition in the Federal Register to list the boreal toad. They presented "substantial information indicating that listing the southern Rocky Mountain population of the boreal toad as endangered may be warranted." At the time of publication of this document, the U.S. Fish and Wildlife Service had not made a final determination on the petition to list the boreal toad as an endangered species.

Natural History: The Western boreal toad lives near springs, streams, ponds, and lakes in foothill woodlands, mountain meadows, and moist subalpine forest to 3,200 m. During the day it buries itself in loose soil or gopher or squirrel burrows near the water. At night, it ranges away from water, feeding primarily on ants. The primary threats to this species include disturbance, degradation, and loss of wetland habitats; conversion of small ponds into larger reservoirs by damming; and trout introduction and predation on toad larvae. In addition, impacts by livestock, timber management practices, human recreation, and water pollution may potentially jeopardize toad populations.

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Northern Leopard Frog

Distribution: The northern leopard frog (*Rana pipiens*) is distributed widely across the United States, Mexico and Canada (Finch 1992). There are scattered isolated populations in the southwest portion of its range, including southern Wyoming and northern Colorado. Preferred habitats include cattail marshes, beaver ponds, and other permanent water sources with aquatic vegetation, at elevations below 10,000 feet.

This frog has been documented on the Forest, and surveys have been conducted to better determine its population status and habitat requirements.

Natural History: Their preferred habitats include cattail marshes, beaver ponds, and other permanent water sources with aquatic vegetation, at elevations below 10,000 ft. Breeding is opportunistic and can occur at any time of the year following heavy rainfall. The northern leopard frog is rarely found near ephemeral ponds.

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Wood Frog

Distribution: Though widespread from Alaska east through Canada and northeastern United States, the wood frog (*Rana sylvatica*) has a disjunct (geographically separated) and extremely limited distribution in the Rocky Mountains (Finch 1992). Locally, it occurs in small isolated populations in the Medicine Bow Mountains of Colorado and Wyoming and in the Rabbit Ears and Park Ranges of Colorado.

Wood frogs have been documented on the Forest, and surveys have been conducted to better define population status and habitat requirements.

Natural History: Wood frogs inhabit small marshy ponds that often dry up, slow moving streams, and inactive beaver ponds in the montane zone to 3,050 m. Egg masses are laid in cool waters, typically along northern sunlit shores. Reproduction is not successful in ponds inhabited by trout (Finch 1992).

Mitigation and protection measures:

FWD-GO #1

FWS&G (Range) #2

FWS&G (TES) #7, #8

Hanging Garden Sullivantia (*Sullivantia hapemanii* var. *purpusii*)

Although this species has not been recorded on the Forest, it is found in the vicinity. It requires cool, moist habitats usually found on cliffs of various geology in the riparian zones of canyons (Spackman et al. 1997).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Roundleaf Sundew (*Drosera rotundifolia*)

Roundleaf sundew occurs on floating peat mats; in bogs; and on the margins of acidic ponds, fens, and kettle lakes (Spackman et al. 1997). This species has been documented to occur on the Forest.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Livid Sedge (*Carex livida*)

This species has been documented to occur on the Forest. It occurs as disjunct populations in Colorado. It is associated with wet areas, rich fens, and mineral-rich wetlands (Spackman et al. 1997).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Species with documented historical occurrences on or within the vicinity of the Forest, but not likely to currently occur:

White-Faced Ibis

Distribution: The white-faced ibis (*Plegadis chihi*) breeds locally from central California, eastern Oregon, southern Idaho, Montana, southern North Dakota, and southwestern Minnesota south to Mexico; and from eastern Texas and southern Louisiana east occasionally to Florida.

An occasional migrant within the vicinity of the Forest.

Natural History: These birds inhabit wetland habitats, preferably marshes and sloughs or ponds surrounded by low bushes or willows, and emergent vegetation such as bulrushes. They may also be found in tule or bulrush swamps, in centers of ponds, and in irrigated rice fields. The roost in marshes in the evenings. They are colonial nesters. They feed on insects, newts, leeches, worms, mollusks, crustaceans, frogs, fishers, and some snails (DeGraaf et al. 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Lewis' Woodpecker

Distribution: Lewis' woodpecker (*Melanerpes lewis*) breeds from southern British Columbia, south through most of the western states and east to southwestern South Dakota and northwestern Nebraska.

