



United States Department of Agriculture

Volume 3—Final Environmental Impact Statement for the Forest Plan Amendments: Incorporating Habitat Management Direction for the Northern Continental Divide Ecosystem Grizzly Bear Population

Helena-Lewis and Clark, Kootenai, and Lolo National Forests



Forest Service

Northern Region

November 2018

"...for the greatest good of the greatest number for the longest time." —Gifford Pinchot, founding Chief of the Forest Service, 1905

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Volume 3—Final Environmental Impact Statement for the Forest Plan Amendments to Incorporate Habitat Management Direction for the Northern Continental Divide Ecosystem Grizzly Bear Population

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Abstract: Volume 3 of the final environmental impact statement documents analysis of three alternatives developed for the forest plan amendments to incorporate habitat management direction informed by the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy into the Helena, Lewis and Clark, Kootenai, and Lolo National Forest plans.

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Terms

Term	Additional information/full name
amendment forests	Collective term for the Helena-Lewis and Clark, Kootenai, and Lolo National Forests
draft Conservation Strategy	Draft NCDE Grizzly Bear Conservation Strategy (USFWS, 2013)
NCDE Conservation Strategy	Conservation Strategy for the Grizzly Bear in the Northern Continental Divide Ecosystem (IGBC, 2018)
the Forest	Flathead National Forest (or, in the context of the amendments, the Helena-Lewis and Clark, Kootenai, or Lolo National Forest)
assessment	Assessment of the Flathead National Forest
forest plan	Flathead National Forest Land Management Plan (or, in the context of the amendments, the Helena, Lewis and Clark, Kootenai, or Lolo forest plan)
1986 forest plan	Flathead National Forest Land and Resource Management Plan (1986) (or, in the context of the amendments, the Helena, Lewis and Clark, or Lolo forest plan)
2012 planning rule	National Forest System land management planning rule (effective 2012)

List of Abbreviations in final EIS

Abbreviation	Full Name
CFR	Code of Federal Regulations
d.b.h.	diameter at breast height
DC	desired condition (forest plan component)
DCA	demographic connectivity area
EIS	environmental impact statement
FW	forestwide (forest plan component)
GA	geographic area
GBCS	Grizzly Bear Conservation Strategy
GDL	Guideline (forest plan component)
GIS	geographic information system
INFISH	Inland Native Fish Strategy
MA	management area
mi	mile
mmbf	million board feet
mmcf	million cubic feet
MFWP	Montana Fish, Wildlife and Parks
NCDE	Northern Continental Divide Ecosystem
NEPA	National Environmental Policy Act
NFS	National Forest System
NRLMD	Northern Rockies Lynx Management Direction
PACFISH	Pacific Fish Strategy
PCA	primary conservation area
PIBO	PACFISH/INFISH Biological Opinion
STD	standard (forest plan component)
TMDL	total maximum daily load
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

Summary of Volume 3

Proposed Action

The Forest Service proposes to amend the forest plans of the Helena, Lewis and Clark, Kootenai, and Lolo National Forests (also referred to as “amendment forests”) to incorporate habitat management direction for the Northern Continental Divide Ecosystem (NCDE) grizzly bear population. The Flathead National Forest is concurrently proposing to incorporate grizzly bear habitat management direction as part of its plan revision process. Refer to volumes 1 and 2 of this final EIS for information about the plan revision. The area affected by the amendment (primary conservation area; zone 1, which includes two demographic connectivity areas; and zone 2) includes about 5.1 million acres of National Forest System lands (figure 1-70).

Purpose and Need

The purpose of alternative 2 modified evaluated in this final EIS is to amend the Helena, Kootenai, Lewis and Clark, and Lolo National Forest plans to provide consistent direction that will support continued recovery of the NCDE grizzly bear population.

Under the Endangered Species Act of 1973, Federal agencies are directed to use their authorities to seek to conserve endangered and threatened species. Habitat conditions and management actions on the Flathead, Helena-Lewis and Clark, Kootenai, and Lolo National Forests have made important contributions to the increased population size and improved status of the grizzly bear across the NCDE. Supporting a healthy grizzly bear population will continue to depend on coordinated, effective management of the grizzly bear’s habitat.

In 2013, the U.S. Fish and Wildlife Service announced the availability of the draft NCDE grizzly bear conservation strategy. When finalized, the grizzly bear conservation strategy will become the post-delisting management strategy for the NCDE grizzly bear population and its habitat. By incorporating updated habitat management direction informed by the draft NCDE grizzly bear conservation strategy into the forest plans, the Forest Service will continue to support grizzly bear recovery and will demonstrate to USFWS that adequate regulatory mechanisms exist on national forests within the NCDE to support potential future delisting of the population.

Public Involvement and Issues

The Notice of Intent to prepare an environmental impact statement was published in the Federal Register on March 6, 2015. The Notice of Intent asked for public comment on the proposal for a 60-day period (until May 5, 2015). The comment period was subsequently extended by 10 days (until May 15, 2015). As part of the public involvement process, the agency held seven open houses to provide the public with information, answer questions, and accept comments.

Using the comments from the public, other agencies, tribes, and organizations, the interdisciplinary team developed a list of issues to address. The list was then sorted into issues that are specific to the Flathead National Forest revision effort, specific to the amendment effort, or relevant to both. Issues that involve the amendment effort are discussed further in section 5.4. Pertaining to the proposed amendment, the Forest Service identified two issues during scoping that would drive alternative development: (1) grizzly bear habitat, and (2) access and recreation.

The dialogue and recommendations from this public involvement process were used to help develop the alternative to the amendment proposed action. In addition, quarterly interagency meetings were convened, as necessary, since the beginning of the amendment process to provide updates on the planning process as well as to ensure county, State, Federal, and tribal policies and interests were coordinated to the extent practicable.

Based upon the issues identified from the scoping process on the proposed action, a draft environmental impact statement (draft EIS) with a notice of availability was published in the Federal Register in June 2016. The notice of availability began the public comment period for the amendments and draft EIS. A total of two open houses were held in Kalispell and Missoula during the 120-day comment period. In addition to the open houses, the planning team and Forest supervisors continued to provide information throughout the comment period to address questions. The interagency group continued to meet to discuss and provide input with respect to each agency's concerns.

The comment period ended on October 3, 2016 for the draft EIS. The 120-day comment period resulted in over 33,000 comments, including ~730 unique letters and ~23,400 form letters (groups of letters that have the same content usually from organizations). The comments were aggregated into unique concern statements and responses were written and are included as appendix 8 to the final EIS. The responses were also critical to improving the analysis in the final EIS, refining plan direction and aiding the Forest supervisors in identifying the preferred alternative.

Alternatives

The Forest Service developed three alternatives that were considered in detail. Under alternative 1, the no-action alternative, no forest plan amendments or revision would occur and existing forest plan direction would continue to be implemented. Alternative 2 modified would incorporate plan components for grizzly bear habitat management that are informed by the draft NCDE grizzly bear conservation strategy, other available scientific information, and public comments on the draft EIS. Alternative 3 was developed in response to issues identified during public scoping and comments on the draft EIS.

Chapter 6 of this draft environmental impact statement presents a detailed description of the effects of the alternatives. Refer to appendix 1 of the draft record of decision for a detailed presentation of alternative 2 modified, for the text of the amendments plus maps and glossary, and to appendix 2 to the draft record of decision for a comparison of the plan components under each of the alternatives.

Chapter 4. Purpose and Need for Action—Forest Plan Amendments

4.1 Introduction

The Forest Service is amending the land management plans (forest plans) of the Helena-Lewis and Clark, Kootenai, and Lolo National Forests (also referred to as the “amendment forests”) to incorporate habitat management direction for the Northern Continental Divide Ecosystem (NCDE) grizzly bear population. Note that in December 2015, the Helena National Forest and the Lewis and Clark National Forest were administratively consolidated into one Forest, the Helena-Lewis and Clark National Forest. The combined Forest still has two separate and different forest plans, so separate effects analyses for the Helena National Forest and for the Lewis and Clark National Forest have been conducted and are presented in this document. Due to this consolidation, there are now three amendment forests instead of the four discussed in the draft EIS, but there are still four forest plans that are being amended.

The Flathead National Forest, which also lies within the NCDE, is concurrently proposing to incorporate the same habitat management direction for the NCDE grizzly bear population as part of its forest plan revision (presented in volumes 1 and 2 of this draft EIS).

4.1.1 History of grizzly bear conservation efforts

In 1975, the U.S. Fish and Wildlife Service (USFWS) listed the grizzly bear as a threatened species in the lower 48 States, giving the species Federal protection under the Endangered Species Act of 1973, as amended. Since its listing, government agencies have worked together to improve management coordination and habitat conditions, minimize grizzly bear-human conflicts and bear mortality, and increase public awareness and appreciation for the grizzly bear.

4.1.2 Grizzly Bear Recovery Plan

The Grizzly Bear Recovery Plan (also known as the “Recovery Plan”) (USFWS, 1993, p. 82) outlines actions necessary for the conservation and recovery of the grizzly bear in the contiguous United States. The Recovery Plan provides guidance and recommendations applicable to each of four identified recovery zones (Northern Continental Divide, Greater Yellowstone, Cabinet-Yaak, and Selkirk) and three evaluation areas (Bitterroot, North Cascades, and San Juan). For a map of all of the recovery/evaluation areas in relation to historical and current distribution of grizzly bears, refer to the grizzly bear recovery plan (USFWS, 1993, pp. 9, 11) or the five-year status review (USFWS, 2011b, p. 13).

The NCDE, as described on page 10 of the Recovery Plan, is an area of about 5.7 million acres in size, located in the northwestern portion of the State of Montana. The NCDE is contiguous to Canadian grizzly bear populations and habitat. The NCDE includes parts of four national forests (Flathead, Helena-Lewis and Clark, Kootenai, and Lolo), Glacier National Park, Bureau of Land Management lands, parts of the Flathead and Blackfeet Indian Reservations, and State and private lands. National Forest System (NFS) lands encompass more than 60 percent of the NCDE (table 180).

Demographic recovery goals were established for each grizzly bear recovery area (USFWS, 1993, pp. 9, 11). The demographic recovery goals for the NCDE address population size, distribution

across the NCDE, and mortality limits. The Recovery Plan calls for dividing each recovery zone into bear management units. In the NCDE, 23 bear management units (figure 1-71) were delineated. The bear management units are useful in identifying contiguous complexes of habitat capable of meeting the year-round needs of grizzly bears, addressing unique habitat characteristics and grizzly bear activity and use patterns, and assessing the effects of existing and proposed land uses and activities on grizzly bears. The Recovery Plan relies on bear management units to track population status, assess habitat conditions, and ensure that grizzly bears and their habitats are well distributed.

Table 180. Land ownership within the NCDE recovery zone

Ownership	Acres ¹	Subtotal Acres ¹	Percent of NCDE
U.S. Forest Service		3,485,417	61.0
Flathead National Forest	2,136,536	–	–
Helena National Forest	183,758	–	–
Kootenai National Forest	118,770	–	–
Lewis and Clark National Forest	777,963	–	–
Lolo National Forest	268,390	–	–
Glacier National Park		987,755	17.3
Other Federal Lands ²		22,973	0.4
Blackfeet Indian Reservation		254,731	4.5
Tribally managed lands ³	111,094	–	–
Individual allotments ⁴	142,730	–	–
Other government	907	–	–
Flathead Indian Reservation Confederated Salish & Kootenai Tribes		144,896	2.5
Tribally managed lands ³	143,750	–	–
Individual allotments ⁴	1,146	–	–
Montana Dept. of Natural Resources and Conservation		204,413	3.6
Montana Fish, Wildlife & Parks		36,506	0.6
Total Private Lands		525,860	9.2
Private land on Blackfeet Reservation	82,036	–	–
Private land on Flathead Reservation	4,219	–	–
All other private lands	439,605	–	–
Water		55,311	1.0
Total	–	5,717,862	–

1. Acres are based on geographic information system (GIS) data from several Federal and State sources, dated 1 July 2012, at the 1:100,000 scale. Where these layers were not in agreement, efforts were made to identify the correct owner, but there may still be some discrepancies.

2. Includes lands managed by the Bureau of Land Management (20,691 acres), the Bureau of Reclamation (85 acres), and the USFWS (2,197 acres).

3. Tribal lands managed by the respective tribes through coordination with the Bureau of Indian Affairs and tribal council-approved management plans.

4. Allotted lands managed by individual tribal members through coordination with the Bureau of Indian Affairs.

4.1.3 Development of the Draft NCDE Grizzly Bear Conservation Strategy

The purpose of a recovery plan is to outline the management actions that will be needed to achieve recovery of a species that is protected under the Endangered Species Act. In preparation for delisting, a conservation strategy often is developed to ensure that appropriate protections will be in place to maintain the recovered population into the future. The Grizzly Bear Recovery Plan (USFWS, 1993) specifically called for development of a conservation strategy so that continuity and consistency of management would be provided following delisting.

Development of the draft Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy (hereafter referred to as the “draft Conservation Strategy”) began by identifying representatives of Montana Fish, Wildlife and Parks (MFWP), the Montana Department of Natural Resources and Conservation, the Blackfoot Nation, the Confederated Salish and Kootenai Tribes, Glacier National Park, the U.S. Forest Service (USFS), the USFWS, U.S. Geological Survey, and the Bureau of Land Management to be appointed as members of the Interagency Conservation Strategy Team. Their goal was to describe the management and monitoring programs that would be needed to maintain a recovered grizzly bear population in the NCDE.

In May 2013, the draft Conservation Strategy for the NCDE was released to the public for review and comment (78 FR 26064). The draft Conservation Strategy was designed by the Interagency Conservation Strategy Team to

- describe and summarize the coordinated strategies, standards, and guidelines to manage the grizzly bear population, grizzly bear-human conflicts, and grizzly bear habitat such that continued conservation of the grizzly bear population in the NCDE will be ensured;
- document the regulatory mechanisms, legal authorities, policies, management documents, and monitoring programs that are needed to maintain the recovered grizzly bear population; and
- document the commitments agreed to by the participating agencies.

When finalized, the conservation strategy will not change the legal status of grizzly bears in the NCDE. The commitments made by the signatories to conserve the species can be considered by USFWS when making a decision whether to delist. A conservation strategy can help to demonstrate that adequate regulatory mechanisms exist to ensure that a delisted population will be sustained into the future.

4.1.4 Ongoing grizzly bear conservation actions by the Forest Service

Over the years, the Forest Service has undertaken substantial actions both inside and outside the NCDE recovery zone to maintain or improve grizzly bear habitat and to reduce grizzly bear-human conflicts on the national forests. These actions will continue under all of the alternatives. The following are examples of some of those conservation actions.

Issuance of food and attractant storage orders and regulations

Food storage orders require that food, garbage, and other attractants are stored properly so that grizzly bears cannot obtain access to them. This prevents food-conditioning of bears, which usually leads to grizzly bear-human conflicts, injuries, or fatalities. Food storage orders have been issued and implemented in the NCDE since the mid to late 1980s. Over the years, the Flathead, Helena-Lewis and Clark, and Lolo National Forests have individually or jointly issued and updated food storage orders covering the portions of the Forests that are within the NCDE recovery zone. More recently, as more grizzly bears have been observed outside the recovery zone, food storage orders have been

extended to other portions of the forests to prevent or minimize grizzly bear-human conflicts. For example, in 2011 the Kootenai National Forest implemented a forestwide food storage and sanitation special order that includes portions of both the NCDE and Cabinet-Yaak recovery zones (USDA, 2011c). See table 184 for a list of current food/attractant storage orders on NFS lands throughout the NCDE. In addition, the Forest Service has coordinated with communities, counties, and organizations on implementation of local ordinances regarding food and garbage storage on lands adjacent to the national forests.

Bear-resistant containers and facilities

Bear-resistant containers and facilities include bear-resistant food storage boxes and panniers, garbage containers, meat-hanging poles, etc. National forests within the NCDE have provided bear-resistant facilities at campgrounds, trailheads, dispersed campsites, and other areas both within and, in some cases, outside of the recovery zone. Some national forests have programs to loan or rent bear-resistant containers for short-term uses. The Forest Service has fenced or closed garbage dumps, in coordination with local communities, to further reduce conflicts with grizzly bears.

Information and education

A variety of information and educational materials (pamphlets, brochures, signs, videos, etc.) and programs are provided to the public at Forest Service offices. Signs and brochures about proper behavior and safety procedures in bear country are placed at campgrounds, trailheads, dispersed recreation sites, picnic areas, etc. The Forest Service has cooperated with MFWP and other cooperating institutions and individuals in giving presentations and offering workshops that address bear identification; safe camping, hiking, hunting, and working procedures to use in bear habitat; the use of electric fencing to reduce conflicts between bears and livestock (e.g., chickens, pigs, beehives, sheep, cattle); and the proper use of bear-deterrent pepper spray. Wilderness rangers and other backcountry patrols contact the public to provide education on food storage orders and to check on compliance with these orders. Field patrols have been used during hunting seasons to reduce hunter-caused conflicts and grizzly bear mortalities.

Special grizzly bear requirements in contracts and permits

Many contracts and special use permits in the NCDE contain provisions requiring protection of the grizzly bear and its habitat as well as proper storage of food and attractants. Some contract and permit provisions require temporary or permanent cessation of permitted activities to resolve grizzly bear-human conflicts. Timber sale prescriptions and contracts incorporate provisions to protect grizzly bear habitat. For example, silvicultural prescriptions are designed to maintain or enhance food sources, timing provisions are aimed at reducing the potential of grizzly bear-human conflicts, and specific contract provisions require proper food storage and temporary or permanent cessation of permitted activities to resolve grizzly bear-human conflicts.

Livestock grazing

Existing livestock grazing permits may include special provisions such as proper storage of food and attractants as well as carcass removal. Annual monitoring of livestock allotments is performed to check on compliance and assess any conflicts. Disposal of animal carcasses has been emphasized to reduce conflicts with grizzly bears.

Land adjustments

Important grizzly bear habitat has been acquired through land exchanges and acquisitions on the NCDE national forests. The cooperative Montana Legacy Project to acquire Plum Creek Timber

Company lands by the Nature Conservancy, Flathead National Forest, and Lolo National Forest is a landmark example.

Motorized route management and monitoring

Motorized routes are restricted in some areas in order to provide security for grizzly bears and other wildlife. Annual monitoring is performed to evaluate compliance with access restrictions and to provide information and education to the public. Monitoring also helps to identify when repairs are needed to keep road closures effective.

Highway and railroad mortality

For many years, the Forest Service has coordinated with transportation agencies and railroad companies to seek to reduce the risk of collisions with grizzly bears. For example, in 1991 the Great Northern Environmental Stewardship Area was formed for the rail line that traverses the Middle Fork of the Flathead River corridor. Cooperators included the Burlington Northern Santa Fe Railroad, Flathead National Forest, Lewis and Clark National Forest, Glacier National Park, USFWS, Blackfeet Indian Nation, MFWP, Montana Department of Natural Resources and Conservation, Montana Department of Transportation, Flathead County, Glacier County, the Great Bear Foundation, the Flathead Land Trust, The Nature Conservancy, and two citizens. The stewardship area agreement established a conservation trust fund and identified several railroad operation and maintenance procedures that would be followed to minimize train-bear incidents and ensure a rapid response and removal of attractants from the railroad right-of-way.

The Forest Service partners with the National Park Service, Federal Highway Administration, and American Association of State Highway and Transportation Officials to develop and maintain the Wildlife Crossings Toolkit website (<https://www.fs.fed.us/wildlifecrossings/index.php>). This website provides state-of-the-art information for biologists, engineers, and transportation professionals to assist in reducing wildlife mortalities and maintaining or restoring habitat connectivity across transportation infrastructure on public lands.

4.1.5 Relationship between Endangered Species Act listing, the draft Conservation Strategy, and the forest plans

The grizzly bear population in the NCDE is currently listed as a threatened species under the Endangered Species Act. Federal agencies are directed to use their authorities to seek to conserve endangered species and threatened species. Habitat conditions and management on the national forests have made important contributions to the improved status of the grizzly bear.

The USFWS completed a five-year status review of the grizzly bear in 2011 (USFWS, 2011b). Part of the status review involved an assessment of the adequacy of regulatory mechanisms, which was one of the factors that led to the listing of the grizzly bear as a threatened species. The USFWS concluded that the existing regulatory mechanisms in the lower 48 States were incomplete. With regard to NFS lands, regulatory mechanisms were found lacking or incomplete with respect to incorporating motorized access direction into the forest plans, and portions of some national forests lacked food storage orders, which are anticipated to be increasingly important to grizzly bear conservation as both grizzly bear and human populations expand.

The NCDE grizzly bear population was estimated to be 765 bears in 2004 (Kendall et al., 2009), nearly double the target of 391 set in the Recovery Plan based on sightings of females with cubs (USFWS, 1993). The population has continued to increase in size and expand its distribution (R. D. Mace et al., 2012). The Recovery Plan goal for occupancy of bear management units by females with

young has been met, and mortality is at an acceptable level based on the stable to increasing trend and expanded distribution of the population (Costello, Mace, & Roberts, 2016).

The grizzly bear Recovery Plan acknowledges that maintenance of a healthy grizzly bear population will continue to depend on effective, coordinated management. The draft Conservation Strategy provides up-to-date scientific information and a comprehensive set of management recommendations that would sustain the grizzly bear population in the NCDE. Each of the signatories to the Conservation Strategy will contribute and cooperate as appropriate to its mission and jurisdiction.

One of the ways in which the Forest Service provides guidance for the conservation of federally listed species and their habitats is through the forest plan for each national forest. This can be a particularly effective approach for wide-ranging species such as the grizzly bear. Updating the forest plans with habitat management direction that is informed by the draft Conservation Strategy would provide a consistent set of management direction across the NCDE and support continued conservation of the species.

4.2 Proposed Action

As explained in section 1.1 of this final EIS, the Forest Service proposed to revise the Flathead forest plan in accordance with the 2012 planning rule, including habitat management direction for the NCDE grizzly bear population. The Forest Service also proposed to concurrently amend the Helena, Lewis and Clark, Kootenai, and Lolo forest plans to incorporate habitat management direction for the NCDE grizzly bear population.

The existing forest plans (Helena, approved by the regional forester in 1986; Kootenai, approved by the regional forester in 2015; Lewis and Clark, approved by the regional forester in 1986; and Lolo, approved by the regional forester in 1986) each contain management direction related to grizzly bear habitat (reproduced in appendix 1 of the draft record of decision) that has supported recovery of the threatened grizzly bear. The forest plans are consistent in referencing the Interagency Grizzly Bear Guidelines (1986). The Forests have subsequently incorporated additional forest plan components or have completed Endangered Species Act section 7 consultations that modified the implementation of the forest plan. As a result, current forest plan direction regarding management of grizzly bear habitat varies to some extent among the amendment forests.

In 2013, the USFWS announced the availability of a draft grizzly bear conservation strategy for the NCDE population for public review and input (USFWS, 2013c). When finalized, the draft Conservation Strategy will become an interagency management strategy for the NCDE grizzly bears and their habitat post-delisting. The stated intent of chapter 3 (“Habitat Management and Monitoring”) of the draft conservation strategy was to formulate habitat standards applicable to management of public lands that could be incorporated into the Glacier National Park Superintendent’s Compendium and into Forest Service and BLM land and resource management plans.

The interdisciplinary team carefully reviewed and evaluated each of the habitat-related elements recommended in the draft Conservation Strategy to determine whether it would be appropriate for inclusion as forest plan direction (USDA, 2016a). If so, the type of forest plan component that would best portray the intent of that element as expressed in the draft Conservation Strategy was identified: desired condition, standard, guideline, or monitoring item, or a defined term in the glossary. The forest plan components then were written using language that conforms to Forest Service planning direction to create the proposed action (USDA, 2016a).

On March 6, 2015, the proposed action was released along with a notice of intent to prepare an EIS that was published in the Federal Register. The notice of intent initiated the public scoping process. Under the transition provisions of the 2012 planning rule (36 CFR § 219.17), an amendment to a plan that was approved or revised under a prior planning regulation may be initiated under the provisions of the prior planning regulation during a three-year period beginning on May 9, 2012, and then completed and approved under those provisions (36 CFR § 219.17(b)(2)). The amendments of the Helena, Lewis and Clark, Kootenai, and Lolo forest plans met the transition provisions and were proposed to be prepared in accordance with the 1982 planning regulations (see 36 CFR §§ 200-299, revised as of July 1, 2000).

The Forest Service received more than 20,000 comments on the proposed actions for the Flathead forest plan revision and the NCDE grizzly bear amendments during the 70-day comment period that ended on May 15, 2015. The planning team reviewed all the comments, and the responsible officials identified the significant issues to be used to frame the alternatives. Modifications to the proposed action based on the public comments were incorporated into alternative 2 for the forest plan amendments.

4.3 The Planning Area—The Four NCDE National Forests

The NCDE grizzly bear recovery zone encompasses about 5.7 million acres. The four national forests in the NCDE are currently managed under five individual forest plans (Flathead, Helena, Kootenai, Lewis and Clark, and Lolo). Each of the forest plans provides management direction for grizzly bear habitat.

Under the action alternatives, some of the forest plan components would extend beyond the NCDE recovery area that was identified in the grizzly bear Recovery Plan (USFWS, 1993). This larger area was identified in the draft Conservation Strategy (USFWS, 2013c) and encompasses the primary conservation area (which is the same as the recovery zone) as well as zone 1 (about 4.8 million acres), zone 2 (over 4.5 million acres), and zone 3 (over 12 million acres). The acreage of the recovery zone/primary conservation area, zone 1 including the demographic connectivity areas, zone 2, and zone 3 within each national forest is shown in table 181.

Table 181. Acres of NFS land included within the NCDE recovery area/primary conservation area, zone 1, zone 2, and zone 3. The percent of total acres across all ownerships is shown in parentheses.

National Forest	Recovery zone/PCA	Zone 1 including DCA	Zone 2	Zone 3
Flathead	2,136,536 acres (37%)	231,548 acres (5%)	—	-
Helena	183,758 acres (3%)	149,207 acres (3%)	642,786 acres (14%)	5,792 acres (< 1%)
Kootenai	118,770 acres (2%)	283,302 acres (6%)	—	-
Lewis and Clark	777,963 acres (14%)	6 acres (< 1%)	2 acres (< 1%)	972,612 acres (8%)
Lolo	268,390 acres (5%)	386,274 acres (8%)	38 acres (< 1%)	-

Note. DCA = demographic connectivity area.

4.4 Purpose of and Need for Action

The purpose of alternative 2 modified, which is evaluated in this volume of the final EIS, is to amend the Helena, Kootenai, Lewis and Clark, and Lolo National Forest plans to provide consistent direction that will support continued recovery of the NCDE grizzly bear population.

Habitat conditions and management actions on the Flathead, Helena-Lewis and Clark, Kootenai, and Lolo National Forests have made important contributions to the increased population size, distribution, and improved status of the grizzly bear across the NCDE. Supporting a healthy grizzly bear population will depend on coordinated, effective management of the grizzly bear's habitat. There is a need to incorporate updated habitat management direction informed by the draft Conservation Strategy into forest plans to provide adequate regulatory mechanisms that would support the potential future delisting of the NCDE population.

4.5 Decision Framework

The responsible officials for the amendments are the Forest supervisors for the Helena-Lewis and Clark, Kootenai, and Lolo National Forests. The responsible officials will decide whether it is necessary and appropriate to amend the forest plans by incorporating desired conditions, standards, guidelines, and monitoring requirements into the forest plans. This final environmental impact statement was prepared after review of public comments. The selected alternative, which is alternative 2 modified, is identified in a draft record of decision that will be subject to an objection process guided by the direction in 36 CFR Subpart B (219.50 to 219.62). The final record of decision amending the forest plans is anticipated to be in effect until the forest plans are next revised.

Alternatives considered in this EIS apply only to the portions of the forests within the NCDE analysis area. The Kootenai forest plan spans two grizzly bear recovery zones (Cabinet-Yaak and NCDE), and the Lolo forest plan spans three (Cabinet-Yaak, NCDE, and Bitterroot). No changes in forest plan direction are being considered within the Cabinet-Yaak or Bitterroot recovery zones or in other areas outside of the NCDE analysis area.

Forest plans are programmatic in nature and guide future implementation of site-specific projects. Most of the described effects of amending or revising forest plans are indirect effects in that they would occur later in time. Additional National Environmental Policy Act (NEPA) compliance is required for site-specific projects as part of a two-stage decision-making process (Council of Environmental Quality regulations for implementing NEPA: 40 CFR § 1508.23, 42 USC § 4322 (2)(C)), 36 CFR § 219.7(f)). Any direct effects on grizzly bears or other resources would occur when site-specific decisions are made that implement the direction in the forest plan.

Certain other guidance and coordination applicable to management of the grizzly bear may be established through other instruments, such as memoranda of understanding, cooperative agreements, and special orders.

Chapter 5. Alternatives Considered for the Forest Plan Amendments

5.1 Introduction

This chapter describes and compares the alternatives considered. It includes a discussion of how the alternatives were developed, the primary issues raised, a description of each alternative considered in detail, and elements common to all alternatives. This section presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decisionmakers and the public. This chapter also includes a discussion of the alternatives that were considered but not analyzed in detail and the rationale for not considering those alternatives in detail.

5.2 Development of Alternatives

Refer to section 2.1 of this EIS for an overview of Council on Environmental Quality regulations with respect to NEPA procedures, specifically those concerning the development of alternatives.

For the grizzly bear amendment, alternative 1 is the no-action alternative, which reflects the current forest plans, as amended and accounting for current laws, regulations, and requirements of biological opinions. Alternative 2 modified is based on alternative 2 from the draft EIS, with modifications in response to comments during public scoping and the draft EIS comment period. Alternative 3 was driven by issues identified during public scoping.

All reasonable alternatives to alternative 2 modified must meet the purpose and need for change and address one or more of the identified issues. The responsible officials identified a reasonable range of outcomes and effects to inform the decisionmaking process.

5.3 Public Involvement

The notice of intent was published in the Federal Register on March 6, 2015 (USDA, 2015c). The notice of intent requested public comment on the proposal for a 60-day period (until May 5, 2015), which was subsequently extended by 10 days. The Forest Service held open houses in seven communities throughout the NCDE during the scoping period to provide the public with information, answer questions, and accept comments. Using the comments from the public, other agencies, tribes, and organizations, the interdisciplinary team developed a list of issues to address. The list was then sorted into issues that are specific to the Flathead forest plan revision, specific to the plan amendments, or relevant to both.

Issues that involve the amendment effort are discussed further in, section 5.4 of this final EIS, Issues used for alternative development. Pertaining to the proposed amendment, the Forest Service identified two issues during scoping that would drive alternative development: (1) grizzly bear habitat and (2) access and recreation.

The dialogue and recommendations from the public involvement process were used to help develop and refine the alternatives for the amendments. In addition, quarterly interagency meetings were convened, as necessary, since the beginning of the amendment process to provide updates on the planning process as well as to ensure county, State, Federal, and tribal policies and interests were coordinated to the extent practicable.

Based upon the issues identified from the scoping process on the proposed action, a draft EIS with a notice of availability was published in the Federal Register in June 2016. The notice of availability began the public comment period for the amendments and draft EIS. A total of two open houses were held in Kalispell and Missoula during the 120-day comment period. In addition to the open houses, the planning team and Forest supervisors continued to provide information throughout the comment period to address questions. The interagency group continued to meet to discuss and provide input with respect to each agency's concerns.

The comment period ended on October 3, 2016, for the draft EIS. The 120-day comment period resulted in over 33,000 comments, including ~730 unique letters and ~23,400 form letters (groups of letters from organizations that have the same content). The comments were aggregated into unique concern statements and responses were written and are included as appendix 8 to the final EIS. The responses were also critical to improving the analysis in the final EIS, refining plan direction and aiding the Forest supervisors in identifying the preferred alternative.

5.4 Issues Used for Alternative Development

Issues serve to highlight effects or unintended consequences that may occur from the proposed action or alternatives. The Forest Service reviewed all letters received and identified the following two issues that would drive alternative development pertaining to the proposed amendment:

- grizzly bear habitat
- access and recreation

5.4.1 Grizzly bear habitat

Some respondents stated that the proposed revision and amendments do not include enough protections for grizzly bear habitat, and several offered specific ideas for ways to provide greater protections. Some people wanted all forest plan grizzly bear direction to be mandatory standards or wanted the same standards to apply across all grizzly bear management zones. Others stated that protections are adequate; they wanted more management flexibility. Some wanted more standards or guidelines that address connectivity between the NCDE and other recovery zones, specifically the Greater Yellowstone Ecosystem.

5.4.2 Access and recreation

Some people stated that the proposed action is too limiting to motorized opportunities. Others stated that additional closures on roads and trails are needed to protect grizzly bears so the Forest Service should reduce motorized recreation opportunities while increasing opportunities for nonmotorized recreation. Some people felt there should be further limits on the number or capacity of developed recreation sites to better protect grizzly bears, whereas others felt there should be no limitations.

5.4.3 Issues not addressed in this analysis

Delisting of the NCDE population

Some commenters questioned whether the grizzly bear should be delisted, whereas others supported delisting. Some people commented that the size and growth rate of the grizzly bear population in the NCDE should not be relied upon as the criteria for delisting the grizzly bear.

The decision whether to delist the grizzly bear is the responsibility of the USFWS. Whether and when the NCDE population might be delisted is unknown.

Habitat conditions and management on the Flathead, Helena-Lewis and Clark, Kootenai, and Lolo National Forests have made important contributions to the increased population size and improved status of the grizzly bear across the NCDE. It is recognized that supporting a healthy grizzly bear population will depend on continued, coordinated management of the NCDE grizzly bear's habitat. The purpose and need for revising and amending the forest plans is to provide consistent habitat management direction that will support the continued recovery of the NCDE population of grizzly bears and will provide the adequate regulatory mechanisms on NFS lands in the NCDE necessary to support delisting in the future. The amended forest plan direction would be implemented on NFS lands whether or not USFWS takes action to delist the NCDE grizzly bear population.

For these reasons, this issue was not used to develop alternatives.

5.5 Important Points about All Alternatives

All of the alternatives are designed to

- meet law, regulation, and policy;
- incorporate ecosystem management objectives and strategies and contribute towards ecological, social, and economic sustainability;
- provide integrated direction in the forestwide desired conditions, standards, and guidelines;
- allow for retaining existing permitted activities and facilities; and
- provide sustainable levels of products and services.

Certain direction, such as Forest Service agency directives and interagency agreements, is established and implemented independent of the forest planning process. Such direction would continue unchanged under all alternatives. Examples include

- coordinating the translocation of grizzly bears, including nuisance bears;
- working cooperatively with the USFWS and MFWP to reduce the number of grizzly bear-human conflicts; and
- participating in meetings of the Interagency Grizzly Bear Committee and the NCDE subcommittee.

5.6 Description of Alternatives

The Forest Service considered three alternatives in detail. Alternative 1, the “no-action alternative,” reflects current management practices regarding grizzly bear habitat and provides the basis for comparing the existing situation with the action alternatives. Under alternative 1, the forest plans would not be amended to update the existing management direction for grizzly bear habitat.

Alternatives to the no-action alternative were based on the need for change, comments received during public scoping and the draft EIS comment period, and input received during interagency meetings and meetings with tribal partners. The alternatives represent a range of possible options for forest plan components related to grizzly bear habitat management.

5.6.1 Elements common to all alternatives

All alternatives in this document provide for the multiple use and sustained yield of goods and services (36 CFR § 219.1(b)) and support the recovery of the threatened grizzly bear.

5.6.2 Alternative 1—No action

Under the no-action alternative, existing forest plans would continue to guide management. The current forest plans are the 2015 Kootenai forest plan and the 1986 forest plans for the Helena, Lewis and Clark, and Lolo, as amended. (Revisions of the Flathead, Helena, and Lewis and Clark forest plans have been initiated but not completed.) Thus, the current direction for management of grizzly bear habitat in the NCDE would remain in effect.

Because of the lack of adequate regulatory mechanisms as determined by USFWS, it is expected that the grizzly bear would remain listed under the Endangered Species Act. Therefore, it is assumed that the requirements of biological opinions that address incidental take of grizzly bears would remain in place. Such requirements are considered to be part of the no-action alternative.

Alternative 1 relationship to issues

Grizzly bear habitat

All forest plans in the NCDE incorporated the Interagency Grizzly Bear Guidelines (IGBC, 1986). The guidelines are intended to maintain or improve habitat inside the recovery zone, minimize grizzly bear-human conflict potential, and resolve grizzly bear-human conflicts. For each of five management situations, a set of guidelines is provided for coordination of grizzly bear habitat management with five resource management program areas: wildlife management; timber and fire management; range management; recreation management; and minerals, watershed and special uses management. Management situations were identified on NFS lands in the NCDE (table 182), and maps of the management situations are included in each of the existing forest plans.

Management situation 1 contains grizzly population centers and habitat components needed for the survival and recovery of the species or a segment of its population. Maintaining and improving grizzly bear habitat and minimizing grizzly bear-human conflict receive the highest management priority in management situation 1.

Management situation 2 includes areas where current information indicates that the area lacks distinct population centers and that highly suitable habitat does not generally occur. Some grizzly bear habitat components exist, and grizzlies may be present occasionally. Management for the grizzly bear is an important but not the primary objective of the area. Guidelines for management situation 2 are similar to those identified for management situation 1, but in many cases the direction is to be implemented where feasible and/or only where grizzly presence is likely.

Management situation 3 is areas where human presence and developments, such as campgrounds, resorts, or other facilities associated with high levels of human use, result in conditions that make grizzly bear presence untenable for humans and/or grizzlies. Grizzly habitat maintenance and improvement are not management considerations. Guidelines address management of attractants where grizzly bear presence is likely.

No direction is given in the 1986 Interagency Grizzly Bear Guidelines for management of grizzly bears or their habitat outside of the recovery zone. Any applicable management direction under the existing forest plan, along with any requirements of the incidental take statement of a biological opinion provided by the USFWS for areas outside the recovery zone, would be implemented.

Table 182. Acres in management situations 1, 2, and 3 within and outside the NCDE grizzly bear recovery zone under current forest plans

Forest	Management Situation (MS) 1 in NCDE recovery zone	MS 1 outside recovery zone	MS 2 in NCDE recovery zone	MS 2 outside recovery zone	MS 3 in NCDE recovery zone	MS 3 outside recovery zone
Flathead	2,022,688	—	99,418	—	12,614	—
Helena	119,162	—	64,595	—	—	—
Kootenai	112,616	6	2	88,231	7,345	2,556
Lewis and Clark	763,743	—	—	—	14,159	—
Lolo	247,721	—	—	—	—	—

Research subsequent to adoption of the 1986 Interagency Grizzly Bear Guidelines revealed the potential for motorized access to have substantially greater impacts on the survival and reproductive success of grizzly bears, especially adult females (R. D. Mace & Waller, 1996; Mattson, Blanchard, & Knight, 1991; Mattson, Knight, & Blanchard, 1987; McLellan, 1990; McLellan & Shackleton, 1988; C. C. Schwartz, Haroldson, & White, 2010). Each of the forest plans for the national forests in the NCDE contains some guidance for motorized access management for grizzly bears and/or elk, although the management direction varies. Some of the national forests, through the Endangered Species Act section 7 consultation process, have modified their implementation of the forest plan to comply with the terms and conditions that minimize incidental take of grizzly bears.

The individual forest plans also contain some additional desired conditions, standards, and guidelines pertaining to grizzly bears. These may apply forestwide or to certain management areas. Appendix 2 to the draft record of decision provides a detailed list of existing forest plan direction that is relevant to grizzly bear habitat management on the Helena, Kootenai, Lewis and Clark, and Lolo National Forests.

Access and recreation

Alternative A would continue to provide both motorized and nonmotorized recreational opportunities in the same areas and manner as currently. Existing developed recreation sites would be maintained and no limits would be placed on future development, other than those resulting from budget limitations or other existing forest plan direction.

5.6.3 Alternative 2 modified

This alternative is based on the detailed proposed action that was published with the notice of intent on March 6, 2015, with modifications in response to comments on the draft EIS.

Under alternative 2 modified, NFS lands within the recovery zone would no longer be designated as management situations 1, 2, or 3. Instead, management direction would specify whether it is applicable to NFS lands within the primary conservation area, zone 1, the demographic connectivity areas, and/or zone 2 as delineated in figure 1-70. The acreage of each management zone on NFS lands is shown in table 181.

- **Primary conservation area**—the same area as the recovery zone identified in the Grizzly Bear Recovery Plan (USFWS, 1993). The primary conservation area would be managed as a population source area, where continuous occupancy by grizzly bears would be maintained. Baseline habitat conditions would be maintained or improved on NFS lands.

- **Management zone 1**—a defined area surrounding the primary conservation area. Occupancy by grizzly bears is expected in zone 1, but at lower densities than found in the primary conservation area. Combined, the primary conservation area and zone 1 would encompass the area within which grizzly bear population status and trend would be monitored.
- **Salish and Ninemile demographic connectivity areas**—a portion of zone 1 with specific habitat measures to allow female grizzly bear occupancy and eventual dispersal to other recovery zones in the lower 48 States (i.e., the Cabinet-Yaak and Bitterroot Ecosystems).
- **Management zone 2**—an area where grizzly bears would be expected to be present at low densities. The intent would be to maintain existing resource management and recreational opportunities, while providing the opportunity for grizzly bears, particularly males, to move the longer distance between the NCDE and the Greater Yellowstone Ecosystem to provide genetic connectivity. Some additional emphasis would be given to the area on the Helena National Forest that is in zone 1 and a portion of zone 2 located west of Interstate 15 (figure 1-72).
- **Management zone 3**—an area where grizzly bears do not have enough suitable habitat to support long-term survival and occupancy. The management emphasis would be on conflict response. No additional forest plan components are needed or are proposed for zone 3.

Unless it would result in conflicting direction, existing forest plan standards and guidelines would be retained. A display of existing forest plan direction and whether it would be retained, changed, or replaced under the action alternatives is presented in appendix 2 to the draft record of decision. Alternative 2 modified for the amendment forests did not reconsider any goals, objectives, land allocations, standards, or guidelines that are unrelated to grizzly bear habitat management.

For the complete text of alternative 2 modified, refer to appendix 1 of the draft record of decision.

Alternative 2 modified relationship to the issues

Grizzly bear habitat

A fundamental assumption of the draft Conservation Strategy is that maintaining the habitat conditions that existed at the time when the population was stable to increasing and expanding its distribution will continue to sustain the grizzly bear population over time. The rationale for selecting 2011 as the baseline year (USFWS, 2013c, p. 19) was that population data showed that between 2004 and 2011, the NCDE grizzly bear population was increasing at a rate of about 3 percent per year and was substantially expanding its distribution (R. D. Mace et al., 2012). Motorized route density decreased between 2004 and 2011, so, to be conservative, 2011 was selected as the baseline year for measuring levels of human activities. Under certain conditions specified in the forest plan standards and definitions, the baseline could be updated.

Forest plan components (desired conditions, standards, and guidelines) would be added to each of the four forest plans under this alternative. Future land management actions related to motorized access and secure core, developed recreation sites, vegetation management, livestock grazing, and energy and minerals generally would be held to baseline levels in the primary conservation area to sustain recovery of the grizzly bear. In zone 1 and the demographic connectivity areas, plan components would be added to limit grizzly bear mortality risk and provide for population connectivity to nearby grizzly bear recovery zones. In zone 2, existing forest plan direction would be retained with the addition of desired conditions that relate to providing genetic connectivity between the NCDE and the Greater Yellowstone Ecosystem.

Following are some key features of the proposed amendments:

- Special orders for storage of food/wildlife attractants would be in place across NFS lands in the primary conservation area, zone 1, and zone 2.
- Within the primary conservation area, open motorized route density, total motorized route density, and secure core would be maintained at baseline levels in each grizzly bear subunit. High-intensity-use nonmotorized trails would no longer be counted in the calculations. Temporary increases in open and total motorized route densities and temporary decreases in secure core would be allowed for projects, as defined in the glossary. No temporary use by the public during the non-denning season would be authorized within secure core.
- In the demographic connectivity areas, habitat protections would focus on limiting the miles or density of motorized roads/routes open to the public during the non-denning season.
- Within modeled grizzly bear denning habitat in the primary conservation area, there would be no net increase in the percentage of area or miles of routes on NFS lands that are designated for over-snow vehicle use during the den emergence time period.
- Within the primary conservation area, developed recreation sites designed and managed for overnight use during the non-denning season would be limited to one increase above the baseline in number or capacity per decade per bear management unit.
- Vegetation management would be designed to consider grizzly bear habitat and to reduce the risk of grizzly bear-human conflicts within the primary conservation area.
- Livestock allotments in the primary conservation area would have requirements for no net increase in the number of cattle and sheep allotments and no net increase in sheep animal unit months. Livestock allotments would be managed to limit the risk of grizzly bear-human conflicts in the primary conservation area and zone 1.
- Minerals and energy development would be managed with consideration of grizzly bear habitat and to reduce the risk of grizzly bear-human conflicts in the primary conservation area and zone 1. New leases for fluid minerals (e.g., oil and gas) in the primary conservation area would be required to have a no surface occupancy stipulation.
- Forest plan monitoring items would be added.

Access and recreation

There would be no net change in existing levels of motorized routes in the primary conservation area. There would be a new requirement on the Lolo National Forest for no net increase in the miles of open road in zone 1 and the miles of open motorized routes in the demographic connectivity areas. Compared with alternative 3, more motorized trails could occur in grizzly bear management zone 1. In the primary conservation area, there would be no net increase in motorized over-snow vehicle use during the den emergence (late spring) time period.

To reduce the risk of grizzly bear-human conflicts on NFS lands in light of increasing human use of the national forests in the future, there would be a limit of one increase per decade in the number or capacity of new developed recreation sites that are designed and managed for overnight use per bear management unit in the primary conservation area. Outside of the primary conservation area, the number of developed recreation sites could be increased or their capacity could be expanded to meet increased demand. A standard would require mitigation measures to be included in new or reauthorized permits for ski areas to reduce the risk of grizzly bear-human conflicts.

5.6.4 Alternative 3

Development of alternative 3 was based on various comments and suggestions offered during scoping to provide a greater level of protection for the grizzly bear.

Like alternative 2 modified, alternative 3 would remove references to management situations and instead would specify whether habitat management direction would be applicable to the primary conservation area, zone 1, the demographic connectivity areas, and/or zone 2. Alternative 3 would adopt the same plan components for the primary conservation area as alternative 2 modified, except that it also adds NCDE-STD-GRZ-07 and has different wording for NCDE-GDL-GRZ-01.

Alternative 3 also differs from alternative 2 modified by extending some forest plan components to zone 1 and/or the demographic connectivity areas. The plan components that are unique to alternative 3 are as follows, with the changes shown in italics.

Vegetation (VEG)

NCDE-GDL-VEG-01. Within the NCDE primary conservation area *and the Salish and Ninemile demographic connectivity areas*, measures to reduce the risk of disturbance to the grizzly bear population should be incorporated into vegetation and fuels project design criteria, which varies on a site-specific basis (e.g., some activities should be restricted in spring habitat during the spring time period; areas with low levels of human activity should be provided adjacent to areas with high levels of disturbance). Note: Management activities such as pre-commercial thinning, burning, weed spraying, and implementation of road best management practices may need to be completed during the spring time period in order to meet resource objectives (especially if needed to prevent resource damage), in which case other measures should be used to reduce the risk of disturbance (e.g., limiting the duration of the activity or limiting use of closed roads).

NCDE-GDL-VEG-02. Within the NCDE primary conservation area *and the Salish and Ninemile demographic connectivity areas*, vegetation management activities should be designed to avoid detrimental effects on the grizzly bear population and to include one or more measures to protect, maintain, increase, and/or improve grizzly habitat quantity or quality (e.g., promoting growth of berry-producing shrubs, forbs, or grasses known to be bear foods) in areas where it would not increase the risk of grizzly bear-human conflicts. See also NCDE-GDL-WL-01.

NCDE-GDL-VEG-03. Within the NCDE primary conservation area *and the Salish and Ninemile demographic connectivity areas*, measures to retain cover (where present) along a portion of grass/forb/shrub openings, riparian wildlife habitat, or wetlands, should be incorporated in project design criteria (this varies on a site-specific basis).

NCDE-GDL-VEG-04. Within the NCDE primary conservation area *and the Salish and Ninemile demographic connectivity areas*, vegetation management projects (including timber sales and other non-commercial vegetation management contracts) should include a clause providing for modification, cancellation, suspension, or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation.

NCDE-GDL-VEG-05. To reduce the risk of grizzly-bear human conflicts within the NCDE primary conservation area, vegetation management activities designed to enhance grizzly habitat (e.g., to increase huckleberry production) should not occur in or next to campgrounds, administrative facilities, or other developed recreation sites that operate during the non-denning season.

Grazing (GRZ)

NCDE-DC-GRZ-01. Within the NCDE primary conservation area *and zone 1 (including the Salish and Ninemile demographic connectivity areas)*, the number, capacity of, and improvements on cattle and sheep grazing allotments support ecologically sustainable grazing, and temporary grazing permits are used for effective management of noxious weeds, while minimizing the risk of bear-human conflicts on National Forest System lands. See also NCDE-DC-WL-01 and 02.

NCDE-STD-GRZ-02. Within the NCDE primary conservation area *and zone 1 (including the Salish and Ninemile demographic connectivity areas)*, a sheep grazing permit in non-use status shall not be allowed to increase allowable animal unit months when returning to use.

NCDE-STD-GRZ-07. Within the NCDE primary conservation area, sheep grazing allotments shall be closed if the opportunity arises with a willing permittee, to reduce the potential risk of grizzly bear-human conflicts.

NCDE-GDL-GRZ-01. *Within the NCDE primary conservation area, where recurring grizzly bear-human conflicts occur on sheep or cattle allotments and an opportunity exists with a willing permittee, the Forest Service should consider phasing out grazing or moving the livestock to a vacant allotment where there is less likelihood of grizzly bear-human conflicts. See also NCDE-STD-GRZ-07.*

Minerals (MIN)

NCDE-STD-MIN-08. NCDE-STD-MIN-08. Within the NCDE primary conservation area and zone 1 (including the Salish and Ninemile demographic connectivity areas), new leases for leasable minerals shall include a no surface occupancy stipulation (see glossary).

Helena National Forest Zone 1, Zone 2

NCDE -HNF Zone 1&2-STD-02. Within the Helena-Lewis and Clark National Forest portion of the NCDE zone 1 and zone 2 that is west of Interstate 15 (see figure 1-72), motorized routes (roads and trails) open to public motorized use during the non-denning season shall not exceed 2.4 miles/square mile, calculated as the miles of motorized routes on National Forest System lands divided by the acres of National Forest System lands. The purpose of this standard is to support grizzly bear presence and the opportunity for movement of male bears from the NCDE to the Greater Yellowstone Ecosystem.

Kootenai Zone 1

NCDE-KNF Zone 1-STD-02. Within the Kootenai National Forest portion of NCDE zone 1 outside of the area covered by the Tobacco “bears outside the recovery zone” (also known as BORZ) (Kootenai forest plan, appendix B, pp. 150-151), *there shall be no net increase above the baseline in miles of roads open to public motorized use during the non-denning season on National Forest System lands. This standard does not apply to the following:*

- motorized use by agency personnel or others authorized by the appropriate agency personnel;
- temporarily opening a road for a short periods of time to allow for public firewood gathering and other authorized use;
- updated/improved road data without an actual change on the ground;

- changes in technology or projections that result in changed calculations without actual change on the ground (e.g., a switch in geodetic systems from the North American Datum of 1927 to the North American Datum of 1983);
- a road closure location is moved a short distance (e.g., to the nearest intersection or turnout) to a better location to allow turn-arounds providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
- the agency exchanges, acquires, buys or sells lands;
- a change in an open road is necessary to comply with Federal laws (e.g., Architectural Barriers Act of 1968, as amended);
- motorized use for mining activities (as authorized under the Mining Law of 1872) and oil and gas activities (as authorized under the Federal Onshore Oil and Gas Leasing Reform Act of 1987) because these types of permitted resource development are subject to valid existing rights and have a separate set of standards and guidelines;
- a change in an open road is necessary to address grizzly bear-human conflicts, human safety concerns, or resource damage/concerns (e.g., a road paralleling a stream may be decommissioned and replaced by a new upslope road to reduce water quality impacts);
- motorized use for emergency situations as defined by 36 CFR 218.21; and
- temporary roads (see glossary).

Alternative 3 relationship to the issues

Grizzly bear habitat

Alternative 3 would provide additional protection from habitat loss and disturbance by extending the requirement for a no surface occupancy stipulation for new oil and gas leases beyond the primary conservation area to zone 1. One of the desired conditions and one of the standards for the livestock grazing would also extend to zone 1. The vegetation management guidelines would apply to both the primary conservation area and the demographic connectivity areas under this alternative.

To help support occupancy by female grizzly bears in the Salish demographic connectivity area on the Kootenai National Forest, a standard would be added to require no net increase above the baseline in the linear miles of routes (trails and roads) that are open to the public for motorized use during the non-denning season on NFS lands. In zone 1 outside the Tobacco “bears outside recovery zone” on the Kootenai National Forest and zone 1 on the Lolo National Forest, there would be no net increase above the baseline in the miles of roads open to motorized use by the public during the non-denning season on NFS lands. In the Ninemile demographic connectivity area on the Lolo National Forest, there would be no net increase above the baseline in miles of roads or trails open to public motorized use during the non-denning season on NFS lands.

On the Helena National Forest, a standard would be added in zone 1 and the portion of zone 2 located in the Blackfoot and Divide landscapes west of Interstate 15 (figure 1-72) to facilitate the movement of grizzly bears to the Greater Yellowstone Ecosystem. The standard would require that motorized routes (roads and trails) open to public motorized use not exceed 2.4 miles/square mile on NFS lands during the non-denning season.

Access and recreation

Alternative 3 would maintain the same level of opportunity for public use of roads for motorized vehicle use in the primary conservation area and zone 1. In the demographic connectivity areas, alternative 3 would be more restrictive by requiring no net increase in motorized trails (as well as roads) during the non-denning season. To reduce the risk of grizzly bear-human conflicts on NFS lands, increases in the number or capacity of new developed recreation sites designed and managed

for overnight use would be limited in the primary conservation area for grizzly bears, the same as under alternative 2 modified. Outside of the primary conservation area, there would be no restrictions on increases in the number of developed recreation sites or their capacity.

5.6.5 Alternatives considered but eliminated from detailed study

Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR § 1502.14). Public comments received in response to the proposed action provided numerous suggestions for alternative approaches to achieving the purpose and need and further requested that forest plan components applicable to the primary conservation area be extended to zone 1, demographic connectivity areas, zone 2, and/or zone 3. The following alternatives were considered but dismissed from detailed study for the reasons stated below.

Management of a grizzly bear hunting season

Some respondents expressed concern that a hunting season might reverse the recovery of the grizzly bear population in the NCDE, and some were also concerned that a hunting season might discourage connectivity between the NCDE and other grizzly bear ecosystems. It was suggested that the Forest Service should play a role in establishing a science-based hunt.

Hunting and trapping of grizzly bears are currently prohibited and will continue to be prohibited as long as the species is listed under the Endangered Species Act. Whether and when the species might be delisted and a hunting season established is unknown at this time.

The draft Conservation Strategy developed a comprehensive and coordinated interagency strategy to maintain the grizzly bear population post-delisting. The draft Conservation Strategy includes both demographic standards to maintain a healthy, widely distributed, and genetically diverse population with high adult female survival and sustainable mortality limits and habitat standards to provide habitat conditions that support continual occupancy by grizzly bears within the primary conservation area, support female occupancy and dispersal in demographic connectivity areas, and provide the opportunity for movement of grizzly bears, particularly males, through zone 2 to the Greater Yellowstone Ecosystem. Because of the interagency approach, we expect that MFWP would regulate any potential future hunting or trapping of grizzly bears in a manner that is consistent with the goals of the Conservation Strategy. Although the Forest Service has the authority to manage hunting on NFS lands, the Forest Service is not expected to need to impose any separate regulations.

Forest plan direction that contributes to conserving the NCDE grizzly bear population and its habitat will be implemented on NFS lands whether or not USFWS takes action to delist the population. Therefore, this alternative was eliminated from detailed analysis.

Delay the National Environmental Policy Act process until the draft Conservation Strategy is finalized

Some commenters suggested that the Forest Service should not continue the NEPA process on its proposed action until the draft Conservation Strategy has been finalized.

It is not necessary for the Forest Service to wait until the draft Conservation Strategy is finalized before revising or amending its plans. The Forest Service is taking the opportunity to amend the Helena, Kootenai, Lewis and Clark, and Lolo forest plans under the previous planning regulations, concurrently with the Flathead forest plan revision, in accordance with the transition provisions of

the 2012 planning rule (36 CFR § 219.17). Using this process to amend the four forest plans is simpler and is cost-effective.

The Forest Service is using the best available information at this time, which includes but is not limited to information contained in the draft Conservation Strategy. When the draft Conservation Strategy is finalized, the Forest Service will be able to determine whether there are substantive differences that would indicate a need to change relevant forest plan direction. If so, established procedures would be followed to make any needed changes to the forest plans.

The effects of not amending the forest plans are already displayed under the no-action alternative. For these reasons, this alternative was eliminated from detailed analysis.

Habitat-based recovery criteria

Some respondents suggested that habitat-based recovery criteria must be established for the NCDE before delisting can be considered and/or before the forest plans are amended. They felt that the draft Conservation Strategy is premature and should not have been the basis for the proposed action.

The Grizzly Bear Recovery Plan established two separate requirements that must be met before a population can be delisted: (1) attainment of the population demographic parameters for that ecosystem within the monitoring period specified and (2) development and completion of an interagency conservation strategy that will ensure that adequate regulatory mechanisms will continue to be present after delisting (USFWS, 1993). In accordance with a court settlement approved on May 5, 1997 (Fund for Animals v. Babbitt 967 F. Supp. 6 (D.D.C.1997)), USFWS developed and defined habitat-based recovery criteria for the Greater Yellowstone Ecosystem, which were appended to the Recovery Plan in 2007. Three objective and measureable criteria were developed to meet the overall goal of maintaining or improving habitat conditions at the level of human activity that existed in 1998, when the population was increasing at 4 to 7 percent per year. The criteria are: a secure habitat standard, a developed site standard, and a livestock allotment standard, all of which will be monitored.

The decision whether to append the grizzly bear Recovery Plan with habitat-based recovery criteria is the responsibility of the USFWS. On May 11, 2016, USFWS published a notice in the Federal Register informing scientists and other interested parties that they would have the opportunity to submit oral or written comments on habitat-based recovery criteria for the NCDE grizzly bear population. On July 7, 2016, USFWS conducted a workshop to hear oral presentations and also accepted written comments during July 2016. USFWS is now reviewing and responding to the comments. If USFWS decides to append the Recovery Plan for the NCDE, the Forest Service can review the habitat-based recovery criteria at that time and determine whether there is a need to change the forest plan direction.

The Forest Service has chosen to amend the Helena, Lewis and Clark, Kootenai, and Lolo forest plans concurrently with revision of the Flathead forest plan to provide a consistent, updated set of plan components based on currently available information and recommendations from the grizzly bear Recovery Plan (including the appended habitat-based recovery criteria for the Greater Yellowstone Ecosystem), the draft Conservation Strategy, and other sources of scientific information. The proposed forest plan components (desired conditions, standards, guidelines, and monitoring items) that address secure core, developed recreation sites, livestock grazing allotments, and other resource management activities that may occur in grizzly bear habitat in the NCDE are similar to the habitat-based recovery criteria for the Greater Yellowstone Ecosystem.

Apply Flathead National Forest plan amendment 19 to all bear management subunits in the primary conservation area

Some people suggested that the Flathead National Forest plan amendment 19 management direction of 19-19-68 (percent of the subunit with open motorized route density > 1 mile/square mile (OMRD), percent of the subunit with total motorized route density > 2 miles/square mile (TMRD), and percent of the subunit in secure core, respectively) be applied to all bear management subunits in the primary conservation area on all national forests in the NCDE. Many of these commenters felt that amendment 19 management direction is the best available science.

For the Flathead National Forest, see the discussion of the no-action alternative. For the amendment forests, the main difference between amendment 19 and the other alternatives being considered is that meeting 19-19-68 would be required in all grizzly bear subunits where the Forest Service manages over 75 percent of the land.

Currently on the amendment forests, there are a few grizzly bear subunits with more than 75 percent Federal ownership that have not attained the 19-19-68 objectives and, through Endangered Species Act section 7 consultation, are not planned to do so. On the Helena National Forest, the open motorized route density requirement was adjusted to less than 22 percent for the Red Mountain subunit. On the Kootenai National Forest, a higher open motorized route density was established under the revised forest plan for the Forest's two subunits. On the Lolo National Forest, open motorized route density, total motorized route density, and secure core were adjusted for the Swan subunit. In these particular subunits, it was not feasible to meet all of the 19-19-68 criteria due to their unique configuration, proximity to private land developments, the need to maintain open roads for emergency egress, and/or other characteristics that were carefully analyzed and addressed through the Endangered Species Act section 7 consultation process. In some grizzly bear subunits, closing additional roads to meet 19-19-68 would deny private or other agency landowners access to their property, but providing them access is required by law. Therefore, this alternative would not be feasible to implement in all subunits.

It should also be noted that the amendment 19 management direction of 19-19-68 was based upon a progress report for study of habitat use by eight female bears in the Swan Mountains (R. D. Mace & Manley, 1993). Today we have a much more extensive body of knowledge about the grizzly bear population in the NCDE, which shows that the population is large, well distributed within the recovery area, increasing in size, and expanding its distribution, even though not every subunit in the primary conservation area meets 19-19-68. For the above reasons, application of amendment 19 to all bear management subunits on all national forests in the NCDE was not carried forward for detailed analysis.

Primary conservation area and zone 1 should have the same motorized route standards or zone 1 should have lower motorized route densities

Some people commented that BMU subunits should be delineated for zone 1 and that motorized route standards for the primary conservation area should be applied to zone 1 as well. Some commented that zone 1 should have a standard for lower road densities. Some people commented that the revised plan for the Flathead National Forest should have lower road densities for portions of the Salish demographic connectivity area, based upon the geographic units in the 1986 forest plan (alternative A) and findings on road densities from Boulanger and Stenhouse (2014).

Since the goals for the primary conservation area/recovery zone and zone 1 are different, it is not necessary to apply the same habitat protections, nor would this be a practical approach. NFS lands comprise about 61 percent of the primary conservation area but only about 22 percent of the

demographic connectivity areas. Furthermore, some NFS lands in zone 1 are at lower elevations and are generally not consolidated or are intermingled with other land ownerships, making application of the same standards for motorized routes problematic. In their study of grizzly bears in the Swan Valley, Mace and Waller (1998) concluded that road use restrictions on multiple-use lands in lower-elevation, mixed ownership settings would be of limited value unless habituation and mortality levels are also minimized on adjacent private lands. Road densities for geographic units were analyzed for alternative A. As discussed in section 3.7.5 of the final EIS, the motorized access density across the Flathead's portion of the Salish demographic connectivity area as a whole is supportive of the goals of the demographic connectivity area and is also supportive of other multiple-use objectives. For these reasons, this alternative was not carried forward for detailed analysis. Under the action alternatives, monitoring of grizzly bear mortality would include zone 1 to ensure that a healthy population is maintained.

Because individual bears may move across the recovery zone line, the Recovery Plan established a 10-mile buffer area surrounding the recovery within which the demographic recovery criteria are monitored (USFWS, 1993). Similarly, zone 1 would be included in the area within which the population is monitored, and continual occupancy by bears would be expected in zone 1 but at lower densities than in the primary conservation area (USFWS, 2013c).

No administrative use of roads that have public restrictions

Some people commented that there should be no allowance for administrative use of roads that have public restrictions on motorized use (in other words, remove NCDE-STD-AR-01).

This request to prohibit administrative use of roads is not practicable. It is the case that many restricted roads receive no administrative use at any time. However, at certain times or in certain locations, administrative use is necessary to safely conduct activities such as release of captured grizzly bears, cleaning and maintaining culverts, and completing project work.

Administrative use has been ongoing during the period in which the grizzly bear population has been stable to increasing and expanding its distribution. Traffic volumes are comparatively light on roads receiving administrative use, resulting in less disturbance or displacement of bears than would occur on roads open to the public. Mace and others assessed the seasonal use of habitat within 0.3 mile of roads by 13 female and 5 male grizzly bears. They found that most grizzly bears showed a neutral response or even selected for habitats within 0.3 mile of closed roads or open roads with less than 10 vehicles per day (R. D. Mace, Waller, Manley, Lyon, & Zuuring, 1996). Similarly, Northrup (2012) and others reported that grizzly bears did not avoid roads that receive low use levels, and selected areas near roads that were traveled by fewer than 20 vehicles per day (140 vehicles per week). The six trips per week that is allowed for administrative use is far less than this number, so disturbance to grizzly bears is expected to be minor. The Forest Service recognizes that unlimited use for one 30-day time period could disturb bears or cause avoidance in the affected area if it exceeded 20 vehicles per week, but this level of administrative use is unlikely and the total length of time a road can be temporarily opened for administrative use is restricted to a short period to minimize adverse impacts to grizzly bears. There have been no grizzly bear mortalities associated with administrative use of roads in the NCDE. Mortality risk is higher on roads that are open for use by the public. Experience has shown that administrative use is necessary on some restricted roads, and such use has been compatible with a stable to increasing grizzly bear population. For these reasons, this alternative was not carried forward for detailed analysis.

Shorten the duration of project implementation (remove guidelines)

There was a suggestion to drop guideline NCDE-GDL-AR-01, which limits implementation of projects to no more than five years. There was a similar objection to NCDE-GDL-AR-02, which requires restoring open motorized route density, total motorized route density, and secure core within one year of project completion. The commenters stated that these guidelines would allow too much impact to bears, so the duration of project implementation should be shorter.

Experience with projects implemented in the NCDE has shown that a shorter duration in many cases would not be practicable. For vegetation management projects, a duration of four to five years is typical due to the need to sequence activities such as pre-harvest weed treatment, water quality best management practices on roads, timber harvest, slash treatment, tree planting, and road closures and/or reclamation. Other seasonal restrictions under the forest plans further limit the operating season, making a shorter duration impractical. Many projects of five-year duration have been implemented during the period when the grizzly bear population in the NCDE has been increasing and expanding its distribution. As noted above, there have been no grizzly bear mortalities associated with administrative use of roads in the NCDE. For these reasons, this alternative was not carried forward for detailed analysis.

Prohibit temporary increases in motorized route density and temporary decreases in secure core

Some people suggested that no temporary increases in open motorized route density and total motorized route density to allow for project activities, or temporary decreases in secure core, should be allowed.

If no such temporary changes were allowed, many projects that are needed to meet resource management objectives would have to be forgone. For example, In the Cabinet-Yaak recovery zone, the Kootenai forest plan allows a temporary decrease in secure core to address the needs of bull trout (road/stream restoration) in the Cabinet-Yaak recovery area. Similar resource needs exist across the NCDE. Many projects that necessitated temporary increases in road density have been implemented during the period when the grizzly bear population in the NCDE has been increasing. It should also be noted that a substantial amount of secure core is located in wilderness and other management areas where no motorized access exists and no temporary decreases in secure core would occur. On the Flathead National Forest, temporary decreases in secure core have only occurred as a result of adjacent project activities where the buffered area extended into secure core. For these reasons, the suggested alternative was not carried forward for detailed analysis.

Add a rest period following temporary decrease in secure core

Some people said that there should be a rest period of 10 or 20 years following temporary decreases in secure core due to projects.

There is no science indicating that a rest period is needed (USDA, 2015b). The original concept of a 10-year rest period for secure habitat was based upon a theoretical calculation to give a generation of bears a time period without temporary disturbance (from the time a female bear is born to its first litter (six years), and then to raising its offspring to 2.5 years old). This rest period was recommended at a time when the grizzly bear population was much smaller and standards for secure core habitat were being formulated but not yet in place. Grizzly bear experts do not now believe a rest period is necessary for continued bear recovery because secure core is in place, and they believe that the temporary decreases allowed under standard NCDE-STD-AR-03 would support recovery of the

grizzly bear population (USDA, 2015b). For these reasons, this alternative was not carried forward for detailed analysis.

Remove secure core from the suitable timber base

Some people said that secure core in the primary conservation area, and/or habitat to provide security in both of the demographic connectivity areas, should be removed from the suitable timber base.

Through the forest planning process under the National Forest Management Act, certain lands are to be identified as being suitable for timber production and managed to achieve a regulated schedule of harvest. In some areas that are not identified as suitable for timber production, timber harvest (which might yield commercial products) may be allowed to achieve other resource objectives. In some areas, such as congressionally designated wilderness areas, timber harvest is prohibited. There are 1.6 million of contiguous acres of designated wilderness in the Bob Marshall Complex, and nearly 1.9 million acres of designated wilderness across the NCDE management zones.

For the Flathead revised forest plan, the alternatives studied in detail include consideration of varying degrees of commercial timber harvest, and the number of acres of land suited for timber production does vary by alternative. The “need for change” topics driving the revision (e.g., need to improve composition, structure, and landscape patterns of vegetation; need to provide a reasonable level of goods and services including timber products; and need to reduce wildfire risk) were considered in identifying the lands suitable for timber production. The analysis in the final EIS considers the potential effects to grizzly bear secure core and the extent to which appropriate use of timber harvest would be beneficial to bears by increasing production of some bear foods (John S. Waller & Mace, 1997).

The 2015 Kootenai forest plan removed grizzly bear secure core areas from the lands identified as suitable for timber production. However, timber harvest is still allowed within secure core where needed to meet other resource objectives, such as improving grizzly bear foraging habitat.

The Helena, Lewis and Clark, and Lolo forest plans did not consider grizzly bear secure core when identifying the lands suitable for timber production. However, the existing forest plans and the two alternatives considered in detail contain forest plan components that would constrain timber management in a way that is compatible with grizzly bear recovery and would support delisting of the grizzly bear. Changing the lands identified as suitable for timber production is not necessary to meet the purpose and need of the amendments to the Helena, Kootenai, Lewis and Clark, and Lolo forest plans.

For these reasons, this alternative was not carried forward for detailed analysis.

Identify an additional demographic connectivity area on the Helena National Forest

Many commenters suggested that a third demographic connectivity area should be identified on the Helena National Forest at the south end of the NCDE to facilitate movement of bears to the Greater Yellowstone Ecosystem.

The purpose of a demographic connectivity area is to provide opportunities for female grizzly bears to establish home ranges and exist at low densities, thereby facilitating connectivity of bear populations in nearby recovery areas. The Salish and Ninemile demographic connectivity areas were identified to provide for demographic connectivity to the nearby Cabinet-Yaak recovery zone, which has a very small number of grizzly bears, and the Bitterroot potential recovery area, which does not have a resident bear population.

In contrast, the Greater Yellowstone Ecosystem has a robust bear population. In consideration of its geographic isolation, zone 2 was delineated with the objective of allowing bears, particularly male bears, to move through zone 2 and infuse genetic diversity into the Greater Yellowstone Ecosystem. This would contribute to the Recovery Plan's estimated need to bring in one bear from another area every 10 years (USFWS, 1993, p. 56). Male bear movement is believed to be sufficient to provide for gene flow unless grizzly bear populations are very small (M. F. Proctor et al., 2012). Thus, establishment of a demographic connectivity area is not needed in this vicinity, and this alternative was not carried forward for detailed analysis.

However, to respond to the expressed concern, forest plan components were added to alternative 2 modified and alternative 3 that would provide additional direction on the Helena National Forest in the portion of zone 1 and zone 2 west of Interstate 15 (figure 1-72) to facilitate male bear movement and gene flow from the NCDE to the Greater Yellowstone Ecosystem.

Additional demographic connectivity areas/habitat protections in the Big Belt and Little Belt Mountains

Some people recommended that additional demographic connectivity areas and/or habitat protections should be applied in the Big Belt or Little Belt Mountains and adjoining areas to facilitate movement of bears from the NCDE to the Greater Yellowstone Ecosystem.

The Greater Yellowstone Ecosystem has a robust bear population. However, in recognition of its geographic isolation, zone 2 was identified to facilitate movement of bears, particularly male bears, between the NCDE and the Greater Yellowstone Ecosystem populations. Because existing direction in Forest Service and U.S. Bureau of Land Management land management plans has not precluded male grizzly bears from occupying zone 2 in low densities, the draft Conservation Strategy recommended continuing to apply the existing direction with no changes needed. Existing forest plan direction that is applicable to zone 2 on the amendment forests is listed and discussed in section 6.5.5.

At this time, grizzly bears have not been observed on NFS lands in the Big Belt or Little Belt mountain ranges. During the summer of 2017, two sightings of grizzly bears on private land in the Big Belts were confirmed by MFWP for the first time in decades. It is possible that grizzly bears could occur on NFS lands in these mountain ranges in the future, but these are isolated mountain ranges with inherent limitations in providing habitat connectivity. Based on locations of bears observed outside of the recovery zone and recent modeling to predict movement paths by Peck et al. (2017), the zone 1 and zone 2 areas on the west side of the Helena National Forest (figure 1-72) appear to have a better potential to meet the goal of genetic connectivity than the Big Belt or Little Belt mountain ranges.

The purpose of a demographic connectivity area is to provide opportunities for female grizzly bears to establish home ranges and exist at low densities to provide connectivity between populations in nearby recovery zones. Habitat conditions that support occupancy by females exceed what would be needed to allow for movement of male grizzly bears to provide genetic interchange between the NCDE and the GYE. Additional habitat protections in these mountain ranges do not appear to be needed to achieve the goal of genetic connectivity, and therefore this alternative was eliminated from detailed analysis.

Extend all of the plan components proposed for the primary conservation area to zone 2

Some people recommended that all of the plan components (desired conditions, standards, and guidelines) applicable to the primary conservation area be extended to zone 2. It was argued that because no successful dispersals have yet been documented from the NCDE to the Greater Yellowstone Ecosystem, the same habitat protections that have been applied in the recovery zone to support survival and reproduction must be needed. Some commenters were concerned that zone 2 may be a mortality sink.

The intents for the primary conservation area and zone 2 are different. In zone 2, the intent is to allow occupancy and movement of bears, primarily male bears, sufficient for genetic interchange from the NCDE to the Greater Yellowstone Ecosystem. Zone 2 is not considered necessary for recovery of the NCDE population. Male grizzlies have much larger home ranges, move greater distances, and do not show the same affinity for secure core as females. Female bears may occupy zone 2 at low densities, but occupancy of zone 2 is not necessary for recovery of the NCDE population.

The draft Conservation Strategy described the NCDE as a source population for other recovery areas in the U.S. population (USFWS, 2013c) due to its large size, increasing population trend, and low genetic differentiation (Costello et al., 2016; Kendall et al., 2009; R. D. Mace et al., 2012). Mickle et al. (2016) found evidence that reconnection at the eastern and southern periphery of the population has been taking place. Movement of grizzly bears into zone 2 is relatively recent, and there is no evidence that there is a mortality sink on NFS lands in zone 2. Food storage orders and other wildlife habitat management direction are in place on most NFS lands, and a food storage order would be required on NFS lands in zone 2 under alternatives 2 and 3.

The goals for the primary conservation area and zone 2 are very distinct, and managing them in the same way is not necessary to support recovery of the NCDE population or genetic connectivity with the Greater Yellowstone population. For these reasons, this alternative was eliminated from detailed analysis.