Confirmed as likely breeder in vicinity of the Forest.

Natural History: This bird inhabits open country with scattered trees rather than dense forests. They generally excavate their own nest in dead trees or tall stumps but will use natural cavities or old excavated nest sites. Their major breeding habitat probably consists of open or park-like ponderosa pine forests. They are also attracted to burned-over stands of Douglas-fir, mixed conifer, pinyon-juniper, riparian, and oak woodlands. They may also be found in the fringes of pine and juniper tree stands and in deciduous forests, especially riparian cottonwoods (DeGraaf et al. 1991; Oakleaf et al. 1992).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Long-Billed Curlew

Distribution: The long-billed curlew (*Numenius americanus*) historically nested in relatively high abundance in prairie-like habitats across North America, from Montana to Texas. They winter from central California, southern Texas, southern Louisiana, and coastal South Carolina south to Mexico.

A likely breeder in North Park, in vicinity of the Forest.

Natural History: They inhabit grasslands ranging from moist meadowland to very dry prairie. During the breeding season, they commonly perch on bushes, low trees, dirt mounds, rocks, stumps, fenceposts, utility poles, or on other elevated sites. During other seasons they frequent wet habitats, such as shallow margins of inland and coastal waters, open areas of marshes, intertidal zones, or sandbars. Their nest is a slight hollow on the ground, usually in flat areas among short grasses. They feed by probing and pecking in wet sand or mud, under shallow water, or in uplands, usually on beetles, grasshoppers, caterpillars, other insect larvae, mud crabs, fiddler crabs, ghost shrimp, and occasionally small fish and berries (DeGraaf et al 1991).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Black Tern

Distribution: The black tern (*Chlidonius niger*) is found throughout temperate North America and Eurasia, breeding in Canadian prairie wetlands and taiga bogs, and in marshes in the northcentral, central, and western United States (Finch 1992).

Black terns are not confirmed on the Forest, but are occasionally observed in wetlands statewide.

Natural History: They inhabit shallow marshes, open areas of deeper marshes, reed-bordered sloughs, natural ponds, lakes, fish and stock ponds, shallow river impoundments, wet meadows, river oxbows, ditches, edges of streams, and swampy grasslands. They require aquatic habitats with extensive stands of emergent vegetation and large areas of open water. They often nest in colonies, but occasionally nest singly. They feed on aquatic and terrestrial insects, worms, small mollusks, crustaceans, and a few small fish and grubs.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Riparian Habitat and Associated Sensitive Species

The Forest appears to have less acres of riparian habitat than it did in the mid 1800s. The composition and structure of riparian vegetative communities has been altered by land use activities, causing this habitat community to be outside the range of natural variability.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality

of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

The habitat of the three sensitive plants associated with riparian areas would be affected to the same extent as riparian areas (see the Water section of the FEIS). These riparian areas receive protection under all alternatives through the application of the forest-wide standards and guidelines and the Watershed Conservation Practices Handbook (FSH 2509.25). The possibility for damage to riparian/wetlands habitat is greater in those alternatives with greater activity levels, such as road building and timber harvesting. However, identification of riparian areas and known plant locations during project-level planning and monitoring of Best Management Practices should prevent adverse effects to these species.

Summary of Effects by Alternative

The acres of riparian and wetland habitats will not change by alternative. There are currently 61,352 acres on the Forest (Figure J-8). Approximately 51,631 acres, or 84% is classified as riparian habitat, and 9,721 acres, or 16% is classified as wetland habitat.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the greater sandhill crane, fox sparrow, tiger salamander, boreal western toad, northern leopard frog, wood frog, white-faced ibis, Lewis' woodpecker, long-billed curlew and black tern, Hanging Garden Sullivantia, roundleaf sundew and livid sedge, for any of the proposed alternatives.

Grasslands/Forblands**Species known or suspected to occur on the Forest:****Loggerhead Shrike**

Distribution: The Loggerhead shrike (*Lanis ludovianus*) breeds from central Alberta, central Saskatchewan, southern Manitoba, Minnesota, central Wisconsin, central Michigan, and southeastern Ontario, south to Mexico and the Gulf Coast (Finch 1992). They winter in the southern half of the United States and in Mexico. The loggerhead shrike is an uncommon summer resident in the Rocky Mountains. Breeding bird surveys from 1966 to 1987 indicate sharp population declines throughout the United States. This species has been documented as occurring on the Forest. Shrikes will utilize a wide variety of habitats.

Natural History: Loggerhead shrikes inhabit open country with scattered shrubs or small trees, such as shelterbelts, cemeteries, farmsteads, or hedgerows in the plains country and Midwest. In the west, they breed in savannah, pine-oak woodlands, and chaparral types and prefer very open stands. Their nest is bulky, cup-shaped and found in a variety of shrubs and low, dense trees, rarely less than 3 feet or more than 25 feet above the ground. In the West, its diet is primarily composed of insects (mostly grasshoppers and crickets).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #5, #8

Ferruginous Hawk (*Buteo regalis*)

Distribution: This large grassland-associated hawk breeds from the Canadian prairie provinces south to Oregon, Nevada, Arizona, and Oklahoma (Finch 1992). Population trends in Canada have been reported as declining; in the United States, population trends are inconsistent. Ferruginous hawks have been documented on the Forest and confirmed nesting has been reported within the vicinity of the Forest.

Natural History: Ferruginous hawks inhabits the semiarid western plains and arid intermountain regions. They prefer relatively unbroken terrain, with scattered trees, rock outcrops, or tall trees along creek bottoms available for nesting sites. They generally winter on the southern plains. For nesting, they prefer tall trees but will also nest on riverbed mounds; cutbanks; low hills, buttes, and small cliffs; in short trees in open country; on powerline structures; and in haystacks. They feed primarily on ground squirrels, rabbits, and prairie dogs.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #4, #6, #7, #8

Rabbit Ears Gilia (*Ipomopsis aggregata* spp. *weberi*)

This species occurs on the Forest in coniferous forest openings and meadows. It is often associated with disturbed sites, steep slopes, road cuts, and meadows with active ground squirrels.

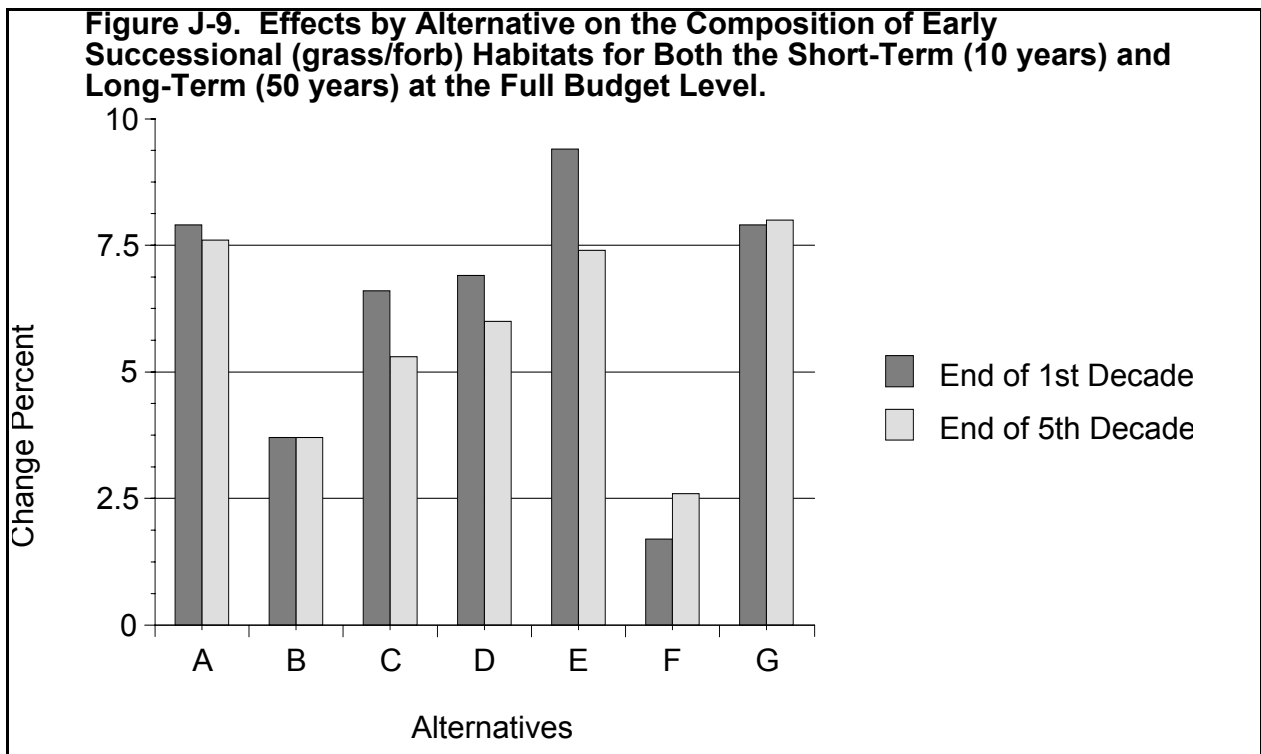
Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Grasslands/forblands and associated sensitive species