Extend plan components for the primary conservation area or demographic connectivity areas to zone 3

Some people suggested extending desired conditions, standards, and guidelines for the primary conservation area or demographic connectivity areas to zone 3 to provide connectivity to the Greater Yellowstone Ecosystem.

Zone 3 is defined as areas that do not provide enough suitable habitat to support long-term survival and occupancy of grizzly bears. Although grizzly bears may occur there, zone 3 is not needed for recovery of the NCDE population or for connectivity to the Greater Yellowstone Ecosystem. The level of habitat management necessary for the primary conservation area or to provide for female occupancy is not needed and not likely to be attainable in zone 3. Additional emphasis on connectivity of the NCDE and Greater Yellowstone Ecosystem bear populations through zone 2 is considered and analyzed under alternative 2 modified and alternative 3, as described previously. For these reasons, this alternative was eliminated from detailed analysis.

Include the Beaverhead-Deerlodge National Forest in this decision

Some people recommended that the amendment should include the Beaverhead-Deerlodge National Forest, perhaps by identifying a demographic connectivity area, to address connectivity between the NCDE and the Greater Yellowstone Ecosystem.

The Beaverhead-Deerlodge National Forest does not have any acreage in the primary conservation area, zone 1, or zone 3, but a portion of the Forest is within zone 2 (USFWS, 2013c, pp. 48, 84, 91, 92). The draft Conservation Strategy states: “Because we know that management direction in current USFS and BLM land management plans in zone 2 did not preclude male grizzly bears from occupying this area in low densities, existing direction will continue to apply. Land management plans on lands managed by BLM or USFS contain numerous standards to benefit other species or resource values that will also benefit grizzly bears. Existing direction for USFS and BLM land management plans is summarized in Appendices 10 and 11” (p. 91). Because no changes to the Beaverhead-Deerlodge forest plan are needed, it was not included in the proposed action or the action alternatives.

We agree that connectivity between ecosystems is important, and alternative 2 modified and alternative 3 both include plan components to address connectivity between the NCDE and the Greater Yellowstone Ecosystem. Movement of bears from the NCDE to the Greater Yellowstone Ecosystem is supported by the food storage order on the Beaverhead-Deerlodge National Forest and by limits on open road densities under the revised Beaverhead-Deerlodge forest plan. Changes to management direction on the Beaverhead-Deerlodge National Forest are not needed to provide for genetic connectivity. For these reasons, this alternative was eliminated from detailed analysis.

Facilitate bear movement with elk security standards in zones 1 and 2

Some commenters suggested adding elk security standards to apply in zones 1 and 2 to facilitate bear movement.

Under the existing forest plans, motorized use of roads may be restricted during the big game hunting season, roughly Oct. 1-Dec. 1, to provide security for elk. Although these restrictions could also result in conditions supportive of bear movement, there would be no benefit to grizzly bears for most of the non-denning season. Alternative 2 modified and alternative 3 would have a standard to maintain the density or linear miles of roads open to the public in zone 1 and the density or linear miles of motorized routes in the demographic connectivity areas at the baseline levels during the non-denning season. A standard limiting road density to less than 2.4 miles/square mile in zones 1 and 2 west of Interstate 15 in the Blackfoot and Divide landscapes on the Helena National Forest is also proposed under alternative 3 to facilitate the movement of bears to the Greater Yellowstone Ecosystem. Plan components for grizzly bear habitat would likely also benefit elk, but adding forest plan components specifically for elk management is outside the scope of the purpose and need for the amendments. Therefore this alternative was eliminated from detailed analysis (also see the forest plan of the Flathead National Forest, Salish geographic area, for elk security plan components GA-SM-DC-03 and GA-SM-GDL-01).

Prohibit all motorized over-snow vehicle recreation

Some commenters proposed allowing no motorized winter recreational use to eliminate any potential impacts on grizzly bears and other wildlife.

As stated in the draft Conservation Strategy (USFWS, 2013c) and the five-year review of the status of the grizzly bear (USFWS, 2011b), there is no known or discernible impact from current levels of winter motorized recreation on the population of grizzly bears in the NCDE. The NCDE population

has been stable to increasing and has met the demographic recovery objectives of the grizzly bear Recovery Plan with existing levels of over-snow use. A standard was added to avoid increased disturbance of female grizzly bears by motorized over-snow vehicles during the den emergence time period. Prohibiting over-snow vehicle use across all modeled denning habitat or across the national forests is not necessary to sustain recovery of the population or provide for connectivity with other ecosystems. For these reasons, this alternative was eliminated from detailed analysis.

Extend the dates defining the denning season

There was a comment suggesting that the date used to define the start of the non-denning season be changed from April 1 or April 15 to March 15.

This request is not supported by the best available information. The dates used in the draft Conservation Strategy (April 1 west of the Continental Divide and April 15 east of the Continental Divide) are based upon information from more than 250 known grizzly bear dens in the NCDE (R. Mace, personal communication, 2014). The April 1/April 15 dates are already conservative in providing protection to bears emerging from dens. For example, in 2015, a year with lower than average snowfall and early snow melt on the west side of the NCDE, the first male emergence was on April 23 and the first female emergence was on April 28. In the future, if the best available information shows that grizzly bears are coming out of their dens at an earlier date, forest plans could be amended. For these reasons, this alternative was eliminated from detailed analysis.

Allow no increase in developed recreation sites on NFS lands in the primary conservation area or zones 1, 2, and/or 3

Some people suggested not allowing any increases in developed recreation sites on NFS lands in the primary conservation area or in zones 1, 2, and/or 3.

Developed recreation sites can impact bears through temporary or permanent habitat loss and displacement, but the primary concern is grizzly bear-human conflicts caused by unsecured bear attractants, habituation, and food conditioning, which can lead to grizzly bear mortality or removal from the ecosystem. Most of the grizzly bears that have been killed or removed from the NCDE by management agencies were involved in conflicts related to unsecured attractants such as garbage, bird feeders, pet/livestock feed, and human foods. The majority of these conflicts and mortalities occurred on private lands. There have been no grizzly bear mortalities at developed recreation sites on NFS lands in the NCDE in recent years, although grizzly bear-human conflicts have occurred at some sites. Because there is not a strong pattern of grizzly bear mortalities associated with developed recreation sites, the conservation strategy team did not feel it necessary to preclude any increases in numbers or capacity of developed recreation sites on public lands. Allowing one increase per decade per bear management unit is consistent with increases that have been permitted during the period that the NCDE grizzly bear population has been stable to increasing and expanding its distribution (USFWS, 2013c).

The risks of grizzly bear-human conflicts and grizzly bear mortality are higher at those developed recreation sites that support overnight public use. These sites are more likely to have attractants and have a higher potential for contact between people and bears. Therefore, the action alternatives propose to limit increases in the number or capacity of developed recreation sites designed and managed for overnight use during the non-denning season in the primary conservation area.

In the primary conservation area, continuous occupancy by grizzly bears is the goal. Occupancy at lower densities is expected in zones 1 and 2, where the goal is to provide connectivity to other recovery zones. Management zone 3 is not expected to provide enough suitable habitat to support

long-term survival and occupancy by grizzly bears. Limiting developed recreation sites in zones 1, 2, or 3 is not necessary to achieve the goals for those areas. Therefore, this alternative was eliminated from detailed analysis.

The Forest Service investigated the idea of allowing no increases in developed recreation sites within more limited areas, such as in proximity to highways. However, it is more difficult to predict precise areas where grizzly bears will cross highways than it is for some other wildlife species. Topography, time of day, highway traffic volume, availability of bridges or underpasses, and other variables may influence bear movements (John S. Waller & Servheen, 2005). After discussion with grizzly bear experts (Kuennen, 2015), we concluded that scientific information is not available to enable reliable identification of specific highway crossing areas in the NCDE or between the NCDE and other ecosystems. However, under the action alternatives, a desired condition was added to the Helena, Kootenai, and Lolo forest plans to encourage consolidation of NFS lands and development of conservation easements with willing landowners in areas adjacent to highways.

Grizzly bear reproduction and mortality will be monitored by MFWP, and if monitoring determines there is a need for additional restrictions on developed recreation sites on NFS lands in the future, forest plans could be amended to provide them.

For these reasons, this alternative was not carried forward for detailed analysis.

Allow only one increase per decade in developed recreation sites on NFS lands in zone 2 or zone 3

Some people suggested allowing only one increase in developed recreation sites on NFS lands in zone 2 or zone 3.

As described previously, the stated goal for zone 2 is to maintain existing resource management and recreational opportunities while providing the opportunity for grizzly bears, particularly males, to move between the NCDE and the Greater Yellowstone Ecosystem to provide genetic connectivity. Zone 3 is not expected to provide enough suitable habitat to support long-term survival and occupancy by grizzly bears, although bears may occur there. Limiting developed recreation sites in zone 2 or zone 3 is not necessary or consistent with the management goals for these areas. Therefore, this alternative was eliminated from detailed analysis.

Ski area mitigation should be required in zone 1 and zone 2

It was suggested that standard FW-STD-REC-04 (Flathead Nation Forest) and NCDE-STD-AR-07 (amendment forests) should be extended to zone 1 and zone 2.

In response to scoping comments on the proposed action, this standard was included in alternative C and alternative 3. The standard was written to apply to the primary conservation area. After reviewing comments on the draft EIS, this standard was also added to alternative B modified and alternative 2 modified in this final EIS.

In the primary conservation area, continuous occupancy by grizzly bears is the goal. Occupancy at lower densities is expected in zone 1, where the goal is to provide connectivity to other recovery zones. The stated goal for zone 2 is to maintain existing resource management and recreational opportunities while providing the opportunity for grizzly bears, particularly males, to move between the NCDE and the Greater Yellowstone Ecosystem to provide genetic connectivity.

We are not aware of any history of grizzly bear conflicts or mortalities associated with operations at ski areas during the non-denning season. NCDE-CD-WL-01 and NCDE-STD-WL-02 already require that food/attractant storage orders be in place in the primary conservation area, zone 1, and zone 2. We do not believe that requiring additional mitigation for new or reauthorized permits would be necessary to achieve the goals for zone 1 and zone 2. Therefore, this alternative was eliminated from detailed analysis.

Restrict logging operations during spring

Some people suggested there should be a mandatory standard restricting all logging operations during the spring time period.

Spring grizzly bear habitat varies over time and space within the NCDE, depending on annual spring snow conditions, disturbances such as wildfires and avalanches, and vegetation conditions at microsites that change due to plant succession. The characteristics of key spring habitat are well researched and documented, but they cannot be reliably mapped across the NCDE. For these reasons, grizzly bear biologists believe that guideline NCDE-GDL-VEG-01 appropriately deals with key spring habitat during site-specific analysis (R. Mace, personal communication, March 18, 2015, meeting). It is not necessary or reasonable to preclude other forest management activities, such as burning, weed spraying, and implementation of best management practices, that may need to be completed during the spring time period in order to prevent resource damage and/or to meet wildlife, fish, and water quality objectives. For these reasons, this alternative was not carried forward for detailed analysis.

Extend plan components for livestock grazing in the primary conservation area to all other zones

Some people suggested extending the desired conditions, standards, and guidelines for livestock grazing in the primary conservation area to all other zones.

There is no scientific or anecdotal evidence that grazing of cattle at existing levels on NFS lands has resulted in grizzly bear mortalities or other population-level impacts. However, experience has shown that although grizzly bears and cattle can be compatible on public lands, there is a strong history of conflicts between grizzly bears and domestic sheep. Almost all domestic sheep allotments have been removed from NFS lands in the NCDE primary conservation area.

Under the action alternatives, forest plan components would constrain livestock grazing to baseline levels in the primary conservation area, or also in zone 1. This is based on the philosophy espoused in the draft Conservation Strategy of continuing the management that occurred during the period when the grizzly bear population was stable to increasing and expanding its distribution. Grizzly bear survival and mortality would be monitored across both the primary conservation area and zone 1 to ensure that a healthy population is maintained.

The goal of zone 2 is to provide the opportunity for movement of grizzly bears, particularly males, from the NCDE to the Greater Yellowstone Ecosystem. The emphasis is on maintaining existing resource management while preventing and responding to demonstrated conflicts. It should be noted that zone 2 is dominated by private landownership. Response to grizzly bear-livestock conflicts on private lands is provided by MFWP bear management specialists in the NCDE and is not within USFS authority.

Zone 3 is not needed for recovery of the grizzly bear but is an area where responding to grizzly bear-human conflicts would be emphasized. Zone 3 is also dominated by private landownership. Adding

the standards for livestock grazing that are applicable to the primary conservation area is not needed and likely would not be effective in zone 3.

In response to public comments, several of the desired conditions, standards, and guidelines related to livestock grazing would be extended to zone 1 under alternative 2 modified, and most would extend to zone 1 under alternative 3. However, an alternative that extended the forest plan components to zones 2 and 3 was not carried forward for detailed analysis.

Reduce the level of protection for the grizzly bear

In response to the proposed action, some commenters suggested that the level of protection of grizzly bear habitat should be further reduced to allow more development and use of natural resources.

Alternative 2 modified is believed to be what is necessary to provide the adequate regulatory mechanisms that would support recovery of the grizzly bear population in the NCDE, help to sustain its long-term persistence, and support its delisting. Relaxing or eliminating those forest plan components would not meet the purpose and need for the action. For these reasons, this alternative was eliminated from detailed analysis.

Under the draft Conservation Strategy, the grizzly bear population will be monitored. If new information becomes available that would support less restrictive management, forest plans could be amended.

Chapter 6. Affected Environment and Environmental Consequences of the Forest Plan Amendments

6.1 Introduction

This chapter summarizes the physical, biological, social, and economic environments of the NCDE analysis area and the potential consequences of implementing any of the alternatives described in chapter 5. Within each resource section, the boundaries of the area used for the resource analysis is described. The discussions of resources and potential effects utilize existing information included in assessments, other forest planning documents, published scientific papers, and other sources as indicated.

6.2 Relationship between Programmatic and Site-Specific Analyses

This final EIS is a programmatic document that considers the effects of revising one forest plan and amending four forest plans. It discloses the environmental consequences on a broad scale. This is in contrast to site-specific analyses for projects. The environmental consequences are described at a forest level of analysis and do not predict what will happen each time the forest plan is implemented through a project. The environmental effects of individual projects will depend on the implementation of each project, the environmental conditions at each project location, and the application of the standards and guidelines in each case.

The affected environment and environmental consequences discussions in this chapter provide a reasonable prediction of consequences on the national forests in the NCDE. However, this document does not describe every environmental process or condition.

The Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR §§ 1500-1508) define direct effects as those occurring at the same time and place as the proposed action and alternatives. Most of the effects of programmatic plans would be indirect effects because they would occur later in time. Direct effects would result from implementation of site-specific projects and would be evaluated when those decisions are made. The analyses of effects presented in this final EIS are based primarily on projections of how future activities would be conducted and would differ between alternatives.

6.3 Budget Levels

The Forest Service budget directly affects the level of activities that may occur through forest plan implementation. To analyze effects without consideration of expected budgets would be a misrepresentation of expected outcomes. Budgets are anticipated to remain flat or decrease in the foreseeable future.

6.4 Geographic and Climatic Setting

The NCDE analysis area extends south from the U.S.-Canada border and straddles the Continental Divide. This mountainous region sits at the boundary between warm, wet, maritime airflows from the Pacific Ocean and cooler, drier airflows from Canada. The portion of the NCDE west of the

divide is characterized by a cool, temperate, maritime-influenced climate, whereas the eastern portion has a cold continental climate.

Soil type and depth, aspect, and elevation all contribute to effective moisture availability for vegetation establishment and growth. Vegetation on the west side of the divide is generally more diverse and productive than on the east side.

Recent climate change has influenced vegetation along with stressors such as invasive species (e.g., white pine blister rust), elevated levels of native insects and pathogens, drought, and uncharacteristically severe wildfires. Recent research suggests that forest composition and productivity are likely to change, often substantially, as the climate changes during this century and beyond (Iverson & McKenzie, 2013).

For this EIS, downscaled climate models published by the Northern Region Adaptation Partnership (Halofsky et al., in press), which is incorporated by reference, were used to provide the context for effects analyses. Key findings for observed and projected climate for the central and east subregions are:

- Over the historical period of record (1895-2012), the annual mean monthly minimum temperature increased by about 2.6 °F (central subregion) and by about 2.2 °F (east subregion), whereas the annual mean monthly maximum temperature increased by about 1.3 °F (central subregion) and by about 1.8 °F (east subregion). During the same period, annual mean monthly precipitation increased slightly, by an average of about 0.1 inch/month (central subregion), with no change in annual mean monthly precipitation in the east subregion.
- By 2100, projections are for an increase of 6-12 °F in the annual mean monthly minimum temperature and 5-11 °F in the annual mean monthly maximum temperature. The average monthly minimum temperature in spring and autumn, or the average monthly maximum temperature in winter, may rise above freezing for the first time.
- Winter and spring are likely to be slightly wetter and summer slightly drier by 2100. Annual mean monthly precipitation is projected to increase by about 0.2-0.3 inches/month, but projections for precipitation have greater uncertainty than those for temperature.
- In montane watersheds, warmer water temperatures, earlier snowmelt-driven runoff, earlier declines to summer base flow, downhill movement of perennial channel initiation, and more intermittent flows are projected, as well as indirect changes attributable to altered and perhaps novel disturbance regimes. For animals restricted to freshwater aquatic environments for most or all of their lives, such as fishes, amphibians, mussels, and aquatic macroinvertebrates, changes in habitat and in hydrologic regimes are likely to lead to marked shifts in their abundance and distribution.

6.5 Wildlife

6.5.1 Introduction

The wildlife section presents information about selected terrestrial species including the grizzly bear, other species listed as threatened or endangered or proposed for listing under the Endangered Species Act, Forest Service sensitive species, and management indicator species.

6.5.2 Regulatory framework

Multiple-Use Sustained-Yield Act of 1960: The national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. This Act authorizes the Secretary of Agriculture to develop the surface renewable resources of national forests for multiple use and sustained yield of the services and products to be obtained from these lands, without impairment of the productivity of the land.

Wilderness Act of 1964: This act established a national wilderness preservation system to be administered for the use and enjoyment of the American people in such a manner as to leave the land unimpaired for future use as wilderness. Wilderness areas are to be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use. Nothing in the act affects the jurisdiction or responsibilities of the States with respect to wildlife and fish in the national forests.

Endangered Species Act of 1973, as amended: In Section 2 of the Endangered Species Act, it is “declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this act.” Section 7 directs Federal departments and agencies, in consultation and with the assistance of the Secretary of the Interior and/or Commerce, to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats. Species and critical habitat that are proposed for listing are also provided protection under the Endangered Species Act. Section 9 prohibits the import, export, take, possession, sale, etc., of endangered fish and wildlife species.

Forest and Rangelands Renewable Resources Planning Act of 1974: This act provides for the Forest Service, U.S. Department of Agriculture, to protect, develop, and enhance the productivity and other values of certain of the nation’s lands and resources. In developing, maintaining, and revising plans for units of the NFS, such plans shall provide for multiple use and sustained yield of products and services in accordance with the Multiple-Use Sustained-Yield Act of 1960, and, in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness.

Sikes Act of 1974, as amended: This act directs the Secretaries of Interior and Agriculture to cooperate with the States in developing comprehensive plans to plan, maintain, and coordinate the conservation and rehabilitation of wildlife, fish, and game, including but not limited to protection of species considered threatened or endangered pursuant to section 4 of the Endangered Species Act (16 USC 1533) or considered to be threatened, rare, or endangered by the State agency.

National Forest Management Act of 1976: Under the National Forest Management Act, forest plans are to provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet the overall multiple-use objectives. The National Forest Management Act requires that projects be consistent with the forest plan.

Sensitive species policy: Sensitive species are protected and managed under the regional forester’s sensitive species program through the Forest Service directives system. Species that are candidates for listing under the Endangered Species Act (i.e., warranted for listing but precluded by higher priority actions) ordinarily have been identified and managed by the Forest Service as sensitive species.

6.5.3 Key indicators for analysis

To focus the analysis of effects of the alternatives, key indicators are identified for each species. Resource elements identify the limiting factors or habitat attributes known to be important to the species, and the measures further define how effects will be estimated.

6.5.4 Methodology and analysis process

The analysis of effects on wildlife includes those species that are listed or proposed as threatened or endangered species under the Endangered Species Act (including the grizzly bear), sensitive wildlife species designated by the regional forester, and management indicator species identified in each of the approved forest plans. The “Affected environment” section briefly summarizes, for the NCDE as a whole, the status and trend of each species, its life history attributes and habitat associations, and responses to human activities, based on a review of published literature, local data, and other available scientific information.

The effects of the alternatives are analyzed separately for each of the national forests where the species is known or suspected to occur. Whether and to what degree implementation of the forest plan management direction would change the key indicators is estimated and described. The depth and detail of analysis is commensurate with the likelihood of occurrence of the species in the affected areas, the predicted response of the species to management activities, the magnitude of effects expected, and the degree of risk to the species.

The analysis of the indirect effects of implementing the forest plan generally considers the effects across each national forest as a whole. Cumulative effects are estimated based on the condition and trend of habitat for the species across all ownerships in the NCDE, as appropriate to the range of each species. In some cases, such as grizzly bear and Canada lynx, the context of an area larger than the NCDE is also considered.

Past actions are considered in the descriptions of existing conditions. The analysis of indirect effects considers activities that may occur during the anticipated life of the plan, which in accordance with the NFMA is generally about 15 years after approval. Analysis of cumulative effects may extend beyond the life of the forest plan because factors such as vegetation management, road management, and climate change have the potential to affect wildlife habitat for long time periods.

6.5.5 Grizzly bear

Key indicators for analysis

The draft Conservation Strategy (USFWS, 2013c) identified six key habitat features and human activities relevant to management of NFS lands that have the greatest potential to impact grizzly bears. These are (1) the amount and distribution of secure core, (2) motorized route densities, (3) developed recreation sites, (4) livestock allotments, (5) vegetation management, and (6) mineral and energy development. The analysis of effects of the alternatives (presented in volume 1 for the Flathead National Forest and in this volume for the other four forests and cumulative effects) is focused on these six aspects of grizzly bear habitat in the NCDE. Additionally, the framework of the grizzly bear management zones is designed to address grizzly bear-human conflicts and connectivity in the NCDE.

The key indicators and measures used to focus the effects analysis are summarized in table 183. The key indicators were developed after considering key stressors, public comments, and issues identified during scoping.

Table 183. Key indicators for assessing effects to grizzly bears

Resource Element	Measure
Grizzly bear secure core and motorized route densities—influence on habitat quality/availability in the primary conservation area	Percentage of each bear management subunit in secure core, percent with open motorized route density more than 1 mile/square mile, and percent with total motorized route density more than 2 miles/square mile. Potential impacts due to temporary reductions to allow for projects or administrative use.
Motorized routes in zone 1 and the DCAs to provide connectivity with adjacent recovery zones and support occupancy by female grizzly bears	Linear miles or density of roads in zone 1 and of motorized routes in the DCAs open to public use during the non-denning season on NFS lands
Developed recreation sites—grizzly bear-human conflict potential in the primary conservation area	Number and capacity of sites with overnight use in the primary conservation area by national forest and history of conflicts
Livestock grazing allotments—potential for conflicts or mortality risk	Number of cattle and sheep allotments and history of conflicts within primary conservation area, zone 1 and DCAs
Vegetation management—potential effects on habitat/bear foods and human-caused disturbance/displacement	Plan components to minimize adverse effects in the primary conservation area, DCAs, and zone 1
Oil, gas, and mineral development—potential habitat loss, bear displacement, mortality risk, grizzly bear-human conflicts	Mineral withdrawals, number of leases, no surface occupancy stipulations, and potential for development in the PCA and zone 1
Grizzly bear attractants and mortality risk	Plan components that address food/attractant storage
Risk of disturbance of females with cubs during the den emergence time period	Change in acres of denning habitat open to motorized over-snow vehicle use during den emergence time period
Connectivity—female grizzly bear occupancy and population connectivity to the Cabinet-Yaak and Bitterroot recovery zones	Change in permeability (linear road miles or road density) and mortality risk in DCAs
Connectivity—genetic interchange with the Greater Yellowstone Ecosystem	Plan components that provide for movement of male bears, focusing on land ownership consolidation or conservation easements and road density

Note. DCA = demographic connectivity area, PCA = primary conservation area.

Methodology and analysis process

All alternatives are designed to conserve the grizzly bear and to provide the regulatory framework to support recovery of the grizzly bear population in the NCDE, within the inherent capability of the analysis area and USFS authority. The habitat-related information and recommendations provided in the draft Conservation Strategy (USFWS, 2013c) were considered in developing forest plan components and analyzing the effects of the alternatives. The Forest Service coordinated and consulted with the USFWS throughout the planning process and will continue to do so.

Information sources

Information on the amount and distribution of secure core habitat, motorized route densities, developed recreation sites, and livestock allotments was updated by the NCDE geographic information system (GIS) specialist, based upon input from multiple land managers within the NCDE. Some data have changed since publication of the draft Conservation Strategy due to better knowledge of on-the-ground conditions, correction or re-alignment of location data, etc.

Incomplete and unavailable information

The NCDE Conservation Strategy is currently in draft, but it provided a compilation of the best available scientific information as of 2013 that was used to inform development of alternative 2 modified. The final Conservation Strategy is in preparation and will not be completed until after this final EIS is published.

The road inventory used for calculations of road miles and densities and secure core for grizzly bears is based upon the USFS INFRA database. The USFS does not have complete knowledge of old roads, whether culverts are in place on old roads, or road systems on adjacent private lands. The Forest Service periodically updates the INFRA database as new aerial images and other data become available. Analysis is based upon the best available scientific information.

Spatial and temporal analysis

The analysis of indirect effects is focused on those portions of the national forest where grizzly bear habitat management direction would apply. This varies by alternative as follows.

- Under the no-action alternative (existing forest plan direction for each of the national forests), habitat management direction would be applied to the NCDE recovery zone within grizzly bear management units as defined in the 1993 Recovery Plan (USFWS, 1993) and where applicable to specific management situations as defined in the 1986 Interagency Grizzly Bear Guidelines (IGBC, 1986). The NCDE recovery zone is divided into 23 bear management units (figure 1-71), of which all but two contain NFS lands. Additional requirements from the forest plan or biological opinions may apply to areas outside the recovery zone where grizzly bears are present.
- Under the action alternatives, amended management direction would apply to NFS lands within a larger area than the recovery zone. This larger area was identified by the draft Conservation Strategy in recognition of the expansion of the bear population into areas outside the recovery zone, the attendant need to establish appropriate management direction in those areas, and the desirability of providing connectivity to grizzly bear populations in other recovery zones. The analysis area is divided into a primary conservation area (which is the same as the NCDE recovery zone in the no-action alternative) and management zones 1 and 2 as delineated in the draft Conservation Strategy.

The analysis area for grizzly bear cumulative effects encompasses the primary conservation area, zone 1 including the Salish and Ninemile demographic connectivity areas, and zone 2, all of which have a goal of grizzly bear occupancy as defined in the draft Conservation Strategy (USFWS, 2013c). This area includes parts of seven national forests (Flathead, Helena, Kootenai, Lewis and Clark, and Lolo as well as the Gallatin and Beaverhead-Deerlodge), Glacier National Park, Bureau of Land Management lands, parts of the Flathead and Blackfoot Indian Reservations, and State and private lands. The NCDE is contiguous to Canadian grizzly bear populations and habitat, so the status of the portion of the grizzly bear subpopulation that is north of the Canadian border and south of Canada Highway 3 in relation to the potential effects of the amendments is also discussed. Forest plan components such as standards and guidelines apply only to those lands and facilities under Forest Service jurisdiction. However, grizzlies are wide ranging, and activities on private and other agency lands can have substantial impacts on their survival and distribution. Therefore, the effects of reasonably foreseeable future management on other ownerships are also considered. Although the analysis of effects is focused on the NCDE population, the context and potential effects on the Cabinet-Yaak and Yellowstone populations are also discussed.

Grizzly bears are expected to continue to be a “conservation-reliant” species (Scott et al., 2005), with the need to continue to coordinate management of the NCDE population over time and across

multiple land ownerships and jurisdictions. Past actions were considered in the description of the affected environment and existing conditions. The analysis of cumulative effects considers activities that may occur during the anticipated life of the forest plans, which in accordance with the NFMA is assumed to be about 15 years. Because certain USFS actions and environmental conditions have the potential to affect grizzly bears over longer time periods, cumulative effects may be considered over a longer time period of several decades. As projections are made further into the future, the level of uncertainty in the prediction of environmental consequences rises.

Affected environment

Geographic distribution of the grizzly bear

Historically, grizzly bears were widely distributed across North America between the Great Plains and the Pacific Ocean, with a strong association with the Rocky Mountains, coastal mountains, shortgrass prairie, and sagebrush desert ecoregions (Mattson & Merrill, 2002). The distribution of grizzly bears contracted dramatically following European and Asian settlement because of human-caused mortality, habitat loss, and population fragmentation (Mattson & Merrill, 2002; USFWS, 1993). Currently, grizzly bears exist primarily in the mountainous regions of western North America (M. F. Proctor et al., 2012).

In 1975, the grizzly bear was listed as a threatened species in the lower 48 States under the Endangered Species Act (USFWS, 1993). In 2011, USFWS completed a five-year status review that described the status and threats in each of the recovery zones (USFWS, 2011b). Grizzly bears exist in four identified recovery zones—Northern Continental Divide, Greater Yellowstone, Cabinet-Yaak and Selkirk—as well as the Bitterroot, North Cascades, and San Juan evaluation areas. The Northern Continental Divide Ecosystem likely supports the largest population of grizzly bears.

Grizzly bear population size, distribution, and trend in the NCDE

The demographic recovery goals for the NCDE recovery zone, as stated in the Recovery Plan (USFWS, 1993), are as follows:

10 females with cubs inside Glacier National Park and 12 females with cubs outside the park over a running 6-year average both inside the recovery zone and within a 10 mile area surrounding the recovery zone, excluding Canada; 21 of 23 bear management units occupied by females with young from a running 6-year sum of verified sightings and evidence, with no two adjacent bear management units unoccupied; known human-caused mortality not to exceed 4 percent of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30 percent of this 4 percent mortality limit shall be females. These mortality limits cannot be exceeded during any consecutive 2 years for recovery to be achieved. Furthermore, recovery cannot be achieved without occupancy in the Mission Mountains portion of this ecosystem. (p. 33)

As explained in the five-year status review of the grizzly bear (USFWS, 2011b, p. 16), sightability of females with young has always been a challenge in the heavily forested ecosystem of the NCDE. In addition, a lack of consistency in data collection and survey efforts was problematic (Costello et al., 2016). For these reasons, as of 2004 USFWS discontinued recording the number of females with cubs and their distribution in the NCDE. Instead, USFWS has relied on new science and techniques developed through an extensive DNA-based mark-recapture population estimate (Kendall et al., 2009) and a study of radio-collared bears sampled proportionately to relative population density, enabling calculation of reproductive rates, survival rates, and population trend (R. D. Mace et al., 2012). Subsequent work by Costello et al. (2016) has further refined the methods used for

monitoring and reporting population distribution, vital rates, and population trend. The following summarizes the findings of these and related studies of population size, distribution, and trend in the NCDE.

The DNA-based mark-recapture study was conducted in a 7.8-million-acre area of occupied grizzly bear range in and around the NCDE recovery zone. Extrapolating from the 563 individuals detected, the overall grizzly bear population in the NCDE was calculated to be 765 grizzly bears in 2004 (Kendall et al., 2009). Between 2004 and 2009, Mace et al. (2012) monitored 83 independent female grizzly bears in the NCDE. Coupled with the DNA project results and other studies of grizzly bear population size in the area, Mace et al. (2012) estimated that more than 1,000 grizzly bears resided in and adjacent to the NCDE recovery zone in 2012. Assuming an initial population size of 765 in 2004, Costello et al. (2016) estimated a population size of 960 grizzly bears in 2014 (95 percent confidence interval, yielding a range of 946-1,089 bears).

Based on verified grizzly bear locations, Costello et al. (2016) found that the overall distribution of grizzly bears in the NCDE has expanded to occupy an area of about 13.6 million acres, more than double the size of the recovery zone. Genetic analysis by Mickle et al. (2016) also supports a recent range expansion, following a range contraction that probably had its low point in the 1920s or 1930s. Grizzly bear densities vary geographically but are highest in Glacier National Park and generally decrease towards the south and on the periphery of the NCDE (Costello et al., 2016; Kendall et al., 2009). This pattern in part may reflect environmental gradients across the NCDE that influence habitat productivity (i.e., food distribution and abundance).

Grizzly bears are well distributed throughout the NCDE recovery zone. In 2004, at least one female bear was detected in each of the 23 bear management units, and an additional 12 were detected outside the recovery zone (Kendall et al., 2009). Costello et al. (2016) evaluated occupancy of the 23 bear management units in the NCDE by females with offspring during 2004-2014. Using the six-year - running tally as set forth in the Recovery Plan (USFWS, 1993), the authors documented full occupancy of the recovery zone starting in 2009 and continuing through 2014 (Costello et al., 2016).

Outside of the recovery zone, most of zone 1 and parts of zones 2 and 3 are occupied by grizzly bears (Costello et al., 2016). Both males and females are becoming increasingly common along streams and in shrubby draws to the east of the recovery zone boundary along the Rocky Mountain Front. Three female grizzly bear dens have been documented in short-grass prairie habitat along the eastern front of the Rocky Mountains (R. D. Mace & Roberts, 2014). In 2017, two grizzly bears were sighted on private lands in the Big Belt Mountains for the first time in decades.

Available information indicates that there is an increasing population trend in the NCDE. Based on monitoring of radio-collared grizzly bears, Mace et al. (2012) calculated that the NCDE population was increasing at a rate of 3.06 percent per year (95 percent confidence interval for $\lambda = 0.928-1.102$). In 2014, Costello et al. (2016) estimated an annual population growth rate of 2.3 percent per year. Costello's estimate differs slightly from Mace et al. (2012), producing a slightly lower, but still positive, estimate of the annual rate of population growth for the NCDE grizzly bear population ($\lambda = 1.023$ compared to $\lambda = 1.031$ in Mace et al. 2012). Costello et al. (2016) stated:

We do not believe the observed difference in the two estimates is a result of actual population change. Our current models included a covariate for trend, and no negative trend was observed in any of the vital rates. Rather, we believe that the differences between Mace et al. (2012) and this report can be attributed to: (1) an increase in sample sizes for estimation of all vital rates; (2) better representation of conflict females in the estimation of vital rates; and (3) subtle but significant differences in methods of analysis. (p. 101)

In the NCDE, human-caused mortality is the most significant factor influencing grizzly bear survival, and survival of adult and subadult females may have the largest influence on grizzly bear population trend (R. D. Mace & Waller, 1997). Of 337 bear mortalities documented between 1998 and 2011, 290 (86 percent) were human caused (R. D. Mace & Roberts, 2012). Of the human-caused mortalities, the major causes were management removals (removed from the population due to conflicts with humans or property, 31 percent), illegal kills (21 percent), defense of life (15 percent), collisions with trains (11 percent), and collisions with automobiles (10 percent).

Recognizing that management removals are documented with 100 percent accuracy, whereas other deaths often go unreported, Costello et al. (2016) analyzed the fates of 66 radio-marked grizzly bears that died between 1990 and 2014 to provide a corrected estimate of unreported mortalities. This revealed that poaching/malicious kills likely accounted for the highest proportion of total independent bear mortality (27 percent), followed by management removals including augmentation of the Cabinet-Yaak population (16 percent), vehicle and train collisions (13 percent), illegal defense of property (11 percent), natural causes (9 percent), defense of life (8 percent), misidentification (2 percent), and undetermined (14 percent). Despite these mortalities, the survival rate for adult females is high at 0.947, with a 95 percent confidence interval of 0.919-0.972 (Costello et al., 2016).

The majority of management removals occur as a result of conflicts at sites on private lands associated with frequent or permanent human presence (USFWS, 2013c). Unsecured attractants on private lands such as chicken coops, garbage, human food, pet/livestock food, bird food, livestock carcasses, wildlife carcasses, barbecue grills, compost piles, orchard fruits, or vegetable gardens are usually the source of these conflicts.

Legal hunting of grizzly bears has not occurred in Montana since 1991, when hunting was suspended (USFWS, 2011b). All but two hunting units in adjacent grizzly bear habitat to the north in Canada have been closed. To reduce grizzly bear mortalities due to mistaken identity, MFWP instituted a mandatory black bear hunter testing and certification program to help educate hunters in distinguishing the two species.

Using genetic analysis, Kendall and others (2009) identified six subpopulations in the NCDE. However, genetic differentiation values were generally low, and few barriers to genetic exchange appear to exist within the NCDE. The highest genetic diversity has been documented in Glacier National Park and surrounding lands, with lower heterozygosity on lands farther south (Mikle et al., 2016), as would be expected in an expanding population. Genetic analysis also indicates that the NCDE population in the United States is well connected to the adjoining portion of the population in Alberta and British Columbia south of Highway 3 in Canada (M. F. Proctor et al., 2015).

In summary, available information documents increases in grizzly bear distribution, population size, and genetic diversity. The estimated population size was 765 bears in 2004 (Kendall et al., 2009), nearly double the Recovery Plan target of 391 bears based on sightings of females with cubs (USFWS, 1993). Population size and distribution is now estimated to have further increased (Costello et al., 2016). Occupancy of all bear management units by females with young has been documented (Costello et al., 2016). Mortality has been at an acceptable level based on ongoing research and monitoring showing that the NCDE grizzly bear population has been stable to increasing and that its distribution is expanding (Costello et al., 2016).

Many factors have led to the increasing numbers and distribution of grizzly bears in the NCDE. Habitat management on NFS lands, including motorized travel restrictions, improvements in securing food and other attractants, carefully designed habitat restoration, and use of prescribed and managed use fire, have contributed to the improved status of the bear population. Based on data

including the locations of grizzly bear observations, grizzly bear-human conflicts, bear mortalities, and DNA and telemetry research, the NCDE grizzly bear population clearly has been increasing and has expanded well beyond the recovery zone boundary (R. D. Mace & Roberts, 2011).

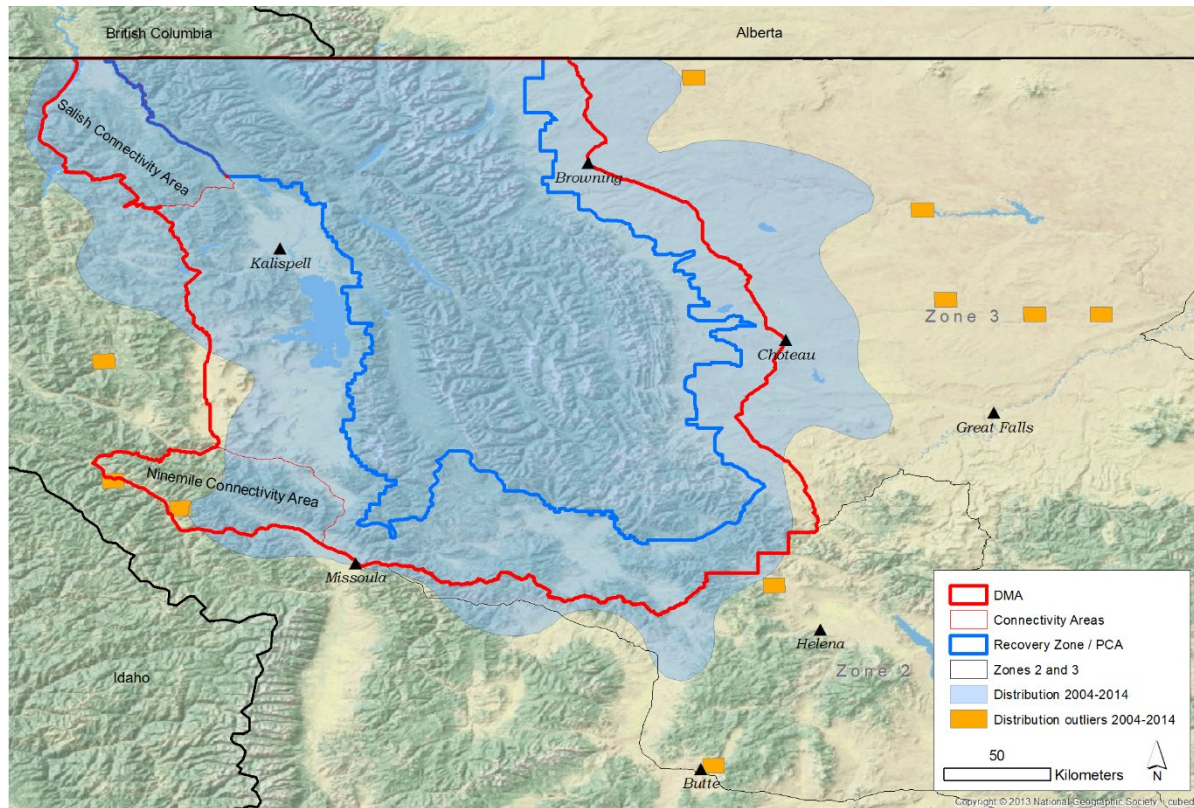


Figure 85. Estimated current distribution of grizzly bears (blue shaded area) during 2004-2014, relative to the NCDE recovery zone (blue line) and the demographic monitoring area (red line) (Costello et al., 2016), used with permission.

NCDE population in relation to other recovery zones

Dispersal between disjunct populations can play an important role in the persistence of a species. Interpopulation movements can reduce competition for resources and mates in the source population, increase genetic diversity in the receiving population, facilitate colonization and recolonization of unoccupied habitats, and augment the numbers of small populations (Dobson & Jones, 1985; Hanski & Gilpin, 1997; Mattson & Merrill, 2002).

Proctor et al. (2012) used genetic data from 3,134 grizzly bears along with radio telemetry location data from 792 grizzly bears across the distribution in western Canada and northern United States to assess large-scale movement patterns and genetic connectivity among bear populations. In the northern, more remote portion of their distribution in Canada, grizzly bear populations were found to be well connected, with movement, dispersal, and gene flow influenced by distance and natural topographic features (e.g., extensive icefields), as would be expected. In contrast, in the southeastern part of their distribution, rates of movement and genetic interchange were impaired due to anthropogenic influences. Population fragmentation in these areas, as measured by genetic discontinuities, corresponded to human settlement, highways, and human-caused mortality.

In its five-year status review for the grizzly bear, USFWS (2011b, pp. 86-92) discussed connectivity and genetic management in some detail. In discussing the desirability of restoring connectivity between isolated populations, they distinguished between small populations (less than 100 individuals) that would benefit greatly from demographic rescue through immigration of females and to a lesser extent from genetic rescue from immigration by male bears and large, isolated populations that have less need for demographic rescue. The Greater Yellowstone Ecosystem population is an example of a large isolated population that would benefit from genetic rescue. Experimental and theoretical data suggest that one or two effective migrants per generation is sufficient gene flow to maintain or increase genetic diversity in isolated populations (Miller & Waits, 2003).

Grizzly bear dispersal distances are comparatively short relative to its body size and large home range size (Bowman, Jaeger, & Fahrig, 2002). Young dispersing grizzly bears, especially females, tend to establish home ranges within or overlapping their mother's (C. C. Schwartz, Miller, & Haroldson, 2003). McLellan and Hovey (2001) measured the distances between the home range center of a mother and those of her dispersed offspring (30 offspring, 12 females and 18 males) over 20 years. They reported that females dispersed, on average, 5.9 miles from their maternal home range, whereas males dispersed 17.9 miles. Using genetic analysis of 711 grizzlies in southwestern Canada, Proctor and others (2004) estimated that females, on average, dispersed 8.6 miles from the center of the natal home range; males on average dispersed 25 miles from a natal or maternal home range. The maximum dispersal distances estimated by Proctor et al. were about 47 miles for a female and 104 miles for a male. Because females disperse only short distances and their dispersal process is gradual, the female component of the bear population may be more susceptible to becoming isolated (McLellan & Hovey, 2001).

The Cabinet-Yaak Ecosystem of northwestern Montana and northern Idaho is about 2,600 square miles in size and as of 2010 was estimated to support a small population of at least 42 grizzly bears (USFWS, 2011b). Genetic analysis by Proctor et al. (2012) identified as distinct the grizzly bears in the area the authors delineated as the Purcell South Yaak area of the trans-border region. They described this population as having fewer than 50 bears, declining at 3.9 percent annually, and unlikely to be viable without female immigration. Immigration of females is needed to offset the risks of demographic and environmental stochastic events associated with small population size and is likely to be more important for this population than genetic connectivity provided by males (M. F. Proctor et al., 2012). There have been no known movements of bears between the Cabinet and Yaak portions of the recovery zone, although the Yaak portion is connected to bears across the border in Canada. The Cabinet-Yaak recovery zone is located about 15 miles from the NCDE. In 2010, two adult females and one adult male bear that were relocated from the NCDE to the Cabinets were documented as having moved back to the NCDE (USFWS, 2011b); although these were not natural movements, they indicate that movement between the recovery zones is feasible.

The Bitterroot Ecosystem of east-central Idaho and western Montana is a potential recovery area; no bears are known to occur there at this time (USFWS, 2011b). The only recent record of a grizzly bear in this area was a male bear that was mistakenly shot by a black bear hunter in 2007. Genetic analysis indicated this bear had come from the Selkirk recovery area (USFWS, 2011b). The NCDE is located about 45 miles from the Bitterroot recovery area.

The Greater Yellowstone Ecosystem in southwest Montana, northwest Wyoming, and east Idaho is a large area of about 9,200 square miles that in 2011 supported an increasing population of about 600 bears (USFWS, 2011b). It is isolated geographically from other recovery zones. Due to its isolation, the current genetic diversity of the Greater Yellowstone population is moderately low compared to other North American and European brown bear populations (Kamath et al., 2015). DNA analysis by

Miller and Waits (2003) on museum specimens showed that there was a decline in allelic richness and genetic heterozygosity of bears in the Greater Yellowstone recovery zone during the early half of the 20th century. However, Kamath et al. (2015) reported that the genetic diversity of the Greater Yellowstone population has stabilized, with a very low (0.2 percent) rate of inbreeding during the 1985-2010 period. Due to its large size, demographic rescue (i.e., immigration by female bears) is not required for this population (USFWS, 2011b). Instead, one to two male migrants every 10 years are estimated to be what is needed to provide genetic connectivity and prevent loss of genetic diversity (Miller & Waits, 2003). This could be achieved either through natural connectivity or translocation of bears.

Potential linkage areas or movement corridors that could facilitate the natural movement of grizzly bears into the Greater Yellowstone Ecosystem have been identified (Servheen, Waller, & Sandstrom, 2001; Walker & Craighead, 1997; John S. Waller & Servheen, 2005). Peck et al. (2017) used GPS telemetry data from 173 male grizzly bears in the NCDE and the Greater Yellowstone Ecosystem and a new analysis method (randomized shortest path algorithm and step selection function models) to identify potential paths for dispersal. These models depicted numerous potential paths from the NCDE to the Greater Yellowstone Ecosystem: dense intersecting paths were predicted in the center of the study area between the recovery zones, with more diffuse paths on the eastern periphery. The predicted paths were corroborated by the locations of confirmed observations of 21 grizzly bears located 4.8 miles or more outside the two occupied ranges. Nevertheless, the authors concluded that the probability of successful dispersal into the Greater Yellowstone Ecosystem remains low, due to the distance between the current occupied ranges for the two populations. The closest proximity is about 66 miles, between the Boulder and Madison mountain ranges (see figure 1 in Peck et al. 2017).

Based on its large population size, increasing trend, and lack of genetic differentiation, the NCDE appears to be capable of serving as a source population for other grizzly bear populations in the contiguous United States (USFWS, 2013c). Demographic connectivity with the NCDE population may be especially important to support the small grizzly bear population in the Cabinet-Yaak Ecosystem. The NCDE population also has the potential to be a source population for the Bitterroot potential recovery zone, which would require movement of both male and female bears to establish a population there. For the Greater Yellowstone recovery zone, periodic immigration of a few male bears from the NCDE would likely be sufficient to provide for genetic connectivity.

Proctor et al. (2012) analyzed data from 1,508 bears to investigate sex-specific movement rates in relation to highways and other human developments. Highway traffic, human settlement, and human-caused mortality influenced sex-specific movement rates between adjacent areas. Both male and female bears moved across areas with minimal human settlement (0 to 20 percent). Females sharply reduced their movement rates as traffic volume increased on highways and in areas where settlement increased to more than 20 percent. Males exhibited a more gradual reduction of movement as traffic and settlement increased. In areas where more than 50 percent of the land was settled, both sexes had a similar marked reduction in movements. Other researchers have also documented that adult grizzly bears, particularly females, are reluctant to cross high-speed, high-traffic-volume highways (Gibeau, Clevenger, Herrero, & Wierzchowski, 2002; John S. Waller & Servheen, 2005). This suggests that NFS lands are more likely to enable successful movements by bears than intermontane valleys with human development, although some private lands would have to be traversed by bears moving from the NCDE to other recovery zones.

The current distribution of grizzly bears has been reported by Costello et al. (2016) for the NCDE and by Bjornlie et al. (2014) for the Greater Yellowstone Ecosystem (shown on figure 1-70). The number of credible grizzly bear reports from the west side of the Helena National Forest has been

increasing as the population in the NCDE increases and more bears are exploring new territory further to the south (R. D. Mace & Roberts, 2012). As of 2014, a male bear from the NCDE was documented as far south as Butte, Montana (figure 85) (R. D. Mace & Roberts, 2012). Available information indicates that bears have been moving south from the NCDE primarily through the west side of the Helena National Forest (Kuennen, 2015). Thus, the area west of Interstate 15 that includes a portion of the Blackfoot landscape south of Montana Highway 200 and all of the Continental Divide landscape (figure 1-72) at this time appears to have the most potential for establishing genetic connectivity through NFS lands from the NCDE to the Greater Yellowstone Ecosystem.

Although several authors have proposed potential corridors or linkage areas between the NCDE and the Greater Yellowstone recovery area, it is more difficult to predict precise movement and highway crossing areas for grizzly bears than it is for other wildlife species that are habitat specialists. Topography, time of day, highway traffic volume, availability of bridges or underpasses, and other variables have all been shown to influence bear movements (John S. Waller & Servheen, 2005). It is for these reasons that the demographic connectivity areas and zone 2 were broadly delineated. Management options for linkage areas that consider topographic and habitat features, mortality risks, highway design criteria, etc. (M. F. Proctor et al., 2012), can be evaluated during site-specific analysis and planning.

Habitat in the NCDE

Grizzly bears use a wide variety of habitats, including open to forested and temperate through alpine habitats. The NCDE recovery zone includes about 5.7 million acres of land, of which about 60 percent is NFS lands. Using verified grizzly bear locations from 2000-2014 to create a current distribution map for the NCDE, Mace and Roberts (2014) estimated that bears are currently occupying an area of about 13.2 million acres, more than double the size of the recovery zone.

Grizzly bear populations persisted historically in areas with large expanses of habitat but no permanent human presence, where the frequency of contact with humans was low (Mattson & Merrill, 2002). Maintaining large blocks of secure habitat is important to the survival and reproductive success of grizzly bears, especially females (R. D. Mace, Waller, Manley, Ake, & Wittinger, 1999; C. C. Schwartz et al., 2010), and is a major goal of the draft Conservation Strategy.

The NCDE contains large acreages of congressionally designated wilderness, totaling about 1.7 million acres within the recovery zone/primary conservation area (figure 1-73). The Wilderness Act of 1964 precludes road construction, motorized uses and mechanized transport, permanent human habitation, new livestock allotments, new mining claims, new oil and gas leases, or other developments that would impair the wilderness character of wilderness areas, except for those specifically allowed by the enabling legislation (e.g., Schafer Meadows airstrip). Wilderness areas provide a high degree of security for grizzly bears.

The NCDE also contains substantial acreage of inventoried roadless areas (figure 1-73). These roadless areas, as well as certain other lands that have little or no permanent human presence or road development, are distributed throughout the NCDE. Inventoried roadless areas contribute to secure habitat for grizzly bears.

The Nature Conservancy mapped landscape permeability for the Pacific Northwest (McRae et al., 2016), including western Montana, by classifying areas as having high, moderate, or low landscape permeability. Resistance to movement was modeled by considering features such as land use, roads and rail lines, energy infrastructure, and housing development. Overall, the network of Federal lands in northwestern Montana was shown to provide a moderate to high degree of landscape permeability

for wildlife. The Forest Service has been cooperating for many years with Federal and State agencies and private organizations to improve habitat connectivity and mitigate the impacts of highways, train tracks, and other developments that impede habitat use and movement by wildlife, including specific efforts for grizzly bears.

Grizzly bears are large animals with high metabolic demands during the non-denning season. Adequate nutritional quality and quantity are important factors for successful reproduction. The search for energy-rich food appears to be a driving force in grizzly bear behavior and habitat selection. Bears are dependent upon learned food locations within their home ranges and have the ability to switch foods according to which food sources are available. Mattson et al. (1991) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have alternative options in years when preferred foods are scarce.

The varying climate, topography, and vegetation conditions throughout the NCDE provide for a variety of habitats and foods for bears to consume during different seasons. During spring and early summer, before berry crops are available, grizzly bears in the NCDE eat roots/corms/bulbs and other vegetation (K. Aune & Kasworm, 1989; McLellan & Hovey, 1995). Grizzlies in the NCDE consume a wide variety of berries once they become available during the summer months (McLellan & Hovey, 1995). During the summer, grizzly bears also may feed on concentrations of lady bird beetles and army cutworm moths on rocky talus slopes at high elevations (K. Aune & Kasworm, 1989; Mattson, Gillin, Benson, & Knight, 1991; Servheen, 1983). During late summer to fall, grizzly bears in the NCDE continue to eat berries but also consume more meat and roots/bulbs/corms (K. Aune & Kasworm, 1989; McLellan & Hovey, 1995).

Mace and Jonkel (1986) evaluated food habitat of grizzly bears by collecting and analyzing scats from four areas of the NCDE: the North Fork of the Flathead River, the South Fork of the Flathead River, the Mission Mountains, and the East Front. Grasses and forbs were a staple food in all areas, with the highest proportion in the Mission Mountains (73 percent compared to 35, 39, and 43 percent in the other areas). Fruit also was important in all areas, varying by area in terms of species consumed and degree of use. Globe huckleberry (*Vaccinium globulare*) was very important in the North Fork and South Fork of the Flathead but rarely used in the other areas. Other berry-producing shrubs used in the North Fork were buffaloberry (*Shepherdia canadensis*) and buckthorn (*Rhamnus alnifolia*). In the South Fork, fruit was the major food eaten from late July through autumn; globe huckleberry was eaten extensively, with lesser use of serviceberry (*Amelanchier alnifolia*) and mountain ash (*Sorbus* spp). In the Mission Mountains, fruits of serviceberry, domestic apples (*Malus* spp.), and domestic plums (*Prunus* spp.) were the most important shrub species. On the East Front, the proportion of fruits eaten was less (31 percent compared to 45, 43, and 46 percent) than in the other areas; the most important species were chokecherry and buffaloberry, with over-wintered bearberry (*Arctostaphylos uva-ursi*) fruits being used in the spring. Aune (1994) similarly reported that on the East Front, berry-producing shrubs that were important in the diet of grizzly bears included chokecherry (*Prunus virginia*), serviceberry, buffaloberry, and bearberry.

Kasworm et al. (2015) reported that the diet of grizzly bears in the Cabinet Mountains as determined from scats collected between 1981 and 1992 was dominated by grasses, sedges, and forbs in May and June, with fruits of shrubs becoming important July through September. Berry production of huckleberry, serviceberry, mountain ash, and buffaloberry has been monitored in the Cabinet-Yaak Ecosystem starting in 1989. Average berry counts varied substantially between years, with huckleberry crops failing in 8 of the 26 years reported (Kasworm et al., 2015, figure 30). Serviceberry and mountain ash may have provided significant secondary food sources in some years when the huckleberry crop failed (e.g., 2001 and 2003). The authors noted that climatic variables

may influence berry production, with huckleberry production highest in years with a cool spring and high July temperatures, and that future changes in climate may influence the availability of these grizzly bear foods.

In the past, grizzlies were known to feed on whitebark pine nuts in the late summer to fall, particularly in the Whitefish Range and on the Rocky Mountain Front (K. Aune & Kasworm, 1989; Kendall & Arno, 1990; R. D. Mace & Jonkel, 1986). High infection rates and mortality of whitebark pine caused by white pine blister rust (Kendall & Keane, 2001) have dramatically reduced or eliminated this food source for bears in the NCDE, although the bear population has been increasing despite the loss of this food source.

Teisberg and others studied grizzly bear population health and body condition, finding that adult females throughout the NCDE entered their dens with average fat levels above those thought to be critical for cub production. Bears on the southwestern, southern, and eastern peripheries of the NCDE consumed a significantly higher proportion of meat in their diets than those in the interior or on the northwestern periphery. However, there was no evidence to indicate that the widely varying food resources across the NCDE are inadequate to meet the needs of reproductively active adult females. As truly opportunistic omnivores, grizzly bears in all regions of the NCDE exploit diverse combinations of food items to arrive at productive body conditions (Teisberg, Madel, Mace, Servheen, & Robbins, 2015).

Grizzly bears hibernate in dens during the winter months. Both males and females have a tendency to use the same general area to hibernate year after year, but the same den is rarely reused by an individual (Linnell, Swenson, Andersen, & Barnes, 2000). Most grizzly bear dens in the NCDE are located at elevations above 6,400 feet (R. D. Mace & Waller, 1997), with the average elevation somewhat higher on the Rocky Mountain Front (K. E. Aune, 1994). The average elevation of 252 grizzly bear dens in the NCDE ranged from 6,427 to 6,906 feet (R. Mace, 2014). It has been estimated that about 47 percent (1,647,863 acres) of NFS land in the primary conservation area provides potential denning habitat (Ake, 2015f). The availability of denning habitat is not likely to be a limiting factor for grizzly bears in this area (USFWS, 2013c).

On the west side of the NCDE, 52 separate females monitored during 1987-1988 to 2012-2013 entered their dens between the first week of October and the fourth week of November, with most occurring the fourth week of October; 72 females emerged in the spring between the third week of March and the fourth week of May, with most occurring during the second week of April (R. D. Mace & Roberts, 2014). On the east side (Rocky Mountain Front), grizzlies (both male and female) entered dens between October 10 and December 5, with a median date of November 7; they emerged in the spring between March 10 and May 13, with a median date of April 7 (K. E. Aune, 1994). Males typically enter dens later in the fall and emerge earlier in the spring than do females.

Grizzly bear response to human activities

Research has clearly demonstrated that the presence of roads and associated human activities impacts grizzly bears by displacing them from important habitats and lowering their survival rates during the non-denning season (Boulanger & Stenhouse, 2014; R. D. Mace et al., 1996; Mattson et al., 1987; McLellan & Shackleton, 1988; John S. Waller & Mace, 1997). Mace and Manley (1993) also showed that grizzly bears adjusted their habitat use patterns to both total road densities and open road densities as well as to the traffic levels on roads.

Research findings from the Swan Mountain Range of the Flathead National Forest have been used to evaluate the effects of motorized route density on grizzly bears in the NCDE since 1995. Mace et al.

(1996) converted a linear road map to a total road density map using a 1 square kilometer (0.39 square mile) moving window analysis and reported the following relationships to road density:

- road density was lower within the composite of the multiannual home ranges of 14 adult and subadult female grizzly bears (0.6 kilometer/square kilometer or 0.95 mile/square miles) than was road density outside the composite home range (1.1 kilometers/square kilometer or 1.7 miles/square mile);
- as total road density increased, the probability of selection by grizzly bears declined;
- 56 percent of the composite female home range was unroaded, compared to 30 percent outside the composite home range;
- within seasonal ranges, grizzly bears were more likely to use areas with higher road densities during spring than during other seasons; and
- selection for habitats within a 0.3-mile buffer around roads decreased as traffic volume increased.

Based on these and related findings, Flathead National Forest plan amendment 19 established limits for total motorized route density (no more than 19 percent with density exceeding 2 miles/square mile), open motorized route density (no more than 19 percent with density exceeding 1 mile/square mile), and secure core (at least 68 percent) within each bear management unit subunit that has more than 75 percent NFS lands. In bear management unit subunits with less than 75 percent NFS lands, no net increase in total motorized route density (the percent of area with more than 2 miles/square mile) or open motorized route density (the percent of area with more than 1 mile/square mile) would be allowed, and no net decrease in the percentage of secure core in a subunit would be allowed.

The Interagency Grizzly Bear Committee's Access Task Force (IGBC, 1998) developed guidelines for the management of motorized routes in grizzly bear habitat. The access task force endorsed the basic premise of managing open and total route densities and secure core during the non-denning season as an effective strategy to support recovery of the species, although they noted that other strategies may also be effective. Under the alternatives being considered for the Flathead forest plan revision and the amendments of the Helena, Kootenai, Lewis and Clark, and Lolo National Forests, the moving window analysis method would continue to be used to calculate motorized route density and to assess the effects on grizzly bears in the primary conservation area.

Conservation of female grizzly bears is generally considered fundamental to increasing grizzly bear numbers (R. D. Mace & Waller, 1997; USFWS, 1993). The primary conservation area (same as the grizzly bear recovery zone) is intended to serve as a source area for grizzly bears. To analyze the effects of the alternatives in the primary conservation area, the moving window analysis method was used. The research findings described above provide a basis for evaluating the effects of motorized route density on grizzly bears. The moving window method has been used since 1995, enabling comparison of past, present, and reasonably foreseeable future effects.

Outside the primary conservation area, within zone 1 and the demographic connectivity areas, the draft Conservation Strategy proposed maintaining grizzly bear occupancy but at a lower density than in the primary conservation area. In recognition of the differing grizzly bear management objectives for zone 1 and the demographic connectivity areas, a different method for analyzing the effects of motorized use during the non-denning season was used. The analysis of effects on bears relied on recent work by Boulanger and Stenhouse (2014), who studied 142 grizzly bears monitored in Alberta from 1999-2012. They reported that survival rates of females with cubs of the year or yearlings were lower than for females without cubs or with two-year-olds in areas with higher road densities. Road

densities less than or equal to 2.4 linear miles/square mile appeared to be a threshold for grizzly bear occupancy in Alberta. Bear mortality was reduced when road density was below 1.6 miles/square mile, and areas with less than 1.2 miles/square mile were described as being capable of serving as core conservation areas. To estimate effects, the linear density of roads or routes (roads and trails) open to public motorized use in zone 1 and the demographic connectivity areas were compared to the Alberta threshold values.

The impacts of winter activities on denning bears have not been well studied, but there is no evidence to indicate that current levels of snowmobile use are inhibiting the recovery of the grizzly bear population in the NCDE. Mace (2014) assessed the distribution of 252 known grizzly bear dens in the NCDE with respect to areas open or closed to motorized over-snow vehicle use. No apparent avoidance by grizzly bears of areas open to motorized over-snow vehicle use was found, with den distribution similar to availability of habitat. In a review of the limited information available on black, brown (grizzly), and polar bears, Linnell and others (2000) reported that bears readily den within 0.6-1.2 miles of human activity (roads, habitations, industrial activity) and appear to be undisturbed by most activity that occurs at distances farther than 0.6 mile. They cautioned that human activity within 0.6 mile may lead to den abandonment, especially early in the denning season, which could cause cub mortality. However, anecdotal information indicates that snowmobile use at a known den site did not cause the bear to abandon its den (Hegg, Murphy, & Bjornlie, 2010), and monitoring of den occupancy for three years on the Gallatin National Forest in Montana did not document any den abandonment (USDA, 2006). Litter abandonment by grizzlies due to snowmobiling activity has not been documented in the lower 48 States (Hegg et al., 2010), nor have adverse effects on bears from snowmobiles been substantiated (R. D. Mace & Waller, 1997).

However, bear research scientists and managers have suggested that in the period shortly before or after den emergence in the spring, a female with cubs may be particularly vulnerable to disturbance by snowmobiles. The cubs have limited mobility for several weeks after den emergence, and the mothers and their cubs have high energetic needs (Haroldson, Ternent, Gunther, & Schwartz, 2002; R. D. Mace & Waller, 1997). Females with cubs have been documented spending a few days to a few weeks near the den after emergence. During this time, the bears were very lethargic and approachable. Disturbance that caused a female to prematurely leave the den in spring or move from the den area could impair the nutritional status of the female and her cubs. There is also the potential of separating a mother and cub, resulting in cub mortality. However, such effects have never been documented, and there are no known scientific papers supporting this potential impact.

As described previously, Mace and Roberts (2014) reported that 72 females on the west side of the Continental Divide emerged in the spring between the third week of March and the fourth week of May, with most emerging during the second week of April. In three earlier grizzly bear denning studies conducted in the NCDE, the den emergence period was similar. The median date of exit on the east side of the Continental Divide was April 7 (K. Aune & Kasworm, 1989), April 14 in the Swan Mountains (R. D. Mace & Waller, 1997), and early April in the Mission and Rattlesnake Mountains (Servheen & Klaver, 1983). Among the different age and sex classes, females with cubs entered their dens earlier and emerged later. After leaving the den site, grizzlies usually moved to lower-elevation habitats such as riparian areas and avalanche chutes to forage during the spring (R. D. Mace & Waller, 1997).

Several studies have documented displacement of individual grizzly bears from nonmotorized trails to varying degrees (Jope, 1985; Kasworm & Manley, 1990; R. D. Mace & Waller, 1996; McLellan & Shackleton, 1988; D. White, Kendall, & Picton, 1999). However, none of these studies documented increased mortality risk or population level impacts due to displacement from foot or horse trails. For

example, although Mace and Waller found that grizzly bears were located further than expected (i.e., displaced) from high-use trails (90 visitors/day) in the Swan Mountains, they reported there were no historic or recent records of grizzly bear-human conflict in their study area (R. D. Mace & Waller, 1996). Similarly, some grizzly bears in Glacier National Park have been displaced to some degree by nonmotorized trails (Jope, 1985; D. White et al., 1999), but conflicts and grizzly bear mortalities there are rare and are related almost exclusively to campgrounds and other developed human-use areas.

Several different variables, such as season, habitats and food sources, recreationist group size and behavior, and the predictability of the activity may influence the degree of disturbance and the risk of grizzly bear-human encounters and conflicts. Sudden encounters between bears and recreationists, particularly activities where the person is moving quickly and/or quietly, have the greatest risk of resulting in injuries or mortalities. Strategies recommended to reduce the risk of sudden encounters include visitor education regarding safe practices in bear country and proper use of bear deterrent spray, managing recreation to occur predictably in space and time, and designing and locating recreation trails to avoid habitats with concentrated bear food resources (Fortin et al., 2016; Herrero & Herrero, 2000; Quinn & Chernoff, 2010). Although a variety of methods can be used to reduce the risk of grizzly bear-human conflicts due to nonmotorized uses, Herrero and Herrero (2000) emphasized that none of them can entirely remove the risk of hiking or mountain biking in grizzly bear habitat.

Developed recreation sites are sites or facilities on Federal lands with features that are intended to accommodate public use and recreation. Examples include campgrounds, trailheads, rental cabins, fire lookouts, summer homes, and visitor centers. Developed recreation sites can impact bears through temporary or permanent habitat loss and displacement, but the primary concern is grizzly bear-human conflicts caused by unsecured bear attractants, habituation, and food conditioning, which could lead to grizzly bear mortality or removal from the ecosystem (Knight, Blanchard, & Eberhardt, 1988). Developed recreation sites that support overnight public use have a higher potential to increase both the levels of bear attractants and grizzly bear mortality risk. Grizzly bear-human conflicts have occurred at developed recreation sites on NFS lands, although efforts such as food storage orders, bear-resistant containers, and public education have been implemented to help reduce the risk of conflicts. Most of the grizzly bears killed or removed by management agencies in the NCDE in the past had been involved in conflicts related to unsecured attractants such as garbage, bird feeders, pet/livestock feed, and human foods. Although the majority of these mortalities occurred on private lands, developed recreation sites on public lands in the primary conservation area remain of concern.

When the grizzly bear was listed in 1975, the USFWS identified “livestock use of surrounding national forests” as detrimental to grizzly bears “unless management measures favoring the species are enacted” (40 CFR § 31734, p. 31734). Impacts to grizzly bears from livestock operations potentially include competition for preferred forage, displacement of bears due to livestock-related activity, and direct mortality due to control actions resulting from livestock depredation or learned use of bear attractants such as livestock carcasses and feed.

Although grizzly bears frequently coexist with large livestock such as adult cattle without preying on them, when grizzly bears encounter smaller animals such as domestic sheep, domestic goats, calves, or chickens, they will often attack and kill them (Anderson, Ternent, & Moody, 2002; Knight & Judd, 1983). If repeated depredations occur, managers may relocate bears or remove them from the population. Thus, areas with small domestic livestock have the potential to become population sinks (Knight, Blanchard, & Mattson, 1988). Because of the increased risk to grizzly bears posed by

actions taken to protect sheep and other small livestock, the 1986 Interagency Grizzly Bear Guidelines emphasized the reduction of these types of allotments.

Approximately 7 percent of all human-caused grizzly bear mortalities in the NCDE between 1998 and 2011 were due to management removal actions associated with livestock depredations (USFWS, 2013c). Most of those livestock-related grizzly bear mortalities occurred east of the Continental Divide, on private lands or on the Blackfoot Indian Reservation along the Rocky Mountain Front. In the NCDE, most livestock depredations by grizzly bears occur on sheep, but they also occur on young cattle.

There are permitted grazing operations on NFS land for horses and mules in the NCDE, primarily associated with outfitter and guide operations or Forest Service administrative use. There is no evidence of conflicts with bears due to depredation, attractants, or forage competition related to horse and mule grazing permits. Honeybees, which are classified as livestock in Montana (MCA 15-24-921), can be attractants to some grizzly bears. Tools such as electric fencing have been and are being used effectively to reduce potential conflicts with beekeeping.

Vegetation management may alter the amount and arrangement of cover and forage and can locally increase bear foods through improved growth of grasses, forbs, and berry-producing shrubs (Zager, Jonkel, & Habeck, 1983). However, the roads and human activity associated with timber harvest can negatively affect grizzly bears by disturbing or displacing bears from habitat during logging activities and increasing mortality risk (Zager et al., 1983). Grizzly bears in the NCDE occupy numerous different habitat types but generally prefer to forage in areas with some type of hiding cover nearby, particularly in daylight hours (K. Aune & Kasworm, 1989; John S. Waller & Mace, 1997). Waller (1992) reported that grizzly bears avoided lower-elevation, more accessible harvested stands as well as stands less than 30-40 years old where the vegetation had not recovered enough to provide security cover.

Mineral and oil and gas development may potentially increase grizzly bear mortality risk from associated motorized use, habituation, and/or increased grizzly bear-human encounters and conflicts. Permanent habitat loss, habitat fragmentation, and displacement from habitat may also occur.

Mineral development refers to surface and underground hardrock mining and coal production, which is regulated by permits on NFS lands. There are no plans of operation or notices of intent to explore or operate any commercial mines inside the primary conservation area on NFS or Bureau of Land Management lands except for the Cotter Mine on the Helena National Forest. The production of oil and natural gas is conducted through a leasing process. Of the 247 oil and gas leases inside the primary conservation area, nine lease holders, one of which is on private lands, have submitted applications for permit to drill to the Bureau of Land Management. Eleven applications for permit to drill have been submitted in zone 1, only three of which are on NFS lands. The applications for permit to drill include surface use plans of operation, which will require evaluation and analysis in compliance with NEPA.

Improperly stored garbage and livestock and pet foods pose a significant risk of habituating bears to human presence and/or conditioning grizzly bears to seek out anthropogenic foods and attractants. Food-conditioned grizzly bears have learned to enter unsecured garbage receptacles, sheds, and other buildings in search of a food reward. Food conditioning and accessibility of attractants often lead to mortality of the grizzly bear by management removal or by people defending their life or property. Bears are particularly susceptible to anthropogenic foods and attractants during years of poor natural food production, such as a berry crop failure. Measures that make food, garbage, and livestock

carcasses inaccessible through proper storage or disposal are very effective in reducing grizzly bear-human conflicts and the potential for injuries or mortalities.

Grizzly bear mortality is monitored within the recovery zone and a roughly 10-mile buffer area surrounding the recovery zone (referred to as zone 1). Private lands comprise only about 9 percent of the NCDE recovery zone (table 180) but total about 29 percent of the larger demographic monitoring area (Costello et al., 2016). In a study in the Swan Mountains of Montana, the majority of grizzly bear-human conflicts and bear deaths were found to have occurred on private lands in rural roaded areas (R. D. Mace et al., 1996). These conflicts often involved bears that were food conditioned or habituated to human presence. Nearly 60 percent of management removals resulted from conflicts caused by unsecured food, garbage, pet and livestock foods, carcasses, orchard fruits, vegetable gardens, etc., that attracted bears into the proximity of humans.

Efforts by the Forest Service to keep human food, garbage, and other attractants unavailable to bears are ongoing. A food storage order was first issued for the Bob Marshall Wilderness Complex in 1998. Food/attractant storage orders have been updated several times since then, and have been extended to some areas outside the recovery zone where the grizzly bear population has expanded to prevent or minimize grizzly bear-human conflicts. Food/attractant storage orders that are currently in effect on all or portions of the Flathead (USDA, 2010a, 2011c), Helena (USDA, 2005, 2010a), Lewis and Clark (USDA, 2010a), Kootenai (USDA, 2011c), and Lolo National Forests (USDA, 2011b) are listed in table 184. These orders apply only to the national forests and do not address food/attractant storage on adjacent lands that are under other ownerships.

Table 184. Current food/attractant storage orders on NFS lands in the NCDE

National Forest	Year	Area where the food/attractant storage order applies
Flathead	2010 and 2011	Lands within the NCDE as well as Tally Lake Ranger District and the Island Unit of the Swan Lake Ranger District
Helena	2005 and 2010	Lincoln Ranger District (the 2005 order applies to lands south of Montana Highway 200; the 2010 order (which replaced the previous 2000 order) applies north of Montana Highway 200)
Kootenai	2011	Forestwide, both NCDE and Cabinet-Yaak recovery zones
Lewis and Clark	2010	Lands within the NCDE (Rocky Mountain Division)
Lolo	2011	Forestwide (superseded the 2010 order)

Environmental consequences

Effects common to all alternatives

Congressionally designated wilderness comprises about 30 percent (approximately 1.7 million acres) of the NCDE recovery zone/primary conservation area (see figure 1-73). The Wilderness Act of 1964 defined wilderness as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” No road construction, motorized uses, mechanized transport, permanent human habitation, or construction of developed recreation sites are allowed within designated wilderness. The Wilderness Act allows livestock allotments that pre-dated

passage of the Wilderness Act and mining claims staked before January 1, 1984, to persist within wilderness areas, but no new grazing permits or mining claims are allowed. If pre-existing mining claims are pursued, the plans of operation are subject to validity examination. Wilderness areas are considered long-term secure habitat for grizzly bears (USFWS, 2011b).

Wilderness study areas are identified by Congress or in the forest plans. These are areas that meet the criteria for wilderness designation, and they are managed in a manner that does not impair their wilderness character until such time as congressional action is completed. Wilderness study areas are assumed to provide secure core for grizzly bears. Within the primary conservation area is the 34,000-acre Ten Lakes Wilderness Study Area.