The projected effects of the proposed alternatives on the composition of grass/forb-dominated habitats for the short and long term are displayed in Figure J-9. Figure J-9 also displays the predicted percentage change in grass/forb habitat forestwide.



There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

Grasslands currently account for approximately 9% of the Forest (117,000 acres). This percent coverage appears to be within the range of natural variability, of 8-10% historically. Heavy livestock use in the past likely contributed to the early seral condition of today's Forest grasslands.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

Summary of Effects by Alternative

Due to projected levels of vegetative management, the total percentage of the Forest in the grass/forb habitat would slightly increase under all alternatives for both the short and long term. This would vary between a high of 10% with Alternative E, for the long term, to a low of just over 2% with Alternative F.

This projected increase in grass/forb habitat, resulting primarily from timber harvest, would not likely benefit the current grass/forb associated sensitive species. This is because these particular species are associated more closely with open plains grasslands and would not likely be found in the higher elevation forested areas where the transitory conversion from mature forest to grass/forb habitat would occur.

The projected percentage of coverage for all alternatives would remain within the natural range of variability of 8% to 10%. Pattern and distribution forestwide would not change significantly with any of the alternatives. Currently grass/forb habitat (Figure J-10) ranges from 2% to 35% coverage on the 29 proposed geographic areas on the Forest.

At the experienced budget level, increases in grass/forb acreage due to increased level of acres harvested for timber would result in about half that displayed for the full budget level. This would still be in the range of natural variability.

The effects of the alternatives to Rabbit Ears gilia will be minimal. These plants exist in scattered populations across the Forest. Since application of the standards and guidelines will be consistent with all alternatives, effects at the programmatic level are minimal. Any effects to individual populations will be mitigated at the individual project level with all alternatives.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the loggerhead shrike, ferruginous hawk, and Rabbit Ears gilia, for any of the proposed alternatives.

Specialized Habitats

Open Water

Species known or suspected to occur on the Forest:**Colorado River Cutthroat Trout**

Distribution: Colorado River cutthroat trout (*Oncorhynchus clarki*) prefer clear, cold, mountain streams. Cool temperatures are provided by healthy streamside riparian vegetative communities. This species of trout is intolerant of sedimentation of spawning gravels. Due primarily to the introduction of non-indigenous species of fish, this subspecies of cutthroat has become restricted to isolated, higher-elevation, low-order (smaller) streams on the Forest.

The Forest currently estimates that 190 stream miles of potential habitat exists within the Forest. The Forest will continue to support the guidelines prescribed in the Conservation Plan for Colorado River cutthroat trout in northwest Colorado under all alternatives. This plan is a cooperative effort between federal and state agencies.

Natural History: These trout live in small streams, large rivers, or lakes. They feed on a variety of organisms. Growth depends on food availability, size of prey, degree of intraspecific and interspecific competition, water temperature, and the length of the growing season (USDA Forest Service, 1976). Any factors that lead to loss of cover, siltation, and increases in water temperature will have detrimental effects on cutthroat trout. The most significant limiting factor for the perpetuation of pure populations of cutthroat trout is the hybridization that results from the introduction of rainbow trout and exotic subspecies of cutthroat trout.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Osprey

Distribution: The osprey (*Pandion haliaetus*) is a cosmopolitan (found in other parts of the world) species, historically breeding throughout much of North America. Osprey suffered severe population declines following World War II due to consumption of fish contaminated with chlorinated hydrocarbons (Henny 1975). As of 1984, only seven nesting pairs were recorded in four isolated areas of Colorado. Populations have dramatically increased in some areas following increased regulation of pesticides. They are considered a rare to uncommon local summer resident. While they are frequently observed on the Forest, there are no nesting records.

Natural History: The osprey occupies a wide range of habitats in association with water, primarily near lakes, rivers, and along coastal waters with adequate supplies of fish. They nest in loose colonies or singly and use a wide variety of structures to support large stick nests. They prefer snags in or near water, with a broken top or side limbs able to support the nest. They prefer snags that are tall, with good visibility and security. Osprey feed almost exclusively on fish but will also eat frogs, snakes, ducks, crows, and small mammals.

Mitigation and protection measures:

FWD-GO #1

FWS&G (BioD) #1, #2

FWS&G (TES) #6, #8

Rocky Mountain Capshell Snail

Distribution: This capshell snail (*Acroloxus coloradensis*) has been documented as occurring on only nine locations in Canada, one in Montana, and three in Colorado. Two of the three locations in Colorado were from the northeastern portion of the Forest. Researchers believe they may be more widespread than previously thought. No surveys have been conducted on the Forest for invertebrates.

Natural History: Very little is known about the specific life history and habitat requirements of the Rocky Mountain capshell snail. It is a freshwater snail that is hermaphroditic (both the male and female reproductive organs are in the same individual). The Rocky Mountain capshell snail has been known to overwinter, though the ecology of overwintering for this species is unknown. This snail inhabits primarily oligotrophic and mesotrophic lakes, and typically utilizes boulder and cobble substrates in shallow water near the shore. The Rocky Mountain capshell snail may require a certain set of water quality characteristics to live and reproduce. In particular, adequate concentrations of bound carbonates and dissolved oxygen, as well as an alkaline pH may be essential water quality conditions for this snail.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7, #8

Cockerell's Striate Disc Snail

Distribution: In Colorado, the Cockerell's striate disc snail (*Discus shimeki cockerellii*) may be expected to occur wherever aspen or narrow-leaved cottonwood groves are found above 8000 feet (Pilsbry 1948).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #7, #8

Direct, Indirect and Cumulative Effects on Open Water Habitat and Associated Sensitive Species

There would be no significant direct or indirect effect on open water habitat for any of the alternatives.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

The occurrence and distribution of many of the migratory sensitive species, such as the Neotropical migrant bird species that occur on the Forest, is only partially related to the quality of Forest habitat. For these species, habitat on their winter ranges is as important as breeding habitat for maintenance of viable populations. No management requirements or mitigation

requirements prescribed on the Forest could provide replacement habitat or compensate for the potential effects to these species due to the loss of critical habitat on non-Forest Service lands.

Summary of Effects by Alternative

Open-water habitat will not change by any alternative. There are currently 1,801 miles of perennial river and streams on the Forest and approximately 2,923 acres of lakes and reservoirs. The Conservation Plan for Colorado River cutthroat trout in northwest Colorado will be considered under all alternatives.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the Colorado River cutthroat trout, osprey, Rocky Mountain capshell snail, and Cockerell's striate disc snail, for any of the proposed alternatives.

Alpine Habitat

Species known or suspected to occur on the Forest:

Dwarf Shrew (*Sorex Nanus*)

Distribution: This small shrew typically occurs as isolated deems (sub-populations) in alpine and subalpine habitat that is usually in association with rock slides and talus slopes. No surveys have been conducted, and the species has not been confirmed on the Forest, though their presence is suspected.

Natural History: Little is known concerning the natural history of the dwarf shrew. It was formerly thought that the dwarf shrew was limited to subalpine and alpine rock slides, but they have since been reported from north-central Montana and central Colorado at considerably lower elevations. Some were reported from shortgrass habitats in South Dakota at even lower elevations. Factors that have historically limited, or may currently jeopardize, dwarf shrew populations are loss of specialized habitat, prey, or nest sites (Finch 1992).

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Colorado tansy-aster (*Machaeranthera coloradoensis*)

Distribution: This species is found in gravelly areas in mountain parks and rock outcrops between 8,500 and 12,500 feet in elevation. It is suspected but not documented on the Routt. It is found on the Medicine Bow National Forest in Wyoming.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Alpine Habitat and Associated Sensitive Species

The current estimate of approximately 54,000 acres comprising 5% of the Forest has not changed significantly over time and is not expected to change under any of the alternatives.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

Summary of Effects by Alternative

Alpine/talus is a unique habitat that will not vary by alternative. The Forest currently has approximately 55,000 acres of this high-elevation habitat.