Inventoried roadless areas are managed in accordance with the 2001 Roadless Area Conservation Rule (36 CFR § 294 subpart B). The roadless rule established prohibitions on road construction, road reconstruction, and timber harvesting within inventoried roadless areas on NFS lands, with limited exceptions. Motorized uses that do not require roads are not prohibited. Unless withdrawn from mineral entry, roads could be constructed if required for locatable mineral exploration or development. Most inventoried roadless areas will contribute secure core habitat for grizzly bears, and this would not change under any of the alternatives.

Indirect effects of the alternatives—Helena National Forest

Alternative 1—Helena National Forest

The Helena National Forest has a small proportion of land within the recovery zone, comprising only 183,758 acres (about 3 percent of the recovery zone). Three bear management subunits within the Monture Landers Fork bear management unit occur on the Helena National Forest (figure 1-74).

Under the no-action alternative, the Interagency Grizzly Bear Guidelines (IGBC, 1986) would continue to be applied to the portion of the Helena National Forest located within the NCDE recovery zone. The Interagency Grizzly Bear Guidelines were designed to maintain and improve habitat, minimize grizzly bear-human conflict potential, and resolve grizzly bear-human conflicts, in coordination with various resource management programs. The Interagency Grizzly Bear Guidelines give the most stringent protection to grizzly bear habitat in management situation 1, where grizzly bear population centers occur. The guidelines for management situations 2 and 3 are less stringent than those in management situation 1 in order to facilitate management of other resources. On the Helena National Forest, about 65 percent of the acres within the recovery zone are designated as management situation 1, with about 35 percent designated as management situation 2 (table 182).

Under the Helena forest plan, the management of grizzly bears outside the recovery zone is addressed in forest plan appendix E (USDA, 1986b). Appendix E provides guidance for identifying grizzly bear habitat that is not currently inventoried and for determining levels of bear activity. Management guidance applies to areas of known grizzly bear activity (biological activity centers are defined as observations in 6 out of the last 10 years, including observations of females with cubs or yearlings at least 5 of the 10 years).

The current known distribution of grizzly bears outside of the NCDE recovery zone on the Helena National Forest includes an area of about 354,600 acres south of Montana Highway 200 and west of Interstate 15 in the Upper Blackfoot and Divide landscapes (see figure 1-72). Grizzly bears are known to occur at low density throughout much of this area. The first documentation of a bear den outside of the recovery area was a radio-marked female bear that denned south of Montana Highway 200 in the winter of 2008-09. There are relatively few verified occurrences of grizzly bears south of

U.S. Highway 12 in zone 2, although there are five reports since 1991 of a female with cubs in that area.

Food/attractant storage orders

Food storage orders are in place on the Lincoln Ranger District, both for the northern portion that is within the NCDE recovery zone and for the portion south of Montana Highway 200 (USDA, 2005). The Forest intends to issue a special order for NCDE bear management zone 2 and begin phasing in implementation during 2017. Ongoing efforts to educate users about proper food and attractant storage will continue.

Motorized access density and secure core inside the NCDE recovery zone

The existing forest plan contains a standard limiting open road density in occupied grizzly bear habitat to less than or equal to 0.55 mile/square mile to minimize human-caused grizzly bear mortality (USDA, 1986b).

In 2006, Endangered Species Act section 7 consultation was reinitiated to evaluate the effects of continued implementation of the forest plan, including motorized access density within the recovery zone. In the resulting biological opinion (USFWS, 2006), USFWS required that no net increase in open and total motorized access densities and no net decrease in security core be allowed within the three grizzly bear management subunits on the Helena National Forest, and some changes were mandated for the Red Mountain subunit. Subsequently, the 2006 biological opinion was superseded by a 2014 consultation on the effects of the forest plan on grizzly bears that were present on the forest both inside and outside of the recovery zone (USFWS, 2014b) and by a 2016 biological opinion on the Blackfoot non-winter travel plan that addressed open motorized access density, total motorized access density, and secure core within the NCDE recovery zone and addressed open road densities in the remainder of the Blackfoot landscape (USDA, 2017a)

Within the NCDE recovery zone, there are three bear management subunits located on the Helena National Forest: Alice Creek, Arrastra Mountain and Red Mountain. Levels of open motorized access density (percent of area > 1 mile/square mile), total motorized access density (percent of area > 2 mile/square mile), and percent secure core (existing or after implementation of the Blackfoot non-winter travel plan decision) were calculated using the moving windows analysis method, shown in table 185.

The Alice Creek bear management subunit has less than 75 percent NFS lands. The baseline for this subunit has been updated to reflect the acquisition in 2006 and 2011 of 6,240 acres from the Nature Conservancy that were previously owned by Plum Creek Timber Company. The Alice Creek bear management subunit fully meets recommended levels for open motorized access density (less than 19 percent), total motorized access density (less than 19 percent), and secure core (at least 68 percent).

The Arrastra Mountain bear management subunit currently slightly exceeds the recommended level for total motorized access density at 21 percent, but meets the recommended levels of open motorized access density and secure core. All recommended levels will be fully met after implementation of the Blackfoot non-winter travel plan (USDA, 2017a).

The Red Mountain subunit meets the current forest plan standard that requires no more than 0.55 mile/square mile of open roads in occupied bear habitat but does not meet the recommended levels for open and total motorized access density (calculated using the moving window method) or secure core. Implementation of the Blackfoot non-winter travel plan decision (USDA, 2017a) is expected to improve conditions for grizzly bears in the Red Mountain bear management subunit by bringing the

levels of open motorized access density and secure core closer to the recommended 19 percent and 68 percent. To minimize incidental take, the biological opinion for the Blackfoot non-winter travel plan included a term and condition requiring that within the Red Mountain subunit, actions on roads proposed for closure be implemented within a three-year period after the date of the decision. Because neither the existing nor the post-implementation levels will fully meet the recommended levels, there are likely to be some adverse effects on a few individual bears in this bear management subunit.

Table 185. Existing open and total motorized access density and secure core by bear management subunit on the Helena National Forest. Source: 2015 moving window analysis (Ake, 2015a).

BMU Subunit	≥75% NFS lands	OMRD (% of area > 1 mile/square mile)	TMRD (% of area > 2 miles/square mile)	Secure Core (% of area)
Alice Creek	no	10	18	70
Arrastra Mountain	yes	16	19	74
Red Mountain	yes	24	21	58
Red Mountain post implementation ¹	yes	21	21	63

Note. BMU = bear management unit, OMRD = open motorized route density, TMRD = total motorized route density.

¹ Blackfoot travel plan record of decision (USDA, 2017a, p. 82).

Other forest plan direction related to motorized routes that directly or indirectly benefits the grizzly bear would continue to be implemented. For example, forestwide standards that are directed at maintaining or improving seasonal habitat or security areas for big game species (such as elk) would remain in place and would help to avoid adverse effects of open roads on grizzly bears.

Overall, implementation of existing forest plan direction pertaining to motorized routes, along with the requirements of biological opinions and incidental take statements, have contributed to reducing mortality risk and maintaining or improving habitat conditions for the grizzly bear within the recovery zone. Some impacts would continue to occur in the form of disturbance or displacement of individual bears, particularly in the Red Mountain subunit where the motorized access density is higher than in the other subunits, but these effects would likely be minor. The forest plan itself does not address open motorized access density, total motorized access density, or secure core, which are now known to be important to grizzly bear conservation in the recovery zone, so this deficiency was addressed through Endangered Species Act section 7 consultations. It is assumed that because the forest plan does not provide the needed regulatory mechanisms to support delisting, the grizzly bear would remain listed under the Endangered Species Act and the requirements of the biological opinions would remain in place under this alternative.

Motorized access outside the NCDE recovery zone

Forest plan appendix E provides guidance for documenting grizzly bear observations and habitat, protecting currently used habitat components, and determining the significance of areas outside the recovery zone to grizzly bear recovery. As described above, grizzly bears are currently known to be present south of the recovery zone in the area that is west of Interstate 15.

The existing forest plan provides direction for motorized access to provide for various resource benefits. These include forestwide standards aimed at maintaining or improving seasonal habitat or security areas for big game species (USDA, 1986b, pp. II-17 to II-19). In addition to forestwide standards, the level of road development and use is determined by the objectives, desired conditions,

standards, and guidelines established under the forest plan for individual management areas. In a 2013 biological assessment (Pengeroth, 2013), a rough estimate of the relative level of expected road use in the “expanded grizzly bear distribution zone” was inferred from the goals, objectives, and standards of each management area. Management area R-1, which comprises about 16,000 acres (5 percent), is allocated for nonmotorized uses, so road density is assumed to be zero. Management areas M-1 (uneconomical/unfeasible), P-3 (Electric Peak Roadless Area), W-1 (wildlife habitat), and W-2 (wildlife/big game habitat), which together comprise about 120,600 acres (35 percent), are expected to have low road densities currently and little or no road development planned. Moderate road densities are expected in management areas H-1 and H-2 (the Tenmile municipal watershed) as well as L-1 (livestock grazing) and L-2 (livestock grazing and elk habitat), which together comprise about 42,500 acres (12 percent). Relatively high road densities are expected in the 166,500 acres (48 percent) that are within management areas T-1, T-3, T-4, and T-5 (productive timberlands).

The current densities of motorized routes (miles of roads and trails divided by square miles of NFS lands) by management zone (as identified in the draft conservation strategy) on the Helena National Forest are shown in table 186. Forest plan direction that limits motorized route density to provide for other resources also may indirectly benefit grizzly bears that occur outside the NCDE recovery zone (Warren, 2017). Based on the threshold values identified in Alberta by Boulanger and Stenhouse (2014), the existing road densities on NFS lands in this portion of the Helena National Forest are compatible with supporting the presence of grizzly bears (< 2.4 miles/square mile), including adult females (< 2 miles/square mile), and with minimizing bear mortality (< 1.6 miles/square mile).

Table 186. Linear density of motorized routes (roads and trails) open to the public during the non-denning season on the Helena National Forest by NCDE bear management zone. Source: Ake (2015e).

Management Zone	Square miles of NFS land	Density of NFS motorized routes	Density of all motorized routes
Zone 1	233 square miles	1.34 miles/square mile	1.5 miles/square mile
Zone 2	1,004 square miles	0.83 mile/square mile	0.93 mile/square mile
Zone 3	9 square miles	0 mile/square mile	0 mile/square mile

The Divide travel plan was recently completed. Implementation of the Divide travel plan decision (USDA, 2016b) will decrease the miles of roads open to full-sized vehicles by 156 miles, from 415 miles to 259 miles, and no construction of any new permanent roads will be authorized. The motorized trail system will be allowed to increase by 45 miles, from 20 miles to 65 miles. The result will be a net decrease of 129 miles in motorized routes open to vehicle use during the grizzly bear non-denning period.

In a biological opinion on the effects of the Helena forest plan on grizzly bears, USFWS (2014b) included a requirement in the incidental take statement that the Forest Service must consult if a net increase in permanent system roads should exceed 5 linear miles during the subsequent 10-year period in the Divide landscape and if a net increase in temporary roads should exceed 30 miles over the next 10 years in the Divide landscape. The Divide travel plan decision is consistent with the 2014 biological opinion and incidental take statement. The 2014 biological opinion is assumed to remain in effect for the life of the forest plan under the no-action alternative.

Motorized over-snow vehicle use during the den emergence period

The Blackfoot-North Divide winter travel plan analyzed a large geographic area of about 372,000 acres, of which about 185,000 acres are within the NCDE recovery zone (USDA, 2013a). On NFS lands in the recovery zone, there are 63,322 acres of modeled denning habitat (Ake, 2015f; Shanley,

2009). About 64 percent of the modeled denning habitat occurs within the Scapegoat Wilderness, where motorized use is prohibited. About 89 percent of all denning habitat is within designated wilderness or other areas that would remain closed to motorized over-snow vehicle use.

In areas where motorized over-snow vehicle use is allowed, the season-ending date is March 31, except for the Copper Bowls extended use area, where the ending date is May 31 (USDA, 2013a). By implementing a March 31 closure date with the exception of the Copper Bowls area, there is very little potential for motorized over-snow vehicle use to overlap with den emergence of grizzly bears. In the Copper Bowls area, the amount of modeled denning habitat (approximately 3,233 acres) and foraging habitat is limited by the rock slopes at the head of the drainage (Shanley, 2009). Any impacts to grizzly bears within the recovery zone during the den emergence period are expected to be minor under the no-action alternative.

Outside the NCDE recovery zone, the Blackfoot-North Divide winter travel analysis (Shanley, 2009) identified 99,413 acres of modeled denning habitat on NFS lands. Of these, 36,091 acres are within the area described as the “grizzly bear distribution zone” in the upper Blackfoot landscape. Under the winter travel plan, 79 percent of the modeled denning habitat is closed to motorized over-snow vehicle use and 21 percent is open to motorized over-snow vehicle use. The ending date for motorized over-snow vehicle use outside the recovery zone is April 15. Motorized over-snow vehicle use south of Montana Highway 200 generally is minimal by April due to poor snow conditions and limited access on lower-elevation lands.

Grizzly bears continue to range southward from the recovery zone, although they are relatively scarce in the Divide landscape (Costain, 2015). During the winter of 2008/2009, a female grizzly fitted with a radio collar by MFWP denned south of Montana Highway 200. This was the first documentation of a grizzly bear den on the Helena National Forest outside of the NCDE recovery zone. There are relatively few verified occurrences of grizzly bears south of U.S. Highway 12, although there are five reports since 1991 of a sow with cubs in that area. As grizzly bears are present at low density, there is a potential for adverse effects due to motorized over-snow vehicle use during the den emergence period under this alternative, although the likelihood of this occurring is low.

Nonmotorized trails

The Interagency Grizzly Bear Guidelines are used as a guide in determining the appropriate response to any grizzly bear-human conflicts that may occur in the NCDE, whether associated with nonmotorized trail use or off-trail backcountry use or located in developed recreation sites or on private or other agency lands. Conflicts and fatalities have occurred on nonmotorized trails in the NCDE, but these are rare events. No population-level effects on grizzly bears have been demonstrated due to nonmotorized trail use.

Developed recreation sites

Developed recreation sites are of concern because frequent or prolonged human occupancy may result in increased bear attractants, increasing the risk of grizzly bear-human conflicts or grizzly bear mortality. Under the existing Helena forest plan, there is a forestwide standard stating that new campgrounds and other developed recreation facilities, such as boat ramps or picnic areas, will generally not be constructed. Existing developed recreation sites will be maintained, but emphasis instead is given to providing dispersed recreation opportunities.

Within the Monture Landers Fork bear management unit on the Helena National Forest, three campgrounds provide a total of 35 campsites, and there are no cabins or lodges. There are eight day-use recreation sites and 17 trailheads on NFS lands in this bear management unit. There is no history of grizzly bear mortalities associated with developed recreation sites on the Helena National Forest.

In the grizzly bear distribution zone outside the recovery zone, there are no developed recreation sites. It is unlikely that new developments designed and managed for overnight use would be constructed under the no-action alternative.

Given the relatively small number and size of developed recreation sites in the primary conservation area on the Helena National Forest, the existing forest plan direction that new developments generally will not be constructed, and the lack of history of conflicts, the risk of mortality for grizzly bears would be low under this alternative.

Livestock allotments

Within the primary conservation area on the Helena National Forest, there are two active cattle allotments and one active sheep allotment. The sheep are closely managed on this allotment (e.g., the sheep are never bedded down on NFS lands but return to private lands at night). No grizzly bear mortalities have occurred on the Helena National Forest as a result of sheep or cattle grazing. Four mortalities and one bear relocation have occurred as a result of livestock depredations that occurred on private land in the Lincoln area.

In the area south of Montana Highway 200 and west of Interstate 15 where grizzly bears are present, there are two active sheep allotments and 30 cattle allotments (9 in the Upper Blackfoot landscape and 21 in the Divide landscape). There have been no reported bear mortalities or management actions towards grizzly bears associated with livestock on NFS lands. Off of the national forest, grizzly bear mortality associated with livestock depredation has occurred on private land.

The existing forest plan direction includes use of the Interagency Grizzly Bear Guidelines within the recovery zone to reduce livestock impacts to important grizzly bear habitats and protect food production areas (wet alpine and subalpine meadows, stream bottoms, aspen groves, and other riparian areas) and to manage grizzly bear-livestock conflict situations. The number of open and active sheep grazing allotments has been reduced when there were opportunities with willing permittees. In addition, provisions in grazing permits provide for the cancellation, suspension, or temporary cessation of activities if needed to resolve a grizzly bear conflict situation. The food and attractant special order requires bear-resistant storage of all livestock food and the reporting of all livestock carcasses within 24 hours of discovery.

The 2014 biological opinion on the effects of the Helena forest plan on grizzly bears included the following mandatory terms and conditions to reduce the potential for mortality and displacement of grizzly bears related to livestock grazing on the Forest (USFWS, 2014b):

3. Allow no new sheep allotments on the Forest within the NCDE recovery zone.
4. Include a provision in all grazing permits that occur within the recovery zone and distribution area requiring the permittee to notify the Forest of any grizzly bear depredation on livestock or conflicts between grizzly bears and livestock, even if the conflict did not result in the loss of livestock, within 24 hours of discovery. The Forest shall work with MFWP and wildlife Control personnel to determine the appropriate action.
5. Include a provision in all grazing permits that occur within the recovery zone and distribution area requiring the permittee to notify the Forest Service of any livestock losses, regardless of the cause, within 24 hours of discovery. Agency personnel and the permittee would then jointly determine how to properly treat or dispose of livestock carcasses so as to eliminate any potential attractant for bears.

Under the no-action alternative, current levels of grazing intensity are not expected to displace grizzly bears or to negatively impact important bear food production areas. Based on the lack of history of conflicts and the extra efforts being made in managing the sheep allotments, the mortality risk associated with livestock grazing on the Helena National Forest is moderate to low. Continued implementation of management direction under the no-action alternative regarding livestock grazing is expected to be compatible with sustaining recovery of the NCDE grizzly bear population.

Vegetation management

The Forest would continue to follow the Interagency Grizzly Bear Guidelines for vegetation management applicable to management situations 1 and 2 grizzly bear habitat. These guidelines specify that measures that maintain and/or improve grizzly bear habitat and populations will be specified in project design. Main provisions of the Interagency Grizzly Bear Guidelines for timber and fire management are as follows.

- All proposed logging and burning activities will be evaluated for their effects on grizzlies and their habitat.
 - Logging and burning activities will occur at a time or season when the area is of little or no biological importance to the bear.
 - Grizzly bear habitat will be improved through vegetation manipulation.
- Habitat management in forested cover should provide a balance of all successional stages.
- Roads used for timber sale purposes will be single-purpose roads only and will be closed to public use not associated with timber sale operation and administration.
- Desirable clearcut features include (1) one or more leave or cover patches in cuts over 10 acres; (2) minimum soil scarification where soil disturbance impedes the reestablishment of grizzly foods; (3) slash disposal by spring broadcast burning; and (4) protection of hydric stream bottoms, wet meadows, marshes, and bogs from soil disturbance and security cover removal.
- Prescribed burning in habitat types that are not managed for timber production could be used to approximate a natural fire frequency in order to promote berry-producing shrubs.

The above vegetation management guidelines would continue to provide diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities. There may be short-term impacts to individual bears from timber management activities and associated road use, but these are not expected to have a negative or long-term adverse impact on the population.

Mineral and oil and gas development

The only commercial mining rights within the recovery zone on lands managed by the Forest Service or Bureau of Land Management are for the Cotter Mine on the Helena National Forest. There is currently no activity occurring at the site.

All NFS lands are available for the staking of claims for locatable minerals under the general mining law unless withdrawn from mineral entry by an act of Congress or through the withdrawal process under the Federal Lands Policy and Management Act. As part of the Rocky Mountain Front mineral withdrawal, the Secretary of the Interior withdrew acres open to the staking of claims for locatable minerals, including a withdrawal area on the Lincoln Ranger District known as Alice Creek/Indian Meadows, totaling 26,589 acres (see Helena forest plan amendment 19). These lands were withdrawn for 20 years, and the withdrawal could be extended for another 20 years. Under the no-action alternative, the withdrawal would continue to protect grizzly bear habitat values and minimize

the potential for grizzly bear disturbance or displacement in the withdrawal area over the life of the forest plan.

Oil and gas leasing would continue to have a stipulation requiring no surface occupancy in management situation 1 grizzly bear habitat under this alternative. No surface occupancy would also be applied to overlapping occupied denning and summer habitat in management situation 2. Timing restrictions may be applied in management situation 2 to denning areas, spring habitat, or summer areas, as described in amendment 13. With a no surface occupancy stipulation, access to oil and gas deposits would require horizontal drilling from outside the boundaries of the no surface occupancy areas. This prevents the loss of grizzly bear habitat and limits the potential for habituation or disturbance or displacement of bears.

Genetic connectivity

The existing Helena forest plan does not provide specific management direction aimed at providing for bear movement that would support genetic connectivity with the Greater Yellowstone Ecosystem. Nevertheless, as the increasing grizzly bear population in the NCDE has expanded into new territory farther to the south, there has been an increasing number of credible grizzly bear reports in the Blackfoot landscape south of Montana Highway 200 and all of the Divide landscape (R. D. Mace & Roberts, 2012). Available information shows grizzly bears have been moving south primarily through the west side of the Helena National Forest (see figure 1-72). To date, grizzly bears have not been documented to occur on NFS lands in the Big Belt or Little Belt Mountains, although in 2017 two sightings on private lands in the Big Belt Mountains were verified by MFWP.

The Montana Highway 200 corridor through the Lincoln Ranger District, including private lands adjacent to Montana Highway 200, represents an area of potential fragmentation that could affect genetic connectivity with the Greater Yellowstone Ecosystem grizzly bear population. Rural residences, open roads, motor trails, developed recreation facilities, livestock grazing, mining operations, and other human activities are spread throughout the southern portion of the Divide landscape, as is displayed in the biological assessment for grizzly bears on the west side of the Helena National Forest (Pengerth, 2013). Still, ample portions of it are unroaded or lightly roaded. For the purpose of analyzing road density, the 317-square-mile Divide landscape was split into 13 management areas, all of which had road densities averaging less than 2.0 miles/square mile as of 2012. As of 2012, no new roads had been constructed by the Forest Service in the Divide landscape in the previous 10 years, and 23 miles had been decommissioned in the previous four years.

Across zone 2 as a whole, the existing density of open roads and motorized trails on NFS lands was less than 1.5 miles/square mile (Ake, 2015e). This density is expected to allow for the survival and movement of grizzly bears.

The final Greater Yellowstone Ecosystem grizzly bear conservation strategy (USFWS, 2016) describes the desirability of maintaining grizzly bear presence in the Tobacco Root and Highland Mountains to facilitate genetic connectivity with the NCDE. The Beaverhead-Deerlodge National Forest lies south of the Helena National Forest and encompasses these mountain ranges. The Beaverhead-Deerlodge forest plan established limits on open motorized route densities in the four landscapes encompassing the Tobacco Root and Highland Mountains area, as shown in table 187 (USDA, 2009a, pp. 45-46). Based on a comparison to the open road density thresholds identified by Boulanger and Stenhouse (2014), the forest plan direction for open motorized route density along with the forestwide food/attractant storage order (USDA, 2014c) are expected to be compatible with the goal of supporting the presence and movement of male bears from the NCDE to the Greater Yellowstone Ecosystem.

Table 187. Beaverhead-Deerlodge forest plan objectives for linear density of open motorized routes in landscapes south of the Helena National Forest. Source: Beaverhead-Deerlodge forest plan (USDA, 2009a).

Landscape name	Objective for open motorized route density
Clark Fork-Flints	1.9 miles/square mile or less
Upper Clark Fork	2.0 miles/square mile or less
Jefferson River	1.6 miles/square mile or less
Tobacco Roots	1.3 miles/square mile or less

Thus, continued implementation of the Helena forest plan is likely to provide habitat conditions that will support movement of dispersing bears, particularly male bears, to the adjoining Beaverhead-Deerlodge National Forest. Open road densities are at a level that will support bear movement, and the forestwide food storage orders will help prevent grizzly bear-human conflicts.

Summary and conclusion for alternative 1

The existing Helena forest plan, which incorporated the Interagency Grizzly Bear Guidelines, together with food storage orders on the Lincoln Ranger District and biological opinions that provided mandatory terms and conditions to avoid or minimize incidental take, has been effective in reducing the potential for grizzly bear-human conflicts and grizzly bear mortality and has contributed to the improved status of the NCDE grizzly bear population. The food storage orders do not cover all of the area where grizzly bears are now present, but Forest staff would continue to educate users about proper food and attractant storage in areas south of the recovery zone. Some minor effects to individual bears would be anticipated as a result of forest management actions under this alternative, but continued implementation of the no-action alternative would be compatible with maintaining a well-distributed grizzly bear population. However, because the existing forest plan does not contain the standards that are needed to manage motorized access in the grizzly bear recovery zone, it does not provide the regulatory mechanisms and assurances needed to support future delisting of the NCDE population. Neither does the plan provide specific management direction for areas outside the recovery zone that are now occupied by bears. Grizzly bears that are outside of the recovery zone would potentially be exposed to higher mortality risk as compared to the other alternatives. It is expected that under this alternative, the grizzly bear would remain listed in the NCDE and would continue to be managed in accordance with requirements of USFWS's biological opinions and incidental take statements.

Alternative 2 modified—Helena National Forest

Under this alternative, specific reference to the Interagency Grizzly Bear Guidelines, including the delineation of management situations, would be removed from the forest plan. However, much of the existing forest plan management direction that is based on the Interagency Grizzly Bear Guidelines would be retained, with the addition of desired conditions, standards, and guidelines, and monitoring items, as shown in appendix 2 to the draft record of decision.

The Helena National Forest contains land within the primary conservation area (representing about 3 percent of the total), zone 1 (representing about 3 percent of the total), zone 2 (about 14 percent of the total), and zone 3 (less than 1 percent) (figure 1-72). Habitat management on Federal lands in the primary conservation area would be designed to maintain or improve habitat conditions compared to the baseline, while allowing resource management activities to continue. Fewer habitat protections would be necessary in zone 1 than in the primary conservation area. No additional habitat protections would be required in zone 2 or zone 3.

Food/attractant storage orders

Food storage orders are in place on the Lincoln Ranger District, both for the northern portion that is within the NCDE recovery zone and for the portion of the Blackfoot landscape that is in zone 1 (see figure 1-72). There is no food storage order yet in place for zone 2. Under this alternative, standard NCDE-STD-WL-02 would be added to the forest plan requiring that a food storage order apply to the primary conservation area, zone 1 and zone 2.

The Helena National Forest intends to issue a food/attractant storage special order for zone 2 and begin phasing in implementation during 2017. Efforts to educate users about proper storage of food and attractants are ongoing.

Motorized access density and secure core in the primary conservation area

Under alternative 2 modified, desired condition NCDE-DC-AR-01 would establish the intent to manage open motorized route density, total motorized route density, and secure core in a manner that contributes to sustaining the recovery of the NCDE grizzly bear population. Forest plan standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density and no net decrease from the baseline for the percent of secure core within bear management subunits in the primary conservation area. No further reductions of open motorized route density, total motorized route density, or increase in secure core would be required in the future.

The secure core definition used in this alternative differs from the definition in the no-action alternative by not buffering high-intensity-use nonmotorized trails. This change was made due to the lack of demonstrable effects of nonmotorized trails on grizzly bears. Furthermore, there are no clear methods or criteria to accurately measure and identify “high-intensity-use” trails, which resulted in data inconsistencies. This different methodology does not result in a substantial change in the amount of secure core. Within the primary conservation area on the Helena National Forest, there is a total of 125,038 acres of secure core (69 percent) when calculated with nonmotorized high-intensity-use trails buffered, and a total of 127,294 acres of secure core (70 percent) when calculated without nonmotorized high-intensity-use trails. The breakdown by bear management subunit is shown in table 188.

Table 188. Comparing secure core calculated with and without nonmotorized high-intensity-use trails. Source: 2015 moving window analysis (Ake, 2015a).

Bear Management Subunit	Percent secure core with high-intensity-use nonmotorized trails	Percent secure core without high-intensity-use nonmotorized trails
Alice Creek	70	71
Arrastra Mountain	74	74
Red Mountain	58	61

The change in methods (no longer buffering high-intensity-use nonmotorized trails) does not translate to a change in effects to grizzly bears. This is because the recalculated values, shown in table 189, would be the baseline under the action alternatives.

Table 189. Open and total motorized route density and secure core by bear management subunit on the Helena National Forest under alternatives 2 and 3. Source: 2015 moving window analysis (Ake, 2015a).

BMU Subunit	≥ 75% NFS lands	OMRD (% of area > 1 mi/mi ²)	TMRD (% of area > 2 mi/mi ²)	Secure Core (% of area)
Alice Creek	no	10	18	71
Arrastra Mountain	yes	16	19	74
Red Mountain	yes	24	21	61

Note. BMU = bear management unit, OMRD = open motorized route density; TMRD = total motorized route density.

NCDE-STD-AR-01 would establish direction in the forest plan regarding administrative use of restricted roads. This would not be a change from current operating procedures. Administrative use might have some impact by disturbing bears in the affected area. However, the risk of human-caused mortality would not increase because of the controls the agency has over its own employees and other authorized users.

NCDE-STD-AR-03 would allow temporary changes in the open motorized route density, total motorized route density, and secure core within a bear management subunit, up to a limit of 5 percent increase in OMRD, 3 percent increase in TMRD, and 2 percent decrease in secure core calculated by a 10-year running average. This level of temporary change is intended to allow projects to continue at about the same levels. These allowances are based on six timber harvest and road management projects for which such temporary changes were approved between 2003 and 2010, a period during which the NCDE grizzly bear population was stable to increasing (Kendall et al., 2009; R. D. Mace & Roberts, 2012). It should also be noted that the ability to conduct projects within secure core is strongly constrained by the overlap with designated wilderness, proposed wilderness, inventoried roadless areas, and other forest plan management area allocations that restrict road development. The Helena National Forest has about 129,000 acres of secure core, of which about 127,000 acres are in wilderness or roadless areas. Therefore, the amount of change and the likely areas where temporary reductions in secure core could take place is in fact very limited and is not anticipated to have adverse population-level effects.

NCDE-STD-AR-04 would allow temporary use of restricted roads for motorized use by the public for purposes such as firewood gathering for less than 30 days and outside the spring and fall bear hunting seasons. However, public motorized use would not be permitted within secure core. There would be some increase in disturbance and the risk of grizzly bear mortality in the primary conservation area associated with this use, but the amount and duration would be limited.

Projects would be designed such that implementation would not exceed 5 years out of a 10-year period (NCDE-GDL-AR-01). Pre-project conditions would generally be restored within one year of project completion (NCDE-GDL-AR-02). This limit on the duration of project activities would help to reduce the potential for displacement of bears from their habitat. Some adverse impacts to bears could occur as a result of human disturbance in the project area, but these guidelines would provide limits on the amount and duration of the disturbance so that bears are not permanently displaced by human activities.

This alternative would establish a set of desired conditions, standards, and guidelines for motorized access that are consistent across the primary conservation area. The plan components are designed to limit motorized route densities and to maintain sufficient secure core in the primary conservation area to support occupancy and reproduction by female bears. Some adverse effects would persist in the Red Mountain bear management subunit, and adverse effects from short-term disturbance might

also occur as a result of temporary use of roads in the primary conservation area. The risks of grizzly bear-human conflicts and grizzly bear mortality are expected to remain at a level that is compatible with supporting recovery of the NCDE population.

Motorized routes in zones 1, 2, and 3

The current known distribution of grizzly bears outside of the NCDE recovery zone on the Helena National Forest includes the area of approximately 354,600 acres that lies south of Montana Highway 200 and west of Interstate 15 in the Upper Blackfoot and Divide landscapes (see figure 1-72). Grizzly bears are known to occur at low density throughout much of this area, which would be designated as zone 1 and zone 2 under the action alternatives.

Under this alternative, desired condition NCDE-HNF Zone 1-DC-01 would be added to recognize the contribution of zone 1 to sustaining recovery of the grizzly bear population and providing the opportunity for movement of bears to the Greater Yellowstone Ecosystem. In zone 1 and the portion of zone 2 west of Interstate 15, desired condition NCDE-HNF Zone 1&2-DC-02 would encourage consolidation of lands adjacent to highways and conservation easements with willing landowners. Standard NCDE-HNF Zone 1-STD-01 would require no net increase above the baseline in density of routes open to public motorized use on NFS lands in zone 1. The intent is to provide for continual occupancy by grizzly bears in zone 1, but at expected lower densities than in the primary conservation area located to the north, by maintaining the conditions that have been compatible with a stable to increasing grizzly bear population.

Under alternative 2 modified, no additional management direction regarding motorized routes would be added for zones 2 or 3. Existing Helena forest plan management direction along with approved travel plans applicable to zones 2 and 3 would continue to govern the development and management of motorized routes in those portions of the national forest. The current open motorized route density on NFS lands during the non-denning season is 1.5 miles/square mile in zone 1 and 0.9 miles/square mile in zone 2. As described for alternative 1, these levels are compatible with supporting occupancy by grizzly bears and minimizing grizzly bear mortality.

Motorized over-snow vehicle use during the den emergence period

Under alternative 2 modified, NCDE-STD-AR-08 would require no net increase in the percentage of area or miles of routes that are designated for public motorized over-snow vehicle use on NFS lands in the primary conservation area during the den emergence time period. The standard would help ensure that impacts to female bears with dependent young would be limited and would not increase over time.

Nonmotorized trails in the primary conservation area

Under alternative 2 modified, several forest plan components would be added that incorporate strategies to reduce the risk of displacement and mortality of grizzly bears. Desired condition NCDE-DC-WL-03 is intended to help reduce the risk of bear-human conflicts by providing information, education, and design features or criteria for management activities. Under guideline NCDE-GDL-AR-03, if the number or capacity of day-use or overnight developed recreation sites within the NCDE primary conservation area is increased, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education). These measures could help to reduce the risk of grizzly bear-human encounters and conflicts related to the use of nonmotorized trails in the primary conservation area.

Developed recreation sites

Several plan components that address developed recreation sites would be added under alternative 2 modified. The existing Helena forest plan standard stating that new campgrounds and other developed recreation facilities, such as boat ramps or picnic areas, will generally not be constructed would remain in place under this alternative.

Within the primary conservation area, the number, capacity, and improvement of developed recreation sites will provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on NFS lands (NCDE-DC-AR-02). Desired condition NCDE-DC-AR-03 states that increases in the number and capacity of developed recreation sites on NFS lands that are designed and managed for overnight use during the non-denning season will be at levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE. Standard NCDE-STD-AR-05 would set a limit of one increase in the number or the overnight capacity of developed recreation sites designed and managed for overnight use per bear management unit per decade on NFS lands in the primary conservation area. In addition, guideline NCDE-GDL-AR-03 states that if the number or capacity of day use or overnight developed recreation sites is increased within the NCDE primary conservation area, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education, by providing backcountry food-hanging poles or bear-resistant food or garbage storage devices, or by increasing law enforcement and patrols). Standard NCDE-STD-AR-07 would require that new or reauthorized ski area permits within the primary conservation area include mitigation measures to reduce the risk of grizzly bear-human conflicts.

The risk of mortality for grizzly bears would be low under this alternative (about the same as under the no-action alternative). This conclusion is based on the relatively small number and size of developed recreation sites on the Helena National Forest (table 210), the forest plan direction that new developments generally will not be constructed, and the lack of history of grizzly bear-human conflicts associated with developed recreation sites on the national forest.

Livestock allotments

Existing forest plan direction to reduce livestock impacts and to minimize grizzly bear-livestock conflicts on NFS lands would be retained. New standards would require that new or reauthorized grazing permits (NCDE-STD-GRZ-01) and temporary grazing permits for small livestock used for purposes such as controlling invasive exotic weeds or reducing fire risk or for trailing of livestock across NFS lands (NCDE-STD-GRZ-06) in the primary conservation area and zone 1 incorporate measures to reduce the risk of grizzly bear-human conflicts. No increase in the number of cattle allotments (NCDE-STD-GRZ-05) or in the number of sheep allotments or permitted sheep animal unit months (NCDE-STD-GRZ-02 and 04) would be allowed in the primary conservation area. Guideline NCDE-GDL-GRZ-01 encourages reducing the number of open or active sheep grazing allotments on NFS lands within the primary conservation area, if an opportunity exists with a willing permittee, to reduce the risk of conflicts with grizzly bears. Livestock carcasses in the primary conservation area and zone 1 must be reported within 24 hours (NCDE-STD-GRZ-03). Within the NCDE primary conservation area, allotment management plans and plans of operation should specify any needed measures to protect key grizzly bear food production areas (e.g., wet meadows, stream bottoms, aspen groves, and other riparian wildlife habitats) from conflicting and competing use by livestock (NCDE-GDL-GRZ-02).

As discussed for the no-action alternative, there is only one sheep allotment within the primary conservation area on the Helena National Forest and two in zone 1. Existing livestock grazing allotments have been compatible with an increasing grizzly bear population. Based on the lack of

history of conflicts, the mortality risk associated with livestock grazing on the Helena National Forest appears to be moderate to low. The additional standards and guidelines would further reduce the potential for conflicts on NFS lands in the primary conservation area and zone 1.

Vegetation management

Under this alternative, existing forest plan standards and guidelines for vegetation management would be retained (see appendix 2 to the draft record of decision). Additional desired conditions and guidelines applicable to the primary conservation area would be added as shown in appendix 1 to the draft record of decision. The added direction is very similar to the Interagency Grizzly Bear Guidelines (IGBC, 1986) in encouraging a mosaic of successional stages; restricting logging activities in time and space as needed; designing projects to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts; and retaining cover as needed along grass/forb/shrub openings, riparian wildlife habitat, or wetlands.

Alternative 2 modified allows for temporary increases in open and total motorized route density and temporary decreases in secure core under NCDE-AR-STD-03 to allow for project activities. This differs from the existing Helena forest plan and programmatic biological opinion. However, this type of limited temporary change has been evaluated and allowed through project-level section 7 consultations in order to accommodate post-fire salvage, timber harvest, and road management projects in the NCDE. The draft Conservation Strategy (USFWS, 2013c) describes six projects affecting 18 subunits, as well as the temporary changes that were allowed, that provided the basis for NCDE-AR-STD-03. There have been very few instances on the Helena National Forest when these temporary changes have been necessary. No measurable difference in effects between the alternatives is expected as a result of incorporating this standard into the forest plan.

The vegetation management guidelines would provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities. There may be short-term impacts to individual bears from timber management activities and associated road use, but these are not expected to have a negative or long-term adverse impact on the NCDE population.

Mineral and energy development

Most of the existing forest plan direction related to mineral and energy development would be retained. Additional desired conditions, standards, and guidelines applicable to the primary conservation area and zone 1 would be added as shown in appendix 2 to the draft record of decision.

Under alternative 2 modified, a no surface occupancy stipulation would be required for new or reauthorized mineral leases across the primary conservation area. Under the no-action alternative, oil and gas leases must have a stipulation requiring no surface occupancy in management situation 1 grizzly bear habitat and in overlapping occupied denning and summer habitat in management situation 2; timing restrictions may be applied in management situation 2 to denning areas, spring habitat, or summer areas, as described in Helena forest plan amendment 13. Thus, alternative 2 modified provides more consistent protection across the primary conservation area than alternative 1.

It is unlikely that exploration and development of leasable minerals would negatively affect grizzly bear habitat or result in disturbance or displacement of bears under alternative 2 modified.

Genetic interchange

Alternative 2 modified would add standard NCDE-STD-WL-02 to require establishment of a food storage order that applies to zone 2, which may help to prevent grizzly bear-human conflicts.

This alternative would add desired condition NCDE-HNF Zone 1-DC-01 that acknowledges the role of grizzly bear habitat in zone 1 in contributing to sustaining the recovery of the grizzly bear population in the NCDE and providing the opportunity for the movement of male bears to provide genetic connectivity with the Greater Yellowstone Ecosystem. Standard NCDE-HNF Zone 1-STD-01 would require no net increase above the baseline in density of motorized routes (roads and trails) open to public motorized use during the non-denning season on NFS lands within the Helena-Lewis and Clark National Forest portion of NCDE zone 1.

Desired condition NCDE-HNF Zone 1&2-DC-02 encourages consolidation of NFS lands adjacent to highways and support for other efforts to reduce barriers to genetic connectivity of grizzly bear populations.

Implementation of this alternative is likely to provide habitat conditions that would support movement of dispersing bears, particularly male bears, to the adjoining Beaverhead-Deerlodge National Forest and promote genetic interchange with the Greater Yellowstone Ecosystem.

Summary and conclusion for alternative 2 modified

Under this alternative, the amended Helena forest plan would incorporate standards to maintain baseline levels of open and total motorized route density and secure core in the primary conservation area and would update management direction for coordination of various resource management programs with grizzly bear habitat in the primary conservation area. The amendment would also add a desired condition and a standard requiring no net increase from the baseline in roads open to public motorized use on NFS lands in zone 1 to allow for occupancy by bears. Standard NCDE-STD-WL-02 would result in extending the food storage order, which would reduce mortality risk in zone 2. The mortality risk associated with livestock grazing on the Helena National Forest appears to be moderate to low, and the additional standards and guidelines under this alternative would further reduce the potential for conflicts on NFS lands in the primary conservation area. This alternative would add standard NCDE-STD-MIN-08 to require no surface occupancy stipulations for new or reauthorized leases in the primary conservation area, which would be more protective of grizzly bears than alternative 1. The amended Helena forest plan under alternative 2 modified would contribute to maintaining a well-distributed grizzly bear population across the Forest.

Alternative 3—Helena National Forest

Under this alternative, the same forest plan desired conditions, standards, guidelines, and monitoring items would be added as under alternative 2 modified. In addition, several additional desired conditions, standards, and guidelines would be added. The effects of these additional forest plan components are described below.

Primary conservation area

Standard NCDE-STD-GRZ-07 would be added, which would require that sheep grazing allotments be closed, if the opportunity arises with a willing permittee, to reduce the potential risk of grizzly bear-human conflicts. The wording of guideline NCDE-GDL-GRZ-01 also differs under this alternative, under which both cattle and sheep allotments would be subject to being phased out or moved if there are recurring conflicts. The language of these two components is stronger and broader than that in alternative 2 modified. However, given the lack of history of conflicts between grizzly bears and cattle and the careful management of the single sheep allotment in the primary conservation area, the effects of alternative 3 on grizzly bears in the primary conservation area are unlikely to be measurably different than the effects of alternative 2 modified.

Zone 1 and zone 2

Under alternative 3, desired condition NCDE-DC-GRZ-01 would be extended to zone 1. Grazing standards NCDE-STD-GRZ-02 and 05 would also be extended to zone 1. Standard NCDE-STD-MIN-08 requiring that a no surface occupancy stipulation be applied to new or reauthorized leasable minerals leases would also be extended to zone 1 under alternative 3. These additional plan components would be expected to further reduce the risk of grizzly bear mortality in zone 1, potentially benefitting the NCDE population as well as improving the opportunity for genetic connectivity to the Greater Yellowstone Ecosystem population.

Alternative 3 would add the desired condition NCDE-HNF Zone 1&2-DC-02 for the Blackfoot and Divide landscape west of Interstate 15 (figure 1-72) on the Helena National Forest. In this area, NFS lands adjacent to highways would be consolidated and conservation easements with willing landowners would be supported in a manner that would provide habitat connectivity, facilitate movement of wildlife, and reduce barriers to the north-south movement of grizzly bears. Standard NCDE-HNF Zone 1&2-STD-02 would limit motorized routes (roads and trails) that are open to public motorized to no more than 2.4 miles/square mile, calculated as the miles of motorized routes on NFS lands divided by the acres of NFS lands. These forest plan components would help to ensure that conditions that support grizzly bear presence and the opportunity for movement of male bears from the NCDE to the Greater Yellowstone Ecosystem would be maintained through time.

Summary and conclusion for alternative 3

The additional plan components would reduce the risk of grizzly bear-human conflicts and the potential for disturbance or displacement of grizzly bears somewhat compared to the other alternatives. The importance of zone 1 and the portion of zone 2 west of Interstate 15 in facilitating the movement of bears, particularly males, to the Greater Yellowstone Ecosystem would be recognized and road density specifically would be managed to support the presence of bears. Thus, alternative 3 may better ensure that conditions that support the movement of bears from the NCDE to the Greater Yellowstone Ecosystem would be maintained through time.

Indirect effects of the alternatives—Kootenai National Forest

Alternative 1—No action, Kootenai National Forest

The Kootenai National Forest has almost 120,000 acres of land within the NCDE recovery zone (about 2 percent of the recovery zone), within the Murphy bear management unit and a small portion of the Stillwater River bear management unit. Currently on the Kootenai National Forest, 112,616 acres are identified as management situation 1, 2 acres as management situation 2, and 7,345 acres as management situation 3.

The forest plan incorporates by reference the Interagency Grizzly Bear Guidelines. Guideline FW-GDL-WL-15 states that elements of the Interagency Grizzly Bear Guidelines, or a conservation strategy once the grizzly bear is delisted, should be applied to project activities.

Motorized access densities and secure core inside the recovery zone

The Kootenai National Forest manages lands within two subunits of the Murphy bear management unit, the Krinklehorn and Therriault subunits (figure 1-76). The 2015 Kootenai forest plan incorporated the 2011 motorized access amendment for grizzly bear habitat within the Selkirk and Cabinet-Yaak Ecosystems and for areas occupied by bears that are outside the recovery zones (USDA, 2011a), and the forest plan also provides direction for the bear management subunits in the NCDE grizzly bear recovery zone (USDA, 2015e). The desired condition of the Kootenai forest plan is to reduce the effects of roads on grizzly bears and provide large, remote areas with low levels of

disturbance for grizzly bears (FW-DC-WL-02, FW-DC-WL-04 and FW-DC-WL-05). Standard FW-WL-STD-03 requires maintaining or improving open motorized access density, total motorized access density, and secure core in the two bear management subunits in the NCDE in relation to the existing levels shown in table 190.

Table 190. Open and total motorized access density and secure core by bear management subunit on the Kootenai National Forest. Sources: Kootenai forest plan (USDA, 2015e) and 2015 moving window analysis (Ake, 2015b)

Bear management subunit	OMRD (% of area > 1 mile/square mile)	TMRD (% of area > 2 miles/square mile)	Secure Core (% of area)
Krinklehorn	18	11	75
Therriault	23	10	71

The Krinklehorn bear management subunit currently meets recommended levels for the NCDE of open motorized access density, total motorized access density, and secure core (i.e., 19-19-68). Under the forest plan, open and total motorized access densities will be maintained at or below the recommended levels and are not expected to have adverse effects on grizzly bears in this subunit.

In the Therriault subunit, total motorized access density and secure core currently meet recommended levels for the NCDE. The open motorized access density in the Therriault subunit (23 percent of the subunit with a density of more than 1 mile/square mile) meets forest plan standards but is higher than the recommended 19 percent. It has not been possible to reduced open motorized access density in this subunit to 19 percent or less because there is a main access road to campgrounds and trailheads that loops through the subunit. The current percentage of open motorized access density is likely to remain the same under this alternative, and this may cause some adverse effects on individual grizzly bears in this subunit due to disturbance or displacement and increased mortality risk.

Motorized access outside the recovery zone

The areas outside the recovery zone on the Kootenai National Forest where there is recurring use by grizzly bears is referred to as the “bears outside recovery zone” area. Seven of these areas were identified. The Tobacco “bears outside the recovery zone” area is located between the Cabinet-Yaak and NCDE recovery zones. A number of grizzly bears, including females with cubs, have been documented in the Tobacco “bears outside the recovery zone” area. At least one female with cubs is known to have denned in this area outside of the recovery zone.

A desired condition for the Tobacco geographic area (GA-DC-WL-TOB-01) is low levels of human disturbance to allow for denning activities of wide-ranging carnivores that are sensitive to human disturbance (e.g., grizzly bears). Motorized access direction for the “bears outside the recovery zone” occupancy areas is provided in appendix B of the Kootenai forest plan (USDA, 2015e). No permanent increases in linear road miles of open or total roads above the baseline may occur in any individual “bears outside the recovery zone” area. Temporary increases are acceptable under certain conditions. The baseline for the Tobacco “bears outside the recovery zone” is 867 miles of open road miles and 1,123.9 miles of total road miles.

The motorized access direction for “bears outside the recovery zone” areas is expected to limit the displacement of grizzly bears from key habitats and the risk of human-caused mortality on the Kootenai National Forest. By maintaining or decreasing the existing miles of motorized routes, grizzly bears are expected to continue to use these areas outside the recovery zone.

Nonmotorized trails in the primary conservation area

The Interagency Grizzly Bear Guidelines are used as a guide to determine the appropriate response to any grizzly bear-human conflicts that may occur in the NCDE, whether associated with nonmotorized trail use or off-trail backcountry use or are in developed recreation sites or on private or other agency lands. Conflicts and fatalities have occurred on nonmotorized trails in the NCDE, but these are rare events. No population-level effects on grizzly bears have been demonstrated due to nonmotorized trail use.

Motorized over-snow vehicle use during the den emergence period

As reported in the final EIS for the revised forest plan, motorized over-snow vehicle use occurs within the NCDE recovery zone on the Kootenai National Forest on about 7 miles of groomed routes and 4 miles of ungroomed routes. Off-route use occurs on approximately 7,905 acres or 18 percent of the 44,724 acres of modeled denning habitat on the Kootenai National Forest (USFWS, 2013b).

Forestwide standard FW-STD-WL-05 prohibits grooming of snowmobile routes in grizzly bear core habitat in the spring after April 1 of each year. Furthermore, FW-GDL-WL-01 states that management activities should avoid or minimize disturbance in areas of predicted denning habitat during spring emergence (April 1 through May 1).

Disturbance from snowmobiles in the period shortly after den emergence of a female with cubs is a concern. However, considering the relatively small acreage affected in the NCDE and the forestwide standard and guideline aimed at minimizing impacts in the den emergence period, any potential negative impact to female bears with cubs would likely be small. To address this concern about disturbance during the den emergence period, the 2013 biological opinion on the forest plan required the Kootenai National Forest and the USFWS to cooperatively develop a plan to monitor the scope and magnitude of late-season snowmobiling (post-April 15) in the Cabinet-Yaak and NCDE recovery zones.

Developed recreation sites

Kootenai National Forest lands within the two NCDE grizzly bear management units, Murphy Lake and Stillwater River, currently have the following developed recreation sites: 5 cabins, 19 campgrounds, 20 day-use sites, and 40 trailheads. There is no history of grizzly bear-human conflicts or mortalities at developed recreation sites on the Kootenai National Forest.

The forest plan requires permits and operating plans to specify measures to reduce grizzly bear-human conflicts and grizzly bear mortality by making wildlife attractants (e.g., food and garbage) inaccessible through proper storage or disposal (FW-STD-WL-04). There is also a forestwide food storage and sanitation special order in place for the Kootenai National Forest (USDA, 2011c). Implementation and monitoring of the food storage orders, public education, and increases in the availability of bear-resistant food storage devices have all helped to reduce or prevent grizzly bear-human conflicts. In addition, concerted efforts by MFWP to respond to grizzly-human conflicts, both on and off NFS lands, have greatly reduced the risks to both bears and people.

Although there is potential for these developed recreation sites to affect bears through habituation or food conditioning, the likelihood of this occurring appears to be low.

Livestock grazing

There is one cattle grazing allotment on 4,880 acres of the Kootenai National Forest portion of the NCDE recovery zone. Eleven allotments overlap the area outside the recovery zone where grizzly bears occur in the Tobacco geographic area. There is no history of grizzly bear-human conflicts or management actions against bears related to grazing in the Kootenai National Forest.

The Kootenai forest plan includes measures to address potential mortality risks to bears associated with livestock grazing. FW-DC-GRZ-01 states that grazing occurs at sustainable levels in suitable locations while protecting resources. Standard FW-STD-WL-04 requires that permits and operating plans specify sanitation measures and adhere to the forestwide food/attractant storage order. Guideline FW-GDL-WL-15 references the Interagency Grizzly Bear Guidelines or the Conservation Strategy to guide management. Because existing allotments are not expected to increase, few acres are subject to livestock grazing, and there is no history of grizzly bear-human conflicts and management actions in these subunits related to grazing, it is unlikely that livestock grazing will result in habituation or have other adverse effects on the grizzly bear. The food storage order in effect on the Kootenai National Forest also helps to minimize the potential for attractant-related human-caused grizzly bear mortality.

Vegetation management

Vegetation management (i.e., timber harvest, salvage, planting, thinning, fuels treatment, prescribed fires) may impact grizzly bears by affecting food resource availability, proximity to escape cover, human disturbance, and potential for conflicts or by temporarily shifting grizzly bears into less secure areas.

Under the Kootenai forest plan, there are 218,212 acres suitable for timber production within bear management units (16 percent of the bear management units in both the Cabinet-Yaak and NCDE recovery zones) and 333,925 acres suitable for timber production in areas outside the recovery zones where grizzly bears now occur (59 percent of the area). However, within management area 6 (general forest), none of the acres of grizzly bear secure core habitat are identified as suitable for timber production. Vegetation management in secure core habitat could be done only to meet resource needs such as insect and disease mitigation and salvage harvest, wildlife habitat diversity, and fuels management.

In the areas outside of recovery zones where there is recurring use by grizzly bears, there would be fewer undisturbed areas available to bears. However, the motorized access amendment limited the miles of open, total, and temporary roads to the baseline in “bears outside the recovery zone” areas, and any timber harvest activities that will occur within multiple watersheds must be scheduled in a manner to minimize disturbance of grizzly bears.

Under the forest plan, timber harvest units, which remove cover, at times may be placed along open roads to meet objectives other than optimizing grizzly bear habitat. However, this is not expected to have a negative effect on grizzly bears since most bears are displaced from the area adjacent to open roads (R. D. Mace et al., 1996).

Mineral and energy development

Under the forest plan, the majority of Kootenai National Forest lands, with the exception of management areas 1a and 1c (wilderness and wilderness study areas) would be available for mineral leasing (e.g., oil, gas, coal, geothermal resources, potassium, sodium, phosphates, oil shale, and sulfur). The Ten Lakes Wilderness Study Area (management area 1c) is located within the NCDE portion of the Kootenai National Forest. The majority of the Forest is also available for locatable minerals, with the exception of 150,100 acres that are withdrawn from mineral entry under the revised plan. Hence, future mining activities could occur in grizzly bear habitat under the forest plan.

The effects of future mining activities on grizzly bears are expected to be similar to those occurring at existing mining sites (e.g., Troy Mine). Such effects may include loss of habitat within the

footprint of the mine, disturbance to grizzly bears from road use and mining activities, displacement from habitat from road use or mine development, or impacts to habitat connectivity.

The extent of these effects would be limited by elements of the revised forest plan. Any mining proposal on the Forest would be considered in terms of forestwide desired conditions that trend towards providing remote areas for species with large home ranges, recovering federally listed species, facilitating denning and habitat use through low levels of disturbance, and managing motorized access to promote recovery (FW-DC-WL-01 through 05). At the project level, forestwide guidelines and standards would address potential effects of mining proposals on connectivity and linkage areas (FW-GDL-WL-12 through 14), food storage and attractants (FW-STD-WL-04, food storage order), disturbance of grizzly bears (FW-GDL-WL-01), and access management (FW-STD-WL-02 and FW-STD-WL-03). Any mining proposals would be subject to additional site-specific analysis and planning.

Demographic connectivity

Occupancy and movement by female bears into the area outside the recovery zone (Tobacco “bears outside the recovery zone”) has been documented. For example, in 2006 a radio-collared female grizzly bear with a cub spent most of the summer in the Salish Mountains of Montana less than 2 miles east of the edge of the Cabinet-Yaak recovery zone, while denning within the boundaries of the NCDE recovery zone (Kasworm, Carriles, Radandt, Proctor, & Servheen, 2011).

The open motorized route density within the Tobacco “bears outside the recovery zone” area is about 2 miles/square mile, which should allow for occupancy by bears but has elevated risk of mortality (Boulanger & Stenhouse, 2014). Demographic connectivity between the Cabinet-Yaak and the NCDE recovery zones could be hindered by higher levels of mortality along U.S. Highways 2 and 93 (Servheen et al., 2001). The forestwide food storage order would continue to help reduce the risk of grizzly bear-human conflicts, particularly in the lower elevations, which often have higher concentrations of human development.

In their 2013 biological opinion for grizzly bears for the Kootenai forest plan, USFWS (2013b) concluded that the areas outside the recovery zones will likely continue to support grizzly bear movement and linkage. Some adverse effects on individual bears may occur due to the miles of open motorized routes and to site-specific projects in the Tobacco “bears outside the recovery zone” area, but it is expected that the area will be functional in providing demographic connectivity between the NCDE and other recovery zones.

Summary and conclusion for alternative 1

The Kootenai forest plan established standards specific to the NCDE portion of the Forest and carried forward the Interagency Grizzly Bear Guidelines (IGBC, 1986) as well as incorporating the 2011 grizzly bear access management direction for the Selkirk and Cabinet-Yaak Ecosystems and “bears outside the recovery zone” areas (USDA, 2011d). The forest plan provides guidance for management of habitat within the recovery zone that includes limiting motorized route density and applying seasonal restrictions in key areas. The forestwide food storage order helps to minimize grizzly bear-human conflicts and bear mortality. Some effects to individual bears would be anticipated as a result of management actions under this alternative, but continued implementation of the no-action alternative would be compatible with maintaining a well distributed grizzly bear population on the Forest. Because it incorporated access management direction for the NCDE recovery zone, the Kootenai forest plan already has the regulatory mechanisms needed to support continued recovery and potential future delisting of the NCDE population.

Alternative 2 modified—Kootenai National Forest

Under this alternative, specific reference to the Interagency Grizzly Bear Guidelines, including the delineation of management situations, would be superseded by the amendment. However, much of the management direction that is based on the Interagency Grizzly Bear Guidelines (IGBC, 1986) would be retained and updated where needed, as shown in appendix 2 to the draft record of decision.

About 118,770 acres of the Kootenai National Forest are within the NCDE primary conservation area (about 2 percent of the total primary conservation area). There are also about 283,300 acres of zone 1 (about 6 percent of the total), most of which (276,822 acres) is within the Salish demographic connectivity area (figure 1-76). Habitat management on Federal lands in the primary conservation area would be designed to maintain or improve habitat conditions compared to baseline conditions while allowing resource management activities to continue. Fewer habitat protections would be necessary in zone 1 and the demographic connectivity area than in the primary conservation area.

Motorized route density and secure core in the primary conservation area

Under alternative 2 modified, a forest plan standard (NCDE-STD-AR-02) would be added that would require no net increase from the baseline for total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline for the amount of secure core in bear management unit subunits in the primary conservation area. Kootenai forest plan standard FW-WL-STD-03 is similar, directing that open motorized route density, total motorized route density, and secure core be maintained or improved in bear management subunits in the NCDE. There would be no difference in effects expected under alternatives 1 and 2.

In contrast to the no-action alternative, the secure core definition used in the action alternatives does not include high-intensity-use nonmotorized trails. However, no high-intensity-use nonmotorized trails have been identified in the NCDE on the Kootenai National Forest, so the change in definition does not result in any difference in effects between the alternatives. The baseline levels are the same as shown for the no-action alternative in table 190.

Standard NCDE-STD-AR-01 would set consistent definitions and procedures for managing administrative use in the NCDE primary conservation area. This would not constitute a change from current management practices on the Kootenai National Forest.

NCDE-STD-AR-03 would allow temporary changes in the open motorized route density, total motorized route density, and secure core within a bear management subunit, up to a limit of 5 percent increase in open motorized route density, 3 percent increase in total motorized route density, and 2 percent decrease in secure core calculated by a 10-year running average to accommodate projects. Pre-project conditions would generally be restored within one year of project completion (NCDE-GDL-AR-02). Under existing forest plan direction (FW-STD-WL-03), site-specific requirements for the NCDE are determined at the project level in consultation with USFWS and through appropriate public involvement and NEPA procedures. The existing forest plan and the programmatic biological opinion did not specifically provide for temporary decreases in secure core and/or temporary increases in total and open motorized route density in the primary conservation area. On the Kootenai National Forest in the past, there have been very few instances of temporary use of restricted roads, and that would likely continue to be the case. Secure core has a significant overlap with a wilderness study area, recommended wilderness, and other forest plan management area allocations that restrict road development. The Kootenai National Forest has about 82,400 acres of secure core in the NCDE. Only about 10 percent of the secure core occurs in areas where road access could possibly occur. However, by explicitly providing more latitude for temporary use, there is a

potential for adverse impacts on individual grizzly bears to occur. The potential is greater than under the existing forest plan direction but would be limited in duration and extent.

Under standard NCDE-STD-AR-04, short-term public use of restricted roads could also be allowed in certain circumstances in the primary conservation area but not within secure core. This would not be a change from current management practices on the Kootenai National Forest.

Guideline NCDE-GDL-AR-02 generally would require restoring secure core, open motorized route density, and total motorized route density to pre-project levels within one year of completion of the project. This would help to limit the potential for disturbance or displacement as a result of project activities.

Motorized routes in zone 1 and the Salish demographic connectivity area

The Kootenai National Forest has 276,822 acres within the Salish demographic connectivity area, and about 6,500 acres in zone 1 outside of the demographic connectivity area (figure 1-76). The boundaries of the Tobacco “bears outside the recovery zone” area and the Salish demographic connectivity area and zone 1 do not completely align.

Under alternative 2 modified, standard NCDE-KNF Zone 1-STD-01 states that the Kootenai National Forest portion of zone 1 and the Salish demographic connectivity area that are in a “bears outside the recovery zone” area would be managed according to the existing forest plan standard FW-STD-WL-02. That is, there would be no increases in permanent linear miles of open or total miles of road within the “bears outside the recovery zone” area, with listed exceptions and an allowance for temporary increases under specified conditions. Standard NCDE-KNF Zone 1-STD-AR-01 is more restrictive than the comparable standards on the Flathead and Lolo National Forests for zone 1 since it limits total (not just open) road miles. This wording would maintain consistency on the Kootenai National Forest across the several “bears outside the recovery zone” areas, and this standard might be helpful over time in encouraging female occupancy in this area.

The small portions of NCDE zone 1 (about 6,500 acres) and the Salish demographic connectivity area (about 9,200 acres) that are outside the Tobacco “bears outside recovery zone” area would be managed according to existing Kootenai forest plan direction (NCDE-KNF Zone 1-STD-02). Management areas within NCDE zone 1 but outside the Tobacco “bears outside recovery zone” area are management area 3 (special areas), management area 6 (general forest), and management area 7 (primary recreation area). Under management area 3, road construction is not allowed in botanical, historical, or zoological areas (MA3-STD-AR-01), but road construction and motor vehicle use are allowed in geological, recreational, and scenic areas (MA3-GDL-AR-02). In management area 6, motorized use of roads and trails is allowed and roads can be constructed and reconstructed (MA6-GDL-AR-01, MA6-GDL-AR-02, MA6-GDL-AR-03, MA6-GDL-AR-04). In management area 7, road construction, road reconstruction, and motorized use are allowed (MA7-GDL-AR-01, MA7-GDL-AR-03, MA7-GDL-AR-04). Thus, the existing direction could allow increases in miles of roads in some portions of this area.

The current (2015) linear density of open roads and motorized trails on Kootenai National Forest lands within the Salish demographic connectivity area is 2.0 miles/square mile (Ake, 2017). This is below the 2.4 miles/square mile threshold for grizzly bear occupancy identified by Boulanger and Stenhouse (2014) for grizzly bears in Alberta, and at their 2.0 miles/square mile threshold for female occupancy. Grizzly bear survival rates may be negatively affected because the motorized route density exceeds the 1.6 miles/square mile threshold for reduced mortality. The existing conditions are expected to enable the Salish demographic connectivity area to function as desired in supporting

grizzly bear occupancy (including female bears), but at a lower density than in the primary conservation area.

On zone 1 lands outside the Salish demographic connectivity area on the Kootenai National Forest (about 6,500 acres), the current (2015) linear open road density is 2.9 miles/square mile (Ake, 2017). This existing open road density is likely to have adverse effects on grizzly bears, but the impact would be small and localized due to the limited acreage involved.

Motorized over-snow vehicle use in the den emergence period

Under alternative 2 modified, NCDE-STD-AR-08 would require no net increase in the percentage of area or miles of routes that are designated for public motorized over-snow vehicle use on NFS lands in the primary conservation area during the den emergence time period. This is compatible with existing Kootenai forest plan guideline FW-GDL-WL-01 to avoid or minimize disturbance in areas of predicted denning habitat during spring emergence. This standard would provide additional assurance that impacts to female bears with dependent young would be limited and would not increase in the future.

Nonmotorized trails in the primary conservation area

Under alternative 2 modified, several forest plan components would be added that incorporate strategies to reduce the risk of displacement and mortality of grizzly bears. Desired condition NCDE-DC-WL-03 is intended to help reduce the risk of bear-human conflicts by providing information, education, and design features or criteria for management activities. Under guideline NCDE-GDL-AR-03, if the number or capacity of day use or overnight developed recreation sites within the NCDE primary conservation area is increased, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education). These measures could help to reduce the risk of grizzly bear-human encounters and conflicts related to the use of nonmotorized trails in the primary conservation area.

Developed recreation sites

Under alternative 2 modified, several plan components would be added that address developed recreation sites designed and managed for overnight use. Standard NCDE-STD-AR-05 would allow no more than one increase in the number or capacity of developed recreation sites that are designed and managed for overnight use (e.g., campgrounds, cabin rentals, huts, guest lodges, recreation residences) during the non-denning season per bear management unit per decade. This would limit the potential for future bear-human conflicts associated with habituation or food conditioning to develop at such sites. In addition, guideline NCDE-GDL-AR-03 states that, if the number or capacity of day use or overnight developed recreation sites is increased within the NCDE primary conservation area, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education, by providing backcountry food-hanging poles or bear-resistant food or garbage storage devices, by increasing law enforcement and patrols). Standard NCDE-STD-AR-07 would require new or reauthorized ski area permits that operate during the non-denning season to include mitigation measures to reduce the risk of grizzly bear-human conflicts. This set of plan components is consistent with what has regularly occurred through consultation during the time period when the NCDE grizzly bear population was stable to increasing.

By allowing future increases in the number or capacity of developed recreation sites with overnight use, there is a potential for adverse effects on individual bears, in particular an increased risk of mortality. However, the forestwide food storage order and the above-described direction would reduce the likelihood of habituation or food-conditioning of bears at those sites.

The no-action alternative does not have a limit on the number or capacity of developed recreation sites. Therefore, this alternative would have lower potential for bear-human encounters at developed recreation sites than alternative 1. However, given the lack of past grizzly bear-human conflicts at developed recreation sites on the Kootenai National Forest, the difference in effects on grizzly bears between alternatives 1 and 2 modified is likely to be small.

Livestock allotments

Existing forest plan direction to reduce livestock impacts and to minimize grizzly bear-livestock conflicts on NFS lands in the primary conservation area would be retained. Under alternative 2 modified, additional standards and guidelines would be added as shown in appendix 1 to the draft record of decision. These include a requirement that new or reauthorized grazing permits (NCDE-STD-GRZ-01) and temporary grazing permits for small livestock used for purposes such as controlling invasive exotic weeds, reducing fire risk, or trailing of livestock across NFS lands (NCDE-STD-GRZ-06) in the primary conservation area and zone 1 incorporate measures to reduce the risk of grizzly bear-human conflicts. No increase in the number of cattle allotments (NCDE-STD-GRZ-05) or in the number of sheep allotments or permitted sheep animal unit months (NCDE-STD-GRZ-02 and 04) would be allowed in the primary conservation area. Livestock carcasses in the primary conservation area and zone 1 must be reported within 24 hours (NCDE-STD-GRZ-03). Within the NCDE primary conservation area, an allotment management plan and plan of operations should specify any needed measures to protect key grizzly bear food production areas (e.g., wet meadows, stream bottoms, aspen groves, and other riparian wildlife habitats) from conflicting and competing use by livestock (NCDE-GDL-GRZ-02).

As discussed for the no-action alternative, existing livestock grazing allotments have been compatible with recovery of the NCDE grizzly bear population. Based on the few acres subject to livestock grazing in the primary conservation area and the lack of history of grizzly bear and livestock conflicts, the mortality risk associated with livestock grazing on the Kootenai National Forest appears to be low. The additional standards and guidelines would further reduce the potential for conflicts on NFS lands in the primary conservation area. Livestock grazing on the Kootenai National Forest is not likely to have adverse effects on grizzly bears under this alternative.

Vegetation management

Under alternative 2 modified, existing forest plan standards and guidelines for vegetation management would be retained and additional desired conditions and guidelines applicable to the primary conservation area would be added, as shown in appendix 1 to the draft record of decision. The added direction is very similar to the Interagency Grizzly Bear Guidelines (IGBC, 1986) in encouraging a mosaic of successional stages (NCDE-DC-VEG-02); restricting logging activities in time and space as needed (NCDE-GDL-VEG-01); designing projects to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts (NCDE-GDL-VEG-02 and 05); and retaining cover as needed along grass, forb, and shrub openings, riparian wildlife habitat, or wetlands (NCDE-GDL-VEG-03).

The forest plan components for vegetation management would provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities. There may be short-term impacts to individual bears from timber management activities and associated road use, but the plan components would limit disturbance or displacement of bears and maintain or improve habitat quality and quantity where appropriate. Implementation of the vegetation management direction is not likely to adversely affect grizzly bears.

Mineral and energy development

Existing forest plan standards pertaining to mineral and energy development would be retained. Additional desired conditions, standards, and guidelines applicable to the primary conservation area and zone 1 would be added as shown in appendix 1 to the draft record of decision. Under alternative 2 modified, new or reauthorized permits, leases, or plans of operation in the primary conservation area and zone 1 would include a provision for modification or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation (NCDE-STD-MIN-02); would include measures for mitigation of mineral development impacts (NCDE-STD-MIN-03); would provide for proper storage and handling of wildlife attractants (NCDE-STD-MIN-04); would require mitigation measures or stipulations such as timing restrictions for ground-disturbing activities in spring habitat and seismic activity in denning habitat if needed (NCDE-STD-MIN-05); would require mitigation measures if needed regarding motorized access, such as management of motorized traffic, helicopter use, and noise reduction (NCDE-STD-MIN-06); and would require worker safety training for employees living near and working in grizzly bear habitat (NCDE-STD-MIN-07). NCDE-STD-MIN-08 would require that new leases for leasable minerals in the NCDE primary conservation area include a no surface occupancy stipulation. Guidelines NCDE-GDL-MIN-01 through 06 provide further direction to reduce grizzly bear disturbance or displacement and the potential for grizzly bear-human conflicts.

These measures would help to ensure that mineral and energy development would be done in a manner that would minimize habitat loss and the disturbance or displacement of grizzly bears. There is a potential for adverse impacts from mineral and energy development on grizzly bears, but forest plan direction would help to minimize these impacts. The location and extent of future development is not known at this time but would be subject to site-specific analysis and planning.

Demographic connectivity

Alternative 2 modified would carry forward the forest plan management direction for the Tobacco “bears outside the recovery zone” area in the Salish demographic connectivity area. The effects would be the same as under the no-action alternative. The management direction applicable to the Salish demographic connectivity area is expected to support occupancy by grizzly bears, including female bears.

Summary and conclusion for alternative 2 modified

Under this alternative, the Kootenai forest plan would continue to maintain baseline levels of open and total motorized route density and secure core in the primary conservation area and would continue to provide for coordination of vegetation management programs with grizzly bear habitat. Plan components would also be added to guide management in the Salish demographic connectivity area and zone 1. The mortality risk associated with livestock grazing on the Kootenai National Forest is currently low, and the additional standards and guidelines under this alternative would further reduce the potential for conflicts on NFS lands. This alternative would add plan components for minerals and energy development, including standard NCDE-STD-MIN-08, which would require no surface occupancy stipulations for new or reauthorized leases in the primary conservation area. The existing forest plan has been effective in contributing to the recovery of the grizzly bear population in the NCDE. The added plan components would provide consistency across NFS lands in the NCDE. The management direction applicable to the Salish demographic connectivity area is expected to support occupancy by grizzly bears, including female bears. Some effects to individual bears would be anticipated as a result of forest management actions under this alternative, but implementation of this alternative would maintain a well distributed grizzly bear population on the Forest and would contribute to supporting continued recovery of the NCDE population.

Alternative 3—Kootenai National Forest

Under this alternative, the same forest plan desired conditions, standards, guidelines, and monitoring items would be added as under alternative 2 modified. In addition, several additional desired conditions, standards, and guidelines would be added. The effects of these additional forest plan components are described below.

Primary conservation area

Standard NCDE-STD-GRZ-07 would be added, which would require that sheep grazing allotments be closed, if the opportunity arises with a willing permittee, to reduce the potential risk of grizzly bear-human conflicts. The wording on guideline NCDE-GDL-GRZ-01 also differs under this alternative by including both cattle and sheep allotments as being subject to phasing out or moving if there are recurring conflicts. The language of these two components is stronger and broader than alternative 2 modified. However, given the limited amount of grazing in the primary conservation area and the lack of history of conflicts between grizzly bears and livestock on the Kootenai National Forest, the effects of alternative 3 on grizzly bears in the primary conservation area are unlikely to be measurably different than the effects of alternative 2 modified.

Zone 1 and the Salish demographic connectivity area

Under alternative 3, all of the vegetation management guidelines that apply to the primary conservation area under alternative 2 modified would also be applicable to the Ninemile demographic connectivity area. The effect of this would likely be to reduce the potential for adverse grizzly bear disturbance/displacement and to design vegetation management activities to protect, maintain, increase, and/or improve grizzly habitat quantity or quality within the demographic connectivity area where it would not increase the risk of grizzly bear-human conflicts. This would be beneficial in encouraging occupancy by female grizzly bears.

Under alternative 3, desired condition NCDE-DC-GRZ-01 would be extended to zone 1. Grazing standards NCDE-STD-GRZ-02 and 05 would also be extended to zone 1. Standard NCDE-STD-MIN-08 requiring that a no surface occupancy stipulation be applied to new or reauthorized leasable minerals leases would also be extended to zone 1 under alternative 3. These additional plan components would be expected to reduce the risk of grizzly bear mortality in zone 1, potentially benefitting the NCDE population in the primary conservation area as well as improving the opportunity for demographic connectivity to other recovery zones.

Standard NCDE-KNF Zone 1-STD-02 would allow no net increase above the baseline in the miles of roads open to public motorized use during the non-denning season on NFS lands in the portion of NCDE zone 1 outside of the area covered by the Tobacco “bears outside recovery zone” area. This would be more protective of bears than alternative 1 and might facilitate occupancy by female bears, although the effect would likely be small due to the limited acreage involved.

Summary and conclusion for alternative 3

The additional plan components would reduce the risk of grizzly bear-human conflicts and the potential for disturbance or displacement of grizzly bears somewhat compared to the other alternatives. By limiting increases in road density in the portion of zone 1 outside the Tobacco “bears outside recovery zone” area, this alternative might better provide conditions that would support occupancy and movement of bears from the NCDE to the Cabinet-Yaak recovery zone in comparison to the other alternatives.