Determination: Based on the above, a determination of "**May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide**" is concluded for the dwarf shrew, for any of the proposed alternatives.

Caves/Mine Shafts

Species known or suspected to occur on the Forest:

Townsend's Big-Eared Bat

Distribution: The Townsend's big-eared bat (*Plecotus townsendii*) ranges throughout western North America, south to central Mexico (Finch 1992). This bat occupies a variety of habitats, including desert shrublands, pinyon/juniper woodlands, and high-elevation coniferous forest. Caves and abandoned mine shafts are used by large concentration of bats for day and hibernation roosts. This bat has not been confirmed on the Forest, and no surveys have been conducted for it.

Natural History: These bats hibernate in caves and mines, beginning about October (this will vary slightly depending on elevation and weather). They begin to become active in March or April, and the females gather in maternity colonies to give birth from May to June. They are commonly found in mesic habitats (coniferous and deciduous forests) although they've also been found in xeric habitats, including pinyon-juniper, sagebrush, and pine (Garber 1991). They are insectivores, feeding primarily on small moths high in the forest canopy. Occasionally they glean beetles, flies, and insects from leaves.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #2, #8

Fringe-Tailed Myotis

Distribution: The fringed myotis (*Myotis thysanodes*) ranges from British Columbia through the western states, skirting Wyoming, to southern Mexico (Finch 1992). This species of bat inhabits mid-elevation grasslands, deserts, and oak and pinyon woodlands. It has also been reported in high-elevation spruce/fir forests. In Colorado, fringed bats are reported to breed in caves and winter in low-land shrub forests. This species has not been confirmed for the Forest, and no surveys have been conducted.

Natural History: This bat feeds largely on arthropods, such as moths, daddy longlegs, and beetles. They emerge to feed about 2 hours after sunset and forage over and along water courses or above the canopy of shrublands and woodlands. They breed in the fall; in spring, ovulation, fertilization, and implantation takes place.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #2, #8

Spotted Bat

Distribution: The spotted bat (*Euderma maculatum*) ranges from Mexico through the western states to the southern border of British Columbia. Its distribution is extremely patchy, and its habitat preference is known primarily from collected specimens (Finch 1992). There are no confirmed sightings of spotted bats on the Forest, and no surveys have been conducted.

Natural History: Relatively little is known about the life history of spotted bats. They have most often been trapped in dry, rough, desert terrain. During the day, bats roost along in rock cracks and crevices, frequently returning to the same cliff face to roost. After the breeding season, they may wander into other habitats. They will fly several miles in search of water, and trap sites set over waterholes have provided most of the bat records. Moths are the primary food for these bats.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #2, #8

Direct, Indirect and Cumulative Effects on Caves/Mine Shaft Habitat and Associated Sensitive Species

There are no anticipated direct, indirect, or cumulative impacts to this habitat from any of the alternatives.

Summary of Effects by Alternative

This specialized habitat will not vary by alternative. Forest-wide standard and guideline #3 (cave and mine shaft management) will ensure that this important habitat for bats and some other species of wildlife is protected under all alternatives.

Projected direct and indirect effects by alternative, for the short term and long term, on the predicted percentage change in composition and structure of mature spruce/fir habitat is displayed in Figure J-1.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the Townsend's big-eared bat, the fringe-tailed myotis, and the spotted bat, for any of the proposed alternatives.

Cliffs With Waterfalls

Species known or suspected to occur on the Forest:

Black Swift (*Cypseloides niger*)

Distribution: These dark swallow-like birds are found in isolated populations throughout the western states, usually associated with rocky cliffs, ledges, and caves near water (DeGraaf et al. 1991). Nests are often located behind waterfalls. They are normally colonial nesters. Black swifts have not been documented on the Forest, although their occurrence is suspected due to extensive amounts of preferred habitat.

Natural History: Black swift are found in areas with rocky cliffs available for nesting, varying from ocean cliffs to mountain ledges, at elevations from sea level to 11,000 feet. They nest in small colonies, from 5 to 15 pairs, on a sea cliff, ledge, or cave, or in a crevice or ledge on a sheer, high, moist cliff face near or behind a waterfall, or over a pool. They feed exclusively on insects captured, usually high in the air, during long-distance foraging flights over all types of terrain.