Indirect effects of the alternatives—Lewis and Clark National Forest

Alternative 1—No action

The Lewis and Clark National Forest has almost 778,000 acres within the NCDE recovery zone (about 14 percent of the recovery zone). There are six bear management units on the Lewis and Clark National Forest, divided into 13 subunits (figure 1-74). Two of the subunits are completely within designated wilderness. About 763,740 acres were designated as management situation 1, no acres were designated as management situation 2, and 14,159 acres were designated as management situation 3 on the Forest.

Under the no-action alternative, applicable portions of the Interagency Grizzly Bear Guidelines (IGBC, 1986) would continue to be applied on the Lewis and Clark National Forest within the NCDE recovery zone as described in the Lewis and Clark forest plan's appendix V (USDA, 1986c). The Interagency Grizzly Bear Guidelines address maintaining and improving habitat, minimizing grizzly bear-human conflict potential, and resolving grizzly bear-human conflicts in coordination with various resource management programs. The Interagency Grizzly Bear Guidelines were designed to give the most stringent protection to grizzly bear habitat in management situation 1, where grizzly bear population centers occur, with more lenient guidelines that would facilitate other resource programs in other management situations.

Food/attractant storage order

A food/attractant storage order is in effect within the NCDE recovery zone on the Lewis and Clark National Forest (USDA, 2010a). Outside the recovery zone, there is a food storage order in place only for campgrounds in the Little Belt Mountains.

Motorized access densities and secure core inside the recovery zone

The Lewis and Clark forest plan does not contain a road density standard for the NCDE recovery zone. However, the Rocky Mountain Front Heritage Act of 2014 (PL 13-291) established conservation management areas within which the construction of new or temporary roads is generally not allowed. The conservation management areas established under the act cover approximately 195,073 acres of NFS lands and 13,087 acres of adjoining lands managed by the Bureau of Land Management. The law permits the use of motorized vehicles only on existing roads, trails, and areas designated for such use at the time the law was passed.

The Interagency Grizzly Bear Guidelines access taskforce report (IGBC, 1998) recommended that a moving window analysis method be used to calculate the percentage of area with open motorized route density of more than 1 mile/square mile, the percentage of area with total motorized route density more than 2 miles/square mile, and the percentage of secure core. The recommended levels for the NCDE are ≤ 19 percent open motorized route density, ≤ 19 percent total motorized route density, and ≥ 68 percent secure core in bear management subunits with more than 75 percent NFS lands. The Lewis and Clark National Forest has not adopted specific limits on motorized access densities but has conducted moving windows analyses for travel management planning.

Most of the bear management subunits on the Lewis and Clark National Forest contain less than 75 percent NFS lands (see table 191). Two of the subunits are located wholly within wilderness and therefore have no motorized routes. Motorized access density in the 11 other subunits has been evaluated through the Birch Creek South travel plan (USDA, 2007e) and Badger-Two Medicine travel plan (USDA, 2009b). Both travel plan decisions substantially reduced motorized access. USFWS concurred with the determination that the travel plan decisions are not likely to adversely affect the grizzly bear.

Table 191. Existing open and total motorized route density and secure core by bear management subunit on the Lewis and Clark National Forest. Source: 2015 moving window analysis (Ake, 2015c).

BMU Subunit	> 75% NFS lands	OMRD (percent > 1 mile/square mile)	TMRD (percent > 2 mile/square mile)	Secure Core (percent of area)
Lick Rock	yes	0	0	91
Roule Biggs	yes	0	0	89
South Fork Willow	yes	14	3	78
West Fork Beaver	yes	16	5	73
Badger	no	0	0	73
Birch	no	0	0	93
Deep Creek	no	10	3	64
Falls Creek	no	0	0	85
Heart Butte	no	1	0	61
Pine Butte	no	7	2	61
Scapegoat	no	5	1	78
Teton	no	11	5	71
Two Medicine	no	2	1	78

Note. BMU = bear management unit, OMRD = open motorized route density, TMRD = total motorized route density

The low road densities and high percentage of secure core in the primary conservation area on the Lewis and Clark National Forest provide excellent quality and availability of habitat for grizzly bears, including females with cubs.

Motorized routes outside the recovery zone

The Lewis and Clark forest plan does not require management for grizzly bears or their habitat outside of the recovery zone. It is important to note that this portion of the Forest is comprised of disjunct mountain ranges. The lands in these isolated mountain ranges are more than 60 air miles away from the recovery zone, separated by land that is almost entirely in private ownership. To date, no grizzly bears have been documented to be present on the Lewis and Clark National Forest outside of the recovery zone.

Nevertheless, there is direction in the forest plan that could provide some benefits to grizzly bears should they occur in the areas outside the recovery zone (Warren, 2017). In particular, the forest plan contains standards that control the type and intensity of activities, including road management, in order to conserve other wildlife species, such as elk. To coordinate management with the needs and objectives for elk, forest plan appendix F provides the Elk-Logging Study (Lyon et al., 1985), which is focused on maintaining elk summer range habitat effectiveness. Forest plan appendix G contains the Montana Fish and Game Commission Road Management Policy, which specifically addresses road density in conjunction with percent hiding cover during the elk hunting season.

Grizzly bears are not expected to inhabit on a regular basis the mountain ranges that are outside the recovery zone. Elk management guidelines would help to reduce the mortality risk for any bears that occasionally use these areas.

Motorized over-snow vehicle use during the den emergence period

The forest plan contains a forestwide standard for developed recreation (Developed Recreation Forest-wide Management Standard A-2) that includes this provision:

(5) Administer provisions of the Endangered Species Act in occupied T&E species habitat (forest plan appendix I). Use the management guidelines developed under the Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program to avoid or mitigate conflicts between developed recreation and threatened and endangered species (forest plan appendix I).

One of the measures included in the interagency wildlife guidelines is: Avoid human activities in grizzly bear habitat components which provide important food sources during spring and early summer, April 1 to July 15 (forest plan, appendix I).

Currently, there is no snowmobiling on the Rocky Mountain Ranger District after April 1 except on three main access roads, where snowmobiling is allowed as long as snow conditions permit. After March 31, snowmobiles are not allowed to leave these roads. Because of these restrictions, over-snow vehicle use is not expected to have any effects on grizzly bears in the primary conservation area during the den emergence period.

Nonmotorized trails in the primary conservation area

The mainline access trails into the Bob Marshall Wilderness are considered high-intensity use. There may be a higher frequency of grizzly bear-human encounters along these trails than on trails receiving less use. The Interagency Grizzly Bear Guidelines provide guidance for the appropriate response to a grizzly bear-human conflict. No population-level effects of nonmotorized trails have been demonstrated.

Developed recreation sites

The South Fork Sun-Beaver-Willow, Teton Sun River, Birch Teton, and Dearborn Elk bear management units contain a total of 99 recreation residences. The South Fork Sun-Beaver-Willow bear management unit has five sites with a substantial number of overnight cabins and bunkhouses, and the Birch Teton and Teton Sun River bear management units each have one site with cabins or bunkhouses. There are 14 campgrounds in four bear management units on the Lewis and Clark National Forest, providing about 148 individual campsites. There are also 7 day-use sites and 52 trailheads within the primary conservation area. There is no history of recurring conflicts at developed recreation sites on the Lewis and Clark National Forest.

The current forest plan does not contain a limit on developed recreation sites, but there have been few increases in developed recreation sites during the life of the Lewis and Clark forest plan. Implementation and monitoring of the food storage order, public education, and increases in the availability of bear-resistant food storage devices have all helped to reduce the number of grizzly bear-human conflicts in recent decades, and these would continue. In addition, concerted efforts by MFWP to respond to grizzly bear-human conflicts, both on and off NFS lands, have substantially reduced the risks to both bears and people.

Livestock allotments

An existing forest plan standard requires that livestock grazing that affects grizzly bears and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. In addition, the Interagency Wildlife Management Guidelines (forest plan, appendix I) provides guidelines that are specifically oriented towards minimizing the potential for conflicts between grizzly bears and livestock:

- livestock grazing on important spring habitat for grizzly bears should be deferred until after July 1;

- boneyards and livestock dumps are prevalent along the East Front and are frequented by grizzly bears. Ranchers and landowners should be encouraged to place carcasses of dead livestock and garbage on remote areas of their land. Dead cows and calves should be hauled a considerable distance from calving grounds to discourage bears from feeding on carrion and newborn calves;
- sheep grazing allotments in management situation 1, as defined in the Yellowstone Guidelines [a document that later became the 1986 Interagency Grizzly Bear Guidelines], on lands administered by government agencies should be eliminated; and
- in riparian habitats that receive high amounts of bear use, fencing to exclude livestock grazing and trampling may be necessary where livestock turn-out dates prior to July 1 are allowed.

There are 21 cattle grazing allotments but no sheep grazing allotments within the recovery zone on the Lewis and Clark National Forest. Current grazing allotments and intensity of use would continue under the no-action alternative.

Approximately 7 percent (21 of 290) of all known human-caused grizzly bear mortalities in the NCDE between 1998 and 2011 were due to management removal actions associated with livestock depredations. These livestock-related grizzly bear mortalities occurred on private lands or on the Blackfoot Indian Reservation along the Rocky Mountain Front, east of the Continental Divide.

Under the no-action alternative, livestock grazing would not be anticipated to disturb or displace grizzly bears or negatively impact important bear food production areas. Based on the lack of sheep allotments, no recent history of conflicts, and no known mortalities associated with livestock grazing on NFS lands, the mortality risk associated with livestock grazing on the Lewis and Clark National Forest is very low. Continued implementation of management direction under the no-action alternative regarding livestock grazing is expected to support continued recovery of the NCDE grizzly bear population.

Vegetation management

The Forest would continue to follow the Interagency Grizzly Bear Guidelines for vegetation management in management situations 1 and 2 grizzly bear habitat. These guidelines specify that measures that maintain and/or improve grizzly bear habitat and populations would be specified in project design. Main provisions of the Interagency Grizzly Bear Guidelines for timber and fire management are listed below.

- All proposed logging and burning activities will be evaluated for their effects on grizzlies and their habitat.
 - Logging and burning activities will occur at a time or season when the area is of little or no biological importance to the bear.
 - Grizzly bear habitat will be improved through vegetation manipulation.
- Habitat management in forested cover should provide a balance of all successional stages.
- Roads used for timber sale purposes will be single-purpose roads only and will be closed to public use not associated with timber sale operation and administration.
- Desirable clearcut features include (1) one or more leave or cover patches in cuts over 10 acres, (2) minimum soil scarification where soil disturbance impedes the reestablishment of grizzly foods, (3) slash disposal by spring broadcast burning, and (4) protection of hydric stream bottoms, wet meadows, marshes and bogs from soil disturbance and security cover removal.

- Prescribed burning in habitat types that are not managed for timber production could be used to approximate a natural fire frequency in order to promote berry-producing shrubs.

The vegetation management guidelines would continue to provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities. There may be short-term adverse impacts to individual bears from timber management activities and associated road use.

Mineral and oil and gas development

In 2006, lands outside of designated wilderness areas on the Rocky Mountain Ranger District, some areas of the Flathead National Forest, and Bureau of Land Management lands along the Rocky Mountain Front were withdrawn permanently from any future mineral, oil, natural gas, or geothermal leasing and all forms of location, entry, and patent under mining laws by the Tax Relief and Health Care Act of 2006 (Pub. L. 109-432). It was not necessary to withdraw lands inside designated wilderness areas from future leasing because new leases are already prohibited by the Wilderness Act in these areas.

Although Public Law 109-432 prohibited the establishment of new leases, it did not eliminate leases that existed in 2006, at the time the law was passed. Many leases on Federal lands that existed at the time Public Law 109-432 was passed have been voluntarily retired. As of 2012, there were 247 oil and gas leases in the recovery zone, most of which are on the Flathead National Forest. Of these, 235 were suspended pending forestwide leasing analyses. Most of the Rocky Mountain Ranger District was identified as discretionarily unavailable for leasing, excluding 19 suspended leases that existed at the time of the analysis and the 1997 record of decision for oil and gas leasing. In December 2006, as part of the Tax Relief and Health Care Act, Congress withdrew from leasing any additional National Forest System lands on the Rocky Mountain Front. The suspended leases were not part of the withdrawal as they represent a prior existing right. Of the 19 suspended oil and gas leases, 16 leases were cancelled by the Bureau of Land Management in 2016. Two leases are cancelled but remain in an authorized status pending the outcome of litigation. There are no pending oil and gas lease parcels and no other areas under lease on the Lewis and Clark National Forest.

An existing forestwide standard (G-2) for oil and gas leasing, exploration, drilling, field development, and production requires that activities be restricted, delayed, or modified to prevent adverse effects on threatened and endangered species and their habitat. Additional measures are included in forest plan appendix I, Interagency Wildlife Management Guidelines, to coordinate oil and gas exploration and development with grizzly bear habitat, including the following:

- establish flight patterns in advance when activities require the use of helicopters. Flight patterns should be located to avoid seasonally important grizzly bear habitat constituent elements and habitat components during the designated seasonal use periods;
- seismic or exploratory drilling activities should not be conducted within a minimum of one mile of den sites during the October 15 to April 15 period;
- seismic permits should include a provision providing for cancellation or temporary cessation of activities, if necessary, to prevent grizzly bear-human conflicts;
- scheduling of well drilling on adjacent sites, within important grizzly bear use areas, should be staggered to provide a disturbance-free area for displaced bears;
- pipeline construction required for the development of a gas or oil field should be condensed into the shortest time frame possible and subject to seasonal restrictions when conducted in important grizzly bear habitat; and

- field operation centers associated with seismic or oil/gas exploration activities should be placed carefully to avoid seasonally important habitat components or constituent elements. Such placement of sites is necessary in order to avoid direct potential conflicts between man and grizzly bear.

With regard to locatable minerals, Public Law 109-432 made lands outside of designated wilderness areas on the Rocky Mountain Ranger District of the Lewis and Clark National Forest, some areas of the Flathead National Forest, and Bureau of Land Management lands along the Rocky Mountain Front unavailable to future location and entry under the General Mining Act of 1872. Although this law prohibited the establishment of new claims, it did not eliminate claims that existed at the time the law was passed.

Under the no-action alternative, the likelihood of development of leasable or locatable minerals occurring within the recovery zone on the Lewis and Clark National Forest is low. Existing forest plan standards would reduce the potential for any adverse effects as a result of exploration or development that does occur.

Summary and conclusion for alternative 1

The existing Lewis and Clark forest plan, which incorporated the Interagency Grizzly Bear Guidelines, has been effective in contributing to the improved status of the NCDE grizzly bear population. Grizzly bear habitat on the Lewis and Clark National Forest is anchored by large areas of designated wilderness and inventoried roadless areas that are unlikely to be affected by human disturbance at a level that would impact bears. Implementation of the food storage order on the Rocky Mountain Division would continue to minimize the potential for grizzly bear-human conflicts and bear mortality within the recovery zone. Some minor effects to individual bears would be anticipated under this alternative, but continued implementation of the no-action alternative together with travel plan decisions applicable to the recovery zone would maintain a well-distributed population on the Forest and would contribute to supporting continued recovery of the NCDE grizzly bear population. However, because the existing forest plan does not contain the standards that are needed to manage motorized access in the grizzly bear recovery zone, it does not provide the regulatory mechanisms needed to support potential future delisting of the NCDE population. It is expected that the NCDE grizzly bear population would remain listed under this alternative.

Alternative 2 modified—Lewis and Clark National Forest

Under this alternative, specific reference to the 1986 Interagency Grizzly Bear Guidelines, including the delineation of management situations, would be removed from the forest plan. However, much of the management direction that is based on the Interagency Grizzly Bear Guidelines would be retained. Where needed, existing forest plan direction would be updated, as shown in appendix 1 to the draft record of decision.

The Lewis and Clark National Forest contains land within the primary conservation area (777,963 acres or 14 percent of the total) and zone 3 (972,612 acres or 8 percent of the total), with negligible amounts in zone 1 (6 acres) and zone 2 (2 acres) (figure 1-77). Habitat management on Federal lands in the primary conservation area would be designed to maintain or improve habitat conditions compared to baseline conditions while allowing resource management activities to continue. No additional habitat protections would be applied to zones 1, 2, or 3.

Food/attractant storage order

A food/attractant storage order is in effect within the NCDE recovery zone (USDA, 2010a). Outside the recovery zone, there is a food storage order in place only for campgrounds in the Little Belt

Mountains (zone 3). There is no requirement for a food storage order in zone 3 under any of the alternatives.

Motorized route density and secure core in the primary conservation area

Under alternative 2 modified, desired condition NCDE-DC-AR-01 would establish the intent to manage open motorized route density, total motorized route density, and secure core in a manner that contributes to sustaining the recovery of the NCDE grizzly bear population. Forest plan standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density and no net decrease from the baseline for the percent of secure core within bear management subunits in the primary conservation area.

The secure core definition used in this alternative differs from the definition in the no-action alternative in that it does not include buffering high-intensity-use nonmotorized trails. This change was made due to the lack of demonstrable effects of nonmotorized trails on grizzly bears. Furthermore, there are no clear methods or criteria to accurately measure and identify “high-intensity-use” trails, which has resulted in data inconsistencies. By not buffering high-intensity-use nonmotorized trails, the percentage of secure core does increase in six of the subunits: Deep Creek, Lick Creek, Pine Butte, Roule Biggs, South Fork Willow, and West Fork Beaver. However, the change in methods does not translate to a change in effects to grizzly bears because the recalculated values, shown in table 192, would be the baseline in this alternative and alternative 3.

Table 192. Baseline levels for motorized route density and secure core by bear management unit subunits on the Lewis and Clark National Forest under alternative 2 modified and alternative 3. Source: 2015 moving window analysis (Ake, 2015c).

BMU Subunit	≥75% NFS lands	OMRD (percent > 1 mile/square mile)	TMRD (percent > 2 mile/square mile)	Secure Core (percent of area)
Lick Rock	yes	0	0	100
Roule Biggs	yes	0	0	100
South Fork Willow	yes	14	3	81
West Fork Beaver	yes	16	5	82
Badger	no	0	0	73
Birch	no	0	0	93
Deep Creek	no	10	3	67
Falls Creek	no	0	0	85
Heart Butte	no	1	0	61
Pine Butte	no	7	2	64
Scapegoat	no	5	1	78
Teton	no	11	5	71
Two Medicine	no	2	1	78

Note. BMU = bear management unit, OMRD = open motorized route density, TMRD = total motorized route density.

NCDE-STD-AR-01 would establish direction in the forest plan regarding administrative use of restricted roads. This would not be a change from current operating procedures. Administrative use might have some impact by disturbing bears in the affected area. However, the risk of human-caused mortality would not increase because of the controls the agency has over its own employees and other authorized users.

NCDE-STD-AR-03 would allow temporary changes in the open motorized route density, total motorized route density, and secure core within a bear management subunit, up to a limit of 5 percent increase in open motorized route density, 3 percent increase in total motorized route density, and 2 percent decrease in secure core calculated by a 10-year running average. This level of temporary change is intended to allow projects to continue at about the same levels as those that occurred between 2003 and 2010, a period during which the NCDE grizzly bear population was stable to increasing (Kendall et al., 2009; R. D. Mace et al., 2012). This standard would increase the potential for disturbance of grizzly bears to occur, but it would be strongly constrained by the overlap with designated wilderness and inventoried roadless areas. The Lewis and Clark National Forest has 715,836 acres of secure core under the action alternatives, of which about 693,869 acres (97 percent) are in wilderness or roadless areas. Therefore, although this allowance for temporary increases or decreases could have an adverse effect on individual bears due to disturbance, the extent of area that could be affected is in fact very limited and would not have adverse effects on the population.

NCDE-STD-AR-04 would allow temporary use of restricted roads for motorized use by the public for purposes such as firewood gathering for less than 30 days and outside the spring and fall bear hunting seasons. However, public motorized use would not be permitted within secure core. There would be some increase in disturbance and the risk of grizzly bear mortality in the primary conservation area associated with this use, but the amount and duration would be limited.

Projects would be designed such that implementation would not exceed five years out of a 10-year period (NCDE-GDL-AR-01). Pre-project conditions would generally be restored within one year of project completion (NCDE-GDL-AR-02). Some adverse impacts to bears could occur as a result of human disturbance in the project area, but these guidelines would provide limits on the amount and duration of the disturbance so that bears would not be permanently displaced by human activities.

This alternative would establish a set of desired conditions, standards, and guidelines for motorized route management that are consistent across the NCDE primary conservation area. The plan components would limit motorized route densities and maintain sufficient secure core in the primary conservation area to support continuing recovery of the NCDE population.

Motorized routes in zone 3

There would be no standards or guidelines related to motorized routes in zone 3. The portion of the Forest that is in zone 3 is composed of isolated mountain ranges more than 60 air miles away from the primary conservation area. Grizzly bears are not currently known to occur in zone 3 on the Lewis and Clark National Forest and are not expected to inhabit zone 3 on a regular basis. Any bears that occur there would not be needed for recovery of the population. Habitat conditions and effects on grizzly bears in zone 3 would be the same as under the no-action alternative.

Motorized over-snow vehicle use during the den emergence period

Under alternative 2 modified, standard NCDE-STD-AR-08 would not allow any increase above the baseline in the acreage of areas and miles of routes open to use by motorized over-snow vehicles in the primary conservation area during the den emergence (i.e., late spring) time period. This would be no change from the current situation but would help to ensure that impacts, particularly to females with cubs during this sensitive period, would not increase in the future.

Nonmotorized trails in the primary conservation area

Under alternative 2 modified, several forest plan components would be added that incorporate strategies to reduce the risk of displacement and mortality of grizzly bears. Desired condition NCDE-DC-WL-03 is intended to help reduce the risk of bear-human conflicts by providing information,

education, and design features or criteria for management activities. Under guideline NCDE-GDL-AR-03, if the number or capacity of day use or overnight developed recreation sites within the NCDE primary conservation area is increased, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education). These measures could help to reduce the risk of grizzly bear-human encounters and conflicts related to the use of nonmotorized trails in the primary conservation area.

Developed recreation sites

Under alternative 2 modified, several plan components would be added that address developed recreation sites. Within the primary conservation area, the number, capacity, and improvements of developed recreation sites would provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on NFS lands (NCDE-DC-AR-02). Increases in the number and capacity of developed recreation sites on NFS lands that are designed and managed for overnight use during the non-denning season (e.g., campgrounds, cabin rentals, huts, guest lodges, recreation residences), would be at levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE (NCDE-DC-AR-03). In addition, guideline NCDE-GDL-AR-03 states that, if the number or capacity of day use or overnight developed recreation sites is increased within the NCDE primary conservation area, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education, by providing backcountry food-hanging poles or bear-resistant food or garbage storage devices, or by increasing law enforcement and patrols). Standard NCDE-STD-AR-05 would set a limit of one increase in the number or the overnight capacity of developed recreation sites designed and managed for overnight use per bear management unit per decade on NFS lands in the primary conservation area. Standard NCDE-STD-AR-07 would require that new or reauthorized ski area permits include mitigation measures to reduce the risk of grizzly bear-human conflicts.

The current forest plan does not contain a limit on developed recreation sites, but few increases have occurred during the life of the Lewis and Clark forest plan. Although there may be an increased risk of grizzly-bear human conflicts due to allowing an increase in developed recreation sites with overnight use in the future, the risk of mortality for grizzly bears would likely remain low. Implementation and monitoring of the food storage orders, public education, and increases in the availability of bear-resistant food storage devices would all continue to help to reduce the number of grizzly bear-human conflicts.

Livestock allotments

Existing forest plan direction to reduce livestock impacts and to minimize grizzly bear-livestock conflicts on NFS lands in the primary conservation area would be retained. Additional standards and guidelines applicable to the primary conservation area, and in some cases zone 1, would be added as shown in appendix 1 to the draft record of decision. New permits must incorporate measures to reduce the risk of grizzly bear-human conflicts (NCDE-STD-GRZ-01). Livestock carcasses must be reported within 24 hours (which is already a requirement of the food storage order). No increase in the number of cattle allotments or in the number of sheep allotments or permitted sheep animal unit months would be allowed (NCDE-STD-GRZ-04 and 05).

Currently, there are 21 cattle allotments and no sheep allotments in the primary conservation area on the Lewis and Clark National Forest. There would be no increases under this alternative. As discussed for the no-action alternative, existing livestock grazing allotments have been compatible with recovery of the NCDE grizzly bear population. The additional standards and guidelines would promote consistency across NFS lands in the NCDE and minimize the potential for conflicts on the national forest in the primary conservation area. Based on the lack of history of conflicts, the

mortality risk associated with livestock grazing on the Lewis and Clark National Forest would be low under alternative 2 modified.

Vegetation management

Under alternative 2 modified, existing forest plan standards and guidelines for vegetation management would be updated with desired conditions and guidelines applicable to the primary conservation area as shown in appendix 1 to the draft record of decision. The added direction is very similar to the Interagency Grizzly Bear Guidelines in encouraging a mosaic of successional stages (NCDE-DC-VEG-02); reducing the risk of disturbance of bears during project activities (NCDE-GDL-VEG-01); designing projects to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts (NCDE-GDL-VEG-02); and retaining cover as needed along grass/forb/shrub openings, riparian wildlife habitat, or wetlands (NCDE-GDL-VEG-03).

The vegetation management guidelines would provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities. Timber management activities and associated road use may result in some short-term adverse impacts to individual bears.

Mineral and energy development

Current forest plan standards for existing seismic exploration, for existing oil and gas leasing, exploration, drilling, field development, and production, and for locatable and common variety minerals would be retained. Additional desired conditions, standards, and guidelines applicable to the primary conservation area and zone 1 would be added as shown in appendix 1 to the draft record of decision. The additional standards and guidelines would apply to new or reauthorized permits, leases, or plans of operation and would provide guidance for mitigation of mineral development impacts (NCDE-STD-MIN-03), proper storage and handling of wildlife attractants (NCDE-STD-MIN-04), timing restrictions for ground-disturbing activities in spring habitat and seismic activity in denning habitat (NCDE-STD-MIN-05), management of motorized traffic and helicopter use (NCDE-STD-MIN-06 and NCDE-GDL-MIN-01), noise reduction (NCDE-GDL-MIN-02), and worker safety when living near and working in grizzly bear habitat (NCDE-STD-MIN-07 and NCDE-GDL-MIN-05). A no surface occupancy stipulation would be required for leasable minerals leases within the primary conservation area (NCDE-STD-MIN-08).

The likelihood of development of leasable or locatable minerals occurring within the primary conservation area on the Lewis and Clark National Forest is low. Forest plan components will help to ensure that any future mineral and energy development will be done in a manner that minimizes habitat loss, the disturbance or displacement of grizzly bears, and the risk of grizzly bear-human conflicts.

Summary and conclusion for alternative 2 modified

Under this alternative, the amended Lewis and Clark forest plan would incorporate plan components for the primary conservation area that would maintain baseline levels of open and total motorized route density and secure core and would also coordinate various resource management programs with grizzly bear habitat. Updating the management direction would provide consistency across NFS lands in the NCDE so that habitat conditions supporting recovery are maintained. The amended Lewis and Clark forest plan under alternative 2 modified would maintain a well-distributed grizzly bear population on the Forest and contribute to supporting recovery of the NCDE population.

Alternative 3—Lewis and Clark National Forest

As described previously for the Helena and Kootenai National Forests, alternative 2 modified and alternative 3 would add the same desired conditions, standards, and guidelines for the primary conservation area. This alternative also includes standard NCDE-STD-GRZ-07, which would require that sheep grazing allotments be closed, if the opportunity arises with a willing permittee, to reduce the potential risk of grizzly bear-human conflicts. The wording of guideline NCDE-GDL-GRZ-01 also differs under this alternative by including both cattle and sheep allotments as subject to phasing out or moving if there are recurring conflicts. The language of these two components is stronger and broader than alternative 2 modified. However, given the lack of history of conflicts between grizzly bears and livestock, particularly cattle, on the Lewis and Clark National Forest, the effects of alternative 3 on grizzly bears in the primary conservation area are unlikely to be measurably different than the effects of alternative 2 modified.

In addition, alternative 3 would add standard NCDE-STD-GRZ-07, which would require that sheep grazing allotments within the NCDE primary conservation area be closed if the opportunity arises with a willing permittee. Since there are no sheep grazing allotments in the primary conservation area on the Lewis and Clark National Forest, this standard would have no effect. Alternative 3 differs from alternative 2 modified by extending certain desired conditions, standards, and guidelines to zone 1 and/or the demographic connectivity areas. Since the Lewis and Clark National Forest has only 6 acres in zone 1 and no demographic connectivity areas, this also would have no effect. Therefore, the effects of alternative 3 on grizzly bears are the same as alternative 2 modified.

Indirect effects of the alternatives—Lolo National Forest

Alternative 1—No action

The Lolo National Forest has roughly 268,000 acres within the NCDE recovery zone (5 percent of the total). There are seven subunits within three bear management units (Rattlesnake, Upper South Fork of the Flathead, and Monture/Landers Fork) on the Lolo National Forest (figure 1-78).

Under the no-action alternative, the Interagency Grizzly Bear Guidelines (IGBC, 1986) would continue to be applied on the Lolo National Forest. The Interagency Grizzly Bear Guidelines address maintaining and improving habitat, minimizing grizzly bear-human conflict potential, and resolving grizzly bear-human conflicts, in coordination with various resource management programs. The Interagency Grizzly Bear Guidelines were designed to give the most stringent protection to grizzly bear habitat in management situation 1 where grizzly bear population centers occur, with more lenient guidelines that would facilitate other resource management objectives in the other management situations. On the Lolo National Forest, 222,290 acres were designated as management situation 1 and 25,430 acres were designated as management situation 2.

The Lolo forest plan does not address the management of grizzly bears outside the recovery zone. Subsequent Endangered Species Act section 7 consultations provided analysis and guidance for areas outside the recovery zone.

Motorized access density and secure core inside the recovery zone

The Lolo forest plan (USDA, 1986d) contains several standards that guide the coordination and management of forest roads. For example, standard 49 (p. II-17) limits roads to the minimum number and design standard to meet resource needs. Standard 52 (pp. II-18 and II-19) directs the management of Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities. Part (e) specifically addresses grizzly bear habitats, providing for seasonal road closures if necessary to reduce the risk of human-caused bear mortality,

closure of all non-arterial systems April 15 to June 15 within designated essential habitat spring range, and closure of roads that bisect identified critical habitat components July 15 through October 15.

The Lolo forest plan does not contain specific requirements regarding motorized access density or secure core within the NCDE recovery zone. During the early 1990s, a grizzly bear recovery strategy was developed for the Lolo National Forest that included definitions, standards, and guidelines related to road density, activity scheduling, and displacement areas that would be applied within the recovery zone. In 1996, USFWS administratively amended the 1982 biological opinion on the Lolo forest plan and also provided an incidental take statement regarding access management and grizzly bears (USFWS, 1996). Terms and conditions of the incidental take statement included, in part, requiring no more than 19 percent of a subunit exceeding 1 mile/square mile of open motorized access density, no more than 19 percent of a subunit exceeding 2 miles/square mile of total motorized access density, and minimum secure core of 68 percent or greater of a subunit, all to be achieved within five years.

Compliance with the terms and conditions of the 1996 incidental take statement led to substantial restrictions and decommissioning of roads on the Lolo National Forest, which has been beneficial for the grizzly bear population. Currently, five of the seven bear management subunits on the Lolo National Forest fully meet the criteria for motorized route density and secure core (see table 193). The Mission subunit does not, but the Forest Service manages less than 75 percent of the land in this subunit; therefore, this subunit has been managed under a no net loss strategy. The Swan subunit also does not meet all of the criteria.

Table 193. Existing levels of motorized access density and secure core by bear management subunits on the Lolo National Forest. Source: 2015 moving window analysis (Ake, 2015d).

BMU Subunit	≥ 75% NFS lands	OMAD (percent > 1 mi/mi ²)	TMAD (percent > 2 mi/mi ²)	Secure Core (percent of area)
Mission	no	25	46	38
Monture	yes	1	1	99
Mor-Dun	yes	19	14	72
North Scapegoat	yes	0	0	94
Rattlesnake	yes	3	13	60
South Scapegoat	yes	13	17	73
Swan	yes	33	17	54

Note. BMU = bear management unit, OMAD = open motorized access density, TMAD = total motorized access density.

In 2011, the Lolo National Forest reinitiated consultation on the access management strategy for the Swan bear management subunit due to noncompliance with portions of the 1996 incidental take statement. In recognition of its unique characteristics, the requirements for the Swan subunit were modified to the following: no more than 17 percent total motorized route density, no more than 31 percent open motorized access density with no more than 22 percent open motorized access density during the spring, and at least 55 percent secure core.

The high road densities and low amount of secure core in the Swan and Mission bear management subunits may be displacing grizzly bears from seasonally important feeding sites, increasing the risk of habituation of some grizzly bears to human activities and increasing the risk of human-caused mortality of bears. However, given the habitat conditions on the rest of the Lolo National Forest and

the NCDE and the improved status of the NCDE population, USFWS concluded that the adverse effects on individual grizzly bears in the Swan subunit are not likely to result in measureable effects to the grizzly bear population (USFWS, 2011c).

Under the no-action alternative, the Forest would continue to comply with the terms and conditions of the incidental take statement related to access management. Four of the seven bear management subunits would continue to provide a high percentage of secure core, indicating that habitat would be readily accessible to bears. Continued implementation of the no-action alternative would maintain these conditions.

Motorized routes outside the recovery zone

The current Lolo forest plan does not require management for grizzly bears or their habitat outside of the recovery zone. The forest plan restricts open road densities to 1.1 miles/square mile in highly productive big game summer range and, as described above, requires that management of roads be coordinated with other resource objectives, including grizzly bear habitat.

In 2004, the Lolo National Forest analyzed the effects of its forest plan direction on grizzly bears occurring both inside and outside the recovery zone; USFWS issued a biological opinion and incidental take statement on August 30, 2004, focusing on access management, livestock grazing, and food and attractant storage (USFWS, 2004). The biological opinion required the Lolo National Forest to contact USFWS if a net increase in permanent system roads exceeds 2 linear miles in the distribution area outside the recovery zone during the subsequent four-year period. Since 2004, no new permanent roads have been constructed in the grizzly bear distribution area outside of the NCDE recovery zone, and 5.14 miles have been decommissioned in the distribution area. The 2004 biological opinion and incidental take statement was extended in 2012 (USFWS, 2012). The term and condition was administratively amended as follows: The Forest will contact the USFWS if more than 2 miles of new permanent road over the 2004 baseline, or 7.14 miles total, will be constructed over the next 10 years in the distribution area outside of the NCDE recovery zone.

Within the Ninemile demographic connectivity area, about 754 miles of Forest Service roads and 36 miles of Forest Service trails are currently open to public motorized use on about 399 square miles of NFS land, for an existing motorized route density of 2.0 miles/square mile (Ake, 2017). In relation to the Alberta thresholds identified by Boulanger and Stenhouse (2014), this existing motorized route density is expected to be compatible with occupancy by female grizzly bears. However the survival rates of females with cubs of the year or yearlings may be negatively affected because the motorized route density exceeds the 1.6 miles/square mile threshold for reduced mortality.

Currently, in zone 1 outside the Ninemile demographic connectivity area, about 315 miles of Forest Service roads are open to public motorized use on about 244 square miles of NFS land, for an existing open road density of about 1.3 miles/square mile. There are only about 2 miles of motorized trail in this area. This existing linear density of motorized routes is below the threshold values identified in Alberta by Boulanger and Stenhouse (2014) for bear occupancy, occupancy by females, and bear mortality.

Motorized over-snow vehicle use during the den emergence period

On the Lolo National Forest, Seeley Lake within the NCDE is a major snowmobile destination area. Groomed snowmobile routes and snowmobile play areas are concentrated outside the recovery zone except for the large block of former Plum Creek Timber land in the Mission bear management subunit and on NFS lands in the lower elevation areas in the Swan bear management subunit and in the Dun Creek drainage in the Mor-Dun bear management subunit. The Monture, North Scapegoat,

South Scapegoat, and Rattlesnake bear management subunits are dominated by wilderness and roadless areas where snowmobile use is restricted by area closures or topography. Spring road closures are in place around Morrell Falls, Richmond Peak, and Clearwater Lake to specifically protect grizzly bears from snowmobile and other motorized disturbance during the non-denning period from April 1-June 30. Two groomed snowmobile routes total 94 miles on the edge of secure core habitat. All 315 square miles of secure core habitat are closed yearlong to snowmobile use. There are 78 square miles outside secure core habitat within the recovery zone that are open to snowmobile use. Since the forest plan does not restrict motorized over-snow vehicle use during the den emergence period, there could be effects to individual female grizzly bears. However, because secure core is protected and only a small proportion of the recovery zone may be affected by snowmobile use during the den emergence period, the impact would be expected to be small.

Nonmotorized trails

The Interagency Grizzly Bear Guidelines are used as a guide to determining the appropriate response to any grizzly bear-human conflicts that may occur in the NCDE, whether associated with nonmotorized trail use or off-trail backcountry use or located in developed recreation sites or on private or other agency lands. Conflicts and fatalities have occurred on nonmotorized trails in the NCDE, but these are rare events. No population-level effects on grizzly bears have been demonstrated due to nonmotorized trail use.

Developed recreation sites

Under the current forest plan, a forestwide standard states that the Forest Service will not significantly expand the capacity of developed recreation sites on the Lolo National Forest during the next 10-year period. (This standard does not include trailheads in the definition of developed recreation sites.) Emphasis will be placed on increasing the use of existing sites by making them usable by a wide segment of society, including the elderly and handicapped. Those existing sites receiving low levels of public use or that are not cost effective to operate will be considered for temporary or permanent closure. This emphasis would continue under the no-action alternative. Due to increasing use in some areas, the forest has responded by hardening dispersed sites and installing facilities to provide for sanitation and public safety.

There are a relatively small number of developed recreation sites in the NCDE recovery area on the Lolo National Forest (table 210). The Monture Landers Fork bear management unit and the Upper South Fork bear management unit are largely designated as wilderness. The Upper South Fork and Rattlesnake bear management units have few developed recreation sites other than trailheads.

From 2000 through 2010, four known grizzly bear mortalities occurred inside the Lolo National Forest boundary and 14 mortalities occurred off of the Forest but in the occupied distribution area south of the Forest boundary (R. D. Mace & Roberts, 2011). Causes of death included collisions with cars, mistaken identify, illegal shooting, and defense of life. None of the mortalities on the Lolo National Forest were known or suspected to be associated with food conditioning or unsecured attractants at developed recreation sites.

Although there is a potential for the developed recreation sites to affect bears through habituation or food conditioning, there is no history of recurring conflicts at developed recreation sites on the Lolo National Forest.

Livestock allotments

There is only one cattle grazing allotment within the recovery zone, located on the Seeley Lake Ranger District, and there are no sheep grazing allotments. Within the recovery zone, the forest plan

directs that grazing be managed to reduce the number of grizzly bear-human conflicts and reduce or eliminate the need for removal of grizzly bears from the population.

In the grizzly bear distribution area outside of the recovery zone, there are three cattle allotments. One is located on the Ninemile Ranger District, but it has not been grazed since 1994. The second cattle allotment is the 4 Mile allotment, which is an active allotment on the Superior Ranger District. It is located near St. Regis and is within the Salish demographic connectivity area. The third is the O’Keefe allotment, which is located within zone 1 on the Missoula Ranger District. No known incidents of grizzly bear mortality or grizzly bear-human conflict have occurred on the Lolo National Forest from livestock grazing-related management control actions since the grizzly bear was listed in 1975 (USFWS, 2012).

Continued livestock grazing under the no-action alternative is not expected to negatively affect or increase the risk of human-caused mortality of grizzly bears.

Vegetation management

The Forest would continue to follow the Interagency Grizzly Bear Guidelines for vegetation management in management situations 1 and 2 grizzly bear habitat. These guidelines state that measures that maintain and/or improve grizzly bear habitat and populations will be specified in project design. A summary of the Interagency Grizzly Bear Guidelines for timber and fire management is as follows:

- All proposed logging and burning activities will be evaluated for their effects on grizzly bears and their habitat.
 - Logging and burning activities will occur at a time or season when the area is of little or no biological importance to the bear.
 - Grizzly bear habitat will be improved through vegetation manipulation.
- Habitat management in forested cover should provide a balance of all successional stages.
- Roads used for timber sale purposes will be single-purpose roads only and will be closed to public use not associated with timber sale operation and administration.
- Desirable clearcut features include (1) one or more leave or cover patches in cuts over 10 acres, (2) minimum soil scarification where soil disturbance impedes the reestablishment of grizzly foods, (3) slash disposal by spring broadcast burning, and (4) protection of hydric stream bottoms, wet meadows, marshes, and bogs from soil disturbance and security cover removal.
- Prescribed burning in habitat types that are not managed for timber production could be used to approximate a natural fire frequency in order to promote berry-producing shrubs.

The vegetation management guidelines would provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through timing of timber sale activities. Although there may be short-term impacts to individual bears from timber management activities and associated road use, these impacts have been and would continue to be managed acceptably using the Interagency Grizzly Bear Guidelines.

Mineral and energy development

Lolo forest plan standard 41 requires: “Before oil and gas lease stipulation recommendations are made, site specific analysis of environmental effects will be made. Stipulations which are displayed in appendix F and based upon the Environmental Analysis for Oil and Gas of Non-wilderness Lands on the Lolo National Forest, 9/20/82, will be recommended in accordance with management area

direction in Chapter III. In some instances, the stipulations will include a provision for ‘no surface occupancy.’ The lessee or designated operator has the right to explore for and extract oil/gas from his/her lease in accordance with the stipulations attached to the lease.”

The magnitude of effects from leasable or locatable minerals exploration and development thus would be limited by provisions of the forest plan. Any such proposals would be subject to additional site-specific analysis. Project development and mitigation plans would be designed to avoid, minimize, or compensate for any adverse effects associated with the mining proposal.

Demographic connectivity

The existing forest plan does not have specific provisions that encourage demographic connectivity to the Cabinet-Yaak and Bitterroot Ecosystems. However, forest plan standard 27 directs that management practices be compatible with habitat needs of threatened and endangered species, consistent with the goal of recovery.

Summary and conclusion for alternative 1

The existing Lolo forest plan, which incorporates the Interagency Grizzly Bear Guidelines, together with biological opinions that provide mandatory terms and conditions to avoid or minimize incidental take, have been effective in contributing to the improved status of the NCDE grizzly bear population. Implementation of the forestwide food storage order would continue to assist with minimizing grizzly bear-human conflicts. Some local or minor effects to individual bears would be anticipated as a result of management activities under this alternative, but continued implementation of the no-action alternative would be expected to be compatible with contributing to recovery of the NCDE grizzly bear population. The forest plan does not provide specific management direction for areas outside the recovery zone that are now occupied by bears, nor does it provide direction to encourage demographic connectivity to the Cabinet-Yaak and Bitterroot Ecosystems. Because the existing forest plan does not contain the standards that are needed to manage motorized access in the grizzly bear recovery zone, it does not provide the regulatory mechanisms and assurances needed to support delisting of the NCDE population. It is expected that under this alternative, the grizzly bear would remain listed in the NCDE and would continue to be managed in accordance with requirements of USFWS’s biological opinions and incidental take statements.

Alternative 2 modified—Lolo National Forest

Under this alternative, specific reference to the 1986 Interagency Grizzly Bear Guidelines, including the delineation of management situations, would be removed from the forest plan. However, much of the existing management direction that is based on the Interagency Grizzly Bear Guidelines would be retained. Where needed, existing forest plan direction would be updated as shown in appendix 1 to the draft record of decision.

Habitat management on Federal lands in the primary conservation area would be designed to maintain or improve habitat conditions compared to baseline conditions while allowing resource management activities to continue. There would be fewer requirements for zones 1 and 2 than for the primary conservation area. The Lolo National Forest contains land within the primary conservation area (about 5 percent of the total), zone 1 including the Ninemile demographic connectivity area (about 8 percent of the total), and zone 2 (figure 1-78). The acreage in zone 2 is negligible (38 acres) and occurs at the Bonita Work Center, an administrative facility that is no longer in use.

Motorized route density and secure core in the primary conservation area.

Under alternative 2 modified, desired condition NCDE-DC-AR-01 states that open motorized route density, total motorized route density, and secure core levels would be provided at levels that

contribute to recovery of the grizzly bear population in the NCDE. Standard NCDE-STD-AR-02 would require no net increase from the baseline in total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline in the amount of secure core in bear management subunits within the primary conservation area.

Temporary changes during project activities would be allowed under NCDE-STD-AR-03, with a limit of 5 percent, 3 percent, and 2 percent, respectively, calculated over a 10-year running average. Guideline NCDE-GDL-AR-02 generally would require restoring secure core, open motorized route density, and total motorized route density to pre-project levels within one year of completion of the project. These forest plan components would generally maintain existing conditions.

The relatively high road densities and low amount of secure core in the Swan and Mission bear management subunits may be displacing grizzly bears from seasonally important feeding sites, increasing the risk of habituation of some grizzly bears to human activities and increasing the risk of human-caused mortality of bears. However, given the more favorable habitat conditions on the rest of the Lolo National Forest and across the NCDE and the improved status of the NCDE population, USFWS concluded that the adverse effects on individual grizzly bears in the Swan subunit are not likely to result in measureable effects to the grizzly bear population (USFWS, 2011c).

The allowance for temporary increases in open and total motorized route densities and temporary decreases in secure core under standard NCDE-STD-AR-03 could result in a higher potential for disturbance of grizzly bears. However, the amount of secure core that could be affected is strongly constrained by the overlap with designated wilderness, inventoried roadless areas, and other forest plan management area designations that restrict road development. The Lolo National Forest has about 221,000 acres of secure core, of which about 211,000 acres are in wilderness and inventoried roadless areas. Only about 4 percent of the secure core occurs in areas where road access would be possible. Therefore, although this standard could allow adverse impacts on an individual bear, this is unlikely due to the limited extent of the area where this could occur.

Other standards would establish consistent definitions and procedures for managing administrative use (NCDE-STD-AR-01) and short-term public use (NCDE-STD-AR-04) in the primary conservation area. This would not constitute a change in how the forest plan is currently being implemented; however, a consistent set of standards and guidelines would be formalized in the forest plan rather than being requirements of a biological opinion and incidental take statement. Thus, the direction would remain in place and provide the needed regulatory mechanisms at such time in the future that the grizzly bear is delisted from the Endangered Species Act.

In contrast to the no-action alternative, the secure core definition used in the action alternatives does not include high-intensity-use nonmotorized trails. This change was made due to the lack of demonstrable effects of nonmotorized trails on grizzly bears. Furthermore, there are no clear methods or criteria to accurately measure and identify “high-intensity-use” trails, which has resulted in data inconsistencies. By not including high-intensity-use nonmotorized trails, the percentage of secure core changed slightly in four bear management subunits and noticeably in the Rattlesnake bear management subunit. However, the change in methods does not translate to a change in effects to grizzly bears because the recalculated values, shown in table 194, would be the baseline in this alternative and in alternative 3.

Table 194. Baseline levels of motorized route density and secure core by bear management subunits on the Lolo National Forest. Source: 2015 moving window analysis (Ake, 2015d).

BMU Subunit	≥ 75% NFS lands	OMRD (percent > 1 mile/square mile)	TMRD (percent > 2 mile/square mile)	Secure Core (percent of area)
Mission	no	25	45	39
Monture	yes	1	1	99
Mor-Dun	yes	19	14	76
North Scapegoat	yes	0	0	100
Rattlesnake	yes	3	11	79
South Scapegoat	yes	13	17	74
Swan	yes	33	17	54

Note. BMU = bear management unit, OMRD = open motorized access density, TMRD = total motorized access density.

Motorized routes in zone 1 and the Ninemile demographic connectivity area

Under the proposed amendment, two desired conditions would be added to the forest plan. NCDE-LNF Zone 1-DC-01 states that roads located within the Lolo National Forest portion of NCDE zone 1 (including the Ninemile demographic connectivity area) will provide for public and administrative access to NFS lands while contributing to sustaining the grizzly bear population in the NCDE and acknowledges that the Ninemile demographic connectivity area will provide habitat that can be used by female grizzly bears and allow for bear movement between grizzly bear ecosystems. NCDE-LNF Zone 1-DC-02 encourages consolidation of NFS lands and conservation easements with willing landowners in the areas between the primary conservation area and the Ninemile demographic connectivity area to provide habitat connectivity and facilitate movement of wildlife.

NCDE-LNF Zone 1-STD-01 addresses the density of roads/motorized routes open to public motorized use. Within the Lolo National Forest portion of NCDE zone 1 (outside the Ninemile demographic connectivity area), there should be no net increase above the baseline in the density of roads open to public motorized use during the non-denning season on NFS lands. Within the Ninemile demographic connectivity area, there should be no net increase above the baseline in the density of roads and trails open to public motorized use during the non-denning season on NFS lands.

This standard would limit the disturbance, displacement, and mortality risk associated with open roads in zone 1 and with motorized routes (roads and trails) in the Ninemile demographic connectivity area. The baseline road density of 1.3 miles/square mile in zone 1 and the motorized route density of 2.0 miles/square mile in the Ninemile demographic connectivity area indicate that conditions in these areas would be likely to support occupancy by bears, including female bears, but at densities lower than in the primary conservation area. This also suggests that the Ninemile demographic connectivity area would be effective in facilitating grizzly bear movement to other recovery zones.

Motorized over-snow vehicle use during the den emergence period

The existing Lolo forest plan does not restrict motorized over-snow vehicle use during the den emergence period. Under the proposed amendment, NCDE-STD-AR-08 would be added to limit the impact of this activity during this period when female bears with cubs are vulnerable to disturbance. The standard would allow no net increase in the percentage of area or miles of routes that are open to public motorized over-snow vehicle use within modeled grizzly bear denning habitat in the primary

conservation area on NFS lands during the den emergence time period. This standard would prevent future increases in impacts to female bears during this period.

Nonmotorized trails in the primary conservation area

Under alternative 2 modified, several forest plan components would be added that incorporate strategies to reduce the risk of displacement and mortality of grizzly bears. Desired condition NCDE-DC-WL-03 is intended to help reduce the risk of bear-human conflicts by providing information, education, and design features or criteria for management activities. Under guideline NCDE-GDL-AR-03, if the number or capacity of day use or overnight developed recreation sites within the NCDE primary conservation area is increased, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education). These measures could help to reduce the risk of grizzly bear-human encounters and conflicts related to the use of nonmotorized trails in the primary conservation area.

Developed recreation sites

Under alternative 2 modified, several plan components would be added that address developed recreation sites. Within the primary conservation area, the number, capacity, and improvements of developed recreation sites would provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on NFS lands (NCDE-DC-AR-02). Increases in the number and capacity of developed recreation sites on NFS lands that are designed and managed for overnight use during the non-denning season (e.g., campgrounds, cabin rentals, huts, guest lodges, recreation residences) will be at levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE (NCDE-DC-AR-03). Guideline NCDE-GDL-AR-03 states that if the number or capacity of day use or overnight developed recreation sites is increased within the NCDE primary conservation area, the project should include measures to reduce the risk of grizzly-bear human conflicts in that bear management unit (e.g., through additional public information and education, by providing backcountry food-hanging poles or bear-resistant food or garbage storage devices, or by increasing law enforcement and patrols). Standard NCDE-STD-AR-05 would set a limit of one increase in the number or the overnight capacity of developed recreation sites designed and managed for overnight use per bear management unit per decade on NFS lands in the primary conservation area. In addition, standard NCDE-STD-AR-07 would require that new or reauthorized ski area permits include mitigation measures to reduce the risk of grizzly bear-human conflicts. This set of plan components is consistent with what has occurred through section 7 consultation during the time period when the grizzly bear population has been stable to increasing.

The limit on increases in the number or capacity of developed recreation sites with overnight use under alternative 2 modified is more restrictive than the no-action alternative. However, given the forest plan's low emphasis on development of new recreation sites, there would likely be little difference in effects on grizzly bears between alternatives 1 and 2 modified. Although there is a potential for some future increase in developed recreation sites with overnight use to affect bears through habituation or food conditioning, the risk of mortality for grizzly bears would be limited. Implementation and monitoring of the food storage orders, public education, and increases in the availability of bear-resistant food storage devices would continue to help reduce the potential for grizzly bear-human conflicts.

Livestock allotments

Existing forest plan direction to reduce livestock impacts and to minimize grizzly bear-livestock conflicts on NFS lands in the primary conservation area would be retained. Additional standards and guidelines applicable to the primary conservation area would be added. New permits would need to incorporate measures to reduce the risk of grizzly bear-human conflicts (NCDE-STD-GRZ-01).

Livestock carcasses would need to be reported within 24 hours (NCDE-STD-GRZ-03). No increase in the number of cattle allotments or in the number of sheep allotments or permitted sheep animal unit months would be allowed (NCDE-STD-GRZ-04 and 05).

As discussed for the no-action alternative, the existing cattle grazing allotment in the primary conservation area and the additional three allotments in the area currently occupied by grizzly bears outside the primary conservation area have been compatible with recovery of the NCDE grizzly bear population. The mortality risk associated with livestock grazing on the Lolo National Forest has been low. The additional standards and guidelines would maintain a low potential for conflicts on NFS lands in the primary conservation area.

Vegetation management

Under alternative 2 modified, existing forest plan standards and guidelines for vegetation management would be updated with desired conditions and guidelines applicable to the primary conservation area as shown in appendix 1 to the draft record of decision. The added direction is very similar to the Interagency Grizzly Bear Guidelines in encouraging a mosaic of successional stages (NCDE-DC-VEG-02); reducing the risk of disturbance of bears during project activities (NCDE-GDL-VEG-01); designing projects to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts (NCDE-GDL-VEG-02); and retaining cover as needed along grass/forb/shrub openings, riparian wildlife habitat, or wetlands (NCDE-GDL-VEG-03).

Timber management activities and associated road use may result in some short-term adverse impacts to individual bears. However, the vegetation management guidelines would provide for diverse cover and forage conditions and would reduce the potential for grizzly bear displacement through the timing of timber sale activities.

Mineral and energy development

Existing forest plan standards pertaining to mineral and energy development would be retained. Additional desired conditions, standards, and guidelines applicable to the primary conservation area would be added as shown in appendix 1 to the draft record of decision. The additional standards and guidelines would apply to new or reauthorized permits, leases, or plans of operation and would provide guidance for mitigation of mineral development impacts (NCDE-STD-MIN-03), proper storage and handling of wildlife attractants (NCDE-STD-MIN-04), timing restrictions for ground-disturbing activities in spring habitat and seismic activity in denning habitat (NCDE-STD-MIN-05), management of motorized traffic and helicopter use (NCDE-STD-MIN-06 and NCDE-GDL-MIN-01), noise reduction (NCDE-GDL-MIN-02), and worker safety when living near and working in grizzly bear habitat (NCDE-STD-MIN-07 and NCDE-GDL-MIN-05). A no surface occupancy stipulation would be required for leasable minerals leases within the primary conservation area (NCDE-STD-MIN-08).

The likelihood of development of leasable or locatable minerals occurring within the primary conservation area and zone 1 on the Lolo National Forest is low. The additional forest plan components under alternative 2 modified would help to ensure that any future mineral and energy development would be done in a manner that minimizes habitat loss, the disturbance or displacement of grizzly bears, and the risk of grizzly bear-human conflicts.

Demographic connectivity

Alternative 2 modified would establish additional management direction requiring no net increase in roads open to public motorized use during the non-denning season in zone 1 and no net increase in

motorized routes (roads and trails) in the Ninemile demographic connectivity area. Implementation of this direction would provide the conditions needed to support occupancy by grizzly bears, including female bears, and to facilitate demographic connectivity with other recovery zones.

Summary and conclusion for alternative 2 modified

Under this alternative, the amended Lolo forest plan would incorporate standards to maintain baseline levels of open and total motorized route density and secure core in the primary conservation area and would update management direction for coordination of various resource management programs with grizzly bear habitat in the primary conservation area. Plan components would also be added to guide management in the Ninemile demographic connectivity area and zone 1. The mortality risk associated with livestock grazing on the Lolo National Forest appears to be low, and the additional standards and guidelines under this alternative would further reduce the potential for conflicts on NFS lands. This alternative would add standards and guidelines for minerals and energy development, including standard NCDE-STD-MIN-08 that would require no surface occupancy stipulations for new or reauthorized leases in the primary conservation area. The existing forest plan has been effective in contributing to the recovery of the grizzly bear population in the NCDE. The added plan components would provide consistency across NFS lands in the NCDE and provide the regulatory mechanisms needed with regard to motorized route density. The forest plan direction for the Ninemile demographic connectivity area would be expected to support occupancy by grizzly bears, including female bears. Some effects to individual bears would be anticipated as a result of forest management actions under this alternative, but implementation of this alternative would maintain a well-distributed grizzly bear population on the Forest and contribute to continued recovery of the NCDE population.

Alternative 3—Lolo National Forest

Under this alternative, the same changes to forest plan desired conditions, standards, guidelines, and monitoring items would be made as under alternative 2 modified. In addition, this alternative extends certain desired conditions, standards, and guidelines beyond the primary conservation area to zone 1 and/or the demographic connectivity areas.

Primary conservation area

As described previously, alternative 3 would add the same desired conditions, standards, and guidelines for the primary conservation area as alternative 2 modified. Standard NCDE-STD-GRZ-07 would be added, which would require that sheep grazing allotments be closed, if the opportunity arises with a willing permittee, to reduce the potential risk of grizzly bear-human conflicts. Since there are no sheep grazing allotments in the primary conservation area on the Lolo National Forest, this would have no effect. The wording of guideline NCDE-GDL-GRZ-01 also differs under this alternative by including both cattle and sheep allotments as being subject to phasing out or moving if there are recurring conflicts. This language is broader than alternative 2 modified. However, given the limited amount of grazing in the primary conservation area or the grizzly bear distribution area and the lack of history of conflicts between grizzly bears and livestock on the Lolo National Forest, the effects of alternative 3 on grizzly bears in the primary conservation area are unlikely to be measurably different than the effects of alternative 2 modified.

Zone 1 and the Ninemile demographic connectivity area

Under alternative 3, all of the vegetation management guidelines that apply to the primary conservation area alternative 2 modified would also be applicable to the Ninemile demographic connectivity area. The effect of this would likely be to reduce the potential for adverse grizzly bear disturbance/displacement and to design vegetation management activities to protect, maintain, increase, and/or improve grizzly habitat quantity or quality within the demographic connectivity area

where it would not increase the risk of grizzly bear-human conflicts. This would be beneficial in encouraging occupancy by female grizzly bears.

Under alternative 3, desired condition NCDE-DC-GRZ-01 would be extended to zone 1. Grazing standards NCDE-STD-GRZ-02 and 05 would also be extended to zone 1. Standard NCDE-STD-MIN-08 requiring that a no surface occupancy stipulation be applied to new or reauthorized leasable minerals leases would also be extended to zone 1 under alternative 3. These additional plan components would be expected to reduce the risk of grizzly bear mortality in zone 1, potentially benefitting the NCDE population in the primary conservation area as well as improving the opportunity for demographic connectivity to other recovery zones.

Summary and conclusion for alternative 3

Extending the guidelines for vegetation management to the Ninemile demographic connectivity area and extending the livestock grazing plan components and standard NCDE-STD-MIN-08 to zone 1 would go further than the other alternatives in providing habitat conditions that would support occupancy by grizzly bears, particularly female bears, and reduce mortality risk. This would maintain a well-distributed population on the Forest and facilitate occupancy of the Ninemile demographic connectivity area and movement of grizzly bears to other recovery zones. Thus, alternative 3 would be the most beneficial to grizzly bears and their habitat.

Indirect effects of the alternatives—Flathead National Forest

Concurrently with the amendments to the Helena, Kootenai, Lewis and Clark, and Lolo forest plans, the Flathead National Forest proposes to include in its revised forest plan the same set of desired conditions, standards, guidelines, and monitoring items pertaining to the grizzly bear. The alternatives being considered and the indirect effects of the alternatives on the grizzly bear for the Flathead National Forest can be found in section 3.7.5 of this final EIS.

As part of the revision process, the Flathead National Forest is considering a broader scope of issues and alternatives. In addition to the forestwide components (desired conditions, standards, and guidelines) that are being evaluated for the NCDE amendment forests, the Flathead National Forest is also contemplating changes in management areas. Four alternatives were considered in detail in volume 1 for the Flathead forest plan revision, compared to the three alternatives considered in detail in volume 3 for the amendments. For the Flathead National Forest, alternative A depicts the no-action alternative, whereas for the amendment forests, alternative 1 is the no-action alternative. Flathead National Forest alternatives B modified and D contain the same direction specific to grizzly bears in the NCDE as alternative 2 modified does for the amendment forests. Flathead National Forest alternative C (wilderness emphasis) provides the same direction specific to grizzly bears in the NCDE as alternative 3 does for the amendment forests.

Cumulative effects on the grizzly bear

Cumulative effects result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7). The analysis of cumulative effects provides a larger context in which to evaluate the effects of the five forest plans by considering conditions across all land ownerships within the NCDE.

Both the grizzly bear Recovery Plan and the draft Conservation Strategy emphasized the need to coordinate management across multiple land ownerships and jurisdictions to sustain the NCDE grizzly bear population through time. In this section, cumulative impacts are considered for (1) management by other Federal agencies, State agencies, tribes, and private landowners on NCDE-

wide habitat quality, (2) grizzly bear-human conflicts on lands not managed by the Forest Service, (3) effects of land management on connectivity between the NCDE and adjacent grizzly bear ecosystems, and (4) future climate change.

NCDE-wide habitat quality

Other Federal lands—Glacier National Park lands represent about 17 percent of the primary conservation area. The Bureau of Land Management, USFWS, and Bureau of Reclamation collectively manage a very small fraction (0.4 percent) of the primary conservation area. Under the Endangered Species Act, all Federal agencies are directed to use their authorities to seek to conserve endangered species and threatened species and must consult with the USFWS if their actions may affect a listed species or its critical habitat. Federal land management is guided by agency land-use plans, the Interagency Grizzly Bear Guidelines, and the requirements of biological opinions. Management of grizzly bear habitat on Federal lands has been an important factor leading to the recovery of the NCDE grizzly bear population.

The expectation in developing the NCDE Conservation Strategy is that the signatories will incorporate the relevant set of habitat standards and guidelines into their respective management plans. All Federal agencies would manage motorized access within the primary conservation area so that (1) there is no net decrease in secure core from the baseline and no net increase in open and total motorized route densities; (2) the number and capacity of developed recreation sites are limited; (3) there is no net increase in the number of livestock allotments and no net increase in the number of sheep from the baseline; (4) vegetation management will be conducted in a way that is compatible with grizzly bear habitat needs; and (5) mineral and energy development will be designed to avoid, minimize, or mitigate adverse impact to grizzly bears.

Actions undertaken by the Federal agencies could have short-term negative effects, such as disturbance/displacement of individual grizzly bears. However, no adverse cumulative effects are anticipated to accrue to the NCDE population as a result of actions by other Federal agencies.

State lands—Montana Department of Natural Resources and Conservation lands comprise about 3.6 percent of the primary conservation area and 6.2 percent of zone 1. In 2011, the Montana Department of Natural Resources and Conservation in conjunction with USFWS completed a habitat conservation plan, which has a 50-year term. This is a comprehensive program to conserve federally listed species and minimize incidental take during ongoing forest management activities in western Montana. Within the area delineated as the primary conservation area, zone 1, and zone 2, the Montana Department of Natural Resources and Conservation manages about 720,000 acres of State trust lands. Of this, approximately 204,000 acres are located within the primary conservation area.

Since 1995, the Swan River State Forest has been a party to the Swan Valley Grizzly Bear Conservation Agreement along with Plum Creek Timber Company, the Flathead National Forest, and USFWS. This agreement has coordinated timber harvest activities and associated road management across the multiple land ownerships in the Swan Valley in a manner that has contributed to the recovery of the grizzly bear population. Under this agreement, three years of rest (during which low-intensity administrative activities may occur but public access is restricted) must be provided after three years of management activities, areas with open road density > 1 mile/square mile must not exceed 33 percent of each bear management subunit, road closure devices are maintained, and seasonal road closures are implemented (Plum Creek et al., 1997).

Recently, a land transfer known as the Montana Legacy Project has been completed in the Swan Valley. The Nature Conservancy and the Trust for Public Land agreed to purchase lands from Plum Creek Timber Company and then sell or donate these lands to Federal, State, and private owners. The

vast majority of these lands are now owned by Federal (USFS) or State (Montana Department of Natural Resources and Conservation), and any lands that were sold to private owners have safeguards (e.g., conservation agreements) attached to them so that the integrity of wildlife habitat is maintained. The “fiber agreement” that was part of the Montana Legacy Project and necessitated coordination of timber harvest on Legacy lands has now ended. In the foreseeable future, Montana Department of Natural Resources and Conservation may be managing their lands in the Swan Valley using their habitat conservation plan (MTDNRC, 2011) rather than the conservation agreement.

On all lands under the habitat conservation plan, the Montana Department of Natural Resources and Conservation is committed to minimizing construction of new open roads in riparian area wetlands and avalanche chutes. Motorized activities are suspended within 0.6 mile of a known active grizzly bear den. Visual cover is retained in riparian and wetland areas. Information is provided to all contractors, and training is provided to employees about living and working in bear habitat.

Within the primary conservation area and zone 1 (zone 1 is called “non-recovery occupied habitat” in the habitat conservation plan), Montana Department of Natural Resources and Conservation agreed to minimize the construction of new open roads; prohibit commercial forest management activities, pre-commercial thinning, and heavy equipment slash treatments during April 1-June 15 in spring bear habitat; minimize helicopter operations requiring flights lower than 500 meters in seasonally important grizzly bear habitat; limit the number of active gravel pits; and discourage new domestic sheep grazing allotments. Spring habitat restrictions are implemented on about 48,600 acres in the Stillwater and Coal Creek State Forests and 31,700 acres in the Swan River State Forest. Currently, the Montana Department of Natural Resources and Conservation has very few grazing licenses on very limited ownership in the NCDE. Fewer than 9,000 acres within the primary conservation area and about 30,700 acres in the non-recovery occupied habitat are grazed by livestock. Information and education programs and other measures are being taken to avoid and minimize the risk of bear-human conflicts. Prompt removal of livestock carcasses also minimizes the risk of bear-livestock conflicts.

Additional protective measures apply to the primary conservation area, including capping the miles of open and restricted roads in the Stillwater Block and Swan River State Forest. The Stillwater Block will maintain 22,007 acres of security zones where management and administrative uses are prohibited during the non-denning season. The Swan habitat conservation plan strategy requires that four years of activity must be followed by eight-year rest periods across five management subzones. The impacts to important grizzly bear habitats are minimized, all primary road closure devices are examined and repaired annually, and no new grazing licenses for sheep and other small livestock will be authorized. The transportation plan for the Stillwater and Coal Creek State Forests capped road construction to 19.3 more miles of permanent road and reduced the miles of road open year-round by 15 percent.

The transportation plan for the Swan River State Forest under the habitat conservation plan capped new permanent roads at 70 miles (none open to the public), allowed a minimal net increase in linear open road miles, and called for an additional 41 miles of road to restrict commercial forest activities during the spring season. The Montana Department of Natural Resources has no commitments to manage secure core habitat for grizzly bears on the Swan River State Forest.

Although there could be some short-term adverse effects on a few individual bears, implementation of the habitat conservation plan is not likely to cause cumulative adverse effects on the NCDE grizzly bear population.

Montana Department of Fish, Wildlife and Parks—A very small proportion of the land within the primary conservation area (0.6 percent) and zone 1 (1.2 percent) are managed by MFWP. Montana's wildlife management areas are managed with wildlife and wildlife habitat conservation as the primary concern, along with providing for enjoyment by the public. Some wildlife management areas are open for hunting or camping and others are not. Several are closed to the public during the winter and spring periods. MFWP is very active in providing public information and education about conserving grizzly bears and their habitat.

Given the agency's mission to conserve wildlife and its small holdings within the primary conservation area and zone 1, no adverse cumulative effects on the NCDE grizzly bear population are anticipated due to management actions of MFWP.

Tribal lands—The Blackfeet Indian Reservation represents about 4.5 percent of the primary conservation area and about 5.6 percent of zone 1. Within the Blackfeet Indian Reservation, there are about 175,000 forested acres. These are managed under the Blackfeet Nation Forest Management Plan (Blackfeet Tribe, n.d.), which is expected to be in effect until 2030. Nearly all of the acres under the forest management plan occur within the primary conservation area or zone 1. Under the forest management plan, no net increase in overall road density levels is allowed.

Lands managed by the Confederated Salish and Kootenai Tribes comprise about 2.5 percent of the primary conservation area and nearly 11 percent of zone 1. Of the acreage that is within the primary conservation area, 91 percent of reservation lands are in the Mission Mountains Tribal Wilderness Area or the South Fork Jocko Primitive Area. No commercial forest activities occur in these areas. There will be no permanent increase in open or total road densities and no permanent decreases in secure core within the wilderness area. In the South Fork Jocko Primitive Area, there will be no net increase in open roads. The forest management plan (2000) provides the following guidance for motorized access management on the remaining lands: open road densities shall not exceed 4 miles/square mile, total road miles shall remain at or below what existed in 1999, total road densities will be reduced over the life of the plan by removing 15 percent of road spurs, and roads in timber sale areas shall be closed after timber harvest is completed. Vegetation management direction in the primary conservation area restricts the locations and methods of harvest in some areas; hiding cover is retained along major highways near identified crossing areas; and during the duration of a timber sale and for two years afterward, adjacent drainages must remain undisturbed. On the Flathead Indian Reservation, there is no livestock grazing within the primary conservation area. Under the conservation agreement, the standards for management of livestock grazing would be the same as for the Federal agencies.

Existing management direction on tribal lands has been in place during the period when the NCDE grizzly bear population was stable to increasing. There may be some adverse effects on individual grizzly bears, such as effects due to high road densities outside of tribal wilderness areas. However, the overall suite of management direction along with the efforts of tribal bear management specialists will minimize adverse effects. Cumulative adverse effects to the NCDE population are not expected as a result of management actions on tribal lands.

Private lands—Privately owned lands comprise about 10 percent of the 5.7-million-acre primary conservation area, nearly 48 percent of zone 1. Privately owned lands occur within and adjacent to NFS lands throughout the NCDE.

The human population in northwestern Montana has grown at a relatively high rate during the past few decades, and growth is expected to continue. Increasing residential development and demand for recreational opportunities can result in habitat loss, habitat fragmentation, and increases in grizzly

bear-human conflicts. These impacts are likely to intensify, although appropriate residential planning, outreach about how to minimize adverse effects, and assistance in resolving conflicts can help mitigate these impacts.

Increasing development on private lands has the potential to have cumulative adverse effects on the NCDE grizzly bear population. Monitoring of population status will provide a mechanism to identify areas of concern so that appropriate preventive or corrective actions can be taken.

Canadian lands—Grizzly bear populations in the lower 48 States are not separated biologically from grizzly bears in Canada. However, there are distinct differences in population status, habitat management, and regulatory mechanisms between the two countries. Overall, Canada supports approximately 27,000 grizzly bears in relatively contiguous populations (Ross, 2002). Grizzly bears are listed as a species of “special concern” under the Canadian Species at Risk Act, but this designation is given to any species that is sensitive to human activities and does not indicate an extinction risk (USFWS, 2011b).

In contrast to the United States, there is no national land management agency to establish and implement habitat management programs across Canada. The national parks and provincial parks have uniform habitat protections in place for grizzly bears. Provincial management plans have been developed for grizzly bears in British Columbia and Alberta. In Canada immediately north of the NCDE, the main human activities that have impacted grizzly bears and their habitat are timber harvesting, oil and gas exploration and development, coal mining, and the proliferation of roads and other human developments related to these industries. On February 18, 2010, the premier of British Columbia announced that mining, oil, gas, and coal development were no longer permissible land uses in the Canadian portion of the North Fork of the Flathead River basin, removing a substantial threat to the NCDE population (USFWS, 2011b).

There is no evidence to suggest that adverse cumulative impacts are now occurring or will occur due to land management activities in Canada.

Grizzly bear-human conflicts

Between 1999 and 2008, 201 human-caused mortalities of grizzly bears were recorded in the NCDE. The top three sources of mortality were management removals (27 percent), illegal kills (25 percent), and trains (12 percent) (USFWS, 2011b). The majority (67 percent) of the management removals were related to unsecured attractants.

Other Federal lands—Within Glacier National Park, food storage regulations (pursuant to 36 CFR § 2.10 (d)) prohibit anyone from leaving food unattended or stored improperly where it could attract or otherwise be available to wildlife. On Bureau of Land Management land within the NCDE recovery zone, the NCDE food storage guidelines are incorporated into their contracts. The NCDE food storage guidelines are also incorporated into contracts in areas that are outside the recovery zone (primary conservation area) but are in an area known to be occupied by grizzly bears. The National Bison Range Complex is located within the NCDE and is administered by USFWS. These refuges are day use only, with no overnight camping allowed. Users are expected to pack out their trash; there are no garbage receptacles anywhere on the refuges.

All Federal agencies are making efforts to prevent or reduce grizzly bear-human conflicts. No adverse cumulative effects are anticipated to accrue to the NCDE population as a result of actions by Federal agencies other than the Forest Service.

State lands—Food and attractant storage programs for Montana Department of Natural Resources and Conservation staff and contractors reduce the risk of bear-human conflicts. On Department lands within the NCDE recovery zone and on scattered school trust lands within the NCDE and Cabinet-Yaak recovery zones, contract language requires daily removal of garbage from work sites. Outside the NCDE and Cabinet-Yaak recovery zones but in known occupied grizzly bear habitat, timber sale contract language requires the daily removal of garbage from work sites. For Department lands outside the recovery zones and outside known occupied grizzly bear habitat, precautions are taken on a case-by-case basis only if there is known bear activity. Recreationists are expected to pack out their trash. As a partner in the Blackfoot Challenge, Montana Department of Natural Resources and Conservation has placed bear-resistant dumpsters at State land locations where bear-attractant conflicts have been known to occur. The Department provides all of its cabin lessees with a brochure, “Living with Bears,” that explains measures that should be taken to minimize bear-human conflicts. No Montana Department of Natural Resources and Conservation employees or contractors have been involved in a grizzly bear-human conflict that resulted in a management action or death of a grizzly bear.

Montana Department of Fish, Wildlife and Parks—The Department completed a grizzly bear management plan for western Montana in 2006 (Dood, Atkinson, & Boccadori, 2006) and a grizzly bear management plan for southwestern Montana in 2013 (MFWP, 2013). These documents establish goals and strategies to manage and enhance grizzly bear populations and to minimize the potential for grizzly bear-human conflicts. The Department also employs several bear management specialists to work with landowners and educate the public in an effort to avoid or resolve grizzly bear-human conflicts and to reduce grizzly bear mortalities. Food storage guidelines are in place in some State parks and wildlife management areas, and bear-resistant dumpsters are in place in most State parks.

The State of Montana allows regulated hunting for black bears and other wildlife species. There is a potential for grizzly bear mortality by hunters to occur as a result of mistaken bear identification or self-defense, especially in proximity to the carcasses of harvested animals. MFWP provides a variety of public information and education programs, including a mandatory black bear hunter testing and certification program to help educate hunters in distinguishing species that are aimed at reducing human-caused mortalities. Black bear hunting seasons have also been shortened in recent years, reducing the potential of mistaken identity. These efforts have helped to decrease legal and illegal shooting mortalities.

Hunting of grizzly bears has not been allowed in Montana since 1991. In a recovered, delisted population of grizzly bears, the Department would assume management responsibility for the grizzly bear population. Management could include regulated hunting in the future, when and where appropriate, which potentially could increase support among some segments of the public. The Department would monitor the level of mortality due to hunting and its effects on the NCDE grizzly bear population.

Tribal lands—The Blackfeet Indian Reservation has a food storage order in place under the Blackfeet Tribe’s rules governing fishing, hunting, and trapping on the Blackfeet Indian Reservation (Blackfeet Tribe, n.d., chap. 3, sec. 17) that applies to all lands within the exterior boundaries of the reservation that are designated as normally occupied by bears. The regulations govern food storage and sanitation in camping and nonresidential situations and the removal of livestock carcasses that may attract bears into conflict situations. In addition, beekeepers in bear country are encouraged to install electric fencing around beehives

All lands within the primary conservation area on the Blackfeet Indian Reservation are currently allotted for livestock grazing. One or more bear management specialists work with livestock

producers to minimize and manage bear-livestock conflicts. Existing sheep allotments will be monitored, evaluated, and phased out if the opportunity arises with willing permittees.

On the Flathead Indian Reservation, there is a food storage order for backcountry areas in the primary conservation area (CSKT, 2017). As warranted, residents are notified of bear activity and precautionary measures that should be taken to reduce bear-human conflict. Tribal biologists provide assistance in mitigating situations where food and attractant storage is an issue.

Although there has been a history of grizzly bear mortalities related to livestock on the Blackfoot Indian Reservation, the rate of increase of the grizzly bear population indicates that the level of mortality has been sustainable. The Blackfoot Nation and the Confederated Salish and Kootenai Tribes have taken actions such as hiring bear management specialists and providing information and education to reduce grizzly bear-human conflicts. Therefore, no adverse cumulative impacts are anticipated due to grizzly bear-human conflicts on tribal lands.

Private lands—Private lands continue to account for a disproportionate number of conflicts and grizzly bear mortalities in the NCDE. These impacts are likely to intensify, although appropriate residential planning, outreach and information about how to avoid conflicts, tools such as bear resistant containers and electric fencing, and assistance in resolving conflicts can help mitigate these impacts. Walters and Holling (1990) stated that managing human-caused mortality, monitoring both population and habitat parameters, and responding when necessary with adaptive management are the best ways to ensure a healthy grizzly population. The USFS does not have authority to manage grizzly bear-human conflicts or human-caused mortality of grizzlies on private lands. Population monitoring and management of grizzly bear-human conflicts is under the authority of MFWP.

The MFWP, Confederated Salish and Kootenai Tribes, and Blackfoot Nation employ bear specialists who work with landowners in an effort to reduce risks to grizzly bears and humans on private, public, or tribal lands. Bear specialists provide information and assistance to landowners on appropriate ways to secure food and attractants from grizzly bears, and they respond to reports of conflicts with nuisance black and grizzly bears. These programs have been successful in informing the public, reducing the availability of attractants to grizzly bears on private and public lands, and reducing human-caused mortalities of grizzly bears. These programs and their positive results are expected to continue for the foreseeable future.

Increasing development on private lands and the accompanying risk of grizzly bear-human conflicts has the potential to have cumulative adverse effects on the NCDE grizzly bear population. Monitoring of population status and grizzly bear-human conflicts will provide a mechanism to identify areas of concern so that appropriate preventive or corrective actions can be taken.

Effects of management and development on connectivity with adjacent ecosystems

A metapopulation is a group of spatially separated populations of the same species. Each population is relatively independent of the others, with the smaller populations more prone to inbreeding depression and local extinction. The metapopulation as a whole may be stable if there is connectivity between the seemingly isolated populations (Hanski & Gilpin, 1997). The draft Conservation Strategy incorporated the concept of source/sink dynamics, indicating that the NCDE could serve as a source population to other recovery zones in the United States that remain threatened by small population size (USFWS, 2013c, p. 2).

The grizzly bear population in the NCDE appears to be well distributed and well connected to grizzly bear populations in Canada (M. F. Proctor et al., 2012). The draft Conservation Strategy describes the NCDE as having the potential to serve as a source population for other recovery areas

in the United States due to its large size and increasing population trend and distribution. Genetic analysis by Mickle et al. (2016) demonstrated that the NCDE population has expanded following a range contraction that probably had its low point in the 1920s or 1930s. The highest density of bears and the highest genetic diversity is found in and around Glacier National Park, with lower densities and lower heterozygosity on lands farther to the south and east (Mickle et al., 2016). As the population has expanded, genetic diversity has been increasing in the peripheral areas. The movement of grizzly bears into zone 2 is relatively recent and offers hope that genetic connectivity could be reestablished with the Greater Yellowstone Ecosystem population through natural movements.

Other Federal lands—The network of Federal lands in northwestern Montana provides a high degree of landscape permeability for grizzly bears. Federal agencies have been cooperating in improving habitat connectivity and mitigating impacts of highways and other developments that impede movement by wildlife, including grizzly bears. No adverse cumulative impacts on connectivity are anticipated.

State lands—Under the Montana Department of Natural Resources and Conservation's habitat conservation plan (MFWP, 2015b), maintenance of eight security zones comprising 22,007 acres in the Stillwater Block and adherence to seasonal restrictions in that transportation plan would facilitate important linkage between the Whitefish and Salish Mountain Ranges. The Swan Valley Conservation Agreement (Plum Creek et al., 1997) also provides a framework for cooperative management, and it would continue to facilitate effective linkage across the valley. The State's habitat conservation plan also has provisions that help to maintain the integrity of linkages in the Swan Valley to provide for movement between suitable habitats and recovery zones if it were to go into effect in this area. Thus, under either strategy into the future, effective linkage is likely to be maintained on State trust lands.

The sale or other disposal of some State lands is allowed. However, under the habitat conservation plan, removal of lands is capped at 5 percent of the baseline acreage of certain areas, including the grizzly bear NCDE recovery zone.

The Department management direction contributes to maintaining or improving connectivity, and adverse cumulative effects are not anticipated.

Montana Department of Fish, Wildlife and Parks—Grizzly bear management plans establish goals and strategies to manage and enhance grizzly bear populations and to minimize the potential for grizzly bear-human conflicts. A long-term goal is to allow the populations in western and southwestern Montana to reconnect through the intervening, currently unoccupied habitats. No adverse cumulative impacts on connectivity are anticipated.

Tribal lands—On the Flathead Indian Reservation lands within the Ninemile demographic connectivity area, the above-mentioned requirements under the forest management plan also apply. There is a tribally designated wilderness, Sleeping Woman, and tribally designated roadless areas, Burgess and the Ravalli Valley complex, that help to facilitate grizzly bear occupancy and movements within the demographic connectivity area. In a 54-mile stretch of U.S. Highway 93 between Evaro and Polson, more than 50 wildlife crossing structures have been constructed. Hiding cover is retained on the reservation adjacent to U.S. Highway 93 at Evaro and in the Ravalli Corridor to provide conditions that facilitate movement of wildlife. No adverse cumulative impacts on connectivity are anticipated as a result of tribal actions.

Future climate change

The USFWS examined climate change and potential future effects on the grizzly bear in its five-year status review (USFWS, 2011b). The review concluded that the most likely ways in which climate change may potentially affect grizzly bear habitat include reduction in snowpack levels, shifts in the denning season, shifts in the abundance and distribution of some natural food sources, and changes in fire regimes due to summer drought.

Reduced snowpack or a shorter winter season could improve the over-winter survival of bears, assuming that sufficient bear foods are available later in the fall and earlier in the spring. However, a shorter denning period could increase the potential for spring and fall encounters between grizzly bears and hunters and/or recreationists, which in turn would increase the risk of mortality to grizzly bears (USFWS, 2011b). Climate models for northwestern Montana have much higher uncertainty about future precipitation than temperature, but projections for precipitation suggest a slight increase in the future, with conditions slightly wetter in winter and spring and at high elevations (Halofsky et al., in press). It would be highly speculative to try to predict the effects on grizzly bears in terms of either survival or mortality risk in northwestern Montana based on the information that is available at this time.

With respect to shifts in the denning season, denning dates in the NCDE have been documented for the period 1987-2013 (R. D. Mace & Roberts, 2014) and continue to be recorded for radio-collared bears. Current denning season dates are defined in the glossary. The draft Conservation Strategy stated that denning dates will be adjusted if the 10-year average den emergence data for females or females with offspring shows a shift of at least a week. The analysis of effects of alternatives on denning habitat uses modeled denning habitat provided by Mace (2014), which is the best available scientific information.

The extent and rate to which individual plant species or plant communities will be impacted by climate change is difficult to foresee with any level of confidence (Fagre, Peterson, & Hessl, 2003; Walther et al., 2002). Berries are an important part of the diet of grizzly bears in the NCDE during summer and fall (R. D. Mace & Jonkel, 1986). Kasworm et al. (2015) reported that huckleberry production in the Cabinet Mountains was highest in years with a cool spring and high July temperatures and suggested that future changes in climate could influence the availability of this food source for grizzly bears. Roberts et al. (2014) investigated climate change vulnerability of grizzly bears using projected changes in distribution of 17 of the most commonly used plant foods in the Canadian Rockies. These authors found variable plant species responses, with many species predicted to persist or even increase while other species declined, with an overall increase in availability and diet richness of bear foods through the coming century. They noted a general trend of uphill migration of bear foods. Although there is considerable uncertainty and the potential interaction of other variables were not modeled, the wide diet breadth and opportunistic foraging behavior of grizzly bears likely make them less susceptible to changes in plant communities than some other species of wildlife, such as polar bears.

Fire frequency and severity are predicted to increase across the western United States as a result of climate change. Large, stand-replacing wildfires that convert mature forest to early successional condition alter the availability of cover and change the composition of grizzly bear foods, potentially changing how bears use the landscape. The removal of forest canopy cover after fires can potentially increase certain bear foods, such as berries and roots (Halofsky et al., in press). Blanchard and Knight found that the large high-intensity Yellowstone fires of 1988 benefitted grizzly bears by increasing forb foliage and root crops (Blanchard & Knight, 1996). Low- to moderate-intensity fires are more beneficial for huckleberry production since they are less likely to damage rhizomes

(Simonin, 2000). Because grizzly bears are flexible in their diet, they are not likely to be directly negatively affected by plant community changes in response to climate change (Servheen & Cross, 2010).

The high degree of uncertainty surrounding the effects of climate change emphasizes the importance of long-term monitoring of the grizzly bear population so that any necessary adjustments can be made. As the effects of climate change become more clear and specific threats that are within Forest Service authority or capability to manage become known, the forest plans may be amended or revised as deemed necessary.

Small (less than 100 individuals) isolated populations are at greatest risk of extinction; where possible, restoring connectivity is the best conservation practice to improve the probability of persistence (M. F. Proctor et al., 2015). One way to mitigate the potential impacts from climate change on the grizzly bear is to have well-connected populations, which would increase resiliency to demographic and environmental variation (USFWS, 2011b). The action alternatives provide additional plan components that would help to conserve the overall distribution of grizzly bears by recognizing the potential for the NCDE to serve as a source population to the other recovery zones. These plan components address habitat management of the Salish and Ninemile demographic connectivity areas to maintain or enhance demographic connectivity with the Cabinet-Yaak and Bitterroot Ecosystems, as well as coordination and habitat management in the zone 1 and the zone 2 portion of the Helena National Forest west of Interstate 15 to support genetic connectivity with the Greater Yellowstone Ecosystem.

Summary of cumulative effects on grizzly bear

The national forests comprise the majority (60 percent) of lands in the NCDE primary conservation area; thus, Forest Service management actions make a substantial contribution to the conservation of the grizzly bear population. Nevertheless, the actions of other landowners in the NCDE are also very important since the grizzly bear is a wide-ranging species that uses a broad range of elevations and habitats during the year.

Road densities, developed recreation sites, livestock grazing, vegetation management, and development of minerals and oil and gas on Federal, State, and tribal lands have the potential to cause disturbance and displacement of bears, fragmentation of habitat, and increased risk of grizzly bear-human conflicts. However, although some individual bears may be adversely impacted by these management activities, the NCDE population has been increasing in number and expanding in distribution while these activities were ongoing. When finalized, all signatories to the NCDE Conservation Strategy will make commitments appropriate to their jurisdictions to contribute to sustaining the recovered population in the NCDE. Coordination and exchange of information between Federal and State agencies and the tribes concerning the status and trend of the NCDE grizzly bear population is expected to continue into the foreseeable future. Therefore, no cumulative adverse impacts are anticipated as a result of habitat management.

There is a potential for adverse cumulative impacts as a consequence of grizzly bear-human conflicts on private lands. If the NCDE population is delisted, the results and analysis of monitoring will be reviewed annually by a coordinating committee. Any deviations from population and/or habitat standards stipulated in the Conservation Strategy will be noted, and a biology and management review will be initiated. If the deviations cannot be corrected, the coordinating committee may petition USFWS for relisting under the Endangered Species Act.

Substantial efforts have been made to provide for connectivity of the NCDE grizzly bear population with other ecosystems, and these are expected to continue. Under the action alternatives,

demographic connectivity areas would be established and purposefully managed by the Federal agencies, Montana Department of Natural Resources and Conservation, and the Flathead Indian Reservation to encourage connectivity to the Cabinet-Yaak and Bitterroot Ecosystems. Additionally, an area on the Helena National Forest would be identified for coordinated management that would support movement of male bears to the Greater Yellowstone ecosystem. These actions will contribute to maintaining or improving connectivity, and no adverse cumulative effects are anticipated.

Climate change may alter grizzly bear habitat and behavior, but the degree of change, particularly with regard to precipitation in northwestern Montana, and the effects on grizzly bears are uncertain and highly speculative at this time. All of the alternatives are anticipated to provide habitat conditions that will support grizzly bear survival and reproduction in the NCDE into the foreseeable future. The action alternatives also recognize the potential for the NCDE to serve as a source population that can help support neighboring recovery zones.

6.5.6 Other endangered, threatened, proposed, and candidate species

Introduction

To facilitate the preparation of biological assessments and fulfill the requirements of section 7(c) of the Endangered Species Act, as amended, the USFWS has generated web-based species lists of threatened, endangered, proposed, and candidate species that may be present on each national forest. The Montana Field Office's web site was accessed on Nov. 17, 2017, to obtain the most recent species lists for the Helena-Lewis and Clark, Kootenai, and Lolo National Forests (USFWS, 2017b, 2017c, 2017d).

Besides the grizzly bear, the Canada lynx and the yellow-billed cuckoo are listed as threatened species under the Endangered Species Act. The wolverine is proposed for listing. Table 195 shows the known or suspected distribution of these three species on the four national forests in relation to the NCDE recovery zone/primary conservation area, and zones 1, 2, and 3.

Table 195. Threatened, endangered, proposed, and candidate terrestrial wildlife species that may be present on the Flathead, Helena, Kootenai, Lewis and Clark, and Lolo National Forests, with occurrence in relation to NCDE grizzly bear management zones.

Species	Listing Status	Flathead	Helena-Lewis and Clark	Kootenai	Lolo
Canada lynx (<i>Lynx canadensis</i>)	Threatened	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zones 1 & 2 Resident west of I-15; transient east of I-15	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 1, Ninemile DCA
North American wolverine (<i>Gulo gulo luscus</i>)	Proposed	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 1, Ninemile DCA
Yellow-billed cuckoo, western distinct population segment (<i>Coccyzus americanus</i>)	Threatened	-	-	-	Zone 1, Ninemile DCA

Note. DCA – demographic connectivity area, NCDE = Northern Continental Divide Ecosystem recovery zone, PCA = primary conservation area.

Note: When the draft EIS was being prepared, the Sprague's pipit was listed as a candidate species, and therefore the effects of the alternatives on this species were analyzed in this section. However, a status review published April 5, 2016 (81 FR 19527) concluded that listing of this species is not warranted. The Sprague's pipit is a grassland bird that breeds in the Great Plains, and it is considered a Forest Service sensitive species in North and South Dakota but not in Montana. Therefore, effects to this species are not analyzed in this final EIS.

Canada lynx

Key indicators for analysis

In the lynx conservation assessment and strategy (ILBT, 2013), anthropogenic influences are placed in either the "upper tier" or the "lower tier." The upper tier includes anthropogenic influences that are of greatest concern to the conservation of the lynx: climate change, vegetation management, wildland fire management, and fragmentation of habitat. Recreation (including snowmobiling), minerals and energy development, forest/backcountry roads and trails, and grazing by domestic livestock, which are the factors of most concern identified in the lynx conservation assessment and strategy, are placed in the "lower tier" of anthropogenic influences on lynx. It is thought that these activities could affect individual lynx, but they are not likely to have a substantial effect on lynx populations and lynx habitat and are of less concern for conservation of the species. The analysis of the effects of the alternatives is focused on these anthropogenic influences, with emphasis on the upper tier.

Methodology and analysis process

Spatial and temporal analysis

The Helena, Kootenai, Lewis and Clark, and Lolo National Forests contain a suite of forest plan components aimed at providing for the conservation and recovery of the Canada lynx (USDA, 2007b). Lynx habitat is divided into lynx analysis units that are intended to facilitate analysis and monitoring of the effects of management actions on lynx habitat. Lynx analysis units do not depict actual lynx home ranges but approximate the size of a female's home range and contain year-round habitat components (ILBT, 2013). Since lynx analysis units encompass lynx habitat on NFS lands as well as other land ownerships, they are also used for analysis of cumulative effects of activities on all lands.

The temporal analysis for lynx considers the fact that not all mapped lynx habitat provides suitable conditions at any given point in time because natural events (e.g., fire, plant succession, insect and disease) and vegetation management activities are constantly changing forest composition and structure. The period considered for analysis of indirect effects of activities is the anticipated life of the forest plan, which is generally about 15 years after approval. Because actions such as vegetation management and climate change have the potential to affect Canada lynx and lynx critical habitat for longer time periods, the temporal analysis for cumulative effects may extend beyond the life of the forest plans.

Affected environment

Population status and distribution

The range of the Canada lynx extends from Alaska across much of Canada (except for the coastal forests), with southern extensions into parts of the western United States, the Great Lakes States, and New England. Lynx distribution is closely aligned with the distribution of snowshoe hares and boreal forests (McKelvey, Aubry, & Ortega, 1999).

In Montana, lynx are primarily restricted to the northwestern portion of Montana from the Purcell Mountains east to Glacier National Park and then south through the Bob Marshall Wilderness Complex to Montana Highway 200, based on 81,523 telemetry points obtained from resident lynx during 1998-2007 (John R. Squires et al., 2013). Using the criteria employed for the Northern Rockies Lynx Management Direction (USDA, 2007b), the Helena, Kootenai, Lewis and Clark, and Lolo National Forests are all considered to be “occupied” by lynx.

USFWS convened an expert workshop in October 2015 to improve understanding of the status of the contiguous U.S. distinct population segment of Canada lynx (Bell et al., 2016). The results of the workshop are used by USFWS to inform recovery planning, classification decisions, and other determinations required by the Endangered Species Act. For the species status assessment unit that encompasses northwestern Montana/northeastern Idaho, experts concluded there would be an initially high and subsequently decreasing probability of Canada lynx persistence, with increasing uncertainty over time but a higher probability of persistence in all time frames compared to other units occupied by lynx. For the unit encompassing northwestern Montana/northeastern Idaho, all experts predicted near-term (year 2025) persistence probability greater than or equal to 95 percent and mid-century persistence at 70 percent to 100 percent (median = 90 percent).

Habitat

Snowshoe hares are the primary winter prey of lynx in Montana (John R. Squires & Ruggiero, 2007), as is true throughout the range of lynx (Aubry, Koehler, & Squires, 1999). Lynx have special adaptations as a predator of snowshoe hares, including a lightweight body frame and proportionately large paws that enable them to travel on top of deep snow. Dense horizontal cover, persistent snow, and moderate to high snowshoe hare densities (greater than 0.2 hares/acre) are common attributes of lynx habitat (ILBT, 2013).

In northwestern Montana, lynx typically are found in boreal and subalpine coniferous forests in areas of gentle topography (John R. Squires et al., 2013). Research has shown that lynx primarily select mature multi-story stands during winter, composed mostly of mature Engelmann spruce and subalpine fir trees. Conifer boughs touching the snow and the young trees in the understory provide the dense horizontal cover that supports higher-density snowshoe hare populations at varying snow depths throughout the winter. Lynx were found to be more restricted to stands with high density of horizontal cover in winter than in summer (John R. Squires, Decesare, Kolbe, & Ruggiero, 2010). Lynx used mid- to high-elevation forests (4,134-7,726 feet) during winter and slightly higher elevations during summer in Montana (John R. Squires et al., 2010). During the summer months, lynx made more use of regenerating forests with abundant small diameter (1-3 inches d.b.h.) and pole-sized (3-7 inches d.b.h.) trees, dense shrubs, and high horizontal cover (John R. Squires et al., 2010).

The lynx recovery outline (USFWS, 2005) stratified lynx habitat into three categories: core, secondary, and peripheral. Core areas are places where long-term persistence of lynx and recent evidence of reproduction have been documented and where the quality and quantity of habitat is available to support both lynx and snowshoe hare life needs. Six core areas were identified in the recovery outline, one of which is in northwestern Montana/northeastern Idaho. The recovery outline stated that lynx conservation efforts should be focused on core areas to ensure the continued persistence of lynx in the contiguous United States.

Secondary and peripheral areas have fewer and more sporadic current and historical records of lynx, and reproduction has not been documented in these areas. Habitat may be patchier, drier, and/or more maritime. In secondary and peripheral areas, the focus of management is on providing a mosaic of

forest structure to support snowshoe hare prey resources for individual lynx that may infrequently move through or reside temporarily in the area. Landscape connectivity should be maintained to allow for lynx movement and dispersal.

For analysis and management purposes, lynx habitat is delineated into lynx analysis units. Lynx analysis units do not depict actual lynx home ranges but approximate the size of a female's home range and contain year-round habitat components. A lynx analysis unit must contain at least 10 square miles of primary vegetation (e.g., spruce/fir) to be capable of supporting lynx (ILBT, 2013). It is not necessary to delineate lynx analysis areas in secondary and peripheral areas, although that may have been done in accordance with prior recommendations.

Thirty lynx analysis units have been delineated on lands administered by the Helena National Forest: 17 in the Blackfoot landscape (all in lynx core/designated critical habitat), six in the Divide landscape (two within lynx core and designated critical habitat and four in secondary), three in the Elkhorns landscape, and four in the Big Belts landscape. The best lynx habitat and the most robust population are in the Blackfoot landscape of the Lincoln Ranger District. The Divide landscape supports a small but apparently persistent population of lynx. Tracking surveys backed by 39 DNA samples identified an adult male lynx that was present for at least three years and an adult female lynx that was present for at least one full year, as well as evidence of the presence of 1 or more additional lynx in this area (Gehman & Jakes, 2007; Gehman, Robinson, & Porco, 2010). Habitat in the Divide landscape connects to the Blackfoot landscape and the adjoining Garnet Range, which has the southernmost lynx population in Montana (ILBT, 2013). The Big Belts and Elkhorns landscapes are considered lynx secondary areas. These areas are not occupied by resident lynx, although transient animals have been documented in the Big Belts landscape.

On the Kootenai National Forest, 47 lynx analysis units have been delineated, all within the lynx core area. These encompass about 67 percent of the Kootenai National Forest (roughly 1,492,600 out of 2,219,100 acres). A large portion of the acreage in lynx analysis units (62 percent) overlaps with the Cabinet-Yaak and NCDE recovery zones for grizzly bear on the Forest. If both bear management units and the bears outside of recovery zone areas are included, there is 87 percent overlap with the total lynx analysis unit acreage.

On the Lewis and Clark National Forest, lynx occur as a resident population. There are 57 lynx analysis units on the Lewis and Clark National Forest, 27 of which are on the Rocky Mountain Ranger District. Large patches of boreal forest on the Lewis and Clark National Forest are well connected to large areas of lynx habitat on the Flathead and Lolo National Forests to the west and to Glacier National Park to the north. The Castle, Crazy, and Little Belt mountain ranges are considered lynx secondary areas and may occasionally host transient dispersing lynx. The Highwood Mountains and Little Snowy Ranges are small, isolated mountain ranges, separated from each other and from other lynx habitat by significant stretches of low-elevation, often agricultural landscapes that do not support lynx or their primary prey species and are considered lynx peripheral areas. The 27 lynx analysis units on the Rocky Mountain Division overlap with the NCDE grizzly bear recovery zone/primary conservation area.

There is a total of 54 lynx analysis units on the Lolo National Forest, 17 of which are within the amendment action area. Four of the lynx analysis units are wholly within the primary conservation area (Big Slide, Scapegoat, Lake, and Monture). Nine lynx analysis units are in both the primary conservation area and zone 1 (Cottonwood Dunham, Morrell, Rice, Clearwater, Marshall Deer, Placid, Boles, Gold, and Rattlesnake). Four lynx analysis units are within the Ninemile demographic connectivity area (Frenchtown, McCormick, Upper Ninemile Siegel, and Ninemile Divide). Lynx are known to be resident on the Lolo National Forest in all lynx analysis units that lie north of Interstate

90 and east of U.S. Highway 93, based on extensive surveys and research conducted since 1998. As part of a multi-species carnivore monitoring program, lynx have been surveyed on the Lolo National Forest since 2007 using methods developed by Squires et al. (2004). In 2010 and 2011, this method (snow tracking and DNA collection) was implemented forestwide. Since 2012, surveys have been concentrated in the Southwestern Crown of the Continent analysis area; over a four-year period, 198 lynx detections were recorded inside lynx core/critical habitat and one lynx was detected outside of but adjacent to critical habitat. Portions of the Forest to the west do not support resident lynx and are considered lynx secondary areas.

Environmental consequences—Canada lynx

Effects common to all alternatives

Current forest plan direction specific to lynx, which addresses vegetation management, livestock grazing, human uses, and linkage areas, would not be changed under any of the alternatives. The following summarizes the existing management direction that addresses the first tier of anthropogenic influences identified in the 2013 Lynx Conservation Assessment and Strategy (ILBT, 2013).

- Climate change. No direction specific to climate change was established since this is outside the control of the Forest Service.
- Vegetation management. Objectives VEG O1, VEG O2, and VEG O4 encourage managing vegetation to mimic or approximate natural succession and disturbance processes while maintaining lynx habitat components; providing a mosaic of habitat conditions through time that support dense horizontal cover and high densities of snowshoe hare; and focusing vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover. Standard ALL S1 requires that vegetation management projects maintain habitat connectivity in a lynx analysis unit and/or linkage area. Standard VEG S1 allows no additional regeneration harvest if more than 30 percent of the lynx habitat in lynx analysis unit is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat. VEG S2 does not allow timber management projects to regenerate more than 15 percent of lynx habitat on NFS lands within a lynx analysis unit in a 10-year period. VEG S5 generally precludes pre-commercial thinning projects that reduce snowshoe hare habitat from the stand initiation structural stage until the stand no longer provides winter snowshoe hare habitat. Standard VEG S6 protects snowshoe hare habitat in multi-story mature or late successional forests. Guideline G1 encourages projects that are designed to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Guideline VEG G5 is to provide habitat for alternative prey species, particularly red squirrel, in each lynx analysis unit. Guideline VEG G11 is to provide denning habitat distributed in each lynx analysis unit.
- Wildland Fire Management. Objective VEG O3 encourages fire use activities that restore ecological processes and maintain or improve lynx habitat. Under guideline VEG G4, prescribed fire activities should not create permanent travel routes that facilitate snow compaction, and permanent firebreaks should not be constructed on ridges or saddles. Guideline VEG G10 is to consider all the vegetation standards when designing fuel treatment projects within the wildland-urban interface to promote lynx conservation. Fuel treatment projects within the wildland-urban interface that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on a national forest.

- Fragmentation of habitat. In areas of intermingled land ownership, objective LINK O1 encourages the Forest Service to work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat. In linkage areas, potential highway crossings will be identified (LINK S1), Forest Service lands should be retained in public ownership (LINK G1), and livestock grazing in shrub-steppe habitats should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages. Guideline HU G6 specifically mentions that methods to avoid or reduce the effects on lynx in lynx habitat should be used when upgrading unpaved roads to maintenance levels 4 or 5 if the result would be increased traffic speeds and volumes or a foreseeable contribution to increases in human activity or development.

Indirect effects of alternative 1 on lynx

The forest plan management direction specific to the Canada lynx would continue to be implemented. As described in the Northern Rockies Lynx Management Direction Final Environmental Impact Statement (USDA, 2007c), some adverse effects would occur, primarily due to vegetation and fuels management, but the overall direction would conserve the Canada lynx.

Indirect effects of alternative 2 modified on lynx

Lynx and grizzly bear habitat overlap to a large extent in northwestern Montana. On the Kootenai National Forest, for example, 87 percent of the total acreage in lynx analysis units is within a grizzly bear recovery zone (NCDE and Cabinet-Yaak) or a “bears outside of recovery zone” area.

The additional standards and guidelines for grizzly bear are not likely to have a measureable effect on lynx. Lynx are specialist predators of snowshoe hares; in contrast, grizzly bears are habitat generalists and omnivores and often are attracted to human food and garbage. Lynx are most limited by habitat and the availability of snowshoe hare prey during the winter; bears hibernate during the winter months. Lynx also do not appear to avoid roads and human activities in the way that grizzly bears do.

Subalpine forest structure that provides snowshoe hare habitat is important to lynx. Under alternative 2 modified, existing forest plan standards and guidelines for vegetation management would be retained, with additional desired conditions and guidelines applicable to the primary conservation area. Desired condition NCDE-DC-VEG-02 would encourage maintaining a mosaic of successional stages; guideline NCDE-GDL-VEG-01 would require measures to reduce the risk of disturbance of grizzly bears; projects would be designed to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts (NCDE-GDL-VEG-02 and 05); and guideline NCDE-GDL-VEG-03 addresses retention of cover as needed along grass, forb, and shrub openings, riparian wildlife habitat, or wetlands. NCDE-GDL-VEG-04 would direct vegetation management projects to include a clause providing for modification, cancellation, suspension, or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation. No new vegetation management measures would be applied to zone 1 or to the Salish and Ninemile demographic connectivity areas. The desired conditions and guidelines for grizzly bears under alternative 2 modified would not alter and are compatible with the existing forest plan direction for lynx.

NCDE-STD-AR-08 would not allow any increase above the baseline in the acreage of areas and miles of routes open to use by over-snow vehicles in the den emergence time period (i.e., late spring). Snowmobiles have not been shown to disturb or displace lynx, and late spring snow naturally becomes compacted, so this standard would have little or no effect on lynx.

NCDE-STD-MIN-08 would require that no surface occupancy stipulations be applied to any new oil and gas leases in the primary conservation area and zone 1. Depending on the location of the leases, this could be beneficial to lynx by reducing the potential for habitat loss and fragmentation.

There is little evidence that summer recreation, minerals exploration and development, Forest roads and trails, or livestock grazing would have substantial negative effects on lynx or their habitat (ILBT, 2013, pp. 80, 83-85). NCDE-STD-MIN-08 would require that no surface occupancy stipulations be applied to any new oil and gas leases in the primary conservation area, and NCDE-STD-AR-05 would limit increases in the number or capacity of developed recreation sites that are designed and managed for overnight use in the nondenning season. These standards could be beneficial in maintaining connectivity within and between areas of lynx habitat on NFS lands.

Indirect effects of alternative 3 on lynx

Under this alternative, the same changes to forest plan desired conditions, standards, guidelines, and monitoring items would be made as under alternative 2 modified. In addition, all of the vegetation management guidelines would be extended to the Ninemile and Salish demographic connectivity areas. This could be beneficial to lynx by maintaining forest connectivity, although the demographic connectivity areas are generally located in lower-elevation valleys rather than the subalpine habitats where lynx reside. Standard NCDE-STD-GRZ-07 would require the closing of sheep allotments if there is a willing permittee, but there is only one sheep allotment remaining in the primary conservation area. This standard would have no effect on lynx. Desired condition NCDE-DC-GRZ-01, standards NCDE-STD-GRZ-02 and 07, and guideline NCDE-GDL-GRZ-01 would be extended to zone 1 under alternative 3, but these would have no effect on lynx.

Cumulative effects on lynx

Future climate change is expected to impact lynx habitat by further reducing the cold climatic conditions that create and maintain boreal forests as lynx habitat. Reduced snowpack and earlier snow melt may also reduce the lynx's competitive edge as a predator of snowshoe hares in deep, fluffy snow. Warmer temperatures may lead to a reduction in available habitat for lynx as subalpine forests recede to even higher elevations. However, for lynx in the unit encompassing northwestern Montana/northeastern Idaho, a panel of experts predicted near-term (year 2025) persistence probability greater than or equal to 95 percent and mid-century persistence at 70 percent to 100 percent (median = 90 percent) (Bell et al., 2016).

Continuing development of private lands to support increased human populations will likely increase habitat fragmentation and may reduce or sever habitat connectivity between blocks of public lands.

Canada has a legal trapping season for lynx. Some lynx home ranges overlap the international border, making those lynx susceptible to harvest. The State of Montana prohibits trapping of lynx; however, legal trapping of other species occurs in Montana and lynx could be unintentionally injured or killed. Poaching may occur, but the magnitude of this form of mortality, although unknown, is probably small.

Canada lynx critical habitat

Affected environment

On September 12, 2014, USFWS issued a final rule revising the critical habitat designation and the distinct population boundary for the contiguous United States distinct population segment of the Canada lynx (79 FR 54782). Under the Endangered Species Act, specific areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat

designation if they contain physical or biological features that (1) are essential to the conservation of the species and (2) may require special management considerations or protection. The physical and biological features that are essential for the conservation of the species are called the primary constituent elements. Areas outside the geographical area occupied by the species at the time it is listed could also be designated as critical habitat, if a designation limited to its current range would be inadequate to ensure the conservation of the species.

The designation of critical habitat does not prohibit development or forest management activities, but Federal agency actions must not result in destruction or adverse modification of critical habitat. The Federal action must be separately evaluated for effects on the species and on its critical habitat. To determine if the action would result in destruction or adverse modification of critical habitat, this analysis focuses on the primary constituent elements. The primary constituent elements for lynx critical habitat, which are unchanged from the previous rule issued in 2009 (USFWS, 2009), are:

Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

- a) Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;
- b) Winter snow conditions that are generally deep and fluffy for extended periods of time;
- c) Sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and
- d) Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

USFWS designated five units of critical habitat, located in the States of Idaho, Maine, Minnesota, Montana, Washington, and Wyoming. For the lynx, only areas that were within the range of the species at the time of its listing were designated as critical habitat.

Lynx critical habitat unit 3 consists of 9,783 square miles in the Northern Rocky Mountains of northwestern Montana and northeast Idaho (figure 1-6 in the biological assessment(Warren, Van Eimeren, & Trechsel, 2017)). Lynx are known to be widely distributed throughout this unit, and breeding has been documented in multiple locations. Lynx critical habitat unit 3 coincides with the lynx core area in northwestern Montana/northeastern Idaho. Lynx critical habitat unit 3 overlaps to a large extent the NCDE recovery zone for the grizzly bear.

On the Kootenai National Forest, 32 of the 49 lynx analysis units (65 percent), comprising approximately 909,816 acres, are located within critical habitat unit 3. The western portions of the Lewis and Clark National Forest and the northern portion of the Divide geographic area on the Helena National Forest are within critical habitat unit 3. On the Lolo National Forest, lynx critical habitat encompasses all lynx analysis units that lie north of Interstate 90 and east of U.S. Highway 93.

Portions of the Helena National Forest, including the Big Belt and Elkhorn Ranges, and the Lolo Pass area of the Lolo National Forest were not designated as critical habitat. Although extensive surveys have been conducted, these areas continue to lack evidence of lynx occupancy, and the habitat quality appears to be inadequate to support lynx.

The Northern Rockies Lynx Management Direction Final Environmental Impact Statement was prepared prior to the final designation of critical habitat and therefore did not include an analysis of the effects on critical habitat. Nevertheless, the amendment adopted forest plan components that contribute to maintaining the primary constituent elements of lynx critical habitat and avoiding actions that potentially could adversely modify critical habitat. Table 196 lists the forest plan components in relation to the primary constituent elements of lynx critical habitat.

Table 196. Canada lynx critical habitat primary constituent elements in relation to lynx management direction in the forest plans

Primary Constituent Element	Primary Constituent Element Description	Associated Objective, Standard, and/or Guideline
1.	Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:	VEG O1, VEG O2, VEG O3, VEG O4
a	Presence of snowshoe hares and their preferred habitat conditions, including dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface	VEG O1, VEG O2, VEG O3, VEG O4; VEG S1, VEG S2, VEG S5 and VEG S6; VEG G1, VEG G4, VEG G5 and VEG G10; GRAZ G1, GRAZ G2, GRAZ G3, and GRAZ G4; HU G1, HU G2, HU G8
b	Winter snow conditions that are generally deep and fluffy for extended periods of time;	VEG G4; HU G4, HU G11, and HU G12
c	Sites for denning that have abundant coarse woody debris (downed trees and root wads);	VEG O1; VEG G11; HU G1
d	Matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.	ALL S1; GRAZ G4; HU G3 and HU G7; LINK S1 and LINK G2

In 2017, the USFWS issued a biological opinion on the effects of the NRLMD on Canada lynx critical habitat, stating that “it is the Service’s biological opinion that the effects of the NRLMD are not likely to result in the destruction or adverse modification of designated Canada lynx critical habitat” (USFWS, 2017a, p. 31). Under the NRLMD, according to the USFWS, adverse effects on primary constituent element 1a (see table 196) would be “limited in severity and in scale to the extent that critical habitat would continue to produce adequate densities of snowshoe hares and adequate levels of cover to support persistent lynx populations” across critical habitat unit 3 and “the proposed action will not alter the physical or biological features of critical habitat to an extent that appreciably diminishes the value of critical habitat for the conservation of lynx. The alterations will not preclude or significantly delay development of such features. The critical habitat units would retain their current ability for the primary constituent element to be functionally established” (p. 34). The conclusion in this biological opinion was based primarily on the biological assessment of the effects of the NRLMD on lynx critical habitat (Conway & Hanvey, 2017).

Environmental consequences—Lynx critical habitat

Effects common to all alternatives

In its final rule designating lynx critical habitat, USFWS identified the following Federal actions that could potentially adversely modify critical habitat: (1) actions that would reduce or remove

understory vegetation within boreal forest stands on a scale proportionate to the large landscape used by lynx, (2) actions that would cause permanent loss or conversion of the boreal forest on a scale proportionate to the large landscape used by lynx, and (3) actions that would increase traffic volume and speed on roads that divide lynx critical habitat. As described in the previous section on effects to lynx, regulatory mechanisms that would conserve the lynx were adopted into the forest plans through the Northern Rockies Lynx Management Direction in 2007 (USDA, 2007b). That direction specifically limits actions that would reduce or remove understory vegetation within lynx analysis units and provides guidance for maintaining connectivity and linkage areas. This management direction would not change under any of the alternatives.

Indirect effects of the no-action alternative on lynx critical habitat

The existing forest plan direction addresses the primary concerns relative to critical habitat and would remain in place. Although it is possible that implementation of the forest plans could result in some local, short-term negative effects on lynx critical habitat, it is very unlikely that actions would be undertaken across large landscapes that would cause adverse modification of lynx critical habitat.

Indirect effects of alternative 2 modified on lynx critical habitat

Alternative 2 modified would not change existing forest plan direction pertaining to lynx foraging habitat, including dense horizontal cover and mature multistoried stands, lynx denning habitat, winter snow conditions, or lynx linkage areas. The limits on oil and gas development and developed recreation sites under this alternative could contribute to maintaining connectivity within and between areas of lynx habitat.

Indirect effects of alternative 3 on lynx critical habitat

Alternative 3 would not change existing forest plan direction pertaining to lynx foraging habitat, including dense horizontal cover and mature multistoried stands, lynx denning habitat, winter snow conditions, or lynx linkage areas. Extending the requirement for a no surface occupancy stipulation for new oil and gas leases and the limit placed on developed recreation sites to zone 1 under this alternative could contribute to maintaining connectivity within and between areas of lynx habitat. Applying the vegetation management guidelines to the demographic connectivity areas, in addition to the primary conservation area, would be compatible with maintaining habitat connectivity for lynx.

Cumulative effects on lynx critical habitat

Future climate change is expected to impact lynx habitat by further reducing the cold climatic conditions that create and maintain boreal forests and deep persistent snow. Reduced snowpack and earlier snow melt may reduce the lynx's competitive edge as a predator of snowshoe hares in deep, fluffy snow. Warmer temperatures may lead to a reduction in available habitat for lynx as subalpine forests recede to even higher elevations. Although there is a potential for future changes in climate to contribute adverse cumulative effects, the magnitude and imminence of the impacts are uncertain.

Development of private lands to support increased human populations will likely continue and may reduce or sever habitat connectivity across valleys that are located between blocks of lynx habitat on public lands.

Wolverine

Key indicators for analysis

The key indicator for determining effects to wolverine is

- persistent spring snow for denning habitat: the change in availability of habitat.

Affected environment

Population status and distribution

USFWS proposed listing the wolverine as a threatened distinct population segment in the contiguous United States on Feb. 4, 2013 (USFWS, 2013a). On August 13, 2014, USFWS withdrew that proposal, concluding that the factors affecting the distinct population segment, including stressors such as land management, recreation, infrastructure development, and transportation corridors, were not as significant as had been believed at the time of the proposed rule's publication (p. 47539). Furthermore, there was a lack of sufficient information to make a reliable prediction about how wolverines are likely to respond to impacts to habitat that may result from climate change and whether such habitat changes will pose a threat in the future (USFWS, 2014a). However, on April 14, 2016, the U.S. District Court, District of Montana, vacated the withdrawal of the proposal to list the wolverine and remanded the matter to USFWS for further consideration consistent with order CV 14-246-M-DLC (Consolidated with Case Nos. 14-247-M-DLC and 14-250-M-DLC). This had the effect of restoring the wolverine's status as a proposed threatened or endangered species, pending completion of a status review. A new status review was initiated on Oct. 18, 2016, along with the re-opening of a public comment period. The decision is now pending.

The wolverine occurs throughout the arctic regions and also in subarctic areas and boreal forests of Eurasia and North America. In the southern portions of the wolverine's range in western North America, wolverine populations occupy peninsular extensions into the North Cascades Range in Washington and the northern Rockies of Montana, Idaho, and Wyoming. Populations once existed but were extirpated from the Sierra Nevada of California and the southern Rocky Mountains of Colorado, Wyoming, and New Mexico. However, wolverine populations have been expanding in the North Cascades and the northern Rocky Mountains from sources in Canada, and wolverine recently have been detected in Colorado, California, Wyoming, and Utah. Continued population growth and expansion is possible and even likely (79 FR 47522).

Wolverines are believed to occur on all of the national forests in the NCDE, although surveys are incomplete and detection of wolverines can be difficult. On the Helena National Forest, 15 unique wolverines were detected through genetic sampling throughout the Lincoln Ranger District during 2012-2014 (SWCC, 2014). On the Lewis and Clark National Forest, wolverines have been documented to occur in all geographic areas except the Highwood, Snowy, and Castle mountain ranges, with a single trapping record from the Crazies from over 40 years ago (USDA, 2015a). On the Lolo National Forest, genetic sampling conducted from 2012 to 2014 verified three individual wolverines on the Seeley Lake Ranger District (SWCC, 2014). On the Kootenai National Forest, based on the map of persistent spring snow by Copeland et al. (2010), the areas that are thought most likely to support wolverines are the Cabinets, West Cabinets, Northwest Peak, and Ten Lakes areas (USDA, 2013b).

Habitat

Wolverines use a wide variety of habitats, including alpine and arctic tundra and coniferous forests. In Montana, year-round habitat is found in high-elevation rocky alpine areas, glacial cirque basins,

and avalanche chutes that provide food sources such as marmots, voles, and carrion (Copeland et al., 2010; Hornocker & Hash, 1981; Inman et al., 2007; Magoun & Copeland, 1998).

Deep, persistent, and reliable spring snow cover (April 15 to May 14) is the best overall predictor of wolverine occurrence in the contiguous United States (Aubry, McKelvey, & Copeland, 2007; Copeland et al., 2010; Inman et al., 2013; Magoun & Copeland, 1998). In Montana, wolverines are generally restricted to high elevations where deep snow persists. They disperse through areas where snow persists through mid-May but also travel through low-elevation habitats (McKelvey et al., 2011).

Home range sizes are large, disproportionately so for a mammal of its size. In Glacier National Park, adult female home ranges averaged 55 square miles, and adult males ranged over an even larger area, including lands outside the Park, with home ranges that averaged 193 square miles (Copeland & Yates, 2006). The availability and distribution of food is likely the primary factor determining wolverine movements and home range size (Hornocker & Hash, 1981). Wolverines, particularly males, frequently travel long distances over rough terrain and deep snow (Copeland & Yates, 2006; Hornocker & Hash, 1981; Inman et al., 2009).

Female wolverines use natal (birthing) dens that are excavated in snow. Wolverines appear to choose areas of high structural diversity for dens, including components such as logs or boulders (Magoun & Copeland, 1998). Persistent, stable snow greater than 5 feet deep appears to be a requirement for natal dens because it provides security for offspring and buffers cold winter temperatures (Copeland et al., 2010).

Female wolverines forage close to their den sites in early summer, progressively ranging farther from dens as kits become more independent. Until they are at least 10 weeks old, kits cannot travel with their mother. Females in Glacier National Park typically used two or three different dens prior to weaning of kits at 6-7 months of age (Copeland & Yates, 2006). Kits were found to gather at rendezvous sites that were located primarily in boulder, talus, and cliff areas (Copeland et al., 2010).

The wolverine is primarily a scavenger of carrion, but it also preys on small animals and birds and eats fruits, berries, and insects when available (Hornocker & Hash, 1981). Wolverines have an excellent sense of smell that enables them to find food, even beneath deep snow. Inman and others (2013) found a link between persistent snow and wolverine foraging strategy. Wolverines appear to rely on the cold and snow to cache carrion.

In the NCDE, the majority of wolverine habitat is located in higher-elevation areas that are largely wilderness, inventoried roadless areas, or lands otherwise relatively unavailable for development. In Idaho, wolverines frequently used unmaintained roads for traveling during the winter and did not avoid trails used infrequently by people or active campgrounds during the summer (Copeland et al., 2007).

Wolverines appear to be capable of dispersing between habitats and through areas where human developments such as transportation corridors occur. Populations across the northern Rocky Mountains appear to be connected to each other via dispersal at the present time (M. K. Schwartz et al., 2009).

Timber harvest, livestock grazing, and prescribed fire appear to have little impact on wolverines since they are not dependent on specific vegetation or habitat features that might be manipulated by land management activities. In British Columbia, wolverines used recently logged areas in the summer and moose winter ranges for foraging in the winter, and males did not appear to be

influenced strongly by the presence of roadless areas (Krebs, Lofroth, & Parfitt, 2007). In Idaho, wolverines used recently burned areas despite the loss of canopy cover (Copeland, 1996).

Climate change has been discussed as the greatest potential impact to wolverine numbers and distribution because of the apparent requirement for deep, persistent snow in order for females to den and reproduce successfully. Wolverines' need for relatively cold average temperatures and for persistent snow explains their occurrence largely in the upper elevations of mountains in the contiguous United States. It appears that low-elevation and valley bottom habitats are used only for dispersal and not for foraging or reproduction in Montana and elsewhere in the northern Rockies (Inman et al., 2009). If climate change affects montane habitats, and particularly the timing, depth, or duration of snowpack, it might impact wolverine numbers and distribution. However, there is a high degree of uncertainty regarding the impacts of climate change and, in particular, if and when a decrease in deep, persistent spring snow will limit the availability of den sites, thereby causing a wolverine population decline in the future. USFWS concluded that available information does not yet indicate if and when that may occur (USFWS, 2014a).

Environmental consequences—Wolverine

None of the alternatives would impact the extent of persistent spring snow or the effects of climate change on wolverine habitat. The majority of wolverine habitat in the NCDE is located in higher-elevation areas that are largely wilderness, inventoried roadless areas, or lands that are relatively unavailable for development. Forest plan direction for activities such as timber harvest, livestock grazing, and motorized use of forest roads and trails are not expected to negatively affect wolverines or their habitat.

Over-snow vehicle use is prohibited in designated wilderness and certain other portions of the Forests, but existing motorized use would continue where it is allowed. With very few exceptions, over-snow vehicle use is not permitted after March 31 on the amendment forests.

There is a potential for existing motorized over-snow vehicle use to negatively impact wolverines in their natal and maternal dens. Under the action alternatives, standard NCDE-STD-AR-08 would allow no net increase in the percentage of area or miles of routes within modeled grizzly bear denning habitat in the NCDE primary conservation area that are designated for motorized over-snow vehicle use on NFS lands during the den emergence time period. This could have a small benefit to wolverines by preventing an increase in possible impacts during the portion of the season when females are using maternal dens.

No direct, indirect, or cumulative effects on wolverine can be identified as a result of the alternatives at this programmatic level.

Yellow-billed cuckoo, western distinct population segment

Key indicator for analysis

The key indicator for determining effects to yellow-billed cuckoo is

- availability of riparian woodland nesting habitat with dense understory foliage: the change in amount and quality of riparian habitat dominated by cottonwood and willow.

Methodology and analysis process

The western yellow-billed cuckoo has not been confirmed to occur or breed on NFS lands in the NCDE. Based on the existence of potential nesting habitat, USFWS considers that it “may be

present” on the Lolo National Forest. Therefore, the analysis of effects was limited to the Lolo National Forest.

Affected environment

Population status and distribution

The yellow-billed cuckoo is a medium-sized bird, about 12 inches in length. The western subspecies generally is larger than the eastern subspecies and differs in the timing of its migration and breeding (Franzreb & Laymon, 1993).

On October 3, 2014, the USFWS published the final rule to list the yellow-billed cuckoo as a threatened distinct population segment in the western portion of its range in the United States, Canada, and Mexico (79 FR 59992). The western distinct population segment of the yellow-billed cuckoo is located west of the crest of the Rocky Mountains. This population was found to be threatened by two factors:

- First, habitat destruction, modification, and degradation from dam construction and operations, water diversions, river flow management; stream channelization and stabilization; conversion to agricultural uses, such as crops and livestock grazing; urban and transportation infrastructure; and increased incidence of wildfire threaten the yellow-billed cuckoo western distinct population segment. These factors also contribute to fragmentation and promote conversion to non-native plant species, particularly tamarisk. The majority of the habitat for the cuckoo is on private lands and continues to be lost or significantly altered.
- Second, rarity and small and isolated population sizes cause the remaining western yellow-billed cuckoo populations to be increasingly susceptible to further declines through lack of immigration, reduced populations of prey species (i.e., food items), pesticides, and collisions with tall vertical structures during migration. The serious and ongoing threat of small overall population size, which is the result of other threats in combination, leads to an increased chance of local extirpations.

There are very few occurrences of the yellow-billed cuckoo recorded west of the Continental Divide in Montana. A few records indicate that yellow-billed cuckoos occur in the Flathead River area, but no information exists to confirm breeding in that area. USFWS indicates that the species “may be present” on the Lolo National Forest.

Habitat

Western yellow-billed cuckoos breed in riparian habitats, particularly woodlands with cottonwoods (*Populus fremontii*) and willows (*Salix* spp.) in the western United States (Laymon & Halterman, 1987). The amount of cottonwood-willow-dominated vegetation cover in the landscape and the width of riparian habitat have been found to influence cuckoo distribution and abundance in Arizona (M. J. Johnson, Magill, & vanRiper III, 2010).

Environmental consequences—Yellow-billed cuckoo

The western subspecies of yellow-billed cuckoo has not been documented to occur within the NCDE recovery zone or the primary conservation area, demographic connectivity areas, or zones 1, 2, or 3. However, riparian woodlands on the Lolo National Forest west of the Continental Divide may provide habitat for the yellow-billed cuckoo. None of the alternatives would alter the management of riparian deciduous forests along rivers. Therefore, no effects to this species or its habitat are anticipated under any of the alternatives.

As there would be no direct or indirect effects from the alternatives, no cumulative effects would occur.

6.5.7 Sensitive wildlife species

Introduction

Sensitive species are managed under the authority of the National Forest Management Act and administratively designated by the regional forester (Forest Service Manual 2670.5). Under the provisions of the 1982 planning rule, Forest Service sensitive species were addressed as part of the forest plans. The regulations and agency policy required that viable populations of native and desired non-native species are to be maintained, and actions that may cause a species to become threatened or endangered are to be avoided (Forest Service Manual 2670.22).

Table 197 identifies the regional forester's sensitive species that are known or suspected to occur on the amendment forests. This list of sensitive species was refined to show only those that may occur within the NCDE recovery zone/primary conservation area, demographic connectivity areas, and zones 1, 2, and 3.

Methodology and analysis process

Each of the existing forest plans was reviewed to identify management direction that is applicable to sensitive species and to important habitats such as snags, old growth, and riparian habitat. The management direction is summarized for each of the forest plans below.

Table 197. Sensitive species known or suspected to occur within the NCDE grizzly bear recovery zone/primary conservation area, Salish or Ninemile demographic connectivity areas, or zones 1-3

Species	Helena	Kootenai	Lewis and Clark	Lolo
American peregrine falcon (<i>Falco peregrinus anatum</i>)	NCDE/PCA, zones 1, 2, 3	zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Bald eagle (<i>Haliaeetus leucocephalus</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Black-backed woodpecker (<i>Picoides arcticus</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Common loon (<i>Gavia immer</i>)	—	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA	NCDE/PCA, zone 1
Flammulated owl (<i>Otus flammeolus</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	—	NCDE/PCA, zone 1, Ninemile DCA
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	—	—	Zone 3	—
Harlequin duck (<i>Histrionicus histrionicus</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1
Bighorn sheep (<i>Ovis canadensis</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Fisher (<i>Martes pennanti</i>)	NCDE/PCA, zones 1, 2	NCDE/PCA, zone 1, Salish DCA	—	NCDE/PCA, zone 1, Ninemile DCA
Gray wolf (<i>Canis lupus</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA

Species	Helena	Kootenai	Lewis and Clark	Lolo
Northern bog lemming (<i>Synaptomys borealis</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA	NCDE/PCA, zone 1, Ninemile DCA
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Coeur d'Alene salamander (<i>Plethodon idahoensis</i>)	—	NCDE/PCA, zone 1, Salish DCA	—	—
Boreal toad (<i>Bufo boreas</i>)	NCDE/PCA, zones 1, 2, 3	NCDE/PCA, zone 1, Salish DCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Northern leopard frog (<i>Rana pipiens</i>)	NCDE/PCA, zones 1, 2, 3	Zone 1	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA
Plains spadefoot (<i>Spea bombifrons</i>)	NCDE/PCA, zones 1, 2, 3	—	—	—
Greater short-horned lizard (<i>Phrynosoma hernandesii</i>)	—	—	NCDE/PCA, zone 3	—

Helena National Forest plan

The Helena forest plan (USDA, 1986b) includes forestwide goals (p. II-1) to maintain habitat for big game and other wildlife species (goal 2) and specifically to identify, maintain, or enhance habitats to facilitate recovery of the bald eagle, peregrine falcon, and gray wolf (goal 8), which have recovered and are now on the list of sensitive species. Forestwide standards for wildlife and fisheries (pp. II-17 to II-21) provide specific measures for the protection of bald eagles, peregrine falcons, and gray wolves, as well as standards for management of old-growth and snag habitat. Additional standards pertaining to general watershed guidance (p. II-25), seismic exploration (p. II-28), road management (p. II-31), and riparian areas (pp. II-34 and II-35) ensure coordination of resource management programs with wildlife habitat needs.

Kootenai National Forest plan

The 2015 Kootenai forest plan (USDA, 2015e) provides management direction specifically aimed at protection of sensitive species and important habitats. Forestwide GOAL-WL-02 is to manage and schedule activities to avoid or minimize disturbance to sensitive species and to manage habitat to promote their perpetuation into the future (p. 28). There are numerous forestwide desired condition statements (pp. 28-30) that express the intention to protect nests, den sites, and other birthing and rearing areas of sensitive species from human disturbance during the period they are active (FW-DC-WL-01); to provide a system of large remote areas to accommodate species such as some wide-ranging carnivores (FW-DC-WL-02), to provide habitat for bald eagles and peregrine falcons (FW-DC-WL-06 and 07) and for native ungulates (FW-DC-WL-16) and wolf packs (FW-DC-WL-18); and to provide aquatic and riparian habitats, old-growth forest, snags and large tree habitat, down logs, fire-killed trees, and cave habitats (FW-DC-WL-10 to 15). Numerous forestwide guidelines (pp. 30-33) address protection of active nesting or denning sites of bald eagle, raptors, harlequin duck, common loon, Townsend's big-eared bat, wolf, and other sensitive, threatened, or endangered species.

Lewis and Clark National Forest plan

The existing Lewis and Clark forest plan (USDA, 1986c) (including amendment 12) provides management direction aimed at protection of sensitive species and important habitats. The long-range goal 3 (p. 2-2) is to promote high-quality wildlife and fish habitats for public benefit, which

includes giving special emphasis to sensitive species (plant, animal, and fish) management. Forestwide wildlife and fish objectives (p. 2-5) include gathering inventory data and providing coordination with other programs to ensure maintenance of sensitive species populations. Forestwide standards addressing sensitive species include requirements to conduct a biological evaluation of each program or activity that is Forest Service funded, authorized, or carried out on occupied sensitive species habitat to determine whether the activity may affect the species (C-2(2) p. 2-32), to use current research data in resource planning and administration affecting sensitive species and their habitats (C-2(4), p. 2-32), and to establish an active public information and education program addressing threatened and endangered and sensitive species management (C-2(11), p. 2-34). There are also forestwide standards to maintain bald eagle and peregrine falcon habitat (C-2(12), p. 2-34) and to manage snags and down logs (C-4, pp. 2-35 and 2-36).

Lolo National Forest plan

The Lolo forest plan contains management direction aimed at protection of sensitive species and important habitats. Forestwide goal 2 (p. II-1) is to provide habitat for viable populations of all indigenous wildlife species and for increasing populations of big game animals. A forest plan objective is to provide habitat for viable populations of the diverse wildlife and fish species on the Forest, with special attention given to species dependent on snags, old-growth areas, and riparian zones (p. II-2). Forestwide wildlife standard 27 (p. II-13) also requires in part that plant and animal species that are not threatened or endangered, but for which viability is a concern (i.e., sensitive species), be managed to maintain population viability. Wildlife standard 25 provides direction to provide sufficient snags and dead material to maintain 80 percent of the population of snag-using species, and wildlife standard 28 requires that land management practices be designed to have a minimum impact on the aquatic ecosystem.

Effects common to all alternatives

All of the forest plans contain direction to protect sensitive species and their habitats. A biological evaluation is conducted for all projects that may impact sensitive species, which helps to minimize or avoid adverse impacts on sensitive species.

Peregrine falcon

Key indicator for analysis

The key indicator for determining effects to peregrine falcon is

- cliffs adjacent to river corridors and valley bottoms, avian prey base: habitat loss or reductions in prey populations.

Affected environment

Population status and distribution

Widespread use of organochlorine pesticides (e.g., dichlorodiphenyltrichloroethane, or DDT) in the 1970s, which caused eggshell thinning and reproductive failure, led to drastic declines in peregrine falcon populations. Subsequently, successful recovery efforts were completed, and the peregrine falcon was delisted in 1999 from the Endangered Species Act (64 FR 46542). As of 2003, data from the first five years of post-delisting monitoring indicated that there were 3,005 nesting pairs of American peregrine falcons in the United States, Canada, and Mexico, compared to approximately 1,750 pairs at the time of delisting (71 FR 60563). Estimates of territory occupancy, nest success,

and productivity in 2003 and in later years have all substantially exceeded the target values needed to sustain recovery of the species.

The Montana Peregrine Institute tracks 178 historical peregrine falcon territories in the State. The average number of active territories over three-year periods has increased from 14 in 1994-1996 to 89 in 2009-2011.

Habitat

The peregrine falcon inhabits a wide range of habitats, including arctic tundra, sea coasts, montane meadows and prairies, and urban centers. Nests are typically placed on cliff ledges or crevices, but some peregrine falcons will also use tall buildings and bridges near good foraging areas. Adult falcons are known to reuse the same nest site for several decades (C. M. White, Clum, Cade, & Hunt, 2002). Peregrine falcons feed primarily on birds, generally medium-size passerines up to small waterfowl, along major rivers and lakes.

In Montana, breeding and wintering habitat occurs primarily along large lakes and major river drainages. Typical nesting habitat on the national forests is comprised of cliffs where the nest scrape is located and adjacent river corridors and valley bottoms that are used for foraging. In Montana, the nesting period is generally June and July (MNHP-MTFWP, 2015g).

Peregrine falcon nest failure can occur due to human disturbances such as recreational climbing (Hamann et al., 1999). The species can become habituated to human intrusion, although pairs nesting in remote locations probably have lower tolerance than those nesting in urban or frequently visited sites (C. M. White et al., 2002). Activities within 0.5 mile of an active nest site may have the potential to impair foraging and cause nest abandonment (Hamann et al., 1999).

Environmental consequences—Peregrine falcon

Indirect effects of alternative 1—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The existing forest plan direction pertaining to peregrine falcons would be retained. The cliff nesting habitat of peregrine falcons is unlikely to be affected by management of grizzly bear habitat on NFS lands, and riparian foraging habitats are identified during site-specific analysis and managed in accordance with the forest plan. Recovery and delisting of the peregrine falcon occurred during implementation of the existing forest plans. Under the no-action alternative, continued expansion of the population and re-occupancy of historical habitat would be expected to occur.

Indirect effects of alternative 2 modified and alternative 3—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Existing forest plan direction that is specific to the peregrine falcon and its habitat would not be changed under either alternative 2 modified or alternative 3. The amended grizzly bear management direction is not expected to affect habitat for the peregrine falcon or its avian prey. The population would be expected to continue to increase, the same as under the no-action alternative.

Cumulative effects—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Since there would be no direct or indirect effects under any of the alternatives, no cumulative effects would occur.

Bald eagle

Key indicators for analysis

The key indicators for determining effects to bald eagle are

- forested habitat adjacent to lakes, rivers, and wetlands: the predicted change in quality or availability of habitat; and
- human disturbance during nesting period: the predicted change in quality or availability of habitat

Affected environment

Population status and distribution

The bald eagle was removed from the Federal list of threatened and endangered species in 2007 but is still protected by the Bald and Golden Eagle Protection Act. Recovery of the population has been attributed to the substantial reduction of environmental contaminants, particularly the banning of DDT (dichlorodiphenyltrichloroethane), and to habitat protection (MBEWG, 2010).

In Montana, there has been a steady increase in the number of breeding bald eagles in Montana, from fewer than 100 nesting territories in 1989 to almost 500 in 2008 (MBEWG, 2010). Suitable but unoccupied nesting habitat for bald eagles remains available, and it is likely that the population will continue to expand in Montana.

Habitat

Important year-round habitat includes wetlands, major waterbodies, spring spawning streams, ungulate winter ranges, and open water areas (USDI-BR, 1994). During the winter, roost trees are used by bald eagles for shelter.

Nesting sites (both current nesting and suitable habitats) are generally located within larger forested areas near large lakes and rivers where nests are usually built in the tallest, oldest large-diameter trees, primarily along large river corridors, lakes, and reservoirs. Nesting site selection is dependent upon local food availability and disturbance from human activities. The majority of breeding habitat is not located on NFS lands but is distributed along large reservoirs and major river systems. Important foraging habitat may be 10 miles or more from the nest.

The majority of the diet is fish, such as salmonids, suckers, and whitefish. In the winter, waterfowl and carrion become more important food sources (USDI-BR, 1994).

Habitat management guidelines for bald eagles in Montana emphasize maintaining prey bases; maintaining forest stands currently used or suitable for nesting, roosting, and foraging; planning for future potential nesting, roosting, and foraging habitat; and minimizing disturbances from human activities in nest territories, at communal roosts, and at important feeding sites (USDI-BR, 1994).

Forest Service activities that may have direct or indirect impacts on bald eagles include timber harvest, road construction, prescribed fire, and fire suppression that could alter habitat or disturb nesting birds. Nest failure can also occur due to human disturbance from recreational or industrial activities, such as helicopter use or blasting. The period in which activities have the greatest influence on nesting and rearing activities generally is between February 1 and August 15 (MBEWG, 2010).

Environmental consequences—Bald eagle

Indirect effects of the no-action alternative—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The bald eagle population has increased dramatically during the period when the existing Helena, Kootenai, Lewis and Clark, and Lolo forest plans were implemented. Each of the forest plans provides specific emphasis for management of bald eagle habitat. The Forest Service uses information outlined in the Montana Bald Eagle Management Plan (MBEWG, 2010) and National Bald Eagle Management Guidelines (USFWS, 2007a) during project analysis, which includes protecting known nesting and foraging areas. Under the no-action alternative, it is likely the bald eagle population would continue to expand both on and off NFS lands.

Indirect effects of alternative 2 modified—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The effects on the bald eagle would be similar to the no-action alternative. Existing forest plan management direction specific to the bald eagle would be retained. The additional standards and guidelines that would limit new developed recreation sites in the primary conservation area could benefit the bald eagle by reducing the potential for nest site disturbance or displacement caused by human presence and associated activities. This alternative would add NCDE-STD-MIN-08, which would require a no surface occupancy stipulation for new oil and gas leases in the primary conservation area. These potential benefits may or may not occur, depending on site-specific locations and conditions. The population would be expected to continue to increase, similarly to the no-action alternative.

Indirect effects of alternative 3—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The effects on the bald eagle would be similar to alternative 2 modified. Standard NCDE-STD-MIN-08 would be extended beyond the primary conservation area to also apply to zone 1. This might help to minimize habitat loss and disturbance to eagles. Whether there would be benefits to the bald eagle would depend on site-specific locations and conditions. As with the other alternatives, the population would be expected to continue to increase.

Cumulative effects

Contaminants and poisons, such as pesticides and lead, continue to cause mortality of bald eagles. Powerline electrocution is also a source of mortality, although efforts to change the design and otherwise protect eagles have been implemented in many areas. Wind energy development can also cause eagle mortality but is subject to review and regulation under the Bald and Golden Eagle Protection Act. Increasing residential and other development along rivers and lakes can disturb and displace eagles from important nesting and foraging habitat. There would be a potential for adverse cumulative impacts from all of these factors. However, given the existing regulatory protections and the bald eagles' continuing upward population trend, these impacts in combination with the alternatives being considered would not be expected to have cumulative adverse effects on the overall population.

Black-backed woodpecker

Key indicators for analysis

The key indicator for determining effects to black-backed woodpecker is

- amount of recently burned conifer forest: the predicted change in availability of habitat and prey base.

Affected environment

Population status and distribution

Black-backed woodpeckers range from central Alaska and northern Canada to montane areas of California and New England. Black-backed woodpeckers are yearlong residents of Montana.

Habitat

Burned conifer forests and other insect-infested forests provide key conditions necessary for both nesting and foraging by black-backed woodpeckers (Hutto, 2008). Black-backed woodpeckers are considered “burn specialists” and occur at highest densities in burned, unlogged areas (Saab, Russell, & Dudley, 2007). They are cavity-nesting birds, occupying forested habitats that contain high densities of snags, especially post-fire areas (Dixon & Saab, 2000).

Nappi and Drapeau (2009) found high nest densities and reproductive success in severely burned spruce forests, with declining nest success as the time since the burn increased. Large, stand-replacing burns provide high concentrations of wood boring beetles that are a primary food source for black-backed woodpeckers for two to four years following a burn. The authors suggested that old forests (including mature and old-growth forest habitats) may help sustain black-backed woodpecker populations in regions with longer fire cycles.

Burned forests are believed to act as source habitats for two to four years following a fire, from which birds emigrate once the food supply diminishes (Nappi & Drapeau, 2009). Both male and female birds must frequently colonize new habitat patches during their lifetimes (J. C. Pierson, Allendorf, Drapeau, & Schwartz, 2013).

In a conservation assessment for the black-backed woodpecker, Samson (2006) found a significant increase in the amount of acreage burned throughout the USDA Forest Service Northern Region (hereafter “Northern Region”) when comparing 1990-1993 (66,743 acres) against 2000-2003 (1,139,537 acres). Throughout the Northern Region, habitat for black-backed woodpecker currently is well distributed and well connected, and there are no gaps that would limit black-backed woodpecker movements (Samson, 2006).

Environmental consequences—Black-backed woodpecker

Indirect effects of alternative 1—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The Helena, Kootenai, Lewis and Clark, and Lolo National Forests would continue to implement their current forest plan direction pertaining to snag habitat. Population numbers and distribution of black-backed woodpeckers would likely continue to fluctuate, primarily in response to large stand-replacing fires and bark beetle outbreaks.

Indirect effects of alternative 2 modified and alternative 3—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Existing forest plan management direction pertaining to snags or post-fire salvage harvest would not change under either of the action alternatives. The grizzly bear management direction would maintain baseline levels of motorized access in the primary conservation area. Therefore, no change from the current rate of removal of snags for firewood cutting or post-fire salvage is expected in those areas. No effects to this species or its habitat are anticipated due to either of the action

alternatives. Population numbers and distribution would likely continue to fluctuate, primarily in response to wildfires and bark beetle outbreaks.

Cumulative effects

As there would be no direct or indirect effects, no cumulative effects would occur.

Common loon

Key indicators for analysis

The key indicator for determining effects to common loon is

- island and shoreline habitat on large lakes and fish prey base: change in availability of habitat or prey base.

Affected Environment

Population status and distribution

Common loons breed on lakes in the forested regions of Alaska, Canada, and the most northern portions of the continental United States, and they winter along the coasts. Globally, the population is considered “secure.” Montana lists the common loon as a species of concern.

Montana supports the largest breeding population of common loons in the western continental United States. The 10-year average summer count is 216 individuals, consisting of an average of 62 territorial pairs, 52 non-breeding “single” adults, and 41 chicks. Since surveys began in the late 1980s, the population has remained stable (Hammond, 2009).

Common loons are long-lived birds with a relatively low reproductive rate. The average age of first-time breeders is about seven years old. Loons lay only one to two eggs and raise no more than one brood per year. Both parents defend the territory and raise the young (Hammond, 2009). In Montana, about 50 percent of loon nests fail each year due to natural causes (flooding, predation) and human factors (disturbance). Juvenile loons typically spend their first three winters on or near the West Coast of the United States before returning to their natal area (Hammond, 2009).

Common loons nest on the Lolo and Kootenai National Forests. The adult loon population in the Tobacco-Stillwater and Clearwater-Swan drainages represents about 30 percent of Montana’s total population (Kelly, 1992). Common loons are not known to nest on the Helena or Lewis and Clark National Forests, but migrating birds have been recorded on the Rocky Mountain Range, Upper Blackfoot, and Little Belts geographic areas and on the edge of Big Belts and Divide landscapes on adjacent large reservoirs (USDA, 2015a).

Habitat

In Montana, common loons generally nest on lakes larger than about 13 acres in size and below 5,000 feet in elevation, according to a 1990 report by Skaar (as cited in Hammond, 2009). If nesting on a small lake, they may use an adjacent lake for supplementary foraging.

Successful nesting requires nesting sites and nursery areas that are sheltered from winds and human disturbances. Loon nests are typically located on islands situated in open water, along transitional swamp shorelines, or within marshes (Kelly, 1992). Nest sites are generally located within 4 feet of the water’s edge. Once the eggs have hatched and the young are ready to leave the nest, the family moves to a nursery area, a shallow-water area protected from wind, waves, and other loons and with abundant insects and small fish (Hammond, 2009).

Water quality is an important habitat feature for breeding loon success. Loons are visual predators; therefore, clear water is crucial for foraging efficiency (Hammond, Mitchell, & Bissell, 2012). Loons feed mostly on small fish such as yellow perch and various minnow species. Other aquatic organisms may also be consumed.

Analysis by Hammond and others (2012) suggests that the loon population is limited by intraspecific interactions rather than available foraging habitat. Therefore, conservation efforts should be focused on lake complexes that have high numbers of territorial pairs.

Loons are extremely territorial and sensitive to disturbance during the nesting season. Eggs in nests may be susceptible to loss due to predation or cooling if disturbance keeps the incubating adult off of the nest for prolonged periods of time. Disturbance of nesting pairs by recreationists and development surrounding occupied lakes has been thought to be an important stressor of loons. Kelly (1992) reported an increase in productivity on several lakes in northwestern Montana after implementing information and education programs and deploying floating signs around nests. These efforts appear to have been successful in mitigating the potential negative effects of disturbance on reproductive potential (Hammond et al., 2012). The Forest Service has partnered with the State of Montana, the Loon Society, and the Common Loon Working Group over many years to monitor loon productivity, provide public education, and place signs near occupied loon nests to prevent boaters from disturbing nesting loons.

Environmental consequences—Common loon

Indirect effects of alternative 1—Kootenai and Lolo National Forests

On the Kootenai and Lolo National Forests, recreational access sites such as campgrounds and boat ramps are provided on several lakes that also support nesting loons. The Forest Service would continue with cooperative efforts to provide public information and education and to place floating signs around active loon nests. The existing nesting population would be maintained.

Indirect effects of alternative 2 modified and alternative 3—Kootenai and Lolo National Forests

Under alternative 2 modified and alternative 3, existing forest plan direction would remain in place. Limits on new developed recreation sites in the primary conservation area could benefit the common loon by reducing the potential for nest site disturbance or displacement caused by human presence and associated activities in those portions of the Kootenai and Lolo National Forests. These potential benefits might or might not occur, depending on site-specific locations and conditions. The existing nesting population would be maintained.

Indirect effects of the alternatives—Helena and Lewis and Clark National Forests

Forest Service actions would not be expected to have any effect on migrating loons. Therefore, there would be no effects from any of the alternatives on the Helena National Forest or the Lewis and Clark National Forest.

Cumulative effects

Increasing human population and associated developments might increase the potential for disturbance and displacement of nesting loons, reducing their reproductive success. If this should occur, the Forest Service would take action to reduce or mitigate the disturbance.

Climate change could affect loons by altering water levels, water temperatures, and vegetation. If climate change alters precipitation and the timing of spring melt, water levels might fluctuate more during nesting than occurred previously. This might impact reproductive success if nests become

submerged or elevated as the water level varies. Altered water temperatures might impact the suitability of lakes for different fish species, thereby changing prey abundance. Aquatic vegetation, which is important for nests, could be altered, and this might change nest site availability. Forest plan direction would not have an influence on these changes.

Flammulated owl

Key indicators for analysis

The key indicator for determining effects to flammulated owl is

- ponderosa pine and Douglas-fir forest: the change in availability of habitat and insect prey base.

Affected environment

Population status and distribution

Flammulated owls are known to breed along the western border of Montana and to winter in Mexico. Flammulated owls are strongly associated with mature ponderosa pine forests and to a lesser extent with Douglas-fir forests. They prefer stands with an open canopy (< 40 percent crown closure) where they can successfully forage for moths and grasshoppers. Flammulated owls nest in cavities, often using abandoned pileated woodpecker or northern flicker cavities for their nest (Hayward & Verner, 1994). Estimates of the amount of habitat currently available for the flammulated owl in the Northern Region (Samson, 2006) indicate that habitat is abundant and well distributed across the national forests.

Flammulated owl surveys were carried out throughout the Northern Region in 2005 (Cilimburg, 2006). Flammulated owls were detected on the Helena National Forest in the Upper Blackfoot, Divide, Big Belts, and Elkhorn landscapes. Owls were again detected in 2008 and 2014 surveys conducted on the Helena National Forest.

On the Kootenai National Forest, dry ponderosa pine and Douglas-fir forests are relatively uncommon, with existing suitable habitat for flammulated owls estimated to total only about 24,000 acres (1 percent of the total area of the Kootenai National Forest). Modeling over a five-decade period projected that snag densities and the amount of the Forest in a large tree size class will increase, although most of the increase in acreage of large-diameter ponderosa pine and Douglas-fir will likely have a denser canopy cover (> 40 percent) than is preferred by the flammulated owl. Overall, the trend in flammulated owl habitat will be static (ERG, 2012).

The Lewis and Clark National Forest is on the eastern edge of the mapped distribution of flammulated owls and likely does not support a population. Surveys conducted on the Lewis and Clark National Forest in 2005 did not detect flammulated owls. The Rocky Mountain Ranger District is included in the range-wide distribution map for this species but lacks ponderosa pine habitat. The Little Belt, Highwood, Castle, Crazy, and Snowy mountain ranges are outside the known range of the species (USDA, 2015a).

On the Lolo National Forest, a Northern Region survey conducted in 2005 detected singing male owls at 35 of the randomly selected points, suggesting the species is relatively common in areas accessible by roads in the Douglas-fir and ponderosa pine zone. A number of additional surveys were conducted between 2005 and 2014 in conjunction with regional monitoring, forest old-growth monitoring, and project area surveys, and these also detected flammulated owls. According to the 2001-2013 wildlife monitoring report, the Lolo National Forest provides a substantial amount of habitat, estimated at about 16,000 acres (Brewer, Lewis, Tomson, Wroblewski, & Reel, 2014).

Habitat

Older ponderosa pine forests and ponderosa pine/Douglas-fir forests are favored by flammulated owls, but breeding locations have also been documented in Douglas-fir forest types and occasionally in grand fir, western larch, spruce/fir, lodgepole pine, and mature quaking aspen stands (Smucker, Cilimburg, & Fylling, 2008). Flammulated owl home ranges vary in size but average about 37 acres (McCallum, 1994).

Flammulated owls consistently select habitat that combines open forest stands (35 to 65 percent canopy closure) with large trees and snags, occasional clusters of thick understory vegetation, and adjacent grassland or forest openings. Roosting occurs in fairly dense stands, whereas relatively open stands seem to be selected for foraging and for nest sites (McCallum, 1994). Nests are placed in both live and dead large-diameter trees with cavities, commonly excavated by pileated woodpecker, northern flicker, or sapsuckers (Cilimburg, 2006). Flammulated owls prey primarily on nocturnal moths and insects in stands with an overstory of old ponderosa pine/Douglas-fir trees (Linkhart, Reynolds, & Ryder, 1998).

Fire exclusion allows growth of young Douglas-firs that suppress recruitment of shade-intolerant and large-diameter trees and may reduce the amount of open understory and tree canopy needed for flammulated owl foraging (Samson, 2006). A lack of low-intensity disturbance may have caused a decrease in the larger size classes of trees in ponderosa pine cover types. Large, stand-replacing fires can be detrimental to habitat needed for nesting. However, logging prescriptions or lower-intensity fires that maintain the large trees/snags needed for nesting and the open conditions needed for feeding can be beneficial (McCallum, 1994).

Threats to flammulated owls are detrimental changes in the structure of ponderosa pine and Douglas-fir stands as well as the loss of large snags needed for nesting. Ponderosa pine has been impacted by recent heavy insect infestations on the Helena National Forest.

Environmental consequences—Flammulated owl

Indirect effects of alternative 1—Helena, Kootenai and Lolo National Forests

Habitat for this species would remain well distributed on the Helena, Kootenai, and Lolo National Forests under the no-action alternative. Forest plan management direction would continue to provide for the protection and management of the old growth and snag habitats that are important for this species.

Indirect effects of alternative 2 modified and alternative 3—Helena, Kootenai, and Lolo National Forests

Existing forest plan management direction pertaining to old-growth forest and snags would be retained. Implementation of standards that limit the miles of motorized routes in zone 1 on the Lolo National Forest and in the Salish and Ninemile demographic connectivity areas could benefit this species by reducing the potential for future loss of snags due to public firewood cutting. These potential benefits may or may not occur, depending on site-specific locations and conditions. None of the other grizzly bear habitat direction is expected to affect flammulated owls.

Cumulative effects

Climate change is increasing the frequency and severity of wildfires and insect epidemics. Uncharacteristically severe fires in ponderosa pine and Douglas-fir forests could cause the loss of nesting and foraging habitat used by flammulated owls. However, lower-intensity, more frequent fires could be beneficial by reducing understory and opening the canopy in the drier, lower-elevation

forests used by flammulated owls. Adverse cumulative impacts are not anticipated to occur during the life of the forest plans.

Greater sage-grouse

Key indicators for analysis

The key indicator for determining effects to sage-grouse is

- amount and condition of sagebrush habitat: habitat loss or fragmentation.

Methodology and analysis process

The greater sage-grouse is not known or likely to occur on any of the amendment forests, with only one report from zone 3 on the Lewis and Clark National Forest. The analysis of effects is limited to that portion of the Lewis and Clark National Forest.

Affected environment

Population status and distribution

Greater sage-grouse occur in eleven States (Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, and North Dakota) and two Canadian provinces (Alberta and Saskatchewan), and they currently occupy approximately 56 percent of their historical range. Greater sage-grouse depend on a variety of shrub-steppe habitats throughout their life cycle and are obligate users of several species of sagebrush.

In 2010, the USFWS issued a 12-month finding that greater sage-grouse was warranted for listing under the Endangered Species Act (75 FR 13910). However, based on new information about the status of the species, potential threats, regulatory mechanisms, and conservation efforts, USFWS in 2015 determined that listing is not warranted at this time (80 FR 59857).

USFWS does not consider that the greater sage-grouse “may be present” on any of the amendment forests (USFWS, 2015b, 2015c, 2015d, 2015e, 2017b, 2017c, 2017d). Neither the species nor its habitat are known or suspected to occur within the NCDE recovery zone, the primary conservation area, or zones 1 or 2. There is one winter sighting from the east end of the Little Belt Mountains (in zone 3) on the Lewis and Clark National Forest. There are no active leks (breeding display sites) on NFS lands, with the nearest active lek located 12 miles from the Highwood Mountains (also in zone 3).

Habitat

Sage-grouse are strongly tied to sagebrush habitats (Connelly, Schroeder, Sands, & Braun, 2000). Leks typically occur in open areas surrounded by sagebrush. Most sage-grouse nests are placed under sagebrush, and these experience greater nest success (53 percent) than those nesting under other plant species (22 percent). In general, sage-grouse nests are placed under shrubs having larger canopies and more ground and lateral cover, as well as in stands with more shrub canopy cover, than at random sites. Grass height and cover also are important components of sage-grouse nest sites. Grass associated with nest sites and with the stand of vegetation containing the nests is taller and denser than grass at random sites.

Early brood-rearing areas occur in upland sagebrush habitats relatively close to nest sites. A high richness of plant species with abundant forbs and insects characterizes brood areas. During June and

July, grouse usually move to more mesic sites, including sagebrush, small burned areas within sagebrush, wet meadows, farmland, and other irrigated areas adjacent to sagebrush habitats.

Sage-grouse use a variety of habitats during the fall. Fall movements to winter range are slow and meandering. Winter habitat is characteristically sagebrush with greater than 20 percent canopy cover. During winter, sage-grouse feed almost exclusively on the leaves of sagebrush.

Environmental consequences—Greater sage-grouse

It is not likely that sage-grouse occur on any of the amendment forests, and the only report of the species is from zone 3 on the Lewis and Clark National Forest. None of the alternatives would alter management of sagebrush habitats, nor would any of the alternatives change existing management direction in grizzly bear zone 3. If the distribution of the greater sage-grouse were to expand in the future in response to conservation efforts, there would still be no effects anticipated on the greater sage-grouse or its habitat.

As there would be no direct or indirect effects, no cumulative effects would occur.

Harlequin duck

Key indicators for analysis

The key indicator for determining effects to harlequin duck is

- water quality and disturbance on fast-flowing rivers and streams: change in availability of habitat and prey base.

Affected environment

Population status and distribution

Harlequin ducks are sea ducks that breed inland on mountain streams (Cassirer & Groves, 1994). The western North America population of harlequin ducks breeds from northwestern Wyoming through northern Montana, eastern and northern Idaho, and into Oregon, Washington, and possibly northern California. After breeding, harlequin ducks return to the coasts of North America and Greenland.

Approximately 150-200 pairs of harlequin ducks breed in Montana (Reichel & Genter, 1996). Most ducks are located in tributaries of the lower Clark Fork River; tributaries of the North, Middle, and South Forks of the Flathead River; streams coming off the East Front of the Rocky Mountains; and the Boulder River.

Harlequin ducks and their habitat, although uncommon, are fairly well distributed across the Kootenai National Forest and the Lolo National Forest. The Helena National Forest and the Lewis and Clark National Forest represent the easternmost distribution of the western North America population; harlequin ducks are known to breed on the Upper Blackfoot landscape and the Rocky Mountain Division (USDA, 2015a, ch. 2). Single males have been observed along the Missouri River, on the Smith River, and on the East Boulder River, but these are single, unrepeatable observations with no evidence of breeding (NatureServe, 2015).

Habitat

Harlequin ducks use clear, fast-flowing rivers and streams for nesting and brood-rearing (Casey, 2000). Instream loafing sites include boulders or gravel bars adjacent to swiftly flowing water. Rivers and streams that lack human disturbance (e.g., boating, fishing, residences) and access by

road or trail are more likely to be used by harlequin ducks. Likelihood of use is also higher where there is dense hiding cover along the stream (overhanging shrub vegetation), logjams, undercut stream banks, and woody debris (Cassirer & Groves, 1994). Harlequins primarily feed on benthic insects during breeding season and also may feed on crustaceans, mollusks, and small fishes.

According to Casey (2000), potential risks and threats to harlequin ducks from activities on NFS lands include the following:

- Activities that result in streambank or channel alteration that eliminates or reduces cover and food supply. These include channelization, damming, livestock grazing, brush removal, timber harvest, gravel extraction, logjam removal, dredging, bank riprap, and road construction.
- High water during nesting may destroy nests, and high flows during early brood rearing may cause loss of broods. Low water renders feeding and brood-rearing habitats unavailable. Hydropower development, stream diversion or damming, mining, timber harvest, wildfire, and road construction have the potential to alter the timing, amount, and duration of stream flow.
- Sedimentation, pesticide contamination, and toxic chemical pollution of streams may reduce the supply of macroinvertebrates or reduce the ducks' ability to find prey. Activities that could cause these impacts include road construction and use, timber harvest, livestock grazing, toxic chemical spills, and mining.
- Human activity, either instream or on the bank, is of concern in part because harlequin ducks do not have an opportunity to re-nest after failure or brood loss. Males depart for the coastal wintering areas soon after nesting commences, whereas females remain on the breeding stream even after experiencing nest failure or brood loss. Activities that may disturb or displace harlequin ducks include boating use, angler use, hiking, camping, and land management activities in and along streams during the breeding season.

Environmental consequences—Harlequin duck

Indirect effects of alternative 1—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

The existing Helena, Kootenai, Lewis and Clark, and Lolo forest plans contain management direction that protects the riparian stream habitats used by harlequin ducks. Although harlequin ducks are rare, management direction appears to be sufficient to maintain their distribution and successful breeding.

Indirect effects under alternative 2 modified and alternative 3—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Existing forest plan management direction specific to harlequin ducks and their stream habitat would be retained under alternative 2 modified and alternative 3. The action alternatives would add limits on new developed recreation sites that could benefit harlequin ducks by reducing the potential for nest site disturbance or displacement caused by human presence and associated activities in the future. These potential benefits might or might not occur, depending on site-specific locations and conditions. None of the other forest plan components for grizzly bear habitat under these alternatives would be expected to affect harlequin ducks. The breeding population would likely be maintained under all alternatives.

Cumulative effects

Small population size, restricted distribution, narrow habitat requirements, and the vulnerability of a large portion of the population to catastrophic events such as high streamflow or coastal oil spills are

significant concerns for the harlequin duck. Water pollution in coastal wintering areas and hunting in wintering areas also have been identified as potential threats (MNHP-MTFWP, 2016b). Climate change has the potential to alter the timing, amount, and duration of stream flow, which may impact nesting success and the availability of macroinvertebrate prey. In combination with the effects of the alternatives, cumulative adverse effects are not expected to occur.

Bighorn sheep

Key indicators for analysis

The key indicator for determining effects to bighorn sheep is

- disease risk, as determined by effective separation of bighorn sheep from domestic sheep and goats: the change in risk of transmission of disease from domestic livestock.

Affected environment

Population status and distribution

Bighorn sheep are distributed throughout western North America, from southern and central British Columbia and Alberta southward into Mexico. Federal lands, primarily administered by the Bureau of Land Management and the Forest Service, provide the majority of habitats for bighorn sheep populations (O'Brien, O'Brien, McCarthy, & Carpenter, 2014).

Historically, bighorn sheep were numerous in Montana and were used for food and other purposes by Native Americans and the early explorers. Settlement led to significant declines of bighorns and other big game species. Bighorn sheep die-offs have been recorded in Montana since the early 1920s (MTFWP, 2010). As of 2008, there were about 5,700 bighorn sheep in 45 distinct populations (MTFWP, 2010). Between 2009 and 2011, bighorn sheep numbers in Montana declined by about 20 percent due to pneumonia-associated die-offs and subsequent poor to nonexistent lamb recruitment in herds that had experienced disease (Butler, Garrott, & Rotella, 2013).

Two bighorn sheep herd units overlap with the Helena National Forest. These are the Elkhorn (also known as Radersburg), which had a severe die-off in 2008 from which it is unlikely to recover, and the Beartooth-Gates of the Mountains, which has a relatively stable population.

There are four bighorn sheep herd units on the Kootenai National Forest: Kootenai Falls, Ural-Tweed, Galton Range (also known as Ten Lakes), and Cabinet (also known as Berray Mountain), all small populations of fewer than 100 animals. The Ural/Tweed and Galton Range herds are especially valuable because they are native populations that have the "Trench" genotype.

On the Lewis and Clark National Forest, there are four bighorn sheep herd units within the Southern Rocky Mountain Front complex that historically were used as a source population for transplants elsewhere. However, these herds, as well as the North Fork Birch-Teton herd unit, experienced a severe die-off in 2010.

Seven bighorn sheep herd units overlap with the Lolo National Forest: North Clark Fork, St Regis Cut-off, Paradise, Grave Creek, John Long Range, West Rock Creek, and Lower Blackfoot. All are robust populations that were at or above their population objectives as of 2008 (MTFWP, 2010).

Habitat

Bighorn sheep may occupy a wide array of habitats, ranging from alpine areas to low-elevation river breaks. They are typically found on cliffs, mountain slopes, and rolling foothills, and they tend to

avoid areas with dense timber. Escape cover or terrain, comprised of steep (60 percent or greater) open slopes, usually with rocky outcrops, in proximity to open foraging areas is a feature in all seasons. Bighorn sheep forage on forbs early in the spring, switching to grasses and shrubs as summer progresses and in the fall and winter. Snow depth may be an important driver of sheep movement to their winter ranges, which tend to be at low elevation or on south-facing slopes (MTFWP, 2010).

Respiratory disease epidemics are considered a primary factor limiting bighorn sheep populations in most of the western United States (O'Brien et al., 2014). Clifford and others (2009) estimated that the risk of pathogen transmission was higher where strong overlap existed between livestock allotments and known bighorn sheep movements. Sells and others (2015) analyzed 22 epizootics that occurred in 43 herds in Montana between from 1979-2013 and found that, within the area of each herd distribution plus a 9-mile buffer, the occurrence of private land, weed control using domestic sheep or goats, a history of pneumonia, and herd density were positively associated with risk of pneumonia.

Bighorn sheep of both sexes are known to make occasional long-distance exploratory movements outside their typical home range, which increase the risk of contact with domestic sheep or other infected herds and the spread of the pathogens upon return to their own herds. Rams have a greater tendency than ewes to make long-distance movements (O'Brien et al., 2014). In Idaho, O'Brien and others (2014) recorded summer-season forays by bighorn sheep, with 50 percent of foraging males traveling at least 5 miles and 10 percent of foraging males traveling at least 13.5 miles beyond their core herd home range boundary. In Montana, DeCesare and Pletscher (2006) detected relatively long-range (12- to 20.5-mile) movements outside of their home ranges by males in three herds.

To reduce the risk of respiratory disease, the Wild Sheep Working Group (2012) made three recommendations to land management agencies. First, reduce the risk of association by eliminating overlap of domestic sheep or goat allotments or grazing permits/tenures within wild sheep habitat; second, ensure that annual operating instructions or their equivalent include measures to minimize domestic association with wild sheep and confirm appropriate methods to remove stray domestic sheep or goats; and third, manage wild sheep habitat to promote healthy populations in areas without domestic sheep or goats.

Historically, there have been many conflicts between grizzly bears and domestic sheep. Over many years, the Forest Service has worked with permittees to resolve conflicts that have occurred on grazing allotments on NFS lands. Nearly all sheep allotments have been phased out or relocated outside the grizzly bear recovery zone/primary conservation area. Currently, there are only two remaining sheep allotments in the recovery zone/primary conservation area, which are on the Helena National Forest and are very closely managed, for example, by bringing in the sheep at night.

MTFWP identified seven habitat issues for Montana bighorn sheep herds. These issues include the following:

- habitat loss and fragmentation and displacement of bighorns caused by residential and resort developments;
- fragmentation of habitat and vehicular collision losses due to highway development and maintenance;
- habitat loss and fragmentation and population reduction and displacement to less productive habitats due to industrial developments such as dam development, hard rock mining, oil and gas development and exploration, and electrical transmission lines;

- livestock grazing on private and public lands, particularly conversion of allotments from cattle to domestic sheep;
- loss of habitat and connectivity due to forest succession or woody plant encroachment into former grasslands or shrub grasslands, caused in part by historical overgrazing and fire suppression;
- reduction or loss of productivity of seasonal ranges due to invasive plant species; risk of disease transmission when domestic animals are used for weed control; and
- human disturbance on critical winter and lambing ranges (MTFWP, 2010).

Environmental consequences—Bighorn sheep

Helena National Forest—Indirect effects of the no-action alternative

Currently, there is one active sheep grazing allotment within the primary conservation area on the Helena National Forest and two active sheep grazing allotments south of Montana Highway 200 in the Blackfoot landscape. The current number of sheep allotments and animal unit months would likely remain the same on the Forest. There is no expectation that domestic sheep grazing would be increased within the recovery zone. The sensitive species status of the bighorn sheep ensures that habitat requirements and disease transmission risks will be considered in future site-specific decisions.

Over 10 air miles currently separate the boundaries of the sheep grazing allotments from the areas known to be occupied by bighorn sheep. Sheep in the allotment on the Lincoln Ranger District that is within the primary conservation area are only allowed to graze during the day and are returned to private land at night due to concerns about predation by grizzly bears. This management practice likely further minimizes the potential for contact between those domestic sheep and wild bighorn sheep. Overall, the potential for disease transfer from domestic sheep to bighorn sheep within the allotments is low and likely to remain so.

Helena National Forest—Indirect effects of alternative 2 modified and alternative 3

A forest plan standard would be added that would not allow any increase in the number of active sheep allotments or permitted animal unit months above the baseline within the primary conservation area and zone 1. In addition, grazing by or trailing of small livestock for weed control within the primary conservation area and zone 1 would have to include measures to reduce the risk of conflicts with grizzly bears. The potential for disease transfer from domestic sheep to bighorn sheep within the primary conservation area would remain low. These standards would provide additional assurance that the level of sheep grazing would not increase in the future.

None of the other plan components that would be added to the forest plans under these alternatives would be expected to have any effect on bighorn sheep or their habitat.

Kootenai National Forest—Indirect effects of the no-action alternative

No active or vacant domestic sheep or goat allotments occur on or adjacent to the Kootenai National Forest. Pack goats are rare, and the use of domestic goats for weed control currently does not occur on the Forest. The forest plan will allow grazing to occur as long as vulnerable resources are protected (FW-DC-GRZ-01). This direction will provide protection for bighorn sheep if domestic sheep grazing were to be proposed in the future, although this is unlikely, and disease transmission risks will be considered in any future proposals.

Kootenai National Forest—Indirect effects of alternative 2 modified and alternative 3

These alternatives would not allow any increase in the number of sheep allotments or animal unit months above the baseline in the primary conservation area and zone 1. There are no domestic sheep allotments currently in the primary conservation area, so the effects would be the same as under the no-action alternative. By not allowing an increase in sheep allotments or animal unit months in zone 1, there would not be an increase in the potential for future disease transfer between wild and domestic sheep.

Lewis and Clark National Forest—Indirect effects of the no-action alternative

Currently, there are no domestic sheep grazing allotments within the grizzly bear recovery zone on the Lewis and Clark National Forest. The sensitive species status of the bighorn sheep ensures that habitat requirements and disease transmission risks are considered in future site-specific decisions.

Lewis and Clark National Forest—Indirect effects of alternative 2 modified and alternative 3

A forest plan standard would be added that would not allow any increase in the number of active sheep allotments or permitted animal unit months above the baseline within the primary conservation area (there is virtually no acreage in zone 1 on this Forest). In addition, grazing by or trailing of small livestock for weed control within the primary conservation area would have to include measures to reduce the risk of conflicts with grizzly bears. Within the primary conservation area, there is no potential for disease transfer from domestic sheep to bighorn sheep. The additional standards under this alternative would provide additional assurance that the level of sheep grazing would not increase in the future.

Lewis and Clark National Forest—Indirect effects of the no-action alternative

There are no active or vacant domestic sheep or goat allotments currently in the recovery zone or elsewhere on the Lolo National Forest. Forest plan standard 4 states that conflicts between livestock and big game will be resolved so big game are allocated the forage required to meet their needs; domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations; and reductions in livestock numbers will be avoided if possible but will be acceptable to meet management goals. According to the 2000-2001 monitoring report, livestock grazing has been diminishing over time on the Lolo National Forest due to a variety of reasons, including the economics of small-scale ranching operations, the loss of private ranch lands to subdivision and development, concerns over conflicting resource issues and values, and the loss of transitory range as past timber harvest units revegetate. The sensitive species status of the bighorn sheep ensures that habitat requirements and disease transmission risks will be considered in future site-specific decisions. Currently, the potential for disease transfer from domestic sheep to bighorn sheep on the Forest is relatively low, although contact is possible on adjacent private lands.

Lewis and Clark National Forest—Indirect effects of alternative 2 modified and alternative 3

This alternative would not allow any increase in the number of sheep allotments or animal unit months above the baseline in the primary conservation area and zone 1 (including the Ninemile demographic connectivity area). As there are no allotments currently, the effects would be the same as under the no-action alternative.

Cumulative effects

Bighorn sheep may interact with domestic sheep and goats on private lands adjacent to the national forests. Vegetation treatments that improve or maintain bighorn habitat at lower elevations on NFS lands have the potential to draw bighorn sheep closer to private lands with domestic sheep. The Forest Service coordinates with MFWP on the management of big game habitat, which provides a means to identify and resolve potential concerns about interactions of bighorn sheep with domestic

sheep on adjacent private lands. Adverse cumulative effects on bighorn sheep are not anticipated to occur.

Fisher

Key indicators for analysis

The key indicator for determining effects to fisher is

- mature coniferous forest with large-diameter trees: the change in amount or distribution of habitat.

Affected environment

Population status and distribution

Trapping, as well as large regional fire events in 1910 and 1934, likely contributed to regional fisher population declines in the early 1900s (Jones, 1991). In five separate reintroduction efforts between 1959 and 1991, fishers were translocated from Minnesota and British Columbia to the northern Rocky Mountains (Vinkey et al., 2006; Weckwerth & Wright, 1968).

Fishers have a large home range size and naturally occur at low density in the Rocky Mountains (M. K. Schwartz, DeCesare, Jimenez, Copeland, & Melquist, 2013). In Montana, the species is legally trapped under a limited quota system, allowing for take of two individuals in trapping district 1 and five in trapping district 2, which are located in northwestern Montana, with a subquota of two female fishers (MTFWP, 2017).

Habitat

Fishers are more likely to occur in areas with wetter, milder climates characterized by higher mean annual precipitation, mid-range winter temperatures, and topography in the form of drainages or valleys (Olson et al., 2014). Fishers disproportionately use stands and regional landscapes characterized by large-diameter trees (M. K. Schwartz et al., 2013). In Idaho, Jones and Garton (1994) found that fishers selected mature and old-growth forests during the summer in Idaho and also selected stands with abundant snags and cavities. Moist forested habitats with continuous overhead cover and riparian zones may be used as travel corridors. Fishers clearly avoid openings, such as clearcuts, open areas, and grassy slopes, as well as stands dominated by ponderosa pine and lodgepole pine (Jones & Garton, 1994). Fishers appear to be restricted to areas with relatively low snow accumulation (Jones, 1991).

Fishers hunt for prey on the forest floor and in trees and snags. Snowshoe hares are the most common prey for fishers, although fishers are noted for their ability to prey on porcupines. Major winter foods include carrion, snowshoe hare, mice, and voles, and their summer diet may also include bird eggs, fish, and fruit (Heinemeyer & Jones, 1994).

The State's predictive habitat model indicates that moderate- to high-suitability fisher habitats comprise approximately 6,504 square miles in west central and northwestern Montana, with trapping district 2 (an area centered on Missoula) having over 50 percent more high-suitability habitat than in trapping district 1 (an area centered on Kalispell) (Giddings, 2013).

According to the Helena-Lewis and Clark terrestrial assessment, there are fewer than 5,000 acres of fisher habitat on the Helena National Forest, which is not sufficient to sustain a fisher population or to contribute to sustaining a fisher population. Some fisher sightings and hair snare (DNA) samples

have been reported from the Lincoln area, which also has the best fisher habitat. A few hair snare samples have also been collected in the Divide landscape (USDA, 2015a).

The Kootenai National Forest provides a substantial amount of habitat for the fisher, estimated at 703,423 acres or 32 percent of the Forest (ERG, 2012). Currently, the amount of habitat on the Forest is estimated to be above the historical range of variability.

There have been four observations of fisher on the Rocky Mountain Division in the past 15 years, two of which were unconfirmed tracks. However, no habitat suitable for the fisher has been identified on the Lewis and Clark National Forest (USDA, 2014a, 2015a). It is unlikely that the species is present, and the observations, if legitimate, likely were of transient individuals.

The Lolo National Forest has participated in grid-based hair trap surveys for fisher annually since 2007. From 2007 through 2012, 66 sampling units covering over 1,000,000 acres were surveyed on the Lolo, with 24 of the units surveyed twice. According to the 2000-2013 wildlife monitoring report, 14 of 16 fisher detections through DNA analysis occurred on the Lolo, with the remaining two occurring on the Bitterroot National Forest.

Threats to fisher are loss of mature forest with its components of large-diameter live trees with heart rot and snags that are needed for resting and denning. Vegetation management and fire suppression have influenced the habitat of this species and its prey by altering composition and structure. High-quality habitats for fisher, unlike that for grizzly bear, are not strongly associated with low levels of human population and roads (Carroll, Noss, & Paquet, 2001).

Environmental consequences—Fisher

Indirect effects of the alternatives—Helena National Forest

Although the Helena National Forest has a limited habitat base for the fisher, individuals are present in mature forest habitat. None of the alternatives would change the forest plan direction pertaining to fisher habitat. There would be no effect anticipated on fisher from any of the alternatives.

Indirect effects of the alternatives—Kootenai National Forest

Under the no-action alternative, both snags and the large/very large size class are projected to increase. None of the forest plan direction for mature forests and snag habitats would change under alternative 2 modified, or alternative 3, so the same increase would be projected under the action alternatives. Modeling over a five-decade period predicted that fisher habitat would decrease, likely due to wildfire and root disease, but would remain within the historical range of variability (ERG, 2012). This suggests that loss of viability of the fisher population is not likely to be a concern.

Indirect effects of the alternatives—Lolo National Forest

Under the no-action alternative, the amount of old-growth forest and the number of snags and large and very large trees are projected to increase. It is expected that the Lolo National Forest would continue to contribute a significant proportion of the fisher habitat and population in Montana.

None of the forest plan standards for old growth and snag habitats will change under alternative 2 modified or alternative 3. The effects would be the same as for the no-action alternative.

Cumulative effects

Moderate to high amounts of contiguous cover are a consistent predictor of fisher occurrence at large spatial scales. Future climate change is expected to lead to more frequent and severe wildfires, which alters forest composition and structure in ways that are likely to diminish the capacity to support

fishers. Large wildfires along with timber harvest may reduce the amount of available habitat for fishers over time.

Trapping may affect the distribution and persistence of fisher populations. Trapping is regulated by MFWP. Fisher are one of the five furbearers that are required to be reported, registered, and pelt tagged so the actual number of harvested animals can be known. A quota of seven fisher, which may only be taken in trapping districts 1 and 2, has been in place since 1996. A female subquota of two females provides an additional measure of protection for the reproductive segment of the population to further ensure that the harvest has no influence on statewide population status (Giddings, 2013). No adverse cumulative effects on fisher are anticipated as a result of trapping.

Gray wolf

Key indicators for analysis

The key indicators for determining effects to gray wolf are

- habitat diversity, especially on ungulate winter range: the change in amount or distribution of habitat; and
- habitat security: road density.

Affected environment

Population status and distribution

The gray wolf was extirpated from the western United States during the early 1900s, due primarily to conflicts with people and loss of habitat. In 1973, the northern Rocky Mountain subspecies (*Canis lupus irremotus*) was listed as endangered under the Endangered Species Act. Wolves from Canada began to naturally colonize adjoining habitat in the United States around 1979, and denning was first documented in northwestern Montana in 1986 (Ream, Fairchild, Boyd, & Blakesley, 1989). By 2002, the northern Rocky Mountain wolf population had met the numerical, distributional, and temporal recovery criterion of maintaining at least 30 breeding pairs evenly distributed among three recovery zones (northwestern Montana, central Idaho, and the Greater Yellowstone Area) for three years in a row (74 FR 15123). The wolf was delisted in Montana and Idaho in May of 2011. The recovered population remains secure under State management (Jimenez, 2014).

Across the amendment forests, wolf packs are established throughout the Helena (except in the Big Belt landscape), Kootenai, and Lolo National Forests. On the Lewis and Clark National Forest, wolf packs are established in all but the Highwood, Snowy, and Castle mountain ranges.

Gray wolves live in packs that generally consist of a socially dominant pair, their offspring of the previous year, and new pups; other breeding-age adults sometimes are also present. Average wolf pack size in Montana is about five individuals. In 2014, 554 wolves in 134 packs were verified in the State of Montana (Bradley et al., 2015).

Montana wolf pack territories average around 200 square miles in size and can be 300 square miles or larger. Pack territories are dynamic and change from year to year, depending on prey availability and relationships with neighboring packs (Bradley et al., 2014).

Habitat

Key components of wolf habitat include a sufficient year-round prey base of ungulates and alternative prey; suitable and somewhat secluded denning and rendezvous sites; and sufficient space with minimal exposure to humans (USFWS, 1987).

In northwestern Montana, the primary prey of wolves includes white-tailed deer, mule deer, elk, and moose (Kunkel & Pletscher, 1999). Alternative sources of food for wolves include rodents, vegetation, and carrion. Some wolves kill domestic livestock such as cattle and sheep when available (Fritts, Bangs, & Gore, 1994). Ungulate winter ranges, usually located on lower slopes or valley bottoms, are key to wolf survival.

Pack activity is centered on the den site and nearby rendezvous sites from late April to September. Wolves commonly den in sites with low levels of disturbance, often within 400 yards of water. A wolf pack may move up to 6 miles to a number of rendezvous sites, typically meadows or past timber harvest areas, until the pups can travel with the adults.

Humans are the primary cause of wolf mortality. In 2014, for example, the number of known wolf mortalities in Montana was 308, of which at least 301 were human-caused. There were 213 taken by legal harvest, 10 by illegal harvest, 57 due to control actions, 11 due to vehicle collisions, six killed under Montana Senate Bill 200, two killed incidentally, one legal tribal take, and one was euthanized. One wolf died of natural causes and six died of unknown causes (Bradley et al., 2014). Frequently used roads can reduce wolf habitat security and increase the potential for legal and illegal mortality (Person & Russell, 2008).

In Minnesota, Thiel (1985) reported that road densities of 0.9 mile/square mile were a threshold for wolf occurrence in his study area. This threshold was attributed to human-related mortality of wolves being correlated with the distribution and density of roads. Mech and others (1988) investigated wolf distribution relative to road density over the entire occupied or potentially occupied range of the wolf in Minnesota. The average density of roads in areas inhabited by wolves was 0.58 mile/square mile, whereas the area uninhabited by wolves had a road density of 1.4 miles/square mile. The roads themselves did not prevent wolves from inhabiting an area; rather, higher road density was associated with increased risk of human-caused mortality or with land uses that may also have affected wolf security.

Wolves generally avoid areas of high open road and trail density (Whittington, St Clair, & Mercer, 2005). In the NCDE, motorized routes closed to provide security habitat for elk and grizzly bears also provide security habitat for wolves.

Extraterritorial forays are common for wolves and may result in permanent dispersal. Such movements might be more common when the opportunity to establish new packs is high, when food resources in the natal area are scarce, or when breeding opportunities in the natal pack are limited (Fuller, 1989). Dispersal distances observed in the northern Rockies averaged about 60 miles (Boyd & Pletscher, 1999). Analysis of the northwestern Montana and the central Idaho recovery areas indicated that large areas of suitable habitat are available to provide connectivity between the two areas; however, the Greater Yellowstone recovery area appears to be poorly linked to the other populations through relatively narrow and largely discontinuous habitat (John R. Squires, Ruggiero, Kolbe, & DeCesare, 2006).

Theoretically, wolves potentially could live wherever prey populations and human tolerance or separation are adequate (Fritts et al., 1994). Analysis of 56 packs in the northern Rocky Mountains indicated that more forest land cover, lower human population density, higher elk density, and lower

domestic sheep density were the primary factors related to wolf occupation and pack persistence (Oakleaf et al., 2006).

Environmental consequences—Gray wolf

Indirect effects of the no-action alternative—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Existing management direction in the Helena, Kootenai, Lewis and Clark, and Lolo forest plans has made important contributions to the recovery of the gray wolf population in the northern Rockies. This includes both appropriate management of winter and summer habitats for deer and elk on NFS lands in coordination with population goals established by the State of Montana and management of key features of wolf habitat, including protection when needed of den and rendezvous sites on NFS lands. The large areas of wilderness and roadless areas within the NCDE along with management of road densities to achieve big game, grizzly bear, and other resource objectives will continue to provide habitat security for wolves on the national forests.

Indirect effects of alternative 2 modified and alternative 3—Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Existing management direction pertaining to the wolf and to elk and deer would continue unchanged under all alternatives. Motorized access in the primary conservation area, zone 1, and the demographic connectivity areas would not increase above the baseline, so there would be no change in wolf security in these portions of the Forests.

Cumulative effects

Big game winter ranges occur at lower elevations that are often predominantly privately owned. Conflicts between wolves and livestock may develop in these areas, and this situation would not be changed by any of the alternatives. Warmer and drier conditions due to climate change are likely to result in winter ranges gradually shifting to higher elevations, which may result in fewer conflicts on private lands that formerly provided important elk and deer winter ranges.

Northern bog lemming

Key indicators for analysis

The key indicator for determining effects to northern bog lemming is

- peatland habitat: the change in amount of peatland habitat.

Affected environment

Population status and distribution

The northern bog lemming is a boreal species, occurring from the northern treeline in North America southward into Washington, Idaho, Montana, Minnesota, and New England. The bog lemming is found in peatlands, which are uncommon landscape features in the northern Rockies (Chadde et al., 1998), and in wet meadows.

On Sept. 29, 2014, WildEarth Guardians submitted a petition to list the northern bog lemming as threatened or endangered. On September 18, 2015, the USFWS published a 90-day finding that the petition presented substantial information indicating that listing might be warranted and initiated a status review.

According to a 1988 book on peatlands by Howard Crum (as cited in Chadde et al., 1998), peatlands (bogs and fens) form gradually, with rates of peat accumulation estimated to be less than 1 inch per century in boreal and temperate climates. The integrity of peatland ecosystems is tied to hydrologic conditions and nutrient input from the larger surrounding landscape. Due to the accumulation of water-holding organic matter, peatlands are exceptionally stable and may persist for centuries in the absence of disturbance. However, the ability of peatlands to recover from disturbance is low. Recovery from a major disruption or the removal of vegetation may require centuries (Chadde et al., 1998).

In Montana, peatlands are concentrated in the western third of the State. Prior to 1992, evidence of bog lemmings in Montana was limited to six locations; these occurrences were on the west side of Glacier National Park and in the Rattlesnake drainage north of Missoula. Northern bog lemmings have now been documented at 26 locations in Montana, ranging in elevation from 3,000 to 7,000 feet, with the majority of observations above 4,600 feet (MNHP-MTFWP, 2015e).

This species is known to occur on the Kootenai, Lewis and Clark, and Lolo National Forests. The northern bog lemming has not been observed on the Helena National Forest, although there is potential habitat in upper portions of the Blackfoot landscape.

Habitat

The primary habitat of northern bog lemmings is peatlands, but they have also been detected in mossy forests, wet sub-alpine meadows, and alpine tundra (Reichel & Corn, 1997). Large mats of sphagnum moss characterize most of the habitat patches where northern bog lemmings have been identified. Sphagnum moss has been found to be the best indicator that northern bog lemmings are present (Reichel & Beckstrom, 1994).

Northern bog lemmings are active day and night throughout the year. They feed on mosses, grasses, sedges, and other herbaceous vegetation and may also eat snails, slugs, and other invertebrates. Bog lemmings occupy surface runways and burrow systems that are up to a foot deep. Their young are born in nests that may be underground or on the surface under concealing vegetation.

Northern bog lemmings have a small home range of less than 1 acre in size. They are social and may be found in small colonies with population densities that may reach 36 individuals per acre (Reichel & Corn, 1997).

Management recommendations for bog lemmings (MNHP-MTFWP, 2015e) include

- assuming that northern bog lemmings are present at sphagnum or fen moss habitat patches unless site-specific surveys indicate otherwise;
- restricting timber harvest to a zone beyond a 100 meter buffer surrounding sphagnum or other fen moss mats or to associated riparian areas that could provide corridors for dispersal to adjacent patches of suitable habitat;
- minimizing livestock grazing in drainages with unsurveyed moss mats present and maintaining good to excellent range conditions there and in occupied habitat; and
- eliminating management activities that could destroy moss mats (road-building, pothole blasting, trail construction, dam construction, alteration of surface and subsurface waterflow, recreational vehicle use in fen habitats).

Environmental consequences—Northern bog lemming

Indirect effects of the no-action alternative

The existing management direction in the Helena, Kootenai, Lewis and Clark, and Lolo National Forest plans provides protection to wetland and peatland habitats.

Indirect effects of alternative 2 modified and alternative 3

Existing forest plan direction pertaining to riparian and wetland habitats would be retained. Additional management direction that would limit livestock grazing in the primary conservation area and in zone 1 under alternative 3, as well as management direction that would limit motorized access in the primary conservation area, zone 1, and the demographic connectivity areas, could indirectly benefit bog lemmings by reducing the potential for impacts to peatland habitats. These potential benefits are highly uncertain given the rarity of the species and might or might not occur, depending on site-specific locations and conditions.

Cumulative effects

Future climate change could change the amount and distribution of northern bog lemming habitat. Reduced precipitation and higher temperatures may reduce the extent of peatland or bog habitats, although this is uncertain. It is unknown if new areas of habitat would be created at higher elevations as the climate changes. Depending on the amount of new habitat created and its proximity to existing habitat, displaced northern bog lemmings may or may not be able to access an adequate amount of habitat. Northern bog lemmings are not highly mobile and may have difficulty reacting to induced shifts in habitat. Bog and peatland habitat is naturally fragmented, adding to the difficulty for bog lemmings to shift their distribution (USDA, 2010b). In combination with the alternatives, no adverse cumulative impacts are anticipated.

Townsend's big-eared bat

Key indicators for analysis

The key indicator for determining effects to Townsend's big-eared bat is

- degradation of cave habitat or disturbance of roosts: the change in availability of habitat.

Affected environment

Population status and distribution

Townsend's big-eared bats are found throughout western North America, from British Columbia south into Mexico. The species is considered globally secure but locally imperiled or vulnerable due to its rare and localized occurrence throughout its range as well as its specialized habitat needs (MNHP-MTFWP, 2015e). It is a State species of concern in Montana.

The distribution and status of bats remain poorly known in Montana. Four maternity colonies of Townsend's big-eared bats have been found in natural caves and one in an abandoned mine in Montana. There are also a few documented hibernacula in the State. The species appears to be experiencing a downward trend in the western United States, including lower numbers at one of the known maternity colonies in Montana (MNHP-MTFWP, 2015e).

In 2005, the USDA Forest Service Northern Region initiated bat surveys using a grid sampling system on selected national forests to gain a better understanding of the composition and distribution of bat species. The selected forests in Montana were the Gallatin, Helena, Flathead, Kootenai, and

Lewis and Clark. Eleven species of bats, represented by 795 total individuals, were captured during late-June to mid-August 2005. The capture of pregnant or lactating females provided evidence of reproduction (Hendricks & Maxell, 2005).

Numerous mines and caves exist on the Helena National Forest that provide potential habitat for bats. As part of the Northern Region's survey effort, nine Townsend's big-eared bats were captured at two sites on the Helena National Forest (Hendricks & Maxell, 2005).

Only one natural cave is known to exist on the Kootenai National Forest (USDA, 2013b). Abandoned and inactive mines and rock/talus slopes are scattered throughout the Forest, some of which could provide habitat for bats, especially those located near river systems, larger lakes, and wetland areas. Snags, bridges, buildings, and rock crevices are available throughout the Forest and could provide habitat for roosting and foraging. However, no maternity roosts, hibernacula, or other occupied roosting habitat are known to exist on the Kootenai National Forest (Hendricks & Maxell, 2005).

Numerous mines and caves exist on the Lewis and Clark National Forest, with concentrations in some areas of the Little Belts. Fourteen observations of Townsend's big-eared bat have been documented on the Lewis and Clark National Forest, all at or near mines or caves in the Big Belt and Little Belt mountain ranges. Few of the known mines and caves have been inventoried for bats, and the actual distribution of the bats remains largely unknown.

Although an inventory for this species on the Lolo National Forest is incomplete, surveys of selected abandoned mines during the summer confirmed the presence of this species on the Forest. A subsequent winter hibernacula survey recorded regionally significant numbers of Townsend's big-eared bats on the Lolo National Forest (Tigner, 2006).

Habitat

The term 'roost' is used to describe any place a bat may use to rest, digest, socialize, mate, give birth, or sleep. Day and night roosts are usually separate locations. During the day, bats sleep or enter a semi-lethargic state in a day roost. Some bats use a night roost to rest and digest evening and night meals. Pregnant females congregate in maternity roosts to give birth and raise their young. Maternity colonies, which are formed during the spring and summer, are typically composed of 20 to 180 females. Males and nonreproductive females gather in separate locations called bachelor colonies. Bats that do not migrate south for the winter hibernate in hibernacula.

Caves and abandoned mines are the primary roost sites for Townsend's big-eared bat during all stages of its life cycle (E. D. Pierson et al., 1999). Temperature and airflow are important for both hibernacula and maternity colonies. Bridges and hollow trees may be used as night roosts.

Townsend's big-eared bats feed on various nocturnal flying insects near the foliage of trees and shrubs, especially near beaver pond complexes, meadows, and streams (Fellers & Pierson, 2002).

The following management activities have the potential to impact bats or their habitat by causing disturbance, roost abandonment, or mortality:

- disturbance of roosting sites, especially hibernacula and maternity sites, primarily by recreational activities in or near caves but also from mining, road construction, and other activities near roosts;
- habitat degradation or alteration of day roosts, maternity roosts, or hibernacula (caves, mines, old buildings) could affect the persistence of individual colonies;

- timber harvest and wildfire may reduce the availability of roost trees and indirectly reduce prey populations due to changes in forest composition and structure;
- road and right-of-way construction could result in the direct removal of snag or cave habitat as well as the additional loss over time of snags along open roads due to fuelwood cutting;
- grazing practices may alter vegetation, which may alter the invertebrate community;
- caves and/or abandoned mines and buildings may be removed or closed due to human safety concerns, resulting in habitat loss; and
- environmental contaminants, including pesticides, heavy metals, and petroleum, may cause mortality of bats; the use of insecticides in foraging areas has the potential to reduce the prey base.

Environmental consequences—Townsend's big-eared bat

Indirect effects of the no-action alternative

The current Helena, Kootenai, Lewis and Clark, and Lolo National Forest plans provide direction to protect cave habitat and to maintain snags at least to minimum specified levels.

Indirect effects of alternative 2 modified and alternative 3

None of the management direction to be added under the action alternatives is likely to adversely affect the habitat of this species. Limiting road densities in the primary conservation area and zone 1 could benefit bats by reducing the potential for snag loss at or near maternity sites, hibernacula sites, or roost sites. These potential benefits would depend on site-specific locations and conditions.

Cumulative effects

White-nose syndrome is a fungal disease that continues to spread and decimate bat populations in the northeastern and midwestern United States. It has not yet reached the western United States. Recreational cave and mine exploration on all land ownerships has the potential to spread the disease. Cave and mine closures are in place in the areas where white-nose syndrome has been confirmed. There is a decontamination protocol in place for NFS lands, which should aid in slowing the spread of the disease. Since the disease is not present in the action area, no adverse cumulative effects are anticipated.

Coeur d'Alene salamander

Key indicator for analysis

The key indicator for determining effects to Coeur d'Alene salamander is

- rock formations with surface water: the change in availability of habitat.

Affected environment

Population status and distribution

The distribution of this species is limited to northern Idaho, northwestern Montana, and southeastern British Columbia. Within the NCDE, it occurs on the Kootenai and Lolo National Forests.

Habitat

Salamanders respire through their skin and are restricted to cool, damp environments. Habitat for the Coeur d'Alene salamander includes three major habitat categories: springs and seeps, waterfall spray zones, and stream edges (MNHP-MTFWP, 2015c).

The species is found in conjunction with both persistent and intermittent surface water. Known populations occur in association with sharply fractured rock formations (used for underground refugia) from 1,600 to 5,000 feet in elevation. This fractured rock is often found in the Belt Rock formation but can also occur in talus and in other geologic types (Cassirer, Groves, & Genter, 1994).

Coeur d'Alene salamanders generally occur in coniferous forest but are not restricted to a particular overstory species or aspect. Populations have been found in areas with ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) overstories and at all aspects (Cassirer et al., 1994).

Roads and timber harvest or other vegetation management can isolate populations and fragment habitat. Removing rock from salamander habitats can also be detrimental.

Environmental consequences—Coeur d'Alene salamander

Indirect effects of the no-action alternative—Kootenai and Lolo National Forests

Existing forest plan management direction provides protection to this species and the fractured rock and wetland environments it inhabits. No adverse impacts are anticipated at the programmatic level. Surveys for the unique habitat of this species and evaluation of potential impacts and mitigation measures are conducted during site-specific analysis.

Indirect effects of alternative 2 modified and alternative 3—Kootenai and Lolo National Forests

Existing management direction pertaining to sensitive species and aquatic and riparian habitats would remain in effect. The grizzly bear management direction would not change and is compatible with existing direction applicable to the habitat for this species.

Cumulative effects

As there would be no direct or indirect effects, no cumulative effects would occur.

Boreal (Western) toad

Key indicators for analysis

The key indicator for determining effects to boreal toad is

- breeding habitat, lakes, ponds, and wetlands: the change in availability of habitat.

Affected environment

Population status and distribution

The boreal toad occurs throughout western Montana. Its range includes mountainous areas of the western United States and Canada, extending northward into southeastern Alaska (MNHP-MTFWP, 2015h).

Habitat

Adult toads congregate at ponds in early spring to breed, typically in May and June. After breeding, adult toads disperse into surrounding terrestrial habitats. They may move more than 0.5 mile from their aquatic breeding sites after the breeding season is finished. Toads can remain away from surface water for relatively long periods of time. Juveniles are often present in wetlands adjacent to breeding sites and may overwinter along the borders of ponds. Breeding and nursery habitat includes permanent and ephemeral lakes, ponds, streams, and ditches, with a preference for shallow, warm areas with mud or silt bottoms (Maxell, 2000).

A study of boreal toads in Glacier National Park found that they increased in occurrence after fires in 2001 and 2003. The authors suggested that toads exploited severely burned areas because these sites were more open and that toads could use burned areas without great risk of increased water loss as long as they had cover. They also found that boreal toads shifted their use away from severely burned habitats to moderately burned areas later in the summer because partially burned areas had more ground/canopy cover and likely retained more soil moisture (Guscio, 2007).

Breeding sites used by toads can undergo a high level of fluctuation in water levels due to natural variation in groundwater and runoff levels as well as through changes in water yield caused by tree harvest and fires. Use of certain herbicides or pesticides within 100 meters of streams or other waterbodies used by toads can also be lethal during certain stages of the toad life cycle (Maxell, 2000).

Road construction, timber hauling, timber harvest, and fuel reduction activities all have the potential to negatively impact toads through disruption of travel routes or directly through crushing, as toads may congregate near roads or travel in large numbers, making them vulnerable to being run over by vehicles (Maxell, 2000).

Factors that impact the water level, temperature, or vegetation in breeding sites may impact the use of those areas for breeding or the success of the breeding activity. Small breeding ponds created by seeps may dry out in some years before metamorphosis occurs, killing tadpoles and rendering reproduction entirely unsuccessful at that site for the year. Livestock grazing in shallow breeding ponds may remove emergent vegetation used by larvae, and trampling by livestock may crush large numbers of tadpoles. Changes in hydrology or water temperature due to natural events such as wildfires may also impact breeding sites.

Changes in beaver activity have been observed to correlate with changes in the number of tadpoles observed at a pond that has been monitored on the Lewis and Clark National Forest multiple times a year for over 15 years (USDA, 2015a). It appears that observed changes in water depth, flow, and temperature related to beaver activity at that site may have impacted breeding activity or success.

Maintaining a number of breeding sites scattered across the landscape, connected by streams and by forest that provides microsites as described above, may be key to maintaining widespread breeding populations of western toads. This may be particularly important east of the Continental Divide, which is near the edge of western toad distribution and has a landscape that is generally drier.

Western toads may congregate around roads in the late evening and early morning, making them vulnerable to being run over by vehicles (Maxell, 2000).

Environmental consequences—Boreal toad

None of the alternatives would change management direction pertaining to pond and wetland habitats on the Helena, Kootenai, Lewis and Clark, or Lolo National Forests. Therefore, none of the

alternatives are anticipated to have any measurable effects on this species or its habitat. Evaluation of the potential effects of project activities on individual toads and their habitat would be completed during site-specific analyses.

As there would be no direct or indirect effects, no cumulative effects would occur.

Northern leopard frog

Key indicators for analysis

The key indicator for determining effects to northern leopard frog is

- breeding habitat, lakes, ponds, and wetlands: the change in availability of habitat.

Affected environment

Population status and distribution

This species is considered globally secure. Populations within the mountains of western Montana are a species of concern with a State rank of S1 (MNHP-MTFWP, 2015f).

Habitat

Northern leopard frogs require a mosaic of habitats to meet annual requirements of all life stages. Separate sites are generally used for breeding and overwintering, but this may occur in the same pond in some cases. Breeding habitats used by northern leopard frogs in Montana include low-elevation and valley bottom ponds, spillway ponds, beaver ponds, stock reservoirs, lakes, creeks, and pools in intermittent streams, warm-water springs, potholes, and marshes with emergent vegetation. During winter, northern leopard frogs usually are inactive underwater on the bottom of deeper streams and ponds or springs that do not freeze and are well oxygenated, sometimes under bottom rubble and debris, in water as deep as 33.5 inches (MNHP-MTFWP, 2015f).

Eggs are laid and larvae usually develop in shallow warm and still water, generally in areas well exposed to sunlight. Generally, eggs are attached to vegetation just below the surface of the water. In summer, adults and juveniles commonly feed in open or semi-open wet meadows and fields with shorter vegetation, usually near the margins of waterbodies. They do not use drier upland habitats.

Metamorphosed frogs eat various small invertebrates, including various insects, spiders, leeches, and snails obtained along the water's edge or in nearby meadows or fields. Larvae eat algae, plant tissue, organic debris, and probably some small invertebrates.

Breeding sites west of the Continental Divide should be protected from livestock and from organic and chemical (e.g., pesticide and herbicide) contamination. Bullfrogs, parasites, and fungal, bacterial, and viral pathogens should not be introduced to these sites (MNHP-MTFWP, 2015f).

Environmental consequences—Northern leopard frog

Existing forest plan direction for protection of wetland and riparian habitats would continue to be implemented under all alternatives. None of the alternatives is anticipated to have any measurable effects on this species or its habitat.

As there would be no direct or indirect effects, no cumulative effects would occur.

Plains spadefoot toad

Key indicators for analysis

The key indicator for determining effects to plains spadefoot toad is

- breeding habitat, lakes, ponds, and wetlands: the change in availability of habitat.

Affected environment

The plains spadefoot toad is a medium-sized toad that ranges throughout the Great Plains, from southwestern Canada across the western United States and into northern Mexico. It is usually found in areas with soft sandy/gravelly soils near permanent or temporary bodies of water.

Plains spadefoot toads are nocturnal. For much of each year, the toads remain largely inactive in burrows of their own construction or in rodent burrows. They typically emerge to breed only during spring and fall rains. Breeding takes place in temporary pools of water left by rainfall. Eggs are laid in clutches numbering from 10-250, hatching within 48 hours of being laid. The larvae can change into tadpoles in as little as two weeks. Tadpoles and toadlets have been observed in stock ponds and small ephemeral reservoirs, usually in sagebrush-grassland habitats.

No special management needs are currently recognized for this species. However, at permanent and semi-permanent waterbodies (reservoirs and stock ponds) where breeding has been observed, portions of the shoreline where emergent vegetation might develop could be fenced to create exclosures that would protect breeding adults, eggs, and tadpoles from trampling and the removal of emergent cover by livestock (MNHP-MTFWP, 2016c).

Environmental consequences—Plains spadefoot

Existing forest plan direction pertaining to wetland and riparian habitats would continue to be implemented under all alternatives. None of the alternatives is anticipated to have any measurable effects on this species or its habitat.

As there would be no direct or indirect effects, no cumulative effects would occur.

Greater short-horned lizard

Key indicators for analysis

The key indicator for determining effects to the greater short-horned lizard is

- semiarid habitat with loose sandy soil: the change in availability of habitat.

Affected environment

Population status and distribution

Short-horned lizards are widely distributed across North America, occupying semiarid plains to high elevations in the mountains (Stebbins, 2003).

Habitat

The short-horned lizard may be found in a wide range of habitats, including shortgrass prairie, sagebrush, and juniper, pine, or fir forests. The soil in these habitats can be stony or rocky but usually has fine loose soil or sand present (MNHP-MTFWP, 2016a).

Short-horned lizards are diurnal, being most active during mid-day and burrowing at night. The mating season is in spring (May to June). They give birth to 5 to 48 live young from July to September.

Short-horned lizards are “sit-and-wait” predators. They feed primarily on ants but will also take an occasional grasshopper or beetle. Often, they can be found sitting in the vicinity of ant nests or trails. They rely extensively on camouflage to avoid predators.

Environmental consequences—Greater short-horned lizard

This species does not appear to have specific habitat requirements that will be affected by existing forest plan direction or the alternatives. No effects on this species or its habitat are anticipated under any of the alternatives.

As there would be no direct or indirect effects, no cumulative effects would occur.

6.5.8 Terrestrial management indicator species

Introduction

The Helena, Kootenai, Lewis and Clark, and Lolo forest plans were developed in accordance with the 1982 regulations for implementation of the National Forest Management Act. The 1982 regulations specify that fish and wildlife habitat shall be managed to maintain viable populations of native and desired non-native vertebrate species in the planning area. To ensure that viable populations will be maintained, habitat must be provided to support at least a minimum number of reproductive individuals, and the habitat must be well distributed so that individual animals can interact with others in the planning area. In order to estimate the effects of forest plan alternatives on fish and wildlife populations, the regulations call for certain vertebrate and/or invertebrate species present in the area to be selected as management indicator species. The 1982 regulations established the following categories of species to be considered for selection as management indicator species: plant and animal species identified on State or Federal lists as endangered or threatened; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality. Monitoring of population trends in relationship to habitat changes is to be conducted in order to validate the assumptions and projections of the forest plan.

Each of the four forest plans has its own unique set of management indicator species, selected to address the Forest’s characteristics, habitat conditions, management issues, and range of alternatives under consideration. Each forest plan established management direction to guide the maintenance and improvement of habitat for its management indicator species to the degree consistent with overall multiple-use objectives. Monitoring plans were developed to track population trends in relationship to habitat changes, in coordination with State fish and wildlife agencies to the extent practicable.

Below, the list of terrestrial management indicator species is shown for each forest plan. (Fish and other aquatic species selected as management indicator species are addressed in the aquatics section of this document.) For each management indicator species, the reason for its selection, its distribution in relation to the zones identified in the draft Grizzly Bear Conservation Strategy, and a brief description of each species’ habitat associations are provided.

Helena National Forest

Eleven species of wildlife, representing three categories of management indicator species, were selected in the Helena forest plan (see table 198).

Table 198. Terrestrial management indicator species in the Helena forest plan

Management indicator species	Selection category	Occurs in the PCA, zone 1, or zone 2?	Indicator/habitat associations
American marten	Special habitat needs—mature tree-dependent group	Yes	Mature coniferous subalpine forests with large-diameter snags and logs; small mammal prey
Pileated woodpecker	Special habitat needs—old growth-dependent group	Yes	Mid-elevation conifer forests with large-diameter ponderosa pine and western larch trees; wood-boring insect prey
Northern goshawk	Special habitat needs—old growth-dependent group	Yes	Diverse forest landscape with dense old-growth stands for nesting; avian and mammalian prey
Hairy woodpecker	Special habitat needs—snag-dependent group	Yes	Nests in snags in a wide variety of coniferous and deciduous forests; insect prey
Grizzly bear, gray wolf, bald eagle, and peregrine falcon	Threatened and endangered species	Yes	(See analysis in previous sections)
Elk and mule deer	Commonly hunted species	Yes	Coniferous forests interspersed with grasslands or shrublands; limited open road density on summer and winter ranges
Bighorn sheep	Commonly hunted species	Yes	(See analysis in section 6.5.7)

Affected environment—American marten (mature tree-dependent group)

The American marten is a solitary carnivore that inhabits mature stands of coniferous forests in North America. In the western United States, martens occur primarily in mid- to high-elevation forests with a strong component of subalpine fir, Engelmann spruce, and lodgepole pine and pockets of coarse woody debris (Buskirk & Ruggiero, 1994). Martens typically inhabit mature forests with at least 30 percent canopy cover, which offers protection from predators and enhances the moist conditions favorable for their small mammal prey. Martens generally avoid large openings. Large snags, stumps, and logs are used for resting, natal (birth) dens, foraging, and protection from the elements, particularly during the winter (Thompson & Colgan, 1994). Because of their strong association with mature and old-growth forests, martens are sensitive to timber harvest and other vegetation management practices.

Marten are known to occur on the Helena National Forest and marten habitat is abundant and well distributed on the forest. In 2008, about 35 percent of forested stands were estimated to provide suitable marten habitat forestwide. The ongoing mountain pine beetle epidemic will reduce the amount of mature and old-growth forest, although the extent of the decrease is not yet known.

Environmental consequences—American marten

None of the alternatives would alter the existing management direction concerning retention of mature forest or snags and down logs. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on this species.

Marten habitat and populations may decline as a result of the mountain pine beetle epidemic but are expected to remain well distributed across the Helena National Forest under all alternatives.

Affected environment—Pileated woodpecker and northern goshawk (old growth-dependent group)

The pileated woodpecker nests in mid-elevation mature and old-growth forests on the west side of the Continental Divide in the northern Rockies (Hutto, 1995; Hutto & Young, 1999). For nesting and roosting, pileated woodpeckers require large, standing dead trees greater than 20 inches d.b.h. They have a strong preference for ponderosa pine and western larch as nest trees (McClelland & McClelland, 1999) but may also nest in Douglas-fir, cottonwood, and mature western white pine trees. Heart rot appears to be an important feature of suitable nest trees. Typical nest stands are at least 50 to 100 contiguous acres in size. Foraging sites include standing trees (dead and alive) and large logs and stumps, where the woodpeckers feed on a variety of wood-boring insects (Bull, 1987) such as carpenter ants. Cavities created by pileated woodpeckers for feeding or nesting are later utilized by dozens of other wildlife species. On the Helena National Forest, the distribution of pileated woodpeckers is limited to the Lincoln Ranger District.

Goshawks are territorial and maintain large home ranges (about 5,820 acres per pair, varying with prey populations and habitat conditions) (Reynolds, Graham, & Reiser, 1992). Northern goshawk nesting territories are composed of dense groups of mature nesting trees, abundant prey (squirrels, hares, larger songbirds, grouse), and mid-level flyways. Closed-canopy old-growth forests are typically used for nesting and post-fledging habitat. In other seasons and activities, the goshawk benefits from a diverse landscape pattern (Beier & Drennan, 1997; Reynolds et al., 1992). Suitable habitat for the goshawk is well distributed across the Northern Region (Samson, 2006). Extensive survey work since the Helena forest plan was adopted has demonstrated that goshawks are widespread across the Forest, although population densities are naturally low.

To maintain viable populations of old growth-dependent species, it was estimated that 10 percent of commercial forest in riparian areas and 5 percent of forests in the dry mix and cool working groups must be maintained in old-growth condition on the Helena National Forest (USDA, 1986b, p. V/6). The forest plan standards require that 5 percent of each third-order drainage be managed for old growth. The 2009 monitoring report documented that the estimated percentage of old growth on all forested lands on the Helena National Forest at that time was 12.2 percent (90 percent confidence interval of 10.1 to 14.5 percent). Recently, large numbers of lodgepole pine and ponderosa pine trees have died and forest canopies have opened up as a result of a bark beetle epidemic, which is likely to measurably reduce the suitability of nesting stands and foraging habitat for these two species.

Environmental consequences—Pileated woodpecker and northern goshawk

None of the alternatives would change the current management direction in the forest plan that pertains to old-growth forest habitat. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on the species. Suitable habitat and populations of pileated woodpecker and northern goshawk may decline over time as a result of the mountain pine beetle epidemic, but it is expected that forest plan standards will continue to be met. The species will remain well distributed across the Helena National Forest under all alternatives.

Affected environment—Hairy woodpecker (snag-dependent group)

Hairy woodpeckers inhabit a wide spectrum of forest habitats, including coniferous and deciduous forests and habitats ranging from open areas created by stand-replacing fire or timber harvest to

mature forests (Hutto & Young, 1999, p. 22). Hairy woodpeckers excavate a nest cavity in dead or decaying trees that are at least 10 inches in diameter. They may forage on smaller-diameter trees, dead and dying trees, live trees, logs, stumps, and on the ground. The diet of the hairy woodpecker includes wood borers, bark beetles, ants, and grubs as well as fruits, berries, and sometimes seeds. The cavities they excavate may later be used by many different animals.

Hairy woodpeckers were selected to represent snag-dependent species (USDA, 1986a, p. III-26). Past wildlife surveys and numerous point-count surveys by the Northern Region Landbird Survey Program indicate that the hairy woodpecker is common and widely distributed on the Helena National Forest. Nesting and foraging opportunities for hairy woodpeckers and other cavity-dependent species are currently increasing dramatically as a result of the bark beetle epidemic.

Environmental consequences—Hairy woodpecker (snag-dependent group)

None of the alternatives would alter the existing management direction concerning retention of snags and down logs. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on this species. Hairy woodpecker habitat and populations are expected to remain well distributed across the Helena National Forest under all alternatives.

Affected environment—Elk and mule deer (commonly hunted species)

Elk inhabit open to dense coniferous forests interspersed with grasslands or shrublands. Forbs and grasses are preferred over shrubs in their diet. Elk are seasonally migratory, moving between traditional winter ranges (generally 4,000 feet in elevation or less) and summer ranges. Winter ranges provide forage and protective cover needed to survive severe weather conditions. Summer range provides calving areas, nutritious forage needed to support growth and reproduction, and adequate hiding and thermal cover. Elk are known to avoid roads, with the degree of avoidance varying by season, the location and type of use of the road, traffic volume, and availability of cover (Lyon, 1983). During the fall, elk seek larger, less roaded blocks of habitat that reduce their vulnerability to hunting (Hillis et al., 1991). Elk security during the hunting season is considered the primary limiting factor on elk populations (Wisdom et al., 2000). The Helena forest plan target population for elk was set at 6,400 elk by the year 2000, which has been achieved.

Mule deer are widely distributed in subalpine habitats in the summer, moving to low-elevation, shrub-dominated slopes in the winter. Shrubs are an important food item year-round, with forbs being important in spring, summer, and fall. Grass makes up only a minor part of the diet for mule deer. Good-quality winter range is critical to sustain mule deer populations.

One of the goals of the forest plan is to maintain and improve the habitat over time to support big game and other wildlife species. In order to accomplish this goal, the forest plan contains both forestwide and management area-specific standards and guidelines to maintain desired habitat conditions for big game, specifying the minimum amounts of hiding cover on elk summer range, thermal cover on winter range, and open road densities. Road management is implemented to maintain or improve big game security, with restrictions on motorized vehicles on winter ranges and on elk calving grounds and nursery areas. Elk/mule deer habitat effectiveness (which integrates consideration of cover/forage, open road density, and livestock impacts on elk habitat potential) is monitored. Travel planning has been completed on portions of the Forest, and monitoring has been ongoing in those areas to evaluate road closure effectiveness. Wildlife habitat enhancement projects have also been ongoing to maintain and enhance big game habitat.

Environmental consequences—Elk and mule deer

The effects of implementing the Helena forest plan are generally occurring as predicted for elk and mule deer. Existing management direction will remain in place under all alternatives. Wilderness areas, recommended wilderness, inventoried roadless areas, and other nonmotorized areas will continue to provide security habitat. Management direction to provide secure core for grizzly bears will contribute to elk security habitat, although grizzly bears do not occur throughout the distribution of elk on the Helena National Forest. Deer and elk populations are expected to remain well distributed across the Forest.

Kootenai National Forest

Two species or species groups of wildlife were selected as management indicator species for analysis in the Kootenai forest plan final EIS (see table 199).

Affected environment—Elk

The elk was selected as a management indicator species because of concern about the availability of security habitat; it was not selected because of a viability concern. Security habitat is defined as timbered stands on NFS lands at least 250 acres in size and greater than 0.5 miles from open motorized routes during the hunting season, calculated for a planning subunit (USDA, 2013b, p. 329).

Table 199. Terrestrial management indicator species in the Kootenai National Forest plan

Management indicator species	Selection category	Occurs in the PCA, zone 1, or zone 2	Indicator/habitat associations
Elk	High social importance and sensitive to the availability of security habitat	Yes	Security areas
Landbird assemblage	Moving towards desired conditions for vegetation would maintain or restore habitat for insectivores	Yes	Open forest structures, mature forests, burned forests, and snags

Note. PCA = primary conservation area.

The forest plan contains the following management direction specific to elk:

FW-DC-WL-16. Habitat for native ungulates (elk, deer, moose, bighorn sheep, and mountain goat) is managed in coordination with State agencies. Cover and forage are managed according to FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-04, FW-DC-VEG-05 and FW-DC-VEG-11.

FW-OBJ-WL-02. Elk. Over the life of the plan, increase by one the number of planning subunits that provide at least 30 percent elk security (see glossary) and increase by one the number of high emphasis planning subunits (determined in cooperation with MFWP; see FW-DC-WL-16) that provide at least 50 percent elk security.

FW-GDL-WL-10. Elk. Management activities in planning subunits should maintain existing levels of elk security (see glossary). Where possible, management activities in high- and medium-emphasis planning subunits (determined in cooperation with MFWP; see FW-DC-WL-16) should improve elk security.

Currently, many planning subunits on the Forest already provide at least 30 percent security habitat for elk. Only a few high-emphasis planning subunits have more than 50 percent security habitat.

Environmental consequences—Elk

Elk security habitat will be maintained or increased under all alternatives. Wilderness areas, recommended wilderness, inventoried roadless areas, and other nonmotorized areas will continue to provide security habitat. Management direction to provide secure core for grizzly bears will also contribute to elk security habitat, although grizzly bears do not occur throughout the distribution of elk on the Kootenai National Forest.

Landbird assemblage (hairy woodpecker, chipping sparrow, olive-sided flycatcher, Hammond's flycatcher, and dusky flycatcher)

A landbird assemblage (insectivorous birds) was identified as a management indicator species to analyze and monitor the desired conditions for vegetation. There was no viability concern identified for any of the individual species in the assemblage. The following is a brief summary of habitat associations of each species (Hutto & Young, 1999):

- The chipping sparrow uses mid-elevation open coniferous forests, edges near openings, and early-successional forests with shrubs. This species feeds in low vegetation or on the ground for insects and the seeds of grasses and annuals.
- The hairy woodpecker uses coniferous forests, including mature forests, along with edges and burned areas. The hairy woodpecker uses cavities in snags for nesting and feeds primarily on insects found on the surface or subsurface of trees.
- The Hammond's flycatcher uses mature coniferous forests that contain canopy openings. The Hammond's flycatcher primarily captures insects in the air.
- The olive-sided flycatcher uses open coniferous forests, edges near openings, or early-successional forests that contain residual conifers or snags to provide singing and foraging perches. The olive-sided flycatcher captures insects in the air.
- The dusky flycatcher uses mid-elevation open coniferous forests, open areas with scattered trees, and brushy areas, and it catches insects in the air.

In addition to the forestwide vegetation desired conditions to maintain or improve habitat for diverse species, including landbirds, the Kootenai forest plan includes the following objective:

FW-OBJ-WL-03. Landbird assemblage (insectivores). The outcome is the management of planned ignitions on 1,000 to 5,000 acres, annually, to provide habitat for olive-sided flycatchers, hairy woodpeckers, chipping sparrows, and Hammond's and dusky flycatchers. (Also see FW-OBJ-FIRE-02, which provides additional habitat for these species.)

Environmental consequences—Landbird assemblage

The existing forest plan provides direction that will maintain or improve habitat components needed by this group of species, including snags, mature forest, openings/edge habitat, and open forest. Forest plan desired conditions will encourage development of a diversity of habitats and landscape patterns similar to those found historically under natural disturbance processes. The action alternatives would not change this existing forest plan direction.

Modeling over a five-decade period predicted that natural disturbances (wildfire and bark beetle epidemics) would reduce the amount of habitat for olive-sided flycatcher. The amount of habitat is

expected to stay within the historic range of variability, and olive-sided flycatchers are expected to remain abundant and widespread (ERG, 2012). The modeling also predicted that habitat for hairy woodpecker, Hammond's flycatcher, dusky flycatcher, and chipping sparrow would increase over the five-decade period due to natural disturbances, forest growth, and/or advancing plant succession (ERG, 2012).

Management of open road access influences the amount of area subject to loss of snags from firewood cutting. The action alternatives would maintain baseline levels of motorized access in the primary conservation area.

Lewis and Clark National Forest

Twenty species of wildlife, representing four categories of management indicator species, were selected in the Lewis and Clark forest plan (see table 200).

Table 200. Terrestrial management indicator species in the Lewis and Clark National Forest plan (USDA, 1986c)

Management indicator species	Selection category	Occurs in the PCA, zone 1 or zone 2	Indicators/habitat associations
Northern goshawk	Special habitat needs—old-growth forest	Yes	Diverse forest landscape with dense old-growth stands for nesting; avian and mammalian prey
Northern three-toed woodpecker	Special habitat needs—tree cavity conifer	Yes	Nests in snags in subalpine coniferous forests; insect prey
Grizzly bear, gray wolf, bald eagle, peregrine falcon	Threatened and endangered species	Yes	(See analysis in previous wildlife species sections)
Elk, mule deer, bighorn sheep, white-tailed deer, mountain goat, black bear, mountain lion, blue grouse	Commonly hunted species	Yes	Diversity of forest, shrubland and grassland habitats Bighorn sheep: see section 6.5.7
Bobcat, beaver	Commonly trapped species	Yes	Bobcat: rocky, vegetated hillsides with small mammal prey base Beaver: streams and ponds with riparian deciduous forest habitat
Golden eagle, prairie falcon, wolverine, Canada lynx	Special interest	Yes	Golden eagle and prairie falcon: nesting cliffs adjacent to prairie habitat Wolverine: see section 6.5.7 Lynx: see section 6.5.6

Affected environment—Northern goshawk

The Lewis and Clark National Forest identified northern goshawk as a management indicator species for old-growth habitat. Forest plan monitoring item C-8 provides that old-growth habitat will be monitored by sampling active nesting goshawk territories. A more detailed description of habitat use by the goshawk is presented in the Helena National Forest section, above.

The number of known goshawk territories increased from 2006-2009 (see table 201), but this was primarily due to greater survey and monitoring efforts. The number of occupied territories and active nests fluctuated year to year. This type of fluctuation is natural in goshawk populations. No conclusions on population trend are available from the monitoring data at this time.

Table 201. Goshawk monitoring results on the Lewis and Clark National Forest 2006-2009 (USDA, 2015d)

Results of Monitoring	2006	2007	2008	2009
Number of known territories	40	42	43	53
Number of monitored territories	25 (63%)	41 (98%)	42 (98%)	50 (94%)
Number of occupied territories	16 (64%)	24 (59%)	16 (38%)	27 (54%)
Number of active nests	13 (52%)	17 (41%)	7 (17%)	25 (50%)

Environmental consequences—Northern goshawk

None of the alternatives would change the current management direction in the forest plan that pertains to old-growth forest habitat. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on the species. The species is expected to remain well distributed across the Lewis and Clark National Forest under all alternatives.

Affected environment—Northern three-toed woodpecker

The northern (American) three-toed woodpecker is a medium-sized black-and-white woodpecker. It breeds from northern Alaska, across Canada's boreal regions, and south into the Rocky Mountains in the United States. This woodpecker is generally a permanent resident with no regular latitudinal migration, although it can be somewhat nomadic. It inhabits subalpine coniferous forests, especially spruce, larch, and fir, and may move into areas that have burned or are experiencing insect outbreaks. The nest cavity is excavated in a dead tree, usually a conifer or aspen tree with heart rot. Its diet is mostly wood-boring insects, particularly the spruce bark beetle, and may also include fruit and tree sap (MNHP-MTFWP, 2015a).

Environmental consequences—Northern three-toed woodpecker

None of the alternatives would alter the existing management direction concerning retention of snags and down logs. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on this species. Northern three-toed woodpecker habitat and populations are expected to remain well distributed and at similar levels across the Lewis and Clark National Forest under all alternatives.

Affected environment—Elk, mule deer, white-tailed deer, mountain goat, black bear, mountain lion, blue grouse (commonly hunted species)

The Lewis and Clark National Forest plan identified elk, mule deer, white-tailed deer, black bear, bighorn sheep, mountain goat, and mountain lion as management indicator species in the category of commonly hunted species (USDA, 1986c, pp. 2-37). In addition to food, water, and shelter, hunted species also seek areas where they are less vulnerable to harvest. These may be areas with light or no hunting pressure or areas providing plentiful cover (e.g., dense forests or hilly terrain). The category of commonly hunted species was selected to ensure coordination and cooperation with MFWP. No viability concern was identified for these species.

As described previously for the Helena National Forest, both elk and mule deer move seasonally between summer and winter ranges. Elk primarily forage on grasses, whereas mule deer are selective browsers of shrubs and forbs.

White-tailed deer occupy a variety of forest habitats and are primarily distributed at lower elevations and valley bottoms. Low-elevation winter range may extend below national forest boundaries. Shrubs are the most important food source, although white-tailed deer use grasses in the spring and forbs when available. Compared to other big game animals, white-tailed deer may be more sensitive to harsh winter conditions due to their small body size and short legs, with fawns being particularly susceptible to mortality during February and March (Dusek, Wood, Hoekman, Sime, & Morgan, 2006). Deep snow accumulation may also make white-tailed deer more susceptible to being killed by predators, especially mountain lions (Dusek et al., 2006). During the winter, white-tailed deer select areas with a dense forest canopy. The snow is not as deep in these stands because the canopy intercepts much of the snow. Thermal cover, probably the most important feature of winter range, is provided by tree crowns that help moderate the effects of severe weather. As winter temperatures decrease and snow depths increase, deer are increasingly restricted to these areas to minimize energy expenditures. Optimum thermal cover is 60 to 80 percent of the critical winter landscape. Existing motorized vehicle access management strategies provide good security and habitat effectiveness. Winter weather severity, hunting harvest and predation, and disease are significant factors affecting the population trend of white-tailed deer (Mackie, Pac, Hamlin, & Dusek, 1998).

Mountain goats inhabit alpine and subalpine habitats in association with very rugged terrain that provides security. They are found at the highest elevations during summer and move lower in winter to cliff faces and steep terrain where snow depths are less and security from predators is available. In the past, the mountain goat population on the Rocky Mountain Front had served as a reliable source population for reintroductions across the State. However, the population recently has been in decline. In 2009, MFWP augmented the Rocky Mountain Front population by translocating goats from a healthy population in the Crazy Mountains. Mountain goats are sensitive to human disturbance and overhunting. On the Lewis and Clark National Forest, road densities and associated disturbance are generally low due to the limited number of roads and the high, steep, rugged habitat used by mountain goats.

Black bears inhabit forested habitats throughout Canada and in many eastern and western States. The distribution in Montana is closely associated with coniferous forest habitats within the various mountain ranges in the State. Mace and Chilton-Radandt (2011) found no relationship between black bear densities at DNA study areas and either road density or the proportion of the area classified as roadless. Black bears hibernate during the winter, using natural cavities in trees or under rocks, logs, or brush piles as dens. The diet is primarily herbaceous vegetation, along with berries, fruits, nuts, insects, tree bark, and rodents (Jonkel & Cowan, 1971). In Montana, black bear density is greatest in the moist, coniferous habitats of the northwest and generally declines in the less moist habitats towards the south (R. D. Mace & Chilton-Radandt, 2011). On average, approximately 1,030 black bears were harvested in Montana annually between 1987 and 2006, with about 14 percent of the average annual harvest occurring in MFWP region 4 (the area encompassing the Lewis and Clark National Forest). Annual harvest has been increasing in most bear management units in region 4.

The mountain lion is a large cat that preys primarily on white-tailed deer, elk, and mule deer. They inhabit mountains and foothills where they have access to prey populations. Mountain lions are territorial and solitary, except for females accompanied by males or kittens. Females den in caves, rock crevices, and brush piles, where they leave their kittens while hunting. Mountain lions usually

hunt by stealth at night and cache unused food for later use. The mountain lion population in region 4 generally is stable with respect to recent harvest and quota levels (Kujala, 2011).

Blue (dusky) grouse are found in high-elevation conifer forests during winter. During the early spring, they descend to lower altitudes, where they inhabit forest edges and openings. Broods may be found quite far from timber during summer and early fall (MNHP-MTFWP, 2015d). The diet is mainly leaves, flowers, and conifer needles. Blue grouse spend most of their time foraging on the ground but also forage for buds and needles in coniferous trees, particularly during the winter (Zwickel & Bendell, 2005). Reliable population data are not available for the dusky grouse since its territorial calling season peaks in April, well before the Breeding Bird Survey begins. Sample sizes on the Christmas Bird Count are also low since it is very inconspicuous in winter.

Environmental consequences—Commonly hunted species

Some of the commonly hunted species are sensitive to disturbance by human activities. The level of motorized vehicle access can influence the vulnerability of big game to legal and illegal shooting. Road restrictions, especially when implemented during the fall and winter seasons at the lower elevations and in valley bottoms, are beneficial in sustaining big game populations. All alternatives would continue to offer a relatively secure environment due to existing motorized vehicle access management strategies for grizzly bear, although grizzly bears do not occur throughout the distribution of elk on the Lewis and Clark National Forest. All alternatives are expected to maintain well-distributed populations that can provide hunting opportunity. Coordination and cooperation with MFWP would continue under all alternatives.

Affected environment—Bobcat and beaver (commonly trapped species)

Bobcats use a variety of habitats but are primarily associated with rimrock and grassland/shrubland areas. Natural rocky areas provide den sites. Bobcats may be active during all hours but are primarily nocturnal. Their primary prey is jackrabbits, snowshoe hares, and other medium-sized rodents (MNHP-MTFWP, 2015b).

Beavers occupy ponds, small lakes, meandering streams, and rivers. Their diet includes a variety of woody and herbaceous species, particularly willow, alder, and aspen.

Environmental consequences—Bobcat and beaver

Populations of bobcat and beaver are expected to be more strongly influenced by trapping regulations than by habitat management. The habitats used by these species would not be affected by either of the action alternatives. There would be no indirect or cumulative effects to the commonly trapped management indicator species under any of the alternatives.

Affected environment—Golden eagle and prairie falcon (special interest)

Golden eagles nest on cliffs and in large trees (occasionally on power poles) and hunt over native prairie, shrub-steppe, and open woodlands. Golden eagles eat primarily jackrabbits, ground squirrels, and carrion and may occasionally prey on deer and pronghorn (mostly fawns), waterfowl, grouse, weasels, skunks, and other animals. Shooting, trapping, ingestion of poisoned bait or lead fragments in carrion, collisions with wind turbines, and electrocutions from high-voltage powerlines have been identified as threats to golden eagle populations. Breeding Bird Survey data for Montana show annual population increases of 1 percent per year during 1966-2009 and 1.7 percent per year for 1999-2009 (these increases are not statistically significant).

Prairie falcons use cliffs for nesting, and prairie habitats for hunting. Most nesting territories in Montana are located between 4,000 and 6,000 feet in elevation. Common prey of prairie falcons in

Montana are western meadowlarks, horned larks, and ground squirrels. Population estimates vary, and there are insufficient data to determine trends based upon Breeding Bird Survey data. There has been a significant increase in the number of prairie falcons detected on Christmas Bird Counts for the period 1966-2012. Loss of prairie habitat is the primary threat to prairie falcons.

Environmental consequences—Golden eagle and prairie falcon (special interest)

None of the alternatives would change the management direction applicable to the prairie habitats inhabited by golden eagles and prairie falcons. Therefore, there would be no direct, indirect, or cumulative effects.

Lolo National Forest

The Lolo forest plan identified three management indicator species (table 202).

Table 202. Terrestrial management indicator species on the Lolo National Forest (USDA, 1986d)

Management indicator species	Selection category	Occurs in the PCA, zone 1 or zone 2	Indicator/habitat associations
Pileated woodpecker	Special habitat needs—mature/old-growth forest	Yes	Mid-elevation conifer forests with large-diameter ponderosa pine and western larch trees and wood-boring insect prey
Northern goshawk	Special habitat needs—old-growth forest	Yes	Diverse forest landscape with dense old-growth stands for nesting and abundant prey
Elk	Commonly hunted	Yes	Coniferous forests interspersed with grasslands or shrublands with limited open road density on summer and winter ranges

Note. PCA = primary conservation area.

Affected environment—Pileated woodpecker and northern goshawk

The pileated woodpecker was selected as a management indicator species representing the group of species associated with mature/old-growth forest with limited management. The analysis of the management situation completed for the Lolo National Forest in the 1980s estimated that these species were at 70 percent of potential population levels and declining due to continuing harvest of old-growth timber (USDA, 1986d, pp. VI-17, VI-18). It was thought that the species in this group were capable of adapting only to limited management activities, such as light thinning.

More recent estimates based on Forest Inventory and Assessment plot data for the Northern Region indicate that habitat for the pileated woodpecker is abundant and well distributed across the Northern Region (Samson, 2006). On the Lolo, there are 98,463 acres of habitat available for nesting and 157,981 acres available for winter foraging (winter is considered a critical time of year for this woodpecker). Population monitoring data collected for breeding birds along random transects across the Northern Region, including the Lolo National Forest, from 1994 to 2000 show a clear upward trend in pileated woodpecker numbers, indicating viability is not a concern (UM, 2015).

The northern goshawk was selected as the management indicator species for the group of species associated with natural old-growth forest. In the analysis of the management situation prepared in the 1980s, it was estimated that population levels were 70 percent of potential on the east half and 40

percent of potential on the west half of the Lolo National Forest, for an average of 55 percent of potential. The goshawk was thought to have a very low tolerance to management activities and to be declining significantly with the harvest of old-growth forests (USDA, 1986d, pp. VI-17, VI-18).

The Lolo National Forest has maintained over 8 percent of its land base in old-growth forest condition, thus meeting its 1986 forest plan allocation objectives. With an increasing emphasis on restoring the historical distribution and condition of old growth, the Forest has cautiously proceeded forward with treating old-growth stands in the warm-dry, low- to mid- elevation habitat groups where significant structural changes have occurred since European settlement (Hessburg, Smith, Salter, Ottmar, & Alvarado, 2000). A study was conducted to monitor old-growth vegetation management treatments that were completed across the Forest between 1995 and 2005 (Brewer et al., 2008). Fifteen of the 17 (88 percent) old-growth stands that were assessed for the effects of management treatments, including ecosystem maintenance burning, timber harvest, and timber harvest followed by burning, continued to meet the old-growth definition after treatment. In comparison, only one (9 percent) of the 11 study stands retained its values as live old-growth forest habitat after being burned by wildfire.

Pileated woodpecker use of untreated (control), treated, and burned areas was relatively common, with the highest number of stands with large cavities occurring in 63 percent of the untreated stands sampled, 44 percent of the treated stands sampled, and 33 percent of the stands affected by wildfire. All 16 treated stands provided habitat consistent with typical conditions for this species, and this is corroborated by the presence of large cavities at frequencies similar to the control stands.

For goshawks, old-growth treatments on the Forest generally occurred in goshawk foraging habitat and outside of their nesting habitat. Goshawk monitoring included 208 broadcast calling stations (104 in 2006 and 104 in 2007), with five goshawks responding to broadcast alarm calls (two in 2006 and three in 2007) for an overall detection rate of 2.4 percent. Four (two vocal approaches, two silent approaches) of the five total goshawk detections were elicited from broadcast calling stations located inside four separate stands that had been treated with improvement cuts and/or ecosystem burns to improve old-growth characteristics, and one detection was elicited from an untreated stand.

Environmental consequences—Pileated woodpecker and northern goshawk

None of the alternatives would change the current management direction in the Lolo forest plan that pertains to old-growth forest habitat. Open road access for firewood cutting would remain about the same under all alternatives and would not have a measurable detrimental effect on the species. The species are expected to remain well distributed across the Lolo National Forest under all alternatives.

Affected environment—Elk

As described previously, elk inhabit open to dense coniferous forests interspersed with grasslands or shrublands. Elk are seasonally migratory, moving between traditional winter ranges and higher-elevation summer ranges. Elk security during the hunting season is considered the primary limiting factor on elk populations (Wisdom et al., 2000). Elk numbers in northwestern Montana are currently stable, with good calf recruitment in 2014 (MTFWP, 2014). Within region 2 as a whole, in 2015 the elk population was slightly above the State's population objective (MTFWP, 2015).

Environmental consequences—Elk

Existing management direction would remain in place under all alternatives. Elk populations are expected to remain well distributed across the Lolo National Forest. Wilderness areas, recommended wilderness, inventoried roadless areas, and other nonmotorized areas would continue to provide security habitat. Management direction to provide secure core for grizzly bears would also contribute

to elk security habitat, although grizzly bears do not occur throughout the distribution of elk on the Lolo National Forest.

6.6 Watershed, Riparian and Aquatic Habitat, and Soils

6.6.1 Introduction

This section of the analysis includes watersheds, riparian and aquatic species, and their habitat. It also includes information on the soil resource. The “Affected environment” and “Environmental consequences” sections include a discussion for all Forests. Determinations for bull trout, Kootenai River white sturgeon, westslope cutthroat trout, and pearlshell mussel are included at the end of the section.

6.6.2 Regulatory framework

Federal Law

Organic Administration Act of 1897: States that the mission of national forests is to “provide favorable conditions of water flow.”

Clean Water Act of 1948, as amended in 1972: The Federal Water Pollution Control Act, or Clean Water Act, is the principal law concerned with polluting activity in the nation’s streams, lakes, and estuaries. Originally enacted in 1948, it has been revised by amendments in 1972 (Pub. L. 92-500) that gave the act its current form and spelled out ambitious programs for water quality improvements that are now being put in place by industries and cities. Congress refined these amendments in 1977 (Pub. L. 95-217) and 1981 (Pub. L. 97-117). The 1987 amendments include

- **a new Section 319 to the act**, under which States are required to develop and implement programs to control nonpoint sources of pollution, or rainfall runoff from farm and urban areas, as well as construction, forestry, and mining sites.
- **section 303(d) of the Clean Water Act**, which requires States to identify pollutant-impaired water segments and develop “total maximum daily loads” that set the maximum amount of pollution that a waterbody can receive without violating water quality standards:
 - ♦ a water quality classification of streams and lakes to show support of beneficial uses and
 - ♦ anti-degradation policies that protect water quality and stream conditions in systems where existing conditions exceed standards.

Multiple-Use Sustained-Yield Act of 1960: Congress has affirmed the application of sustainability to the broad range of resources for which the Forest Service has responsibility. The Multiple-Use Sustained-Yield Act confirms the Forest Service’s authority to manage the national forests and grasslands “for outdoor recreation, range, timber, watershed, and wildlife and fish purposes,” (16 U.S.C. § 528) and does so without limiting the Forest Service’s broad discretion in determining the appropriate resource emphasis or levels of use of the lands of each national forest and grassland.

National Environmental Policy Act of 1969: Requires analysis of projects to ensure the anticipated effects upon all resources within the project area are considered prior to project implementation (40CFR § 1502.16).

Endangered Species Act of 1973, as amended: Section 7(a) (1) supports biotic sustainability by requiring that “all . . . federal agencies shall . . . utilize their authorities in furtherance of the purposes

of this act by carrying out programs for the conservation of endangered species and threatened species.” Section 7(a)(2) of the Endangered Species Act includes direction that Federal agencies, in consultation with the USFWS, will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

National Forest Management Act of 1976: Under the National Forest Management Act, forest plans are to provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet the overall multiple-use objectives. The National Forest Management Act requires that projects be consistent with the forest plan.

The National Forest Management Act states that management activities on NFS lands will not produce substantial and permanent impairment of productivity. The agency ensures that productivity is maintained by establishing soil quality standards. Since 1999, physical soil disturbance has been the focus of soils management on NFS lands. Forest Service Manual chapter 2550, Region 1 Soil Management Supplement, provides a benchmark that indicates when changes in soil properties and conditions may result in a notable change or impairment of soil quality. Not all soil disturbance results in substantial or permanent impairment of productivity. The manual defines levels of soil disturbance (e.g., compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement) that are considered detrimental (of a great enough magnitude to potentially cause substantial impairment). Because soil disturbance recovers towards natural conditions either naturally or through restoration activities, no more than 15 percent of an activity area may have detrimental soil disturbance. This low level of detrimental soil disturbance allows recovery to occur between management activities.

Regulation and policy

Applicable Forest Service Manual and Handbook Direction (policy) follows.

- Forest Service manuals and handbooks within the 2500 file code designation contain direction for soil and watershed management.
- Forest Service manuals and handbooks within the 2600 file code designation contain direction on species and habitat management that supports recovery of listed species and maintenance of viable populations on NFS lands.
- In 2010, Forest Service Manual chapter 2550, Soil Management, was revised at the national level. The emphasis of soil management was changed to include long-term soil quality and ecological function. The manual defines six soil functions: soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering.
- The objectives of the national direction on NFS lands are (1) to maintain or restore soil quality and (2) to manage resource uses and soil resources to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity.

Executive Orders

Executive Order 11988: Directs Federal agencies to take action on Federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid the direct or indirect support of development on floodplains whenever there are reasonable alternatives and evaluate the potential effects of any proposed action on floodplains.

Executive Order 11990, as amended: Requires Federal agencies exercising statutory authority and leadership over Federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. Where practicable, direct or indirect support of new construction in wetlands must be avoided. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands.

Executive Order 12962 (June 7, 1995): Acknowledges the recreational value of aquatic biota by stating the objectives to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities by: “(h) evaluating the effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order.”

6.6.3 Methodology and analysis process

The approach used in this analysis is to take a programmatic look at the forestwide scale of past, present, and reasonably foreseeable activities on the Forest that may positively or negatively affect water resources. Since the forest plan makes no “on-the-ground” decisions, the most appropriate indicators for cumulative effects are reflected in the size and magnitude of different resource programs most likely to affect water resources either positively or negatively.

When water quality is affected, off-site effects can occur. Yet, since the forest plan prescribes no specific activity in any specific area, potential spatial and temporal effects to water quality cannot be attributed to any specific watershed. Therefore, cumulative effects to water quality can only be described in terms of potential to generally affect trends on a forestwide scale. In other words, the cumulative effects of a program at the forest plan scale as opposed to the effects from a project at the project scale can only be discussed in terms of general programmatic tendencies either towards improved or declining water quality or fisheries habitat at no specific site. Consequently, there is no easily defined area that may experience cumulative effects beyond the Forest boundary.

Therefore, the potential cumulative effects from Forest programs to water quality will generally be discussed at the Forest scale. The temporal scale for this analysis will be limited to the life of this plan, generally 10 to 15 years.

Watershed conservation practices and forest plan standards prescribe extensive measures to manage aquatic and riparian resources. If all applicable measures are implemented and if they are effective, adverse effects from any of the alternatives should be minimized. However, as levels of activity increase, the risk that conservation practices will not be properly implemented or will not be entirely effective increases. Therefore, alternatives that propose higher levels of activity for various resources pose greater inherent risks to aquatic and riparian resources. This analysis did not directly model the effects on stream processes and water quality because predictions of outcomes for delivery and routing of water, sediment, and woody debris and their effects on streams and river systems are not applicable at the broad scale. Therefore, broad-scale outcomes were qualitatively estimated for effects on hydrologic function and watershed processes for NFS lands within the project area.

Qualitative estimates of effects are inferred from predicted outcomes for certain landscape and aquatic variables that evaluated vegetation, disturbances, and varying activity levels with consideration of specific land allocations and analysis requirements. The rationale for using these outcomes is that they are key processes or activities that influence hydrologic systems and contribute to the protection and maintenance of ecological functions required for healthy watersheds.

6.6.4 Affected environment

The parent geology of the project area is predominantly metasedimentary rock consisting of quartzite, siltite, argillite, and dolomite species. The surficial soils consist primarily of unconsolidated material of glacial origin overlaid with loess containing ash derived from volcanic eruptions in the Cascade Mountains to the west, most notably the eruption of Mount Mazama in Oregon some 6,800 years ago. Most soils are well-drained gravels, although clay lenses of generally lacustrine origin do inhibit water percolation in areas scattered throughout the project area, creating numerous small bogs and wetlands.

Most of the project area is forested, with isolated patches of talus and bedrock exposure. Vegetation habitat types range from dry, mixed forest to upper subalpine forest and encompass patches of virtually all habitat types that exist in the NCDE. Riparian areas are generally confined to narrow strips along perennial and intermittent stream channels. Drainage networks are typically dendritic, with higher-gradient, lower-order streams combining to form streams of lower gradient and greater stream order. Annual precipitation ranges from about 20 inches per year at lower elevations up to 100 inches per year, much of which falls as winter snow, at the higher elevations.

The aquatic systems in the Inland Northwest evolved over millions of years under the influence of many geologic forces and processes. The present character and resiliency of the systems, climate, and geological processes have evolved following the last ice age, which ended approximately 10,000 years ago. Since then the aquatic systems have been subject to a wide array of disturbances and events. These disturbances have often been intense and cyclic in nature and may appear to recur somewhat randomly but with predictable frequency. The watersheds and their dependent resources have evolved under this “pulse” disturbance regime so that they can effectively respond to those natural disturbances while sustaining their long-term functions, processes, and condition.

Around the beginning of the 20th century, the influx of human populations began in the Inland Northwest along with the development of the land and resources to support those populations. This has resulted in many new human-caused disturbances to the watershed systems, and the pattern of many of those disturbances has tended to be a more sustained or “press” disturbance regime. A press disturbance forces an ecosystem to a different domain or set of conditions (Reeves, Benda, Burnett, Bisson, & Sedell, 1995). Many of those disturbances tend to mimic historic “natural” processes, but the frequency and intensity is greatly amplified. In some cases, the watershed systems have begun to adjust to those press disturbances or have become altered by them, resulting in stressors to aquatic-dependent resources.

Human activities have altered stream channels by direct modifications such as channelization, removal of large woody debris, dams and diversions, and historical log drives and by building infrastructure such as roads, railways, bridges, and culverts that have encroached on riparian areas and stream channels. Humans have also indirectly affected the incidence, frequency, and magnitude of disturbance events. This has affected inputs and outputs of sediment, water, and vegetation. These factors have combined to cause changes in channel conditions throughout many parts of the four national forests, resulting in aquatic and riparian habitat conditions different from those that existed prior to human development. Natural (primarily wildfire, floods, and landslides) and human-caused (timber harvest, fire suppression, road construction, mining, dams, introduction of non-native species, recreation, and grazing) disturbances over the last century have led to changes in the physical watersheds and in the fish and amphibians dependent on them (Lee, Sedell, Rieman, Thurow, & Williams, 1997).

Roads can have some of the greatest effects to watersheds and aquatic biota. Roads can change the runoff characteristics of watersheds, increase erosion and sediment delivery to streams, and alter channel morphology (Furniss, Roelofs, & Yee, 1991). These direct effects lead to changes in habitats for fish and amphibians. Although current best management practices for road construction are designed to minimize the effects to watersheds, many miles of road existing on the landscape were not built to these standards or are placed in stored service. As a result, these roads either continue to affect watersheds through chronic erosion or are at risk for mass failure from undersized stream crossings or locations on sensitive land types.

Priority watersheds

The Flathead, Helena, Kootenai, and Lolo forest plans were amended on August 30, 1995, by the Inland Native Fish Strategy (INFISH) (USDA, 1995a). This interim strategy was designed to provide additional protection for existing populations of native trout, outside the range of anadromous fish, on 22 national forests in the Pacific Northwest, Northern, and Intermountain Regions of the USDA Forest Service. Implementing this strategy was deemed necessary because these species were at risk due to habitat degradation, introduction of exotic species, loss of migratory forms, and over-fishing. As part of this strategy, the regional foresters designated a network of priority watersheds. Priority watersheds are drainages that still contain excellent habitat or assemblages of native fish, provide for metapopulation objectives, or are watersheds that have excellent potential for restoration. Table 203 lists the priority bull trout watersheds.

Table 203. Priority bull trout watersheds

South Fork of the Flathead	Middle Fork of the Flathead	Swan River	North Fork of the Flathead	Kootenai River	Blackfoot River	Clearwater River
Danaher	Bowl	South Lost	Trail	Phillips/Sophie	Copper	Morrell
Youngs	Clack	Woodward	Whale	Wigwam	Monture	Clearwater
South Fork Flathead	Schafer	Goat	Red Meadow	Grave	North Fork Blackfoot	
Gordon	Long	Squeezer	Coal		Landers Fork	
White	Strawberry	Lion	Big		Little Blackfoot	
Big Salmon	Morrison	Piper	Cyclone		Cottonwood	
Little Salmon	Granite	Jim	Frozen			
Spotted Bear	Bear	Cold				
Sullivan		Elk				
Wounded Buck		Lindbergh				
Wheeler		Holland				

INFISH also established riparian management objectives and riparian habitat conservation areas. Riparian management objectives are habitat parameters that describe good fish habitat. Where site-specific data is available, these objectives can be adjusted to better describe local stream conditions. The objectives for stream channel conditions provide the criteria against which attainment or progress towards attainment of riparian goals is measured. Riparian habitat conservation areas are

portions of watersheds where riparian-dependent resources receive primary emphasis. These areas are defined for four categories of stream or waterbody, dependent on flow conditions and presence of fish. The riparian habitat conservation areas are areas within specific management activities and are subject to standards and guidelines in INFISH in addition to existing standards and guidelines in the forest plans.

Species descriptions and habitat requirements

This analysis only considers bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), Kootenai River white sturgeon (*Acipenser transmontanus*), and western pearlshell mussel (*Margaritifera falcata*). These are the aquatic species in the NCDE action area that are listed under the Endangered Species Act (USFWS, 2017b, 2017c, 2017d) or are on the regional forester's sensitive species list. Other native species known to be present in the analysis area are mountain whitefish (*Prosopium williamsoni*), and sculpin (*Cottus spp.*). Tailed frogs (*Ascaphus truei*) are also present in the watersheds. Non-native brook trout (*S. fontinalis*), rainbow trout (*O. mykiss*), grayling (*Thymallus arcticus*), and brown trout (*Salmo trutta*) are present within the analysis area, primarily within the Rocky Mountain Front streams and some Blackfoot River drainages.

White sturgeon—Kootenai National Forest

The white sturgeon inhabits large rivers, lakes, and marine environments from southern California to Alaska's Cook Inlet. It is a migratory species that can reach lengths of nearly 20 feet, weights of 1,970 pounds, and ages of 100 years or more.

The white sturgeon native to the Kootenai River drainage of Montana, Idaho, and British Columbia has been geographically isolated from the lower Columbia River stocks by Bonnington Falls (Cora Linn Dam), near Nelson, British Columbia. White sturgeon migrate freely throughout the Kootenai River (Andrusak, 1980) but are uncommon upstream of Bonners Ferry, Idaho (Apperson, 1992; Graham, 1981). There are no published reports of sturgeon using lateral tributaries in Idaho or Montana (Partridge, 1983). The Kootenai River white sturgeon exhibits both the riverine and adfluvial life histories. Most adult fish reside in Kootenay Lake and make extended (> 60-mile) migrations to spawn in a stretch below Bonners Ferry, Idaho.

The Kootenai River white sturgeon was listed as an endangered species in 1994 (USFWS, 1994b), and the recovery plan for the Kootenai River population of the white sturgeon was completed in 1999 (Duke et al., 1999). Critical habitat has been designated for Kootenai River white sturgeon; however, none was designated on the Kootenai National Forest.

In the Kootenai River, white sturgeon have not successfully spawned in recent years due to changes in river flow dynamics resulting from operations of the Libby Dam. Past land management activities conducted by the Forest Service, such as road construction and timber harvest, are considered a secondary impact to populations of this species (Lee et al., 1997).

White sturgeon spawn during spring peak flows when velocities are high and turbidity is elevated. The fertilized eggs sink to the bottom and then hatch within a few weeks. The newly hatched sac fry briefly drift with the current before retreating into the substrate for up to a month. The juveniles eventually emerge from the substrate and begin a free-roaming life. Juvenile fish use a wide range of depths and water velocities as habitat.

Older fish are relatively sedentary in the deepest locations of the Kootenai River drainage, often selecting low-velocity waters greater than 20 feet deep and with sand substrates. There are very few areas within the lower Kootenai River that contain substrates greater in size than sand. White

sturgeon are opportunistic feeders and subsist on insects, clams, snails, plant material, and fish (Brown, 1971).

Western pearlshell mussel—Sensitive species on the Lolo, Lewis and Clark, Helena, and Kootenai National Forests

Western pearlshell (*Margaritifera falcata*) is a State species of special concern in Montana (S2) and is also included on the Northern Region sensitive species list (USDA, 2011e). Montana's populations of *M. falcata* may be significantly contracting and becoming less viable with decreased streamflows, warming, and degradation. Previously reported mussel beds in the larger rivers (Blackfoot, Big Hole, Bitterroot, Clark Fork) are extirpated from the drainage or are at such low densities that long-term viability is unlikely. This mussel species appears to have crossed the Continental Divide in Montana from west to east with its salmonid host, the westslope cutthroat trout, *Oncorhynchus clarki lewisi*, which is the only native trout in the Missouri River headwaters. Reports of the eastern *M. margaritifera* in Montana are apparently due to the mistaken assumption that a mussel could not cross the Continental Divide (D. Stagliano, 2010).

Western pearlshell occurs in sand and gravel and even among cobble and boulders in low- to moderate-gradient streams up to larger rivers. This species prefers stable gravel and pebble substrates in low-gradient trout streams and intermountain rivers. Western pearlshell is found in runs and riffles in stable main-current channel areas. This mussel is intolerant of silt and warm water temperatures (D. M. Stagliano, Stephens, & Bosworth, 2007).

In large river systems, *M. falcata* attains maximum density and age in river reaches where large boulders structurally stabilize cobbles and interstitial gravels. Boulders tend to prevent significant bed scour during major floods. Boulder-sheltered mussel beds, although rare, may be critical for population recruitment elsewhere within the river, especially after periodic flood scour of less protected mussel habitat. In localized areas where canyon reaches are aggrading with sand and gravel, *M. falcata* is often replaced by *Gonidea angulata*.

Nearly all mussels require a host or hosts during the parasitic larval portion of their life cycle. Hosts are usually fish species, and hosts for *M. falcata* in Montana were typically and historically *Oncorhynchus* spp. (e.g., westslope cutthroat trout), but *Salmo* and *Salvelinus* (introduced species) and even *Rhinichthys* and *Catostomus* (dace and suckers) are anticipated to be suitable hosts as well.

Pearlshell mussels have been found in the Blackfoot, Clearwater, and Tobacco River drainages within the analysis area.

Bull trout—Threatened species

The final rule to list bull trout as threatened in the Columbia River Basin was published on June 10, 1998. The USFWS listed all populations of bull trout within the coterminous United States as a threatened species, combining bull trout in the Coastal-Puget Sound populations (Olympic Peninsula and Puget Sound regions) and Saint Mary-Belly River populations (east of the Continental Divide in Montana) with previous listings of three separate distinct population segments of bull trout in the Columbia River, Klamath River, and Jarbidge River Basins (63 FR 31647, June 10, 1998; 64 FR 17110, April 8, 1999). USFWS designated critical habitat for bull trout throughout the U.S. range on September 30, 2010. Critical habitat encompasses about 18,795 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada. The recovery plan for the conterminous U.S. population of bull trout was finalized in 2015. In its most recent status review for bull trout, USFWS (2008) identified historical habitat loss and fragmentation, interaction with non-native species, and fish passage issues as the most significant primary threat factors affecting

bull trout. These threats are addressed in the recovery plan for each of the six recovery units. The Kootenai, Flathead, and Lolo National Forests are within the Columbia Headwaters recovery unit.

Two basic life history forms of bull trout are known to occur: resident and migratory. Resident bull trout spend their entire lives in their natal streams, whereas migratory bull trout travel downstream as juveniles to rear in larger rivers (fluvial types) or lakes (adfluvial types). Bull trout in the NCDE are an adfluvial migratory group, with juveniles moving downstream to rivers or lakes at age 2-3 and then returning around age 6 to spawn. Bull trout spawning occurs in the fall, and the eggs incubate in the stream gravel until hatching in January (Fraley & Shepard, 1989). The alevins remain in the gravel for several more months and emerge as fry in early spring. Unlike many anadromous salmonids, which spawn once and die, bull trout are capable of multi-year spawning (Fraley & Shepard, 1989). The historic range of bull trout stretched from California, where the species is now extinct, to the Yukon Territory of Canada (Haas & McPhail, 1991).

Several factors have contributed to the decline of bull trout. Habitat degradation, interaction with exotic species, over-harvesting, and fragmentation of habitat by dams and diversions are all factors contributing to the decline (B. E. Rieman & McIntyre, 1995). A change in the species composition of Flathead Lake is perhaps the most important factor in the decline of the upper Flathead bull trout subpopulation (McIntyre, 1998). Between 1968 and 1975, opossum shrimp (*Mysis relicta*) were stocked in three lakes with tributaries feeding into Flathead Lake; the shrimp were then able to migrate downstream, and they became established in Flathead Lake. The shrimp were documented in Flathead Lake in 1981, and populations peaked in 1986. Two non-native species, lake trout (*Salvelinus namaycush*) and lake whitefish (*Coregonus clupeaformis*), expanded as juvenile fish benefited from the addition of shrimp to the prey base.

It is believed that the expansion of the lake trout and lake whitefish contributed to the decline of bull trout (McIntyre, 1998). The mechanisms of the decline are not well understood, but it is assumed that the loss of kokanee as a food source for bull trout and competition/predation with lake trout was a major contributor to the decline in bull trout. Bull trout populations remain healthy in Swan Lake and Hungry Horse Reservoir. Lake trout are absent from Hungry Horse but have recently been documented in Swan Lake, which has raised concern among land and fishery managers; efforts are underway to reduce lake trout.

Critical habitat was designated in 2010 with the aim of providing sufficient habitat to allow for genetic and life history diversity, to ensure that bull trout are well distributed across representative habitats, and to ensure sufficient connectivity among populations. USFWS designated 32 critical habitat units within six recovery units as critical habitat for bull trout. Two critical habitat units, the Kootenai River Basin and the Clark Fork River Basin, overlap with the amendment analysis area.

The primary constituent elements are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. These essential elements (USFWS, 2010) are

- springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia;
- migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers;
- an abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish;

- complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structures;
- water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence;
- in spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand and embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system;
- a natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph;
- sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited; and
- sufficiently low levels of occurrence of non-native predatory species (e.g., lake trout, walleye, northern pike, smallmouth bass), interbreeding species (e.g., brook trout), or competing species (e.g., brown trout) that, if present, are adequately temporally and spatially isolated from bull trout.

Westslope cutthroat trout—Sensitive species, management indicator species

Westslope cutthroat trout is a sensitive species on Forests within the NCDE. A sensitive species is defined as one that is susceptible to activity impacts or habitat alterations and is designated primarily to emphasize habitat protection and prevent population declines that would lead to a threatened designation (Forest Service Manual 2670).

The USFWS was petitioned by environmental groups to include the westslope cutthroat trout under the protection of the Endangered Species Act. In 2003, the USFWS determined that the listing was not warranted due to wide species distribution, available habitat on public lands, and conservation efforts underway by State and Federal agencies. The South Fork of the Flathead River drainage is considered a stronghold for westslope cutthroat trout throughout its range (Shepard, May, & Urie, 2005).

The primary reasons for this species' decline are similar to those discussed above for the bull trout. Habitat loss is considered a widespread problem. Cutthroat trout have declined due to poor grazing practices, historic logging practices, mining, agriculture, residential development, and the lingering impacts of forest roads. Fish have been unable to use countless miles of spawning habitat due to barriers created by dams and road culverts. Genetic introgression with rainbow trout threatens the long-term persistence of westslope cutthroat trout (Hitt, Frissell, Muhlfeld, & Allendorf, 2003).

Westslope cutthroat trout have two possible life forms, resident and migratory. Migratory forms are further divided into adfluvial (migrates to lakes) or fluvial (migrates to rivers). All life forms spawn in tributary streams in the springtime when water temperature is about 10 °C and flows are high (Liknes & Graham, 1988). Cutthroat trout spawn when they are about four or five years old, and only a few survive to spawn again (McIntyre & Rieman, 1995). Fry emerge in late June to mid-July

and spend one to four years in their natal streams. Resident fish spend their entire lives in tributary streams, whereas migratory forms may travel miles as they move between waterbodies and spawning habitat.

Bull trout and westslope cutthroat trout status by watershed

South Fork of the Flathead River

The South Fork of the Flathead River originates at the confluence of Danaher and Youngs Creeks in the Bob Marshall Wilderness and flows north 57 miles into Hungry Horse Reservoir. It drains a 1,663-square-mile area with an average annual discharge of 3,522 cubic feet per second. Bull trout are native to the South Fork of the Flathead River drainage and are distributed throughout the Flathead River Basin. Prior to human intervention, migratory bull trout that spawned and reared in the South Fork occupied Flathead Lake as adults. The construction of Hungry Horse Dam in 1952-1953 blocked access to the entire South Fork drainage. About 38 percent of the spawning and rearing area once available to the Flathead bull trout population was cut off (Zubik & Fraley, 1987).

The construction of Hungry Horse Dam isolated the South Fork population of bull trout from the rest of the Flathead River system. The Montana Bull Trout Scientific Group (1995b) reported that the South Fork of the Flathead drainage upstream from Hungry Horse Dam is the “most intact native fish ecosystem remaining in western Montana” (p. i). Currently, subadult bull trout upstream of the dam in Hungry Horse Reservoir or in the South Fork main stem above the reservoir reside for several years prior to maturity and migration into tributaries to spawn. The majority of the spawning and rearing habitats for the South Fork bull trout population are located in backcountry areas, most of which is in the Bob Marshall Wilderness. Juvenile bull trout rear from one to four years before moving downstream to the main stem or to the reservoir.

The Montana Bull Trout Scientific Group (1995b) reported that the South Fork bull trout population trend is stable based on available data. However, they cautioned that data are limited and more long-term information is needed for a full assessment. This is significantly different than the rest of the Flathead River Basin subpopulations. The current status of Flathead River subpopulations of migratory bull trout in the Middle Fork and North Fork of the Flathead River is depressed and the trend is declining.

Two known disjunct populations of bull trout occur in the South Fork of the Flathead River drainage. Big Salmon Lake supports a migratory bull trout population that uses 5.5 miles of Big Salmon Creek upstream from the lake to a barrier falls for spawning and rearing. Doctor Lake also supports a bull trout population; little is known about this population, but it is suspected to spawn and rear in a short reach of Doctor Creek upstream of the lake (MBTSG, 1995b).

Core areas are drainages that currently contain the strongest remaining populations of bull trout and that must be given highest priority for protection as they will be the primary source of fish for recolonization (B. Rieman & McIntyre, 1993). They are usually relatively undisturbed and have been identified as needing the highest level of protection (MBTSG, 1995b). Core areas in the South Fork include the entire drainages of Wounded Buck, Wheeler, and Sullivan Creeks. Also included as core areas are tributaries to the river upstream of the reservoir (Spotted Bear River, Bunker Creek, Little Salmon Creek, White River, Gordon Creek, Youngs Creek, and Danaher Creek) and the South Fork itself above Gordon Creek.

Nodal habitats are waters that provide migratory corridors, overwintering areas, or other areas that are otherwise essential to bull trout at some point in their life history (MBTSG, 1995b). Nodal

habitat for the South Fork population is provided by the main stem of the South Fork of the Flathead River downstream from Gordon Creek, including Hungry Horse Reservoir (MBTSG, 1995b).

The Bull Trout Recovery Plan (USFWS, 2015a) suggests that an appropriate conservation goal is to maintain the status quo. It is believed that by protecting and maintaining the existing native species complex through natural production, maintaining the current genetic structure and diversity, and ensuring that operation of Hungry Horse Dam does not exceed the desired minimum pool level, the conservation goal to meet bull trout life history requirements in the South Fork of the Flathead River will be met.

Westslope cutthroat populations in the South Fork of the Flathead River drainage are arguably the strongest within their range, given that there are no non-native fish and the area is primarily wilderness.

Middle Fork and North Fork of the Flathead River

The Flathead River drainage supports one of the highest migratory bull trout populations in the United States. Historically, prior to the construction of Hungry Horse Dam and Reservoir, Flathead Lake bull trout had access to all three forks of the Flathead River (North, South, and Middle Forks) and bull trout were widely distributed throughout the drainage. The Middle and North Fork populations are considered one metapopulation since these fish depend on Flathead Lake for a major part of their life cycle. Juvenile fish rear in the tributaries of the Middle and North Fork for one to three years before migrating back to Flathead Lake (Fraley & Shepard, 1989).

The Middle Fork of the Flathead River originates in the Great Bear Wilderness at the confluence of Bowl and Strawberry Creeks. It flows for 47 miles to Bear Creek along U.S. 2, where it forms the southern boundary of Glacier National Park. It then flows for 54 miles to its confluence with the North Fork. Nineteen streams in the Middle Fork subbasin are known to support bull trout, including five in Glacier National Park.

At present, the predominant life history form of bull trout in the North and Middle Fork system is the lacustrine-adfluvial. No resident populations are known to exist, and there are no indications that fluvial populations are present. Adfluvial fish reach sexual maturity in Flathead Lake at about age 6 and migrate upriver beginning in April. They reach the North and Middle Forks in June and July and enter tributaries in August, with spawning commencing in late September and October when water temperatures drop to 9 to 10 °C (48.2 to 50 °F) (Fraley & Shepard, 1989). Incubation of eggs to emergence of swim-up fry lasts about 200 days, with emergence occurring in April. Juvenile bull trout rear for two to three years in the streams until they migrate downstream to Flathead Lake.

Unlike the South Fork bull trout population, recent monitoring data (MFWP, 2015a) indicate declining numbers of spawning bull trout in the Middle Fork and North Fork River systems. The mechanisms for the decline in the Flathead Lake migratory population are not completely understood but include the introduction of and subsequent population increase in mysis shrimp in Flathead Lake, which, in turn, changed the composition of the fish community in Flathead Lake. Lake trout (*Salvelinus namaycush*) and lake whitefish (*Coregonus clupeaformis*) now dominate the fish community and may be responsible for the decline in bull trout as well as other species. These changes in the Flathead Lake and River system are considered the primary threat to bull trout in the entire drainage system. Lake trout and bull trout competition has been documented elsewhere. Donald and Alger (1993) looked at 34 lakes in the distributional overlap of the species and found that, in 28 cases, only one species was present. In the lakes where they were sympatric, lake trout were the dominant species, and three case histories were documented where lake trout had completely displaced bull trout. A secondary threat is the high incidental catch of bull trout and the

strong fisheries management emphasis on introduced species (MBTSG, 1995a). Forestry issues are also considered important in the managed portions of the Middle Fork and North Fork subbasins.

Core areas are drainages that currently contain the strongest remaining populations of bull trout and that must be given highest priority for protection, as they will be the primary source of fish for recolonization (B. Rieman & McIntyre, 1993). Core areas in the Middle Fork include the Nyack, Park, Ole, Bear, Long, Granite, Morrison, Schafer, Clack, Strawberry, and Bowl Creek drainages. Core areas in the North Fork include the Trail, Whale, Red Meadow, Coal, and Big Creek drainages.

Nodal habitat for this population is provided by the main stem rivers. Nodal habitats are waters that provide migratory corridors, overwintering areas, or other areas that are otherwise essential to bull trout at some point in their life history (MBTSG, 1995a). The restoration goal for the migratory population of bull trout in the Flathead River drainage is to maintain or restore self-sustaining populations in the core areas, protect the integrity of the population genetic structure, and enhance the migratory component of the population (MBTSG, 1995a). The specific goal is to increase bull trout spawners to the level recorded in the 1980s and to maintain this level for three generations. The average 1980 redd count in the Middle Fork index streams was 151 (MBTSG, 1995a). In 2013, 137 redds were counted in the index streams.

Westslope cutthroat trout that are migratory have also been affected by lake trout predation in Flathead Lake, but resident populations remain strong.

Swan River

At present, the Swan River drainage provides habitat for one of the strongest collections of local migratory bull trout populations remaining in the State of Montana (MBTSG, 1995a). At least 23 tributaries support some level of juvenile bull trout rearing (Leathe & Enk, 1985). Bull trout spawning occurs in at least 10 tributary drainages. Major spawning and rearing areas in the Swan River drainage are highly influenced by groundwater, which reduces the risk of impact from drought conditions. Bull trout are thought to be primarily adfluvial fish and to mature in Swan Lake, located at the northern end of the Swan Valley. The recent invasion of lake trout into Swan Lake may threaten the long-term viability of this population. Lake trout have been suppressed by gillnetting since 2010, with about 5,000-7,000 lake trout removed annually. Core areas include Elk Creek, Cold Creek, Jim Creek, Piper Creek, Lion Creek, Goat Creek, Woodward Creek, Soup Creek, and Lost Creek, as well as Swan Lake, Holland Lake, and Lindbergh Lake.

Westslope cutthroat trout populations remain strong in some tributary streams but have been replaced by brook trout, and they have hybridized with rainbow trout in other streams.

Blackfoot River

There are two bull trout local populations within the Blackfoot River core area on the Helena National Forest—Landers Fork and Poorman Creek, identified in the 2002 Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan (USFWS, 2002) and the Conservation Strategy for Bull Trout on USFS lands in Western Montana (USDA-USFWS, 2013).

Historically, bull trout populations were well distributed throughout the core area and were likely present in much higher densities than they are today. It is thought that up to 1,000 bull trout redds may have been historically present in the Blackfoot River Core Area. As with most bull trout populations, overall numbers were likely highly variable from year to year, based on natural climatic and disturbance patterns. These redd numbers were generated from estimating the potential in each of the 16 major spawning tributaries to the Blackfoot River (Union, Gold, Belmont, Cottonwood,

Monture, Chamberlain, North Fork Blackfoot, Nevada, Arrastra, Beaver, Willow, Poorman, Upper Willow, Landers, Alice, and the upper Blackfoot).

Bull trout populations in the Blackfoot River were likely first exposed to mining-caused impacts in the late 1800s in the form of small-scale mining. This mining was focused mainly south of the Blackfoot River in the Lincoln area (eastern Nevada Creek tributaries to Anaconda Creek) and in the northern Garnet mountain range (Ashby to Chamberlain Creek). The mining method was often an instream placer mining operation that directly disrupted fish habitat and stream functions. Once disturbed in this fashion, streams rarely have the ability to naturally recover to their predisturbance level.

Westslope cutthroat populations are impacted by competition with brook trout and hybridization with rainbow trout in some areas, but overall the local populations are well distributed.

Monture Creek subpopulation of bull trout

This watershed is a mixture of alpine ridges and cirques, moderately steep to steep soils formed in slightly weathered sedimentary rocks, and undulating deep soils on glacial moraines. The upper section of the drainage is managed by the Forest Service. The lower section of the drainage is a mixture of Weyerhaeuser, private, and State land. Monture Creek is considered a core area. The highest redd count was 93 in 2002, and 63 redds were counted in 2013.

Clearwater subpopulation of bull trout

Due to the glaciated nature of the Clearwater drainage, many streams are lower gradient and provide preferred fish habitat. The Clearwater flows from its headwaters through a chain of several lakes, where it eventually drains into the Blackfoot River. The Forest Service manages about 70 percent of the Upper Clearwater, the remaining 30 percent a combination of Weyerhaeuser and private ownership. In the lower section of the Clearwater subpopulation, the Forest Service manages about 5 percent, with private ownership making up the rest. The most significant uses and impacts are associated with timber and recreation. The highest redd count was 74 in 2012, and 49 redds were counted in 2013.

Copper Creek subpopulation of bull trout

Streams currently known to support fisheries located within this watershed include Copper Creek and tributaries to Copper Creek, including lower Red Creek, lower Cotter Creek, Snowbank Creek, the North Fork of Copper Creek, and an unnamed tributary to Copper Creek in the headwaters. The majority of the basin is in public ownership. The Copper Creek drainage has been affected by wildfire, timber harvest, roads, and recreation. Some of the past timber harvest and existing roads, including approximately 5 miles of the main access road, are located within the riparian habitat conservation area of Copper Creek and its tributaries. The highest redd count was 82 in 2009, and 22 redds were counted in 2013.

Landers Fork subpopulation of bull trout

Bull trout have been documented in Landers Fork below Silver King Falls. Fish collected in Landers Fork were juvenile bull trout or westslope cutthroat trout, with the exception of one brown trout. No brook trout were found in any of the samples. Landers Fork above Silver King Falls is not believed to be historical bull trout habitat because Silver King Falls is an upstream migration barrier.

Kootenai River

The Wigwam River drainage in the United States is a 30,792-acre watershed that flows north into British Columbia, Canada. The major lakes in the drainage include Big and Little Therriault Lakes,

Paradise Lake, and Wolverine Lakes. Bull trout and westslope cutthroat trout are codominant species, with some mountain whitefish (*Prosopium williamsoni*) and largescale suckers (*Catostomus macrocheilus*) also represented. Due to partial fish passage barriers, the whitefish and suckers rarely occur in the U.S. portion of the Wigwam. The Wigwam River is a bull trout core area (a population stronghold). The Kootenai National Forest plan lists the Wigwam River as a priority bull trout watershed.

Grave Creek is considered one of the major fisheries streams on the Fortine Ranger District. This drainage produces both resident and migratory populations of bull trout, cutthroat trout, and a moderate run of rainbow trout. Grave Creek is considered the major spawning stream south of the Canadian border for Lake Koocanusa's bull trout population and is a priority bull trout watershed. The Tobacco/Grave bull trout subpopulation (stock) is a part of the larger upper Kootenai River metapopulation. The Tobacco/Grave population consists of both migratory and resident forms. Bull trout are known to inhabit or reproduce in Grave Creek and the following tributaries: Lewis, Blue Sky, Clarence, Stahl, and Williams Creeks. Migratory fish from Lake Koocanusa are known to spawn in Grave, Lewis, Blue Sky, Clarence, and Stahl Creeks. The upper reaches of Stahl and Williams Creeks support instream falls that are fish barriers. Only Williams Creek is known to have an isolated population of resident bull trout above the falls.

Sun, Teton, Two Medicine, Badger, Deep, and Dearborn Rivers

Bull trout are not present in these drainages. The most widespread impact to aquatic habitats in these drainages is the stocking of non-native fish. This has eliminated westslope cutthroat trout of conservation-level purity from most of the historically populated stream reaches. The few isolated populations that still persist represent unique genetic diversity from the range east of the Continental Divide (Allendorf & Leary, 1988; Leary, Allendorf, & Knudsen, 1987). Survey work jointly conducted by the USFS and MFWP recently led to the discovery of a previously unknown remnant population. This is the last known genetically pure population in the entire Sun River drainage. Historically, fish were unable to colonize the Sun River above the falls at Diversion Dam, located approximately 1.5 miles downstream from Gibson Dam. Although fish are not native to this portion of the Sun River drainage, this area has been stocked with both native and non-native fish species and is dominated by non-native trout.

Several other river and large stream networks occur within this area. These include headwater portions of the Two Medicine River, Badger Creek, the Teton River, Deep Creek, and the Dearborn River. Thirty-four conservation populations of westslope cutthroat trout are known to occur in this geographic area. Headwater tributaries of Badger Creek contain five of the eight tested populations with 100 percent genetic purity. There are not any genetically pure populations known in Dearborn River drainages. There is one in each of the Two Medicine River and Teton River systems. Preliminary testing indicates that Deep Creek contains genetically pure fish from west of the Continental Divide. These are likely the result of an unauthorized transplant from west of the Continental Divide to an area above a waterfall that is a natural fish barrier.

Soils

Certain attributes associated with soils on the Forests make them sensitive or susceptible to management-caused impairment of soil quality and productivity. Sensitive soil properties on Forests are the organic surface horizons, mass wasting events, and thin-lithic soils.

Land use practices such as grazing, logging, and mining have been occurring on Forest Service lands since the Forests were established. Impacts of these activities are evident on the soil landscape today. Dynamic soil characteristics may be indicators of impaired productivity. Compaction may restrict

plant rooting, lower the soil's water-holding capacity, and decrease infiltration. Loss of surface soil through displacement and mixing may decrease soil productivity. Displacement occurs during temporary road construction, excavation of skid trails and landings, and ground-based harvest. Areas with ground disturbance may become more favorable for weed invasion, which can reduce overall soil productivity.

The soil organic layer is extremely important to all soils on the Forests. Soil organic matter is fundamentally important to sustaining long-term soil productivity and is influenced by fire, harvest activities, and decomposition and accumulation rates. The organic component of soil is a large reserve of nutrients and carbon and is the primary site for microbial activity. Forest soil organic matter influences many critical ecosystem processes, including the formation of soil structure. Soil organic matter is also the primary location for nutrient recycling and humus formation, which enhances nutrient and water storage and overall fertility. Soil organic matter depends on inputs of biomass (e.g., vegetative litter, fine woody debris) to build and maintain the surface soil horizons, support soil biota, enhance water-holding capacity, and prevent surface erosion. A review of the soil data and interpretations from the Natural Resources Conservation Service Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>) shows that a majority of the analysis area has soils sensitive to erosion should the surface organic layer be removed.

Woody debris in the form of slash can provide a practical and effective mitigation for reducing harvest impacts on the physical function and processes of soil. Some controversy has emerged in recent years over the role of coarse woody debris in maintaining long-term soil productivity. The controversy involves the fact that coarse wood contains very little in the way of nutrients. Regardless, recent research still recommends leaving enough of this material on the ground after treatment to encourage biodiversity and ecological function (e.g., microbial action, mushroom production) (Page-Dumroese, Jurgensen, & Terry, 2010).

6.6.5 Environmental consequences

Introduction

In the past two decades, there has been a net reduction of roads across all Forests. These tended to be roads that were in excess of what was needed for management or recreational activities, were difficult or expensive to maintain, or both. Roads were also decommissioned to benefit wildlife and fish and to improve water quality. In the past, roads have been a primary cause of the reduction of water quality due to sedimentation from roads that were connected to streams. Decommissioning has disconnected many of these roads as a sediment source; roads constructed in the last decade meet standards for water conservation practices. Much of the road decommissioning has taken place inside the primary conservation area, with little accompanying road construction.

Effects of the no-action alternative on soil and aquatics

The effects on soil and water resources from the alternatives for grizzly bear habitat conservation are in direct proportion to the amount of activity that is allowed. In general, there would be no adverse effects. Alternative 1 would allow the present levels of activities to continue and would maintain the current condition of soil and water resources. There are additional opportunities for road decommissioning within and outside the primary conservation area as Forests address excess roads from past logging and heavily roaded NFS lands recently acquired through land exchanges, such as in the Swan Valley. Some additional road construction may be needed to address access needs for timber management and fuel hazard reduction, especially within 1.5 miles of structures.

Effects of alternatives 2 and 3 on soil and aquatics

Alternatives 2 modified and 3 would have the same effects from roads as alternative 1 because activities that would cause disturbance, such as road building, would remain at the 2011 baseline. Levels of open motorized road density, total motorized route density, and secure core under alternative 1 are set by biological opinion terms and conditions. The secure habitat standard and the developed site standard would limit these activities. There would be a limit on overnight-use developed recreation sites, allowing an increase of one developed site in each bear management unit/decade under alternative 2 modified and alternative 3. Depending on the location, this would result in soil disturbance and potential impacts on aquatics if constructed within riparian areas. There would be no increases in the density of roads open to the public during the non-denning season on NFS lands in zone 1. Alternative 2 modified includes a requirement for no surface occupancy for new oil and gas leases in the primary conservation area, which under alternative 3 is extended to also include zone 1. There would be no net increase allowed in late spring snowmobiling in the primary conservation area under the action alternatives.

Alternative 3 would further reduce activities, such as voluntary reductions in allotments for sheep in the primary conservation area, and would also require no surface occupancy for new oil and gas leases in zone 1. The vegetation management guidelines would be extended to the Salish and Ninemile demographic connectivity areas. These plan components would further reduce disturbance to soil and reduce the potential for sediment to reach stream channels. Consequently, where current soil and water conditions are less than desired, reduction of disturbance levels would provide an opportunity for recovery. Where current conditions reflect desired conditions, there would be no effect.

Effects on bull trout, bull trout critical habitat, westslope cutthroat trout, and western pearlshell mussel

Alternative 1 is the no-action alternative. The Lolo forest plan, the Kootenai forest plan, and the Helena Forest plan direction applicable to the Blackfoot River drainage was amended in 1995 by INFISH (USDA, 1995a), which will continue to provide standards and guidelines to limit management actions that may impact aquatic species. INFISH did not apply to the Lewis and Clark National Forest. Westslope cutthroat trout on the Lewis and Clark National Forest largely occur along the Rocky Mountain Front, where management activities that may impact this species are largely limited, except for grazing.

Alternative 2 modified and alternative 3 propose several standard and guidelines that would be beneficial to aquatic species because they would limit the amount of road construction, grazing, recreational development, and mining surface occupancy that might adversely impact aquatic species. The greatest benefits would be derived for aquatic species in the primary conservation area, followed by the demographic connectivity area, zone 1, and zone 2, respectively. The following is a synopsis of the beneficial standards or guidelines (note: none of the standards and guidelines would provide adverse effects to fish):

- NCDE-STD-AR-01—This standard would limit the amount of vehicle traffic in the primary conservation area, which would allow for some vegetation to become established on the road surface and limit sediment production. Gated roads would also benefit native fish by making fishing access more remote and reducing access for potential poachers.
- NCDE-STD-AR-02—This standard would limit road construction in the primary conservation area, which would reduce sediment production.

- NCDE-STD-AR-05—This would limit the number of recreation sites in the primary conservation area, which, if they are proposed near streams, would provide benefits in the long term since there could be no more than one recreation site in a bear management unit.
- NCDE-GDL-AR-02—Restoring temporary roads in the primary conservation area within one year would reduce potential sediment inputs following management activities.
- NCDE-STD-GRZ-04—Capping sheep allotments and animal unit months in the primary conservation area and demographic connectivity area/zone 1 under alternatives 2 modified and 3 might reduce impacts to aquatic species, depending on the location of the allotment.
- NCDE-STD-GRZ-05—Capping the number of cattle allotments in the primary conservation area under the action alternatives and in the demographic connectivity area (zone 1) under alternative 3 might reduce impacts to aquatic species depending on the location of the allotment.
- NCDE-GDL-GRZ-02—Protecting riparian areas for grizzly bears would also provide protection for aquatic species and habitat.
- NCDE-STD-MIN-05—Measures in this standard would provide for riparian habitat conservation area restoration and maintenance for operating plans.
- NCDE-STD-MIN-08—Within the NCDE primary conservation area (under alternative 2 modified) as well as in zone 1 (including the Salish and Ninemile demographic connectivity areas) under alternative 3, new oil and gas leases should include a no surface occupancy stipulation that would benefit aquatic species by limiting surface disturbance, depending on the location of the proposal.

Bull trout critical habitat is present within the primary conservation area and zone 1, so any standard and guideline that limits roads or ground disturbance might provide beneficial effects to the sediment primary constituent element. None of the action alternatives would cause potential adverse effects to critical habitat.

Cumulative effects

There are no adverse direct or indirect effects to aquatic species; therefore, there are no cumulative effects from the action alternatives.

Effects determinations

Based on the analysis of all alternatives, including the no-action alternative, other interrelated and interconnected activities, and the cumulative effects of other Federal and non-Federal activities within the planning area, it has been determined that the implementation of the no-action alternative or the other action alternatives “may affect, not likely to adversely affect” bull trout and designated bull trout critical habitat. Bull trout should benefit by less road construction and less recreational development. Temporary roads and developed recreation sites, depending on location, may still have some level of impact.

There will be “no effect” on Kootenai River white sturgeon since they do not occur within the analysis area, although they do occur on the Kootenai National Forest below Libby dam.

Implementing any alternative including the no-action alternative “may impact individual westslope cutthroat trout and pearlshell mussels but would not lead toward Federal listing under the ESA.” These species are listed as Northern Region sensitive species on the Kootenai, Lolo, Helena, and Lewis and Clark National Forests.

6.7 Forest Vegetation and Timber Management

6.7.1 Introduction

Forest vegetation of the Northern Rocky Mountains is dynamic, with changes occurring through natural processes as well as management activities. Natural disturbance processes include fire, windstorms, landslides, and insect and disease outbreaks. Management of forest vegetation includes such things as timber harvest, planting, thinning and other timber stand improvement activities, and prescribed burning. Plant succession, natural disturbances, and management activities together have produced the current forest vegetation conditions. Natural processes will continue to operate under all alternatives. This section addresses the issue of administrative access and vegetation management for grizzly bear and the potential effects on activities associated with forest vegetation management.

Vegetation management is used to move vegetation towards desired conditions, reduce hazardous fuels, and treat insect and disease infestations, as well as provide wood products for local communities. Vegetation management includes activities such as commercial timber harvest, thinning, and pruning, as well as prescribed burning. The effects of prescribed burning are addressed under section 6.11.

6.7.2 Regulatory framework

Law and executive orders

Federal law

The **National Forest Management Act of 1976**: This act sets forth the requirements for land and resource management plans for the NFS. The act provides for balanced consideration of all resources. It requires the Forest Service to plan for diversity of plant and animal communities. The forest plans, in compliance with NFMA, establish forestwide management direction, goals, objectives, standards, and guidelines for the management of forest vegetation.

6.7.3 Key indicators for analysis

The key indicators for forest vegetation and timber management are the following:

- acres of management areas suitable for timber production and potential changes to timber harvest and
- acres in need of stand tending and potential change to access for management.

6.7.4 Methodology and analysis process

The analysis only considers acres of land identified as suitable for timber production within the analysis area. More information on suitable lands can be found in the forest plans for the Helena, Kootenai, Lewis and Clark, and Lolo National Forests.

Designation of suitable timber lands was determined in the forest plans. Timber land suitability is based in part on factors such as rainfall, temperature, or other growing conditions affecting the ability of trees to establish cover on a site. The potential for successful regeneration within five years or for irreversible damage from timber harvest to soil, slope, or other watershed conditions is also factored into the suitability determination. There may also be special areas designated by statute, executive order, or regulation where timber harvest is prohibited. Timber suitability within the

analysis area was determined using GIS or database queries based on suitability designations from the forest plans.

The acres of potential stand-tending need were derived from past regeneration harvest within the analysis area. Queries were made to the Forest Service Activity Tracking System (FACTS) database for regeneration harvest within the past 20 years.

The vegetation and timber management analysis is based on changes to administrative access and direction for vegetation management activities.

Information sources

Data used in this analysis are from the Helena, Kootenai, Lewis and Clark, and Lolo forest plans and current GIS maps of timber suitability. The Forest Service Activity Tracking System database for each forest was used to determine areas with timber regeneration activities within the past 20 years.

Incomplete and unavailable information

There is no incomplete or unavailable information for this topic.

Analysis area

The affected area for direct and indirect effects to forest vegetation management is the lands administered by the Helena, Kootenai, Lewis and Clark, and Lolo National Forests within the primary conservation area, demographic connectivity areas, zone 1, and a portion of zone 2. This area represents the NFS lands where changes may occur to vegetation management as a result of changes to administrative access.

6.7.5 Affected environment

Forest plans for the Helena, Lewis and Clark, and Lolo National Forests were approved in 1986. The Kootenai has recently revised their forest plan, with a final decision in 2015. Timber management goals, objectives, and standards were identified for each Forest along with a numerical upper limit for timber harvest, or allowable sale quantity (ASQ). Lands suitable for timber production were also identified in each existing forest plan.

The Helena and Lewis and Clark forest plans (USDA, 1986b, 1986c) identify areas that are suitable for timber production. Approximately 26 percent of the Helena National Forest (or 251,600 acres) and 15 percent of the Lewis and Clark National Forest (or 282,307 acres) were identified as suitable for timber production in 1986. Almost the entire Helena National Forest (99.5 percent) and 42 percent of the Lewis and Clark National Forest are within the analysis area. The allowable sale quantity for the Helena was set at 15 million board and for the Lewis and Clark at 12 million board feet.

The Kootenai forest plan identified 793,700 acres suitable for timber production, or 36 percent of the forest. Only 18 percent of the Kootenai National Forest is within the analysis area, which limits the effect of the alternatives on its overall management. The allowable sale quantity for the Kootenai was set at 80.2 million board feet, with a predicted timber offer at 47.5 million board feet.

The 1986 Lolo forest plan identified 1,003,900 acres suitable for timber production, or 48 percent of the Forest. Approximately 25 percent of the Lolo National Forest is within the analysis area. The allowable sale quantity for the Lolo was set at 131 million board feet for decades 2 through 5 of its forest plan.

Management areas containing lands suitable for timber production

To estimate the potential effect on timber harvest, the management areas that contain lands suitable for timber production were analyzed and summarized for each amendment forest (see table 204). Note that these are not acres suitable for timber production. Rather, they are the acres and percent of management areas that are suitable for timber production. Lands suitable for timber production are found within these management areas, but not all acres meet the criteria for lands suitable for timber production (are physically and technically capable of timber production without damage to other resources or inconsistency with management of other resources). Management areas were used as an estimate of timber suitability. A total of 916,028 acres of management areas suitable for timber production are within the analysis area.

Table 204. Acres and percent of management areas suitable for timber production by national forest and by area, with totals inside and outside the analysis area

Forest	PCA	Zone 1 inside DCA	Zone 1 outside DCA	Zone 2	Total management area acres suitable within the analysis area	Total management area acres suitable outside the analysis area
Helena	29,076 (16%)	-	60,679 (41%)	184,782 (29%)	274,537 (28%)	138
Kootenai	18,367 (15%)	270,147 (98%)	2,925 (45%)	-	291,439 (72%)	1,117,179
Lewis and Clark	44,090 (6%)	-	-	-	44,090 (6%)	724,574
Lolo	49,990 (19%)	173,669 (73%)	82,303 (54%)	-	305,962 (46%)	850,522

Note. DCA = demographic connectivity area, PCA = primary conservation area.

The Lolo has the most acres of management areas suitable for timber production, with the Kootenai and Helena in a close second and third. The Lewis and Clark has very few acres of management areas suitable for timber production within the analysis area. The Kootenai, Lolo, and Lewis and Clark also have large acreages of management areas suitable for timber production that are outside the analysis area, limiting the overall effect of the alternatives on the total timber program on these forests.

Historical harvest of timber

Table 205 displays acres of regeneration harvest from 1985 through 2013 inside the analysis area by national forest. This harvest has occurred to meet forest plan goals, objectives, standards, and guidelines. A total of 118,500 acres have been regeneration harvested within the analysis area, with the majority (more than 60 percent) occurring on the Kootenai within the demographic connectivity area.

Table 205. Acres of regeneration harvest by national forest, by area inside the analysis area, from 1985 through 2013

Forest	PCA	Zone 1 inside DCA	Zone 1 outside DCA	Zone 2	Total acres regeneration harvest within the analysis area
Helena	3,300	-	3,800	14,600	21,700
Kootenai	1,700	71,800	1,200	-	74,700
Lewis and Clark	300	-	-	-	300
Lolo	3,300	12,400	6,100	-	21,800

Source: FACTS database query combined with analysis area, April 15, 2016.

As a result of regeneration harvest activities and reforestation, many areas of young even-aged stands are meeting land management objectives. However, many of these young stands will require stand tending in the form of thinning or stocking control to maintain desired growth and species composition. Managers wanting to maintain the dominance of seral, shade-intolerant species must evaluate these stands as they develop and consider the need for some stand tending.

6.7.6 Environmental consequences

Effects common to all alternatives

Each alternative would have varying effects on land managers' abilities to treat forest vegetation using timber harvest. As stated elsewhere in this document, this is a programmatic decision that does not identify site-specific actions. Therefore, the comparison of alternatives described here is based on generalized effects associated with access and vegetation management standards and guidelines. Access is necessary to respond to forest health needs, to manage vegetation to achieve restoration goals, and to provide commodity outputs.

There is no change to acres suitable for timber production under any alternative. Effects will be described through the potential to access suitable timber lands for commercial timber harvest and to provide for stand-tending needs.

Alternative 1—No action

For the Helena, Lewis and Clark, and Lolo, the Forests would continue to follow the Interagency Grizzly Bear Committee vegetation management guidelines in management situations 1 and 2 grizzly bear habitat. These guidelines specify that measures that maintain and/or improve grizzly bear habitat and populations will be specified in project design.

Under the revised forest plan for the Kootenai, there are 218,212 acres suitable for timber production within bear management units (16 percent of the bear management units in both the Cabinet-Yaak and NCDE recovery zones) and 333,925 acres suitable for timber production in areas outside the recovery zones where grizzly bears now occur (59 percent of the area). None of the acres of grizzly bear secure core habitat are identified as suitable for timber production. Vegetation management in secure core habitat could be done only to meet resource needs such as insect and disease mitigation and salvage harvest, wildlife habitat diversity, and fuels management.

For all amendment forests, access to lands suitable for timber production within grizzly bear habitat is allowed within specified limits under the forest plans or the Interagency Grizzly Bear Committee vegetation management guidelines. Space and time considerations for grizzly bears limit access for

commercial timber harvest as well as for stand-tending needs. On the Helena, Lewis and Clark, and Lolo National Forests, access to lands suitable for timber production and areas with stand-tending needs in areas outside the recovery zone is somewhat greater under this alternative, as the forest plans do not contain specific management direction for grizzly bears in these areas. However, the requirements of biological opinions and incidental take statements remain in place and may limit access to these areas.

Alternative 2 modified

Under this alternative, existing forest plan desired conditions, objectives, standards, and guidelines for vegetation management on the amendment forests would be retained. Additional desired conditions and guidelines for vegetation management within the primary conservation area would be added, as shown in appendix 1 to the draft record of decision. The added direction is very similar to the Interagency Grizzly Bear Guidelines in encouraging a mosaic of successional stages; restricting logging activities in time and space as needed; designing projects to maintain or improve grizzly bear habitat quality or quantity where it would not increase the risk of grizzly bear-human conflicts; and retaining cover as needed along grass/forb/shrub openings, riparian wildlife habitat, or wetlands. This direction does not apply outside of the primary conservation area.

Under alternative 2 modified, standards would be added within the primary conservation areas to establish consistent definitions and procedures for managing road access for administrative use (NCDE-STD-AR-01) and temporary changes during project activities (NCDE-STD-AR-03 and NCDE-GDL-AR-02). For the amendment forests, there is no substantive difference between alternatives 1 and 2 within the primary conservation areas to access for timber harvest or stand-tending needs. For all amendment forests, both alternative 1 and alternative 2 modified require no net increase in motorized route densities and no net decrease in secure core. There is some flexibility in accessing core through NCDE-STD-AR-03, which would allow for some timber harvest within these areas and access to stands for stand-tending needs. However, on the Kootenai there are no lands suitable for timber production within core. On the other amendment forests, access to core has been allowed through site-specific project consultation. Thus, little change in access for timber harvest or stand-tending needs in primary core areas on the amendment forests is expected under alternative 2 modified.

On the Helena and Lolo National Forests, additional standards would be applied to zone 1 (both forests) and the demographic connectivity area (on the Lolo). For these Forests, a standard would be added requiring no net increase in miles of roads open to public motorized use on NFS lands above the baseline within zone 1. Compared to alternative 1, it is expected there would be some reduction in access to these areas for timber harvest and stand-tending needs.

For zone 1 and the demographic connectivity area on the Kootenai National Forest, direction under the revised forest plan would be retained, with no increases in permanent linear miles of open or total miles of road within the “bears outside recovery zone” area, with listed exceptions and an allowance for temporary increases under specified conditions. Thus, there is no difference between alternative 2 modified and alternative 1 in access for timber harvest or stand-tending needs in these areas.

The Lewis and Clark National Forest does not have any areas in zone 1, and there would be no change to management of vegetation in areas outside the primary conservation area.

Alternative 3

Under this alternative, the same changes to forest plan desired conditions, standards, guidelines, and monitoring items would be made as under alternative 2 modified. Under this alternative, the

vegetation guidelines (NCDE-GDL-VEG-01 through 05) direction is extended to include the demographic connectivity areas on the Kootenai and the Lolo. An additional standard for access management would be added to zone 1 and a portion of zone 2 (the expanded grizzly bear distribution zone) on the Helena, limiting motorized routes (roads and trails) that are open to public motorized use to no more than 2.4 miles/square mile, calculated as the miles of motorized routes on NFS lands divided by the acres of NFS lands within these individual areas. Within the Kootenai National Forest in the “bears outside recovery zone” areas, which overlaps with a portion of NCDE zone 1 including the Salish demographic connectivity area, no increases in permanent linear miles of open roads, total roads, or motorized trails would occur on NFS lands, although a temporary increase in open and total miles of road would be allowed under specified conditions. In zone 1 outside of the area covered by the Tobacco “bears outside recovery zone,” there would be no net increase above the baseline in miles of roads open to public motorized use during the non-denning season on NFS lands. Within the Lolo National Forest zone 1 and the Ninemile demographic connectivity area, there would be no net increase above the baseline in miles of roads (or roads and trails in the Ninemile demographic connectivity area) open to public motorized use during the non-denning season on NFS lands, with certain exceptions. See standards NCDE-HNF Zone 1&2-STD-02, NCDE-KNF Zone 1-STD-03, and NCDE-LNF Zone 1-STD-02.

Expansion of the vegetation guidelines to the demographic connectivity areas would not limit access for vegetation management on the Kootenai and Lolo.

The effect of the additional standard limiting motorized routes on the Helena, Kootenai, and Lolo National Forests would limit access to areas suitable for timber production and stands needing tending in the demographic connectivity areas (Kootenai and Lolo) and the expanded grizzly bear distribution zone (Helena). There would be no change to access for vegetation management on the Lewis and Clark under alternative 3.

Cumulative effects

Across the amendment forests, a reduction in access results in a decrease in opportunities to access lands suitable for timber harvest and for future stand-tending needs. Past, present, and reasonably foreseeable project-level activities within the NCDE are expected to include actions that would improve other resource conditions through road storage and decommissioning activities. This could result in a reduction in opportunities for future timber harvest and stand-tending needs.

6.8 Threatened and Endangered, Proposed, and Candidate Plant Species

6.8.1 Introduction

The USFWS Montana Field Office’s website was accessed to obtain species lists for the Helena, Kootenai, Lewis and Clark, and Lolo National Forests (USFWS, 2017b, 2017c, 2017d). The plant species included in this analysis are water howellia (*Howellia aquatilis*) and Spalding’s campion (*Silene spaldingii*), which are listed as threatened under the Endangered Species Act, and whitebark pine (*Pinus albicaulis*), which is a candidate species and is on the regional forester’s sensitive species list. Table 206 shows the occurrence of these plant species in relation to the grizzly bear NCDE recovery zone/primary conservation area and zones 1, 2, and 3.

Table 206. Suspected occurrence of water howellia and Spalding's campion and known or suspected occurrence of whitebark pine within the NCDE grizzly bear recovery zone/primary conservation area and zones 1, 2, and 3 on the Helena, Kootenai, Lewis and Clark, and Lolo National Forests.

Species	Helena	Kootenai	Lewis and Clark	Lolo
Water howellia (<i>Howellia aquatilis</i>)	—	—	—	NCDE/PCA, zone 1, vernal pools and wetlands, Lake and Missoula Counties
Spalding's campion (<i>Silene spaldingii</i>)	—	Zone 1, Salish DCA	—	Zone 1
Whitebark pine (<i>Pinus albicaulis</i>)	NCDE/PCA, zones 1 and 2	NCDE/PCA	NCDE/PCA, zone 3	NCDE/PCA, zone 1, Ninemile DCA

Note. DCA = demographic connectivity area, PCA = primary conservation area.

6.8.2 Regulatory framework

Endangered Species Act of 1973: Under this act, the Forest Service has a legal requirement to use its authorities to seek to conserve endangered species and threatened species and designated critical habitat. Species and critical habitat that are proposed for listing are also provided protection under the act.

National Forest Management Act of 1976: Under this act, forest plans are to provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area to meet the overall multiple-use objectives.

Sensitive species policy: Species that are candidates for listing under the Endangered Species Act and that occur on NFS lands normally are placed on the regional forester's sensitive species list. Sensitive species (plants and animals) are protected and managed under the sensitive species program through the Forest Service directives system.

6.8.3 Key indicators for analysis

Key indicators that will be used to analyze effects to plant species are the known threats and/or stressors to the individual species, such as invasive species, habitat conversion (i.e., human developments), and climate changes. These vary by species. Potential adverse effects are considered based upon the likelihood and intensity to which the various alternatives may affect the threats and stressors.

6.8.4 Methodology and analysis process

Analysis area

The analysis area used for direct and indirect effects is the lands administered by the Helena, Kootenai, Lewis and Clark, and Lolo National Forests within the primary conservation area, zone 1 including the Salish and Ninemile demographic connectivity areas, and a portion of zone 2.

Information sources

Available information sources were obtained from available Federal Register notices, survey records, the recovery plan, and published literature. Some uncertainty remains as to the distribution of *Silene spaldingii* populations. The analysis considered both the known distribution of each plant species and descriptions of suitable occupied habitat.

6.8.5 Affected environment

Water howellia

Water howellia (*Howellia aquatilis*), a vascular plant species in the family Campanulaceae, was listed as threatened under the Endangered Species Act by the USFWS on July 14, 1994 (USFWS, 1994a). The USFWS drafted a recovery plan for the species (Shelly & Gamon, 1996), but it has not been finalized. Therefore, there are no recovery goals officially identified for the species.

Water howellia is an aquatic plant restricted to small, shallow (approximately 20-40 inches deep during the early summer months) pothole ponds or oxbows, long isolated from the flowing surface waters of the adjacent river. All known populations occur in the Swan Valley, with populations “suspected” to occur on the Lolo National Forest. Surveys to date have not confirmed the presence of this plant on the Lolo National Forest, although suitable habitat is thought to exist.

The USFWS concluded their five-year review of water howellia in 2013 (USFWS, 2013d). Their conclusion was that the threats identified at the time of listing have been mitigated through regulatory mechanisms such as the conservation strategy (Shelly & Gamon, 1996) and incorporation of project design features that remove or minimize disturbance to populations. In addition to management changes to water howellia habitat, there have been almost two hundred additional populations documented range-wide since the time of listing, including sites previously believed to be extirpated in Oregon and California. Because of all of these factors, the USFWS is recommending delisting water howellia while maintaining current conservation measures (USFWS, 2013d).

Spalding's campion

Spalding's campion (also known as Spalding's catchfly) is an herbaceous perennial plant in the pink family (Caryophyllaceae). It was listed as a threatened species under the Endangered Species Act on October 10, 2001 (USFWS, 2001).

Spalding's campion is a regional endemic found predominantly in bunchgrass grasslands and sagebrush-steppe and occasionally in open pine communities in eastern Washington, northeastern Oregon, west-central Idaho, western Montana, and the southern edge of British Columbia. As of 2007, there were 99 known populations of Spalding's campion (USFWS, 2007b). Occupied habitat occurs in five physiographic regions: the Palouse Grasslands in west-central Idaho and southeastern Washington; the Channeled Scablands in eastern Washington; the Blue Mountain Basins in northeastern Oregon; the Canyon Grasslands of the Snake River and its tributaries in Idaho, Oregon, and Washington; and the Intermontane Valleys of northwestern Montana.

Spalding's campion is described as “suspected” to occur on the Flathead, Kootenai, and Lolo National Forests. Surveys to date have not confirmed the presence of this plant, although suitable habitat is thought to exist on the national forests. Populations are known to occur on the Lost Trail Wildlife Refuge and on private lands near these national forests. The recovery plan identifies potential key conservation areas that overlap with the Flathead and Kootenai National Forests.

Whitebark pine

Whitebark pine is a native conifer tree that occurs in western North America in the Coastal Mountain Ranges (from British Columbia to Washington, Oregon, and down to east-central California) and Rocky Mountain Ranges (from northern British Columbia and Alberta to Idaho, Montana, Wyoming, and Nevada). It grows at the highest forested elevations on cold, windy, snowy sites (Arno & Hoff, 1990). On productive upper subalpine sites, whitebark pine is the major seral species that in the

absence of fire is eventually replaced by shade-tolerant species, whereas on harsh upper subalpine forests and at treeline it can dominate as climax vegetation (Keane et al., 2012). Whitebark pine trees produce large, dense seeds that lack wings and therefore depend upon birds and squirrels for seed dispersal across the landscape. It is known to occur on all of the national forests in the NCDE.

Whitebark pine is experiencing an overall long-term pattern of decline. Threats include habitat loss and mortality from the non-native white pine blister rust, mountain pine beetles, catastrophic fire, environmental stresses due to climate change, and the inadequacy of existing regulatory mechanisms. This species is ecologically very significant in maintaining snowpack and regulating runoff, initiating succession after fire or other disturbance events, and providing seeds that are a high-energy food source for many species of wildlife, including grizzly bears (Tomback, Arno, & Keane, 2001).

On July 18, 2011, the USFWS determined that the whitebark pine warrants protection under the Endangered Species Act, but adding the species to the Federal list of endangered and threatened wildlife and plants was precluded by the need to address other listing actions of a higher priority (76 FR 42631). Therefore, whitebark pine is designated as a candidate species. USFWS has assigned it a listing priority number of 2, indicating the threats are imminent and of high magnitude. Whitebark pine is included on the sensitive species list for the Northern Region.

On the Kootenai National Forest, according to the most recent Forest Inventory and Analysis data (R1 Hybrid 2011 database), live whitebark pine trees are present on about 0.94 percent of the forested area. The Kootenai National Forest has been implementing many of the whitebark pine restoration actions that were suggested by Keane et al. (2012), such as collection of seed and planting of seedlings. However, to date the number of acres that have had some form of restoration action has been limited due to budgetary limitations, difficult logistics in accessing the remote, high-elevation sites, and other factors.

According to Forest Inventory and Analysis data, living whitebark pine trees are present on about 12 percent of the Helena and Lewis and Clark National Forests, representing about 333,350 acres. It is dominant on far fewer acres; the whitebark pine cover type occurs on only 4 percent of the two national forests. The geographic areas with the highest proportion of living whitebark trees are the Crazy Mountains, Castle Mountains, Elkhorns, and Rocky Mountain Range (USDA, 2015a).

Live whitebark pine trees are present on about 6.4 percent of the Lolo National Forest, representing about 137,190 acres, though it is the dominant species on only an estimated 38,100 acres (1.8 percent of the Forest) (USDA).

6.8.6 Environmental consequences

Water howellia

Human-influenced threats to water howellia include habitat conversion (i.e., draining of wetlands, development); invasions of non-native plants; timber harvest activities that may alter the hydrologic regime or increase siltation of wetlands; and livestock use resulting in degradation to pond habitat. Natural disturbances that may affect water howellia include climate change that affects seasonal water-level fluctuations; aquatic vegetation succession; and wildland fire where it alters the hydrological regime.

Because the species is not known to occur on Lolo National Forest lands and because the management direction pertaining to the grizzly bear would not affect the pond habitats of water howellia, no direct, indirect, or cumulative effects are anticipated under any of the alternatives.

Spalding's campion

The recovery plan for *Silene spaldingii* identified habitat loss due to human development, habitat degradation associated with excessive grazing, and invasions of aggressive non-native plants as threats. In addition, the loss of genetic variability and adverse effects of inbreeding are a problem for many small, fragmented populations where genetic exchange is limited. Other potential threats include changes in fire frequency and seasonality, off-road vehicle use, and herbicide spraying and drift.

Because the species is not known to occur on NFS lands and because the management direction pertaining to the grizzly bear would not affect the prairie habitats of the Spalding's campion, no direct, indirect, or cumulative effects are anticipated under any of the alternatives.

Whitebark pine

Several interrelated threats to whitebark pine raise concerns about the long-term viability of whitebark ecosystems (76 FR 42631).

- Fire suppression: After a century of fire suppression, many whitebark pine stands are experiencing a species conversion to shade-tolerant trees and a lack of suitable seedbeds for regeneration. As a result, whitebark pine has lost its competitive advantage (USFWS, 2011a).
- Climate change: In a warmer climate, the species' fundamental habitat may shift to cooler sites at higher elevations and latitudes. Recent studies indicate that whitebark pine is one of the tree species in the northern Rocky Mountains that is most vulnerable to climate change. The adaptive capacity of whitebark pine is thought to be relatively low because its dispersal is fairly limited, it is often outcompeted by other subalpine conifers, and it is highly susceptible to mountain pine beetle and blister rust (Loehman et al., in press).
- White pine blister rust: White pine blister rust is an exotic fungal disease against which whitebark pine has limited resistance. Since blister rust was introduced to North America in 1910, it has spread through the range of five-needled pines. As this disease has moved into fragile, high-elevation ecosystems, normal successional pathways have been altered. Blister rust typically infects nearly all individuals of the host species, causing branch and stem cankers that eventually kill most of the infected trees.
- Mountain pine beetle: Five-needled pines are susceptible to this aggressive bark beetle. In densely stocked stands, whitebark pine is more likely to be attacked because of stress from competition. Mountain pine beetle accelerates the loss of key mature cone-bearing trees.

Although whitebark pine is known to occur on all of the national forests in the NCDE, the management direction pertaining to the grizzly bear would not influence the threats identified above, nor would it affect the alpine habitats of the whitebark pine. No direct, indirect, or cumulative effects on whitebark pine are anticipated under any of the alternatives.

6.9 Non-Native Invasive Plants

6.9.1 Introduction

A plant species is considered to be an invasive plant if it meets two criteria: (1) it is non-native to the ecosystem under consideration, and (2) its introduction causes, or is likely to cause, economic or environmental harm or harm to human health (Executive Order 13112, 1999). Non-native invasive plants include exotic plants and noxious weeds. Exotic plants are species that have been introduced inadvertently or intentionally to an area, usually from a different continent; however, not all exotic species are invasive species.

The term noxious weed is a legal designation and is defined by Montana Code Annotated (MCA 7-22-2101, 2014) as “any exotic plant species established or that may be introduced in the State that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities.”

6.9.2 Regulatory framework

Federal law

Carlson-Foley Act of 1968 (Pub. L. 90-583): This act authorizes and directs heads of Federal departments and agencies to permit control of noxious plants by State and local governments on a reimbursement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-Federal land. In other words, this act permits county and State officials to manage noxious weeds with herbicides on Federal lands and to be reimbursed for that management, given that other applicable laws such as NEPA are also met.

Potential linkage areas or movement corridors that could facilitate the natural movement of grizzly bears into the Greater Yellowstone Ecosystem have been identified (Servheen et al., 2001; Walker & Craighead, 1997; John S. Waller & Servheen, 2005). Peck et al. (2017) used GPS telemetry data from 173 male grizzly bears in the NCDE and the Greater Yellowstone Ecosystem and a new analysis method (randomized shortest path algorithm and step selection function models) to identify potential paths for dispersal. These models depicted numerous potential paths from the NCDE to the Greater Yellowstone Ecosystem: dense intersecting paths were predicted in the center of the study area between the recovery zones, with more diffuse paths on the eastern periphery. The predicted paths were corroborated by the locations of confirmed observations of 21 grizzly bears located 4.8 miles or more outside the two occupied ranges. Nevertheless, the authors concluded that the probability of successful dispersal into the Greater Yellowstone Ecosystem remains low, due to the distance between the current occupied ranges for the two populations. The closest proximity is about 66 miles, between the Boulder and Madison mountain ranges (see figure 1 in Peck et al. 2017).

Federal Environmental Pesticide Control Act of 1972 (Pub. L. 92-516): This act amends the 1947 Federal Insecticide, Fungicide, and Rodenticide Act (Pub. L. 80-102). The act requires all pesticides to be registered with the Environmental Protection Agency. The law also states that it is unlawful to use any registered pesticide in a manner inconsistent with its labeling.

Federal Noxious Weed Act of 1974: This act states that each Federal agency shall establish and adequately fund an undesirable plant management program; complete and implement cooperative agreements with State agencies regarding the management of undesirable plant species on Federal lands under the agency's jurisdiction; and establish an integrated management system to control or contain undesirable plant species targeted under cooperative agreements.

Federal Land Policy and Management Act of 1976 (Pub. L. 94-579): This act provides authority to control weeds on rangelands as part of a rangeland improvement program.

Executive orders

Executive Order 13112: Directs Federal agencies to prevent the introduction of invasive species; to detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; to monitor invasive species populations accurately and reliably; to provide for restoration of native species and habitat conditions in ecosystems that have been invaded; to conduct research on invasive species and develop technologies to prevent introduction; to provide for environmentally sound control of invasive species; and to promote public education on invasive species and the means to address them. All of these actions are subject to the availability of appropriations.

State and local law

The **State of Montana County Noxious Weed Management Act** states that it is unlawful for any person to permit any noxious weed to propagate or go to seed on the person's land, except that any person who adheres to the noxious weed management program of the person's weed management district or who has entered into and is in compliance with a noxious weed management agreement is considered to be in compliance with this section.

Other regulation, policy, and guidance

Forest Service Manual 2900 ensures that Forest management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on NFS lands or to adjacent areas.

Forest Service Manual 2070, Vegetation Ecology: Provides direction for the use of native and non-native seed use on NFS lands. Specifically emphasizes the use of native seed mixes in all revegetation, rehabilitation, and restoration projects on NFS lands.

Forest Service National Strategic Framework for Invasive Species Management (USDA, 2013c): Provides broad and consistent strategic direction on the prevention, detection, and control of invasive species. Incorporates the invasive species systems approach to respond to threats over the next 5 to 10 years.

6.9.3 Key indicators for analysis

The key indicator used for assessing effects to invasive species is the difference in frequency, intensity, or type of management activity or natural processes by alternative, insofar as they may potentially disturb the ground and result in greater risk of weed spread or invasion. This includes both human-caused and natural disturbances such as access and motorized use, recreational uses, livestock grazing, fire (wildfire and prescribed fire), and vegetation management (including timber harvest). The process for identifying risk and impacts resulting from invasive species is completed by Forest Service botanists and vegetation specialists.

Vegetation management

Ground-disturbing activities; equipment transport and use associated with management activities such as timber harvesting, fire treatments and fire suppression; or other authorized uses are a common vector influencing the establishment and expansion of non-native invasive species. Both the establishment and the expansion of invasive plants are dependent on seed sources in the area or seed

transported from another area and on local soil and climate conditions. Most of these risks are minimized with site-specific treatments, site restoration, and rehabilitation.

Access and motorized use

A main vector for seed spread is vehicle use (e.g., road construction and maintenance equipment, logging vehicles, and passenger cars and trucks) (Taylor, Brummer, Taper, Wing, & Rew, 2012). Many existing infestations can be found along, or have originated from, roadsides because vehicle traffic provides ideal means for noxious weed spread. Roads and vehicle traffic pose difficult challenges to management of invasive species.

Transportation of weed seed by contractor or special-use vehicles or equipment on NFS roads is managed to a degree. Contract stipulations are used to require specific actions, e.g., vehicle and equipment washing, to lessen the possibility of weed transport to reduce the risk of new infestations. Use of roads by the general public presents a greater risk because of the lack of control measures and the lack of knowledge about invasive species spread.

Recreation

Recreational activities, including nonmotorized, are another vector for potential seed establishment and dispersal. Recreational activities and areas receive concentrated and frequent use and continual ground disturbance. Generally, wilderness areas and large unroaded lands are less likely to contain invasive weeds due to less widespread public access, especially via motorized means. However, these large unroaded areas are vulnerable to weed infestation and spread from recreational uses. Seed transport happens inadvertently by humans, dogs, and pack stock. Trails that receive high uses, including those in wilderness areas, are vulnerable to invasive weed infestation and may serve as vectors for spread into surrounding sites. Bike and horse trails and motorized trails are at higher risk of introduction, spread, and establishment of weeds compared to hiking trails. Areas with high use and high ground disturbance occur within wilderness areas and are as vulnerable to weed infestation as developed sites outside wilderness. Frequently, infestations are found around trailheads, trails, campgrounds, and other developed recreation sites. These seed sources pose a risk of further spread into wilderness and undeveloped lands. Areas located immediately adjacent to and surrounding developments tend to experience the most disturbance, whereas the peripheries of these areas are less disturbed and less likely to be favorable for the establishment and persistence of invasive species. Motorized and mechanized vehicles are another common vector of seed transport and establishment, primarily because there is little ability to ensure that passenger and recreational vehicles are not transporting weed seeds as they travel Forest roads and trails.

Methods used to help prevent invasive species from being introduced and spreading into recreation areas include public education and requirements for use of weed-free hay for pack stock, in addition to weed-control methods used by the Forest Service, contractors, and volunteer groups.

Livestock grazing

Invasive species expansion may also occur with the transport of seed by livestock from infested areas. Seeds can be spread through livestock feces, fleeces, and hooves (Belsky & Gelbard, 2000), and many can pass through an animal's digestive system and retain the ability to germinate (Belsky & Gelbard, 2000). Native grazers such as mule deer, bighorn sheep, and elk, and some birds such as mourning doves, can also perform this same method of seed spread. Conversely, domestic livestock grazing (in a process known as prescribed grazing) has also been shown to be an effective method for managing large invasive plant infestations while assisting the ecological succession process (Jacobs, 2007).

Localized areas where excessive grazing duration and use contributes to reduced ground cover can become susceptible to invasive plant establishment, and areas with low plant cover and frequent disturbance are most at risk of invasion. Generally, these areas are roadsides, streambanks, and areas where stock congregate, such as around salt blocks.

Fire and fuels

Although the Forest Service is attempting to restore historical fire regimes to the landscape, fire can have a detrimental impact to the ecosystem post-fire, depending on the occurrence of invasive species infestations pre-fire. Fire often results in an increase in non-native species diversity and cover, whether it is from prescribed burn or wildfire (Keeley, 2006; Zouhar, Kapler Smith, Sutherland, & Brooks, 2008). Typically, the burned area experiences an increase in invasive species, both forbs and grasses, within one to three years post-burn (Zouhar et al., 2008). From studies conducted in closed-canopy forests in the West, it has been observed that non-native species with easily dispersed seed can infest a burned area where there were no invasive plants pre-burn. Some species (e.g., St. John's wort) tend to die back when the canopy closes post-fire. Other species (e.g., Canada thistle) persist in closed canopy conditions. Other than areas heavily infested with cheatgrass, there is no evidence that the presence of invasive plants in the forested landscape changes fire regimes.

6.9.4 Methodology and analysis process

Analysis area

The geographic scope of the analysis for non-native invasive plants is the NFS lands of the amendment forests that lie within the NCDE primary conservation area, zones 1 and 2, and the Salish and Ninemile demographic connectivity areas. These areas represent the NFS lands where changes may occur from activities that result from alternative 2 modified.

For cumulative effects, the analysis area includes the Flathead NFS lands in the primary conservation area, zone 1, and Salish demographic connectivity area, as well as non-NFS lands within and immediately adjacent to the administrative boundary of the amendment forests.

Information sources

Primary information sources include the Montana Noxious Weed List (MNWP, 2015), collaboration with county weed coordinators, and the results of project-specific invasive plant risk assessments to identify invasive species needing management across the Forests. As project areas are surveyed, new infestations are inventoried. Existing data on invasive species is stored in the Natural Resource Manager's Threatened, Endangered, and Sensitive Plants, and Invasive Species database (NRM-TESP-IS). This USFS database is continually updated with inventoried infestations.

Unavailable information includes invasive species infestations that are known or suspect but have not yet been inventoried. Wilderness and research natural areas are examples of areas that are not well inventoried. There is also a lack of information on areas that are weed-free, especially in vegetation types at highest risk. The Natural Resource Manager database is continually updated to match up to field observations that are reported by project personnel.

6.9.5 Affected environment

Non-native invasive plants have not adapted to or evolved with the local environment, which means they have no natural enemies. These plants generally disrupt the natural processes of the environment. They displace native plants or reduce forage for some animal species, degrade natural

communities, change hydrology, change microclimatic features, increase soil erosion, alter wildfire intensity and frequency, and cost land management agencies and governments millions of dollars in treatments and fire suppression. Because non-native invasive species have no natural control in the places to which they are introduced, they tend to spread aggressively and reduce overall native community biodiversity.

Invasive plant inventory

The Natural Resource Manager database is continually updated to match up to field observations that are reported by project personnel. However, there are still many areas on the amendment forests that have not been inventoried. The following subsections summarize the most recent inventories of invasive species on the amendment forests.

Helena and Lewis and Clark National Forest

As of December 2014, 142,052 acres (or 5 percent) of the Helena and Lewis and Clark National Forests were associated with invasive plant inventories, and there were 26 recorded species. Approximately 98 percent of the inventoried invasive plant infestations occurred within 0.5 mile of major transportation routes (system roads and trails). Fifteen percent of the inventoried infestations on the Helena and Lewis and Clark National Forests were within 30 feet of major system roads and trails in 2014 (USDA, 2015a).

The most abundant invasive plant species on the Helena and Lewis and Clark National Forests as of 2014 were spotted knapweed, dalmation toadflax, musk thistle, Canada thistle, houndstongue and leafy spurge. The species of highest priority for treatment and containment were spotted knapweed, leafy spurge, toadflax species (yellow and dalmation), orange and meadow hawkweed, and those species that are on the State noxious list but not currently present on the Helena and Lewis and Clark National Forests (e.g., yellow starthistle). These species are known to be highly aggressive (e.g., spotted knapweed) or are not currently established on the national forests (e.g., yellow starthistle).

Kootenai National Forest

On the Kootenai National Forest, it is fairly common to see invasive species along many roadsides, railroad and utility rights-of-way, and other disturbed areas, such as gravel pits. Spotted knapweed, tansy ragwort, rush skeleton weed, and other weed species have migrated away from the road right-of-way onto undisturbed hillsides, especially within the drier vegetation types. Orange hawkweed has an increased presence on moist habitat types under full canopies and is converging on the edges of the Cabinet Mountain Wilderness. Weeds are also becoming established in harvest units where the seeds have been brought by machinery and other vectors such as wildlife, cattle, railcars, and/or wind (USDA, 2013b).

Mapping of noxious weeds on the Kootenai National Forest has only occurred on a limited basis, and total infested acreage is not known. Forest plan monitoring as of 2003 indicated that existing weed infestations on the Forest had increased greatly over the previous 25 years (USDA, 2007a). Spotted knapweed is listed as the most common weed on the Forest. In 1995, county weed specialists estimated that spotted knapweed had infested over 240,000 acres in Lincoln County and 175,000 acres in Sanders County (Hirsch & Leitch, 1996). Of the 240,000 acres of spotted knapweed in Lincoln County, 180,000 acres were believed to be Federal lands, and of the 175,000 acres in Sanders County, 57,750 acres were believed to be Federal lands (Hirsch & Leitch, 1996). An effort to map orange and meadow hawkweed on the Forest by section was attempted several years ago. Sections were categorized and mapped as non-infested, less than 5 acres infested, 5 to 40 acres infested, or over 40 acres infested. The end result was that most of the Forest was displayed as

infested, with a high percentage of the Forest sections in the category of greater than 40 acres infested (USDA, 2007a).

Lolo National Forest

There is no comprehensive weed inventory for the Lolo National Forest. An estimate inventory was conducted in 1999 for 23 species of weeds, and this indicated that 258,300 acres in the Lolo National Forest were infested (USDA, 2007d). Another estimate was made in 2005 for the same 23 species, and the total came to approximately 391,700 acres (USDA, 2007d). As of 2007, there were 21 invasive species found on the Lolo National Forest, and 10 invasive species were found nearby that had not yet established on the Forest (USDA, 2007d).

Populations of widespread invaders, such as spotted knapweed, sulfur cinquefoil, houndstongue, and Canada thistle, are widespread and continue to expand. Since they became established, in some cases decades ago, they have increased on the Lolo National Forest. These weeds have also invaded both disturbed and undisturbed areas.

New invaders such as the hawkweeds and common toadflax have become established relatively recently. Some of these infestations were first seen on the Lolo National Forest in the last few years, whereas others have been here longer but have only recently been discovered. Most new invaders have limited distribution.

Potential invaders such as yellow starthistle, purple loosestrife, salt cedar, and dyer's woad have not been found on the Lolo National Forest yet but do occur nearby. Based on the extent of the infestations in adjacent areas and States, these weeds have the potential to become established and impact other resources on the Lolo National Forest. Table 207 shows the estimated acres infested with invasive species for the amendment forests and the Flathead National Forest (for cumulative effects analysis).

Table 207. Estimated acres with non-native invasive plant species

Forest	Invasive species (acres)
Flathead ¹	25,300
Helena ²	107,871
Kootenai ³	Not known ³
Lewis and Clark ²	34,181
Lolo ⁴	350,000

Sources

1. Flathead National Forest assessment (USDA, 2014b).
2. Helena and Lewis and Clark National Forests assessment (USDA, 2015a).
3. Final Environmental Impact Statement (FEIS), Kootenai National Forest Invasive Plant Management (USDA, 2007a, pp. 3-7). Mapping of noxious weeds on the Forest has only occurred on a limited basis, and total infested acreage is not known.
4. Lolo National Forest Integrated Weed Management Record of Decision (USDA, 2007d).

Non-native invasive plant management

Forest Service policy (specifically, Executive Order 13112 and Forest Service Manual 2900) and the National Invasive Species Strategic Framework (USDA, 2013c) identify prevention of the introduction and establishment of non-native plant species as an agency objective. This policy directs the Forest Service to

- determine the factors that favor establishment and spread of invasive plants,
- analyze invasive species risks in resource management projects, and
- design management practices that reduce these risks.

The desired condition inferred from Executive Order 13112 and Forest Service Manual 2900 and the national strategy is the prevention of new infestations (within the area where activities would occur or from the use of travel routes associated with those activities) and to manage the infestations currently established on the Forests through control measures.

For all Forests, management goals for invaders are as follows:

- potential invaders—prevent establishment and, if found, promptly eradicate;
- new invaders—for small infestations, eradicate, and for larger infestations, reduce; and
- widespread invaders—contain areas that are already infested and reduce plant populations.

Methods used to prevent invasive species from being introduced and spreading into new areas include closing infested areas to travel, washing vehicles and equipment upon entering an area, and using weed-free seed and straw mulch for revegetation. Treatments such as manual, mechanical, biological, and chemical methods are generally limited to localized areas and those species on the Montana State list. Containment combines prevention and treatment with the objective of limiting spread of an existing infestation and reducing the acres of existing infestations by treating around the perimeter of the infestation. Invasive weed management in cooperation with private and agency partners, county weed districts, and others is important in all of these treatment activities.

Seeding of temporary roads as a conservation measure to reduce invasive species infestations has been occurring on national forests for many years. Desirable non-native mixes of grasses and forbs have primarily been used in the past. Native grasses and forbs have been used more in recent years.

Infestations in some sites have been reduced by these measures. However, in spite of these control efforts, existing infestations continue to invade disturbed areas and intact plant communities. It is still common to see noxious weeds along many roadsides, railroad and utility rights-of-way, and other disturbed areas, such as gravel pits.

6.9.6 Environmental consequences

Alternative 2 modified and the other alternatives represent programmatic decisions; therefore, they will have no direct effects on invasive plant species. Direct effects would occur at the project level when site-specific decisions are made. Most of the effects identified in this analysis would be considered indirect effects in that they would occur later in time.

Alternative 1—No action

Management direction

Existing forest plans and amendments contain management direction currently being used by the amendment forests to address non-native invasive plants. The management direction includes forestwide goals, objectives, desired conditions, standards, and guidelines pertaining to non-native invasive species.

Helena National Forest

The Helena National Forest plan (USDA, 1986b) specifies cooperating with the State of Montana and county weed boards to confine present infestations and prevent invasive species establishment in new areas and to use an integrated pest management approach that includes mechanical, chemical, and biological methods. Forest plan amendment 6 (USDA, 1993) added standards to implement an integrated pest management approach in the Bob Marshall Wilderness Complex.

Kootenai National Forest

The Kootenai National Forest plan specifies containing or eradicating populations through use of integrated pest management approaches and cooperating with other agencies to assist control efforts across jurisdictional boundaries. The treatment goal is 30,000 to 75,000 acres to reduce non-native invasive plant density, infestation size, and/or occurrence, including along eligible wild river segments (USDA, 2015e).

Lewis and Clark National Forest

The Lewis and Clark National Forest plan's direction (USDA, 1986c) for invasive plants includes public education to prevent resource degradation and spread of noxious weeds; reseeding with desirable plant species; determining effective environmentally acceptable practices to control noxious weeds and other pests, especially around streams, bogs, and associated riparian habitat, upland game bird nesting habitat, and other sensitive non-target animal or habitat that may be adversely affected by spraying; and cooperating with other agencies, private individuals, contractors, and permittees to control noxious weed and pest infestations. The forest plan's amendment 11 added standards to implement an integrated pest management approach for weeds in the Bob Marshall Wilderness (USDA, 1993).

Lolo National Forest

The Lolo National Forest plan's (USDA, 1986d) current direction for noxious weeds includes specific treatment types in a few areas, such as Homestead Meadows. Amendment 11 (USDA, 1993) added forestwide direction to assess conditions on-site, consider risk factors, and prioritize weed prevention measures. Additionally, Lolo forest plan amendment 17 added standards to implement an integrated pest management approach for weeds in the Bob Marshall Wilderness Complex (USDA, 1993).

Indirect effects of the no-action alternative

Ground disturbance is an important factor in the establishment and spread of invasive species, and the locations of infestations are also important. Adverse impacts from invasive species can be further exacerbated by interactions with fire, native pests, weather events, human actions, and environmental change.

Under the no-action alternative, management direction to address non-native invasive plant species is already in place and would continue to be followed. The effects of continuing the no-action alternative, as contrasted to alternative 2 modified, show in the following key areas.

Vegetation management

Management direction to address non-native invasive plant species is already in place and has been followed where these plants are known to occur or where potential habitat is suspected to exist. Continuation of current invasive plant species management would still be available to treat grizzly bear habitat (including secure core).

Motorized use and access

No further reduction in motorized road access density is anticipated and no changes to motorized use and access would occur. Correspondingly, no changes attributable to motorized use and access are expected to occur to affect ground disturbance and invasive plant species in the areas where grizzly bears occur. Continuation of current invasive plant species management would still be available to treat infestations.

Recreation

Management direction to address non-native invasive plant species is already in place and has been followed where these plants are known to occur or where potential habitat is suspected to exist. Continuation of current invasive plant species management would still be available to treat infestations related to use of recreation sites.

Under the no-action alternative, there is no constraint on the number of recreation developments that could be constructed in the grizzly bear recovery area as there is under alternative 2 modified. Because there is no constraint under the no-action alternative, there could be more ground disturbance, and the potential for invasive species to establish and spread could increase. Treatments would continue, as would prevention efforts. However, for comparison of alternatives qualitatively, the lack of a constraint for the number of recreation developments is a distinctive feature of the no-action alternative for the amendment forests.

Livestock grazing

The establishment and spread of noxious weeds is primarily related to the amount of surface disturbance created. To evaluate the impact of livestock grazing management on invasive species under each alternative, it was assumed that alternatives that increase grazing opportunity would result in increased potential for invasive species to establish and spread. Conversely, alternatives that limit grazing opportunity would be expected to decrease the potential for invasive species to establish and spread. Because these assumptions result in the same relationships analyzed in the livestock grazing section (see section 6.15), the effects and consequences to noxious weeds would be the same as those presented in that discussion.

Fire and fuels

The establishment and spread of noxious weeds is primarily related to the amount of surface disturbance created. To evaluate the impact of proposed fire and fuels management on noxious weeds under each alternative, it was assumed that alternatives that provide more opportunity for fire and fuels management activities would result in increased potential for invasive species to establish and spread. Conversely, alternatives that limit fire and fuels management activities would be expected to decrease the potential for invasive species to establish and spread. For the analysis, it was also assumed that fire and fuels treatment acres would not exceed timber harvest acres in any alternative. Because these assumptions result in the same relationships analyzed in the fire and fuels management section (see section 6.11), the effects and consequences to noxious weeds would be the same as those presented in that discussion.

Alternative 2 modified

Effects of alternative 2 modified for the amendment forests

Vegetation management

Adaptive weed treatments and revegetation of disturbed areas would still be used under this alternative for the amendment forests to combat weed establishment and infestation and to improve

grizzly habitat. Under alternative 2 modified, for all amendment forests, these treatments might be restricted in spring in the primary conservation area to decrease grizzly bear-human conflicts but could still be implemented during spring to meet objectives. The guidelines of alternative 2 modified are not anticipated to result in adverse impacts as invasive species could still be treated effectively under alternative 2 modified, as under the no-action alternative.

Motorized use and access

Under alternative 2 modified, standards would be added within the primary conservation areas to establish consistent definitions and procedures for managing road access for administrative use (NCDE-STD-AR-01) and temporary changes during project activities (NCDE-STD-AR-03 and NCDE-GDL-AR-02). Compared to alternative 1, there would be a new requirement on the Lolo National Forest for no net increase in the density of motorized routes/roads open to public use on NFS lands in the demographic connectivity areas/zone 1. Both alternative 1 and alternative 2 modified would require no net increase in motorized route densities and no net decrease in secure core in the primary conservation area on all amendment forests. For all amendment forests, there would be no substantive difference in motorized access between alternatives 1 and 2 within the primary conservation area. Ground disturbance in association with this threshold of motorized use and access would be an indirect effect that might potentially affect invasive species establishment and spread. Treatments would continue, as would prevention efforts.

Recreation

Management direction to address non-native invasive plant species is already in place and has been followed where these plants are known to occur or where potential habitat is suspected to exist. The continuation of current invasive plant species management would still be available to treat infestations related to use of recreation sites.

Under the no-action alternative, there is no constraint on the number of recreation developments that could be constructed, as there is under alternative 2 modified. However, there are constraints under the action alternatives, which should result in less ground disturbance and less potential for invasive species to establish and spread. Treatments would continue, as would prevention efforts.

Livestock grazing

The establishment and spread of noxious weeds is primarily related to the amount of surface disturbance created. To evaluate the impact of livestock grazing management on noxious weeds under each alternative, it was assumed that alternatives that increase grazing opportunity would result in increased potential for invasive species to establish and spread. Conversely, alternatives that limit grazing opportunity would be expected to decrease the potential for invasive species to establish and spread. Under this alternative, management direction would allow no increase in the number of cattle or sheep allotments and no increase in sheep animal unit months within the primary conservation area. The no-action alternative does not have this constraint, resulting in potentially less establishment and spread of weeds due to grazing impacts under alternative 2 modified as compared with alternative 1. Because these assumptions result in the same relationships analyzed in the livestock grazing section (see section 6.15), the effects and consequences to noxious weeds would be the same as those presented in that discussion.

Fire and fuels

The establishment and spread of noxious weeds is primarily related to the amount of surface disturbance created. To evaluate the impact of proposed fire and fuels management on noxious weeds under each alternative, it was assumed that alternatives that provide more opportunity for fire and fuels management activities would result in increased potential for invasive species to establish

and spread. Conversely, alternatives that limit fire and fuels management activities would be expected to decrease the potential for invasive species to establish and spread. For the analysis, it was also assumed that fire and fuels treatment acres would not exceed timber harvest acres in any alternative. Because these assumptions result in the same relationships analyzed in the fire and fuels management section (see section 6.11), the effects and consequences to noxious weeds would be the same as those presented in that discussion.

Alternative 3

Indirect effects of alternative 3

Alternative 3 would encourage closing of sheep allotments where there is a willing permittee and phasing out sheep and cattle allotments with recurring grizzly bear-livestock conflicts in the primary conservation area, resulting in slightly less potential effect on weed establishment and spread than either alternative 1 or 2.

Climate change

Climate change is likely to result in differing responses among invasive plant species, resulting from differences in their ecological and life history characteristics. As documented in the Northern Rockies Adaptation Partnership Vulnerability Assessment (NRAP, 2015, ch. 8), climate change could result in either range expansion or contraction of an invasive species. Invasive species are generally adaptable, capable of relatively rapid genetic change, and many have life history strategies (e.g., prolific seed production, extensive deep roots) that can enhance their ability to invade new areas in response to changes in ecosystem conditions. Warmer temperatures and associated drier conditions, more severe or frequent droughts, and more favorable conditions for wildland fire may increase the ability of invasive plants to establish and out-compete native plants. These changes might provide more opportunities for invasive plants to gain an advantage over native species and spread beyond the amendment forests' boundaries under all alternatives.

Summary of effects

Under alternative 2 modified and alternative 3 for the amendment forests, and unlike the no-action alternative, managing road densities to the 2011 baseline and limiting management activities within the primary conservation area and zone 1, such as adjusting the timing of vegetation management treatments, use of roads, and reduced new recreation developments, are all expected to result in less ground disturbance and less possibility for invasive species to establish and spread, depending on site-specific conditions. Invasive species could and would still be treated where they occur under alternative 2 modified. Natural seed establishment and spread of invasive species would not be affected under this alternative.

Cumulative effects

The effects that past activities have had on non-native invasive plants are discussed in the "Affected environment" section and are reflected in the current condition. Therefore, past activities are not carried forward into the cumulative effects analysis. Cumulative effects include the effects of implementing the alternatives on the amendment forests as well as on the Flathead National Forest. Under the action alternatives, including alternative 2 modified, a consistent set of plan components would be implemented across the four Forests, including the guideline for suggested timing restrictions for treatment of weeds.

Invasive species spread without regard to administrative boundaries. As such, the cumulative effects of the Forest Service's treatment of weeds on any of the NCDE forests under any alternative,

including the no-action alternative, may negatively or beneficially impact colocated Federal, State, and private lands depending upon the specific site. Likewise, adjacent or nearby landowners' specific site conditions and weed treatment efforts also would affect weed conditions and treatments on NFS land. Under all of the alternatives, coordination with State and local agencies and communication with the public would continue to maximize opportunities to combat the spread of undesirable, non-native invasive species.

Effects summary

Non-native plant species infestations are consistently identified through site-specific surveys. Suggested timing restrictions for treatments may be more restrictive under alternative 2 modified (and alternative 3) than under the no-action alternative, depending upon the site location and species being treated. However, both alternative 2 modified and alternative 3 provide for invasive species to be treated outside of the suggested restrictions to be effective on the landscape and to meet Forest Service objectives. Thus, all three alternatives would result in no adverse effect with regard to non-native invasive species management.

6.10 Rare and Sensitive Plant Species

6.10.1 Introduction

A sensitive species is a species, subspecies, or variety of plant for which a regional forester has determined a concern for its population viability because of a current or predicted downward habitat or population trend. Sensitive species are managed and protected under the regional forester's sensitive species program. The Forest Service has determined that these species need special management to maintain and improve their status on the national forests to prevent the need to list them under the Endangered Species Act. The Forest Service is required to identify and mitigate potential effects to sensitive species from Federal land-disturbing actions. To comply with the Sensitive Species Program, Forest botanists conduct inventories during project planning to locate sensitive plant species.

This section focuses on sensitive species other than threatened, endangered, and candidate species, which are discussed in section 6.8. This section also contains a cumulative effects analysis, which includes discussion of the sensitive plant species associated with the Flathead National Forest.

6.10.2 Regulatory framework

Law and executive orders

Forest and Rangelands Renewable Resources Planning Act of 1974: This act provides for maintenance of land productivity and the need to protect and improve the soil and water resources.

National Forest Management Act of 1976: "Regulations that set out the process for the development and revision of the forest plans . . . shall specify guidelines which provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (section 6(g)(3)(B)).

Forest Service Manual 2600, Wildlife, Fish, and Sensitive Plant Habitat Management, chapter 2670, Threatened, Endangered and Sensitive Plants and Animals.

2620.3—Policy. 4. Specify in forest plans and project plans the standards, guidelines, and prescriptions needed to meet identified habitat goals and objectives for wildlife and fish, including endangered, threatened, and sensitive animal and plant species.

2672.1—Sensitive Species Management. Sensitive species of native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing.

6.10.3 Key indicators for analysis

The key indicator for assessing differences among alternatives in effects to sensitive species are tied to the potential location and intensity of ground-disturbing activities (e.g., vegetation management in grizzly bear habitat and construction/reconstruction of roads, motorized use and access, and recreation). Naturally occurring threats and stressors such as drought, flooding, wind, insects, and wildland fire (both prescribed fire and the use of natural, unplanned ignitions to meet resource objectives) also cause ground disturbance and stress species.

6.10.4 Methodology and analysis process

The analysis process for identifying impacts to sensitive species is completed by Forest Service botanists and vegetation specialists who review existing geospatial information systems, data as entered through the Natural Resource Manager, and literature.

The Montana Natural Heritage Program maintains a database of species information and status rankings in accordance with Natural Heritage Network guidelines and methodologies. The Montana Natural Heritage Program status rankings (shown in table 208) categorize the risks to viability associated with each species the program evaluates. These rankings, and other criteria in Forest Service Handbook 1909.12, chap. 10 sec. 12.52, and CFR § 219.9(b)(3) are considered by the regional forester, who identifies species on the list in coordination with each Forest's supervisor. In response to new or changed information on plant species, the regional forester occasionally adds or removes species. Thus, the list is dynamic and is expected to change in the future.

This analysis is programmatic in nature, considers the affected environment at a broad scale, and may use assumptions to help define the affected environment and determine effects. Known and potential stressors and threats to rare plants from implementation of alternatives have been identified and reviewed. Potential adverse effects were considered based upon their potential likelihood and intensity.

Table 208. Global and State status rankings of the Montana Natural Heritage Program

Global Ranking	State Ranking	Definition
G1	S1	At high risk because of extremely limited and/or rapidly declining population numbers, range, and/or habitat, making it highly vulnerable to global extinction or extirpation in the State.
G2	S2	At risk because of very limited and/or potentially declining population numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the State.
G3	S3	Potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.
G4	S4	Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.

Stressors and threats

Stressors and threats are defined as activities (by the Forest Service or others) or natural conditions that currently or potentially have negative effects on the diversity of rare plant communities or their habitat. Threats can be divided into direct and habitat reduction.

- Direct stressors are often associated with ground disturbance from wildlife and livestock grazing (trampling and herbivory), recreational activities (trampling), and other activities that could impact populations either directly through loss of individuals or indirectly through disruption of soil or increased risk of competition with invading non-native invasive species.
- Habitat reduction also results from ground or vegetation disturbance but generally occurs at a larger, longer-term, or permanent scale. Activities and conditions that are stressors and threats for habitat reduction include invading non-native invasive species, road construction and reconstruction, drought, flood, and disease.
- Additionally, climate change, which may result in abnormal changes to precipitation amounts, precipitation distribution, and temperature extremes, can affect rare plants. The possibility of withering from increased and prolonged summer temperatures or drought conditions is a potential local and widespread stressor resulting from climate change.

Analysis area

The geographic scope of the analysis for effects to sensitive plants is the NFS lands of the amendment forests that lie within the NCDE primary conservation area, zone 1, the Salish and Ninemile demographic connectivity areas, and zones 2 and 3. Range of species may extend beyond the management zones, but this area represents the NFS lands where changes may occur to rare plants or habitats from activities that result from the alternatives.

For cumulative effects, the analysis area also includes the Flathead NFS lands in the grizzly bear management zones and other areas identified for cumulative impact consideration.

Information sources

The primary information source is the list of sensitive species that is determined by the regional forester. Incomplete information exists for many rare plant species as to their viability, biology, habitat, etc., so the majority of the species statuses are derived from expert opinion and/or panel consensus, specifically at biannual meetings held by the Montana Native Plant Society in conjunction with the Montana Natural Heritage Program. Though there are uncertainties and gaps in data and knowledge about most rare plant species, the best available information is used in this analysis to assess the existing condition and determine potential effects among the alternatives. Information gaps relevant to sensitive species may be filled in through future inventories, plan monitoring program results, or research, and this information is integrated into databases and site-specific analyses as it becomes available.

6.10.5 Affected environment

Sensitive and rare species habitats are managed to maintain population viability, to prevent the need for Federal listing, and to determine the status and distribution of threatened, endangered, sensitive, and other rare plants. Habitat that would be suitable within project areas and that could be affected by project-related activities is surveyed to determine the presence of rare plant species. Protection measures are then implemented to provide for the diversity of plant and animal communities following the National Forest Management Act and Forest Service policy.

The rare plant species included in the analysis are those that are listed under the current regional forester's list of sensitive species (USDA, 2011f) and not already discussed in section 3.5.1 of this final EIS on threatened, endangered, and candidate plant species.

The rare plants in table 209 are found throughout the amendment forests. Populations of these rare plants are found in habitats that range from very wet environments (aquatic, wetlands, riparian areas, bogs, fens) to mixed environments (moist and dry forest areas, moist and dry grasslands) to dry environments at low and high elevations.

Distribution, habitat information, and population data for each species are available from the Idaho Conservation Data Center, Washington Natural Heritage Program, Montana Natural Heritage Program, and NatureServe databases.

6.10.6 Environmental consequences

Potential consequences come from activities or natural conditions that currently do or potentially may have adverse effects on the diversity of rare plant communities or their habitat. Consequences are generally direct, such as trampling of a sensitive plant from livestock grazing, human use, or herbivory; a result of ecological processes (for example, from fire, fire exclusion, insects, and disease); or habitat reduction (e.g., loss of habitat during oil and gas exploration and development or road construction and maintenance).

A decision resulting from this analysis would not proceed at the project level until further site-specific NEPA analyses are completed. Then, at the project level, habitat found to be suitable for sensitive species that could be affected by project-related activities would be surveyed to determine the presence of sensitive plant species within the analysis area. Following the National Forest Management Act, Forest Service policy, and site-specific NEPA regulations, protection measures would be implemented at the project level to provide for the diversity of plant and animal communities and to identify and protect habitats for sensitive and rare plants as needed on a site-by-site basis.

Forestwide direction for all alternatives

For sensitive species, management efforts to ensure the diversity of rare plant communities or their habitat are already in place. The Forest Service management policy (Forest Service Handbook 2609.25, 1.25, 1988 and Forest Service Manual 2670) ensures that for all rare plant species, the following measures will be taken:

- biological evaluations will be written for all activities that may affect sensitive species and their habitat;
- “effects” of activities will be determined as similar to those for threatened, endangered, or proposed species; and
- special management emphasis will be included in all management activities to ensure the viability of the sensitive species and to preclude trends towards endangerment that would result in the need for Federal listing. This Forest Service management policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

All of the alternatives implement the protection measures noted above that are required by law, regulation, or policy. In addition, the action alternatives do not change the Inland Native Fish Strategy (USDA, 1995a) that is part of current forest plan direction. The Inland Native Fish Strategy

contains riparian management objectives for habitat conservation areas and a comprehensive set of standards and guidelines related to the kinds of activities that may or may not occur within the riparian areas. Though not specifically designed to do so, many of the INFISH standards and guidelines serve as protection measures for the rare plants associated with aquatic and/or riparian habitats.

At the scale of each amendment forest singly, the four amendment forests together, and the amendment forests with the Flathead National Forest, it is important to note the difficulties associated with assessing the impacts of alternative 2 modified to more than 89 rare plants. Plant species may be rare for a number of reasons, such as evolutionary history, population ecology, historic or current human activities, climate and other factors, or, more likely, a combination of multiple factors. Human activities may or may not be responsible for the current distribution and abundance of the rare plant species presented in table 209. This analysis looks at effects at the local (direct) and widespread (habitat reduction) scales.

Table 209. Sensitive species on the Helena, Kootenai, Lewis and Clark, and Lolo National Forests

Genus	Species	Type ^a	G Rank ^b	S Rank ^b	Helena ^c	Kootenai ^c	Lewis and Clark ^c	Lolo ^c	Habitat Type ^d
<i>Agastache</i>	<i>cusickii</i>	2	G2G3	S1					
<i>Antennaria</i>	<i>densifolia</i>	2	G3	S1					
<i>Arabis</i>	<i>fecunda</i>	2	G2	S2				S	
<i>Astragalus</i>	<i>barrii</i>	2	G3	S2S3					
<i>Astragalus</i>	<i>lackschewitzii</i>	2	G2	S2	S		K		
<i>Astragalus</i>	<i>scaphoides</i>	2	G3	S2					
<i>Balsamorhiza</i>	<i>macrophylla</i>	2	G3G5	S1					
<i>Botrychium</i>	<i>ascendens</i>	2	G2G3	S1		K	K		M
<i>Botrychium</i>	<i>crenulatum</i>	2	G3	S2	K	K			M
<i>Botrychium</i>	<i>hesperium</i>	2	G3G4	S2		K			M
<i>Botrychium</i>	<i>paradoxum</i>	2	G2	S2	S	K	K	S	C
<i>Botrychium</i>	<i>pedunculatum</i>	2	G2G3	S1		K			M
<i>Carex</i>	<i>idahoensis</i>	2	G2Q	S2					
<i>Castilleja</i>	<i>covilleana</i>	2	G3G4	S2					
<i>Collema</i>	<i>curtisporum</i>	2	G3	S2		K			
<i>Epipactis</i>	<i>gigantea</i>	2	G3G4	S2	S	S	K	K	P
<i>Erigeron</i>	<i>lackschewitzii</i>	2	G3	S2			K		
<i>Grimmia</i>	<i>brittoniae</i>	2	G1	S1		K		K	D, M
<i>Grindelia</i>	<i>howellii</i>	2	G3	S2S3	S	S		K	D
<i>Haplopappus</i>	<i>aberrans</i>	2	G3	S1					
<i>Nodobryoria</i>	<i>subdivergens</i>	2	G2	S2		K			S
<i>Penstemon</i>	<i>lemhiensis</i>	2	G3	S2					
<i>Phlox</i>	<i>kelseyi</i>	2	G2	S2	K		K	S	
<i>Pinus</i>	<i>albicaulis</i>	2	G4	S2	K	K	K	K	C
<i>Saxifraga</i>	<i>tempestiva</i>	2	G2	S2	S				
<i>Waldsteinia</i>	<i>idahoensis</i>	2	G3	S1				K	
<i>Adoxa</i>	<i>moschatellina</i>	3	G5	S2				K	

Genus	Species	Type ^a	G Rank ^b	S Rank ^b	Helena ^c	Kootenai ^c	Lewis and Clark ^c	Lolo ^c	Habitat Type ^d
<i>Allium</i>	<i>acuminatum</i>	3	G5	S1				K	D
<i>Amerorchis</i>	<i>rotundifolia</i>	3	G5	S2S3	S	K	K	S	M
<i>Aquilegia</i>	<i>brevistyla</i>	3	G5	S2	S		K		
<i>Athysanus</i>	<i>pusillus</i>	3	G4	S1				S	
<i>Bidens</i>	<i>beckii</i>	3	G4	S2		K		K	A
<i>Brasenia</i>	<i>schreberi</i>	3	G5	S2		K		K	A
<i>Carex</i>	<i>amplifolia</i>	3	G4	S1		K			M
<i>Carex</i>	<i>chordorrhiza</i>	3	G5	S2		K		S	A
<i>Carex</i>	<i>lacustris</i>	3	G5	S1					
<i>Carex</i>	<i>prairea</i>	3	G5?	S2		K			P
<i>Carex</i>	<i>rostrata</i>	3	G5	S1		K		K	A
<i>Carex</i>	<i>vaginata</i>	3	G5	S1		K			DR
<i>Clarkia</i>	<i>rhomboides</i>	3	G5	S2		K		K	
<i>Claytonia</i>	<i>arenicola</i>	3	G4	S1				K	
<i>Corydalis</i>	<i>sempervirens</i>	3	G4G5	S1		K			D
<i>Cypripedium</i>	<i>fasciculatum</i>	3	G4	S2		K		K	D
<i>Cypripedium</i>	<i>parviflorum</i>	3	G5	S3	K	K	K	K	DR
<i>Cypripedium</i>	<i>passerinum</i>	3	G4G5	S2	S	K	K	S	DR
<i>Drosera</i>	<i>anglica</i>	3	G5	S2	K	K	S	K	P
<i>Drosera</i>	<i>linearis</i>	3	G4	S1	K	S	S		P, C
<i>Dryopteris</i>	<i>crinata</i>	3	G5	S2		K		K	P
<i>Eleocharis</i>	<i>rostellata</i>	3	G5	S2					D
<i>Elymus</i>	<i>innovatus</i>	3	G5	S1			K		
<i>Eriophorum</i>	<i>gracile</i>	3	G5	S2		K			P
<i>Eupatorium</i>	<i>occidentale</i>	3	G4	S2		S		S	C
<i>Gentianopsis</i>	<i>macounii</i>	3	G5	S1			K		
<i>Gentianopsis</i>	<i>simplex</i>	3	G4	S1		S		S	A, DR
<i>Goodyera</i>	<i>repens</i>	3	G5	S2S3	S		K		

Genus	Species	Type ^a	G Rank ^b	S Rank ^b	Helena ^c	Kootenai ^c	Lewis and Clark ^c	Lolo ^c	Habitat Type ^d
<i>Heteranthera</i>	<i>dubia</i>	3	G5	S1					
<i>Heterocodon</i>	<i>rariflorum</i>	3	G5	S1		K		K	
<i>Idahoa</i>	<i>scapigera</i>	3	G5	S1				S	
<i>Juncus</i>	<i>hallii</i>	3	G4G5	S2	K		S		
<i>Lathyrus</i>	<i>bijugatus</i>	3	G4	S1		K			D
<i>Liparis</i>	<i>loeselii</i>	3	G5	S1					
<i>Lomatium</i>	<i>geyeri</i>	3	G4	S2		K			P
<i>Lycopodiella</i>	<i>inundata</i>	3	G5	S1		S			P
<i>Lycopodium</i>	<i>dendroideum</i>	3	G5	S1		K			C, DR, M
<i>Lycopodium</i>	<i>lagopus</i>	3	G5	S1		K			M
<i>Meesia</i>	<i>triquetra</i>	3	G5	S2		K		S	P
<i>Mertensia</i>	<i>bella</i>	3	G4	S1				K	
<i>Mimulus</i>	<i>ampliatius</i>	3	G4	S1		K			M
<i>Mimulus</i>	<i>breviflorus</i>	3	G4	S1		K			M
<i>Mimulus</i>	<i>clivicola</i>	3	G4	S1		S		K	D
<i>Ophioglossum</i>	<i>pusillum</i>	3	G5	S2		K			P
<i>Oxytropis</i>	<i>podocarpa</i>	3	G4	S1	S		K		
<i>Petasites</i>	<i>frigidus</i>	3	G5	S1					
<i>Phegopteris</i>	<i>connectilis</i>	3	G5	S2		K			M
<i>Polygonum</i>	<i>douglasii</i>	3	G5T4	S2	K		K		
<i>Potamogeton</i>	<i>obtusifolius</i>	3	G5	S2			K	S	
<i>Potentilla</i>	<i>quinquefolia</i>	3	G5	S2			K		
<i>Psilocarphus</i>	<i>brevissimus</i>	3	G4	S2		K			A
<i>Salix</i>	<i>barrattiana</i>	3	G5	S1			S		
<i>Scheuchzeria</i>	<i>palustris</i>	3	G5	S2		K		K	P
<i>Schoenoplectus</i>	<i>subterminalis</i>	3	G4G5	S2	K	K	S	K	A
<i>Scorpidium</i>	<i>scorpioides</i>	3	G4G5	S2		K			P
<i>Thalictrum</i>	<i>alpinum</i>	3	G5	S2	S		S		

Genus	Species	Type ^a	G Rank ^b	S Rank ^b	Helena ^c	Kootenai ^c	Lewis and Clark ^c	Lolo ^c	Habitat Type ^d
<i>Trichophorum</i>	<i>cespitosum</i>	3	G5	S2		K	K		A, DR
<i>Trifolium</i>	<i>eriocephalum</i>	3	G5	S2				S	
<i>Trifolium</i>	<i>gymnocarpon</i>	3	G4	S2				K	
<i>Utricularia</i>	<i>intermedia</i>	3	G5	S1		K			A
<i>Veratrum</i>	<i>californicum</i>	3	G5	S1	S				
<i>Viola</i>	<i>selkirkii</i>	3	G5?	S1		K			M

a. Type: 2 = rangewide imperilment, 3 = regional/State imperilment

b. State standardized ranking system denoting global range-wide (G) and State (S) status. Definitions of codes can be found at: <http://fieldguide.mt.gov/statusCodes.aspx>.

c. Presence: K = known, S = suspected

d. Habitat guild: A = Aquatic, C = Cold Forest and Forested Subalpine, D = Dry Forest, DR = Deciduous Riparian, M = Moist Forest, P = Peatland, S = Subalpine Grassland

Alternative 1—No action

Existing forest plans and amendments contain management direction currently being used by the amendment forests to address sensitive species. The management direction includes forestwide goals, objectives, desired conditions, standards, and guidelines pertaining to sensitive species, which are summarized here.

Because there would be no changes to current management direction for any of the amendment forests, there would be no direct, indirect, or cumulative effects under the no-action alternative. However, because the no-action alternative is the baseline to which the action alternatives are compared, it is important to understand what actions would continue under the no-action alternative.

Management direction for alternative 1—No action

Management direction for sensitive species is found in current plans under threatened, endangered, and candidate species. The management direction includes forestwide goals, objectives, desired conditions, standards, and guidelines pertaining to sensitive species, which are summarized here. Stated in varying ways in current plans, in general, the amendment forests manage habitat to maintain population viability, to prevent the need for Federal listing, and to determine the occurrence, status, and distribution of threatened, endangered, sensitive, and other rare plants. Surveys for rare plants are conducted prior to project activities.

Indirect effects of alternative 1

Continuing current management under the no-action alternative would have no negative effects to rare plants for any of the amendment forests. Not adopting the amendments would not change protection or management of rare species.

Alternative 2 modified

Management direction

Under alternative 2 modified, no direction specific to rare plants is proposed. However, there are potential consequences to rare plants from forest plan amendment components associated with other resource programs, specifically, vegetation management (e.g., within the grizzly bear primary conservation area), motorized use and access (including roads), recreation, and livestock grazing.

Effects common to all amendment forests

Effects to sensitive species are indirect by virtue of other programs conducted by the amendment forests (and the Flathead National Forest for cumulative effects) to implement the amended forest plans. These effects are similar across the amendment forests and are summarized below.

Vegetation management

Direction that is proposed for the amendment forests is specific to vegetation management activities and includes a guideline that suggests use of native seed mixes or those less palatable to grizzly bears for revegetation in the primary conservation area and zone 1.

Ground disturbance and trampling of vegetation during the conduct of vegetation management activities, which are presented throughout this volume, could potentially result in loss of individual rare plants that are found within grizzly bear habitat. Additionally, ground disturbance could make site-specific conditions favorable to invasive species establishment and spread.

These potential impacts are anticipated to be of low potential because, like the no-action alternative, the Forest Service would conduct site-specific surveys for sensitive species prior to project implementation. The surveys would allow information to be used for rare species avoidance and seed selection choices that do not compete with rare plants and are not preferred by grizzly bears. Additionally, the site-specific surveys would include invasive species identification for treatment purposes (see section 6.10).

Motorized use and access

To decrease the potential for grizzly bear-human conflicts, road densities would be maintained at the 2011 baseline and vegetation management activities (that may require access and/or motorized use) would be limited in time and space, if needed, within the primary conservation area. This temporary restriction may result in less potential for ground disturbance, inadvertent trampling, and potential loss of sensitive species during the spring. However, the guideline also allows for activities such as precommercial thinning, burning, weed spraying, and implementation of best management practices to occur in the spring if necessary to meet objectives and prevent resource damage. Under this alternative, there would be no increase in the density of roads open to public motorized use in zone 1 or in the demographic connectivity areas, which is a change for the Lolo National Forest.

Site-specific surveys for sensitive species would be completed prior to conducting projects, such as building roads, but, similar to the no-action alternative, surveys would not be conducted in association with road maintenance activities or general motorized use and accessing of roads. Thus, the potential for effects to rare species with motorized use and access associated with the implementation of the action alternatives in comparison to the no-action alternative is comparatively equal at the programmatic level.

Recreation

Ground disturbance may result from the construction, use, and maintenance of new recreation developments. Under alternative 2 modified, and unlike the no-action alternative, the number of new recreation developments in the primary conservation area is restricted to one increase in number or capacity of overnight-use developed recreation sites per bear management unit per decade. In contrast to the no-action alternative, this restriction results in a potential reduction for ground disturbance and associated reduction in potential for inadvertent trampling and loss of individual species. A site-specific survey for sensitive species would be conducted prior to implementation, which would lessen the potential for loss of larger populations of sensitive species that a recreation footprint would impact.

Livestock grazing

Ground disturbance and trampling of rare plants that result from livestock grazing could potentially result in loss of individual rare plants if these plants are found within grizzly bear habitat that also lies within livestock allotments. Additionally, ground disturbance could make site-specific conditions favorable to invasive species establishment and spread. These potential impacts are anticipated to be of low potential because, like the no-action alternative, the Forest Service surveys for sensitive species in association with grazing allotment management. The surveys allow information to be used for rare species avoidance.

To evaluate the impact of livestock grazing management on rare plants under each alternative, it was assumed that alternatives that increase grazing opportunity would result in increased potential for disturbance and trampling of rare plants. Conversely, alternatives that limit grazing opportunity would be expected to decrease potential disturbance and trampling of rare plants.

Under alternative 2 modified, management direction would maintain the baseline number of sheep and cattle allotments within the primary conservation area, which is more restrictive than the no-action alternative. Furthermore, under this alternative, sheep grazing animal unit months would not increase beyond the existing levels.

Alternative 3

Management direction

Alternative 3 proposes no changes to rare plant species management for any of the amendment forests. Effects to rare plants would be a consequence of programs that implement the following direction under alternative 3 that differs from direction proposed under alternative 2 modified.

Indirect effects of alternative 3

The consequences to rare plant species from direction under alternative 3 are the same as presented under alternative 2 modified, with the exception of vegetation management, minerals and energy development, and livestock grazing.

Vegetation management

The guidelines associated with vegetation management in the primary conservation area have been extended to the demographic connectivity area (see section 6.5.5). Similarly to alternative 2 modified, ground disturbance associated with vegetation treatments could potentially result in loss of individual rare plants, although the extent of treatments would likely be slightly less under alternative 3. The potential impacts are anticipated to be of low potential because, like the no-action alternative, the Forest Service would conduct site-specific surveys for sensitive species prior to project implementation when there are known sensitive plant occurrences or suitable habitat present. The surveys would allow information to be used for rare species avoidance and seed selection choices that do not compete with rare plants and are not preferred by grizzly bears.

Minerals and Energy Development

Under alternative 3, the standard requiring no surface occupancy for any new oil and gas leases would be extended to zone 1. Compared to alternative 2 modified, the potential for disturbance that could impact rare plants is slightly decreased in this alternative.

Within the Kootenai National Forest and Lolo National Forest demographic connectivity areas, there would be no increase in motorized routes (roads and trails) open to public motorized use on NFS lands to support bear occupancy.

Livestock grazing

Under alternative 3, standards and guidelines aimed at reducing grizzly bear-livestock conflicts and mortality risk would be extended to zone 1. Furthermore, under this alternative, sheep grazing allotments in the primary conservation area would be closed where there is an opportunity with a willing permittee. The potential for impacts on rare plants would be slightly less than under alternative 2 modified.

Cumulative effects

The effects that past activities have had on rare plants are discussed in the “Affected environment” section and are reflected in the current condition. Therefore, past activities are not carried forward into the cumulative effects analysis. Cumulative effects include the impacts of the amendments as well as of the Flathead National Forest’s revised forest plan. Under the action alternatives, including

alternative 2 modified, the same forest plan components would be implemented the across the four forests, including the guideline for seed choices for revegetation activities.

NFS lands play a critical role in the conservation of plant species, including rare plants. In the future, human populations are likely to expand, which will result in greater human presence and pressure on public lands, for example, for recreational uses. These trends suggest not only that public land will play an increasingly important role in the conservation of species but also that management to assist recovery and/or prevention of Federal listing of species will be an increasingly difficult challenge.

Climate change

Climate change is likely to result in differing responses among rare plant species because of differences in their ecological and life history characteristics. Climate change could result in either range expansion or contraction of rare plant species, which is dependent on the particular plant species. Unlike invasive species, rare plant species are not particularly adaptable to changes in their habitat, including changes that result from climate variabilities, particularly if a change in climate is long-term. Thus, a trend towards either warmer temperatures, drier conditions, more severe or frequent droughts, or more favorable conditions for wildland fire—or the opposite trend of cooler temperatures, moist conditions, and less favorable conditions for wildfire—may either increase or decrease the ability of some rare plant populations to persist, depending on the particular species. Because a rare plant's persistence is directly related to climate that is favorable to their particular habitat requirements, climate changes should be expected to result in consequences to rare plant populations. Additionally, any change in climate condition that negatively affects a rare plant's persistence would also make it vulnerable to competition for habitat resources by other plant species, including non-native invasive species. None of the alternatives propose actions that are known to either manipulate or influence climate. Thus, the potential effects of climate change to rare plants are independent of the action and common to all alternatives.

Effects summary

Habitats and populations of sensitive plant species are identified through site-specific surveys, and impacts to them from ground-disturbing activities are avoided or minimized through site-specific design criteria and mitigation. Alternative 2 modified would not contribute to any cumulative negative effects on sensitive plant species or their habitats. Compared to the no-action alternative, the limitations related to motorized activity and developed recreation under alternative 2 modified would result in less potential ground disturbance and thus less potential effect to sensitive plant species. Alternative 3, because of the inclusion of additional restrictions on potential ground-disturbing activities in areas outside the primary conservation area, would result in less potential effects to sensitive plant species than alternative 2 modified. However, if there are known sensitive plant occurrences or suitable habitat in proposed project areas, then all alternatives require site-specific surveys before projects are implemented. Because mitigation to avoid or minimize impacts would be implemented, projects may impact individuals or habitat but will not likely contribute to a trend towards Federal listing or loss of viability to populations or species. Implementing the amendments may also contribute to a positive cumulative effect in limiting development and disturbance near sensitive plant populations and habitats within grizzly bear habitat.

6.11 Fire and Prescribed Fire

6.11.1 Introduction

Forest vegetation of the northern Rocky Mountains is dynamic, with changes occurring through natural processes as well as management activities. Natural disturbance processes include fire,

windstorms, landslides, and insect and disease outbreaks. Management of forest vegetation includes such tools as timber harvest, planting, thinning and other timber stand improvement activities, and prescribed burning. Plant succession, natural disturbances, and management activities together have produced the current forest vegetation conditions. Natural processes will continue to operate under all alternatives. This section addresses the issue of administrative access and vegetation management for grizzly bear and the potential effects on activities associated with prescribed burning and wildfire. The effects of mechanical treatments are addressed in section 6.7.

Response to wildfire and the use of prescribed fire occurs on the landscape, and both utilize various means of transportation. The amendment's primary effect in relation to wildfire and prescribed fire is related to these activities.

6.11.2 Key indicators for analysis

Road access for fuels management and fire suppression is the key indicator.

6.11.3 Methodology and analysis process

Due to the nature of the proposal and the very limited scope of impact to fire and fuels, professional judgement related to effects of each of the alternatives on restrictions of access was the primary means of analysis of effects to fire and fuels management.

6.11.4 Analysis area

The analysis area includes the entire amendment area.

6.11.5 Affected environment

The plans of the Helena, Lewis and Clark, and Lolo National Forests were approved in 1986, and the Kootenai plan was approved in 2015. Each of these plans provides for the response to wildfires on their units and gives direction for fuels management, including prescribed fire.

6.11.6 Environmental consequences

Effects common to all alternatives

The alternatives would have no direct effect on current direction that is provided in each Forest's management plan as it relates to prescribed fire and wildfire management. Access in response to wildfire is an exception provided for in all alternatives and thus does not affect the amendment forests. The primary effect is the access necessary to implement effective implementation of prescribed fire projects.

Alternative 1—No action

Management direction for alternative 1—No action

Vegetation management in secure core habitat could be done only to meet resource needs such as insect and disease mitigation and salvage harvest, wildlife habitat diversity, and fuels management. There should be no effect on prescribed burning opportunities on the amendment forests.

On the amendment forests, access to areas outside the recovery zone is somewhat greater under this alternative, as the forest plans do not contain specific management direction for grizzly bears in these areas. However, requirements of biological opinions and incidental take statements remain in place and may limit access to these areas.

Alternative 2 modified

Management direction

Under alternative 2 modified, standards would be added within the primary conservation areas to establish consistent definitions and procedures for managing road access for administrative use (NCDE-STD-AR-01) and temporary changes during project activities (NCDE-STD-AR-03 and NCDE-GDL-AR-02). For the amendment forests, there is no substantive difference between alternative 1 and alternative 2 modified within the primary conservation areas. For all amendment forests, both alternative 1 and alternative 2 modified require no net increase in motorized route densities and no net decrease in secure core. There is some flexibility in accessing core through NCDE-STD-AR-03. Access to core would be allowed through site-specific project consultation. Thus, little change in access for prescribed fire in primary core areas on the amendment forests is expected under alternative 2 modified.

On the Helena and Lolo, additional standards would be applied to zone 1 (both Forests) and the demographic connectivity area (on the Lolo). For the Helena, a standard would be added requiring no net increase in the density of motorized routes (roads and trails) open to public motorized use during the non-denning season on NFS lands above the baseline within zone 1. For the Lolo, there would be no net increase in the density of roads open to public motorized use in zone 1 and no net increase in the density of motorized routes in the Ninemile demographic connectivity area. Compared to alternative 1, it is expected there would be some reduction in access to these areas for prescribed fire.

For zone 1 and the demographic connectivity area on the Kootenai, direction under the revised forest plan would be retained, with no increases in permanent linear miles of open or total miles of road within the “bears outside a recovery zone” area, with listed exceptions and an allowance for temporary increases under specified conditions. Thus, there would be no difference between alternative 2 modified and alternative 1 in terms of access for prescribed fire.

The Lewis and Clark does not have any areas in zone 1, and there would be no change to management for vegetation in areas outside the primary conservation area.

Alternative 3

Under this alternative, the same changes to forest plan desired conditions, standards, guidelines, and monitoring items would be made as under alternative 2 modified. Under this alternative, the vegetation guidelines (NCDE-GDL-VEG-01 through 05) direction is extended to include the demographic connectivity areas on the Kootenai and the Lolo. An additional standard limiting motorized roads and trails would be added to the demographic connectivity areas on the Kootenai and the Lolo National Forest. In zone 1 and a portion of zone 2 (the expanded grizzly bear distribution zone) on the Helena, motorized routes (roads and trails) that are open to the public would be limited to no more than 2.4 miles/square mile, calculated as the miles of motorized routes on NFS lands divided by the acres of NFS lands within these individual areas. See standards NCDE-HNF Zone 1&2-STD-02, NCDE-KNF Zone 1-STD-01, and NCDE-LNF Zone 1-STD-02.

Expansion of the vegetation guidelines to the demographic connectivity areas would not limit access for vegetation management on the Kootenai and Lolo.

The effect of the additional standard limiting motorized routes on the Helena, Kootenai, and Lolo National Forests would limit access to areas for prescribed fire in the demographic connectivity areas (Kootenai and Lolo). It could also limit future access in the portion of zone 1 and zone 2 on the

Helena National Forest that is west of Interstate 15, although current road densities are below the standard. There would be no change to access for vegetation management on the Lewis and Clark under alternative 3.

Cumulative effects

There likely would be no effect to wildfire suppression success with the current access and proposed future access, given the exceptions provided. However, for prescribed fire the timing component related to treatments in 5 years over a 10-year period might have minor influences when considering the weather and smoke constraints that sometime affect the ability to conduct a prescribed burn, especially if the project is multifaceted in its implementation (e.g., timber harvest and then prescribed fire).

6.12 Air Quality

6.12.1 Introduction

Air quality is dependent on the type and amount of pollutants emitted into the atmosphere, those that currently exist in the atmosphere, the size and topography of the airshed, and the prevailing meteorological and weather conditions. Sources of pollution within the Forest may include particulates generated from timber and mining operations and prescribed fire. Dust from Forest roads may also contribute to fine particulates in the air.

The focus of this discussion is on smoke and how the various alternatives could affect smoke production through the use of prescribed fire, the use of natural, unplanned ignitions to meet resource objectives, or emissions from unwanted wildfires. Of all potential sources of air pollution from management activities that occur on the Forests (e.g., road dust, mining operations, emissions from logging equipment and recreational vehicles), smoke is the most substantial contributor to air quality and visibility. Smoke can create public health issues as well as reduce the ability to view the scenery on the Forest. However, as discussed in sections 6.7 and 6.11, there is a strong need to use fire to maintain and restore the fire-adapted ecosystems on the Forests and to reduce hazardous fuels in the wildland-urban interface.

6.12.2 Key indicators for analysis

The key indicators are ambient air quality and visibility. Specifically,

- an alternative would be considered to have potentially significant impacts if implementing the alternative would result in a National Ambient Air Quality Standards (NAAQS) non-compliance violation as determined by the Montana Department of Environmental Quality; and
- an alternative would be considered to have potentially significant impacts to visibility if implementing an alternative would result in degradation of visual quality, views, or the aesthetic landscape.

6.12.3 Methodology and analysis process

A qualitative assessment of smoke emissions and consequences to ambient air quality and visibility was used as the indicator for effects to air quality. The actual quantitative values of smoke and other emissions that would be produced by each alternative are too variable to accurately predict. Therefore, the comparison of alternatives is based on a qualitative assessment of the relative amounts and timing of smoke that might be emitted under the alternatives.

6.12.4 Affected environment

Air quality is highly influenced by climate. The affected environment lies both east and west of the Continental Divide. West of the Divide, the climate can be described as a modified north Pacific coast type where winters are milder, precipitation is more evenly distributed throughout the year, summers are cooler in general, and winds are lighter than on the eastern side of the Divide. There is more cloudiness in the west in all seasons, humidity runs a bit higher, and the growing season is shorter than in the eastern plains areas (WRCC, 2015).

Pollutants

The Environmental Protection Agency defines 6 of 33 known air pollutants as criteria pollutants for which National Ambient Air Quality Standards are set. The most common violation of a standard from smoke is that of the particulate matter 2.5 (PM_{2.5}) size standard. Wildfires are considered a naturally occurring event whose smoke impacts may not be prevented. For natural events, the State Department of Environmental Quality is required to have a natural emergency action plan that identifies procedures such as notifying the public of the health impacts of smoke and how to decrease and/or minimize exposure. Prescribed fires that are ignited by land managers are considered anthropogenic and therefore are subject to regulation.

Smoke

The Forest Service participates in the Montana/Idaho Airshed Group for prescribed burns within the State of Montana. Group members submit prescribed burns to the smoke management unit for daily, site-specific approval. The smoke management unit is responsible for making sound and timely decisions to maximize the amount of smoke being put in the air (acres burned) and minimize adverse air quality impacts based on individual airsheds throughout Montana and Idaho. This plan provides some flexibility should a National Ambient Air Quality Standards violation occur because of smoke. Adherence to the Montana/Idaho Airshed Group Operating Guide