Mitigation and protection measures:

FWD-GO #1

FWS&G (TES) #8

Direct, Indirect and Cumulative Effects on Cliffs with Waterfalls Habitat and Associated Sensitive Species

There are no anticipated direct, indirect or cumulative impacts to this habitat from any of the alternatives.

There is no protection or consideration afforded to Forest Service-designated sensitive species on private or other public lands. Some sensitive species have a relatively large proportion of their habitat located on private land. Management of these lands significantly affects the overall viability and distribution of these species from a cumulative effects perspective.

Summary of Effects by Alternative

No significant effects are anticipated under any of the alternatives. Resource protection measures designed to ensure water quality and riparian health would prevent this specialized habitat from being impacted by proposed management activities.

Determination: Based on the above, a determination of **"May adversely impact individuals, but not likely to result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide"** is concluded for the black swift, for any of the proposed alternatives.

Determination Of Effects On Sensitive Species

It is the determination of this biological evaluation that the levels of management activities proposed in all of the alternatives **"may adversely impact individuals, but [are] not likely to result in a loss of viability on the Planingng Area, nor cause a trend to federal listing or a loss of species viability rangewide."** This determination is based on the minimal changes in the composition, structure, function, pattern, and distribution of sensitive species habitat and the implementation of mitigation measures designed to protect sensitive species and their habitat. This would be the determination at both the experienced and full implementation budget levels.

Determination Of Effects Of The Proposed Alternatives On Species Viability

The conclusion is that any of the proposed alternatives may adversely impact individuals or small groups of species, but none is likely to result in a loss of viability for any of the analyzed species in the planning area nor cause a trend towards federal listing or a loss of species viability at the Forest, Section or Province level. This would be true for both the experienced and full implementation budget levels. It is also concluded that, under all the alternatives, fish and wildlife habitat would be managed to maintain viable populations of existing native and nonnative vertebrate species on the Forest.

This determination and conclusion is based on the following:

- There are no adverse impacts resulting from the forestwide programmatic decisions under any of the alternatives to threatened, endangered, or sensitive species.
- Conservation agreements between the Forest Service and other state and federal agencies will be developed and approved as necessary for candidate and sensitive species to preclude the need for federal listing or prevent extirpation of the species from the planning area.
- Land allocations are proposed under all of the alternatives that contain sensitive plants and habitat for all listed or sensitive animal species where no ground-disturbing activities would be proposed. This would include existing and proposed wilderness, research natural areas, core areas, etc. The acreage allocated to each varies by alternative.
- There is little predicted change in habitat complexes over the short term (10 years) or long term (50 years) for any of the proposed alternatives at the Forest, Section, or Province level. An analysis of 30 geographic areas within the Forest indicated that current habitats will continue to be well-distributed and remain within the range of natural variability.
- A forestwide GIS computer mapping analysis of potential old-growth stands determined that adequate blocks of late successional or old growth habitat will be well-distributed over the Forest to link ecosystems within and adjacent to the Forest and ensure species dispersal and recruitment.
- An analysis of road density and habitat effectiveness indicates that levels will not vary significantly from the current (i.e., <0.22% road density and <10% for habitat effectiveness) for any alternative over the short or long-term.
- At either the Province or Section level, adequate habitat is available to ensure viability for all species analyzed. No animal species are restricted to

just the Forest or depend on habitat within the Forest exclusively to maintain viability.

- Biological evaluations will be completed for projects or activities permitted under this Revised Plan to address the effects on sensitive plants. The following are examples of general measures that could be employed to avoid or mitigate impacts to sensitive plants:
 - Avoid the sensitive plants or their habitat.
 - Limit the degree or magnitude of the impact.
 - Reduce impacts by requiring timing stipulations.
 - Repair, rehabilitate, or restore following the activity.
 - Compensate by creating or enhancing other habitat.
 - Consider alternative methods to complete the activity.

Specific direction, standards, and guidelines that address each sensitive species or assemblage of sensitive species have been proposed forest-wide. In addition, the proposed management area prescriptions have more standards and guidelines designed to protect sensitive species and their habitat. These standards and guidelines vary by alternative in the number of acres that they would be applied to.

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Dated:

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Dated:

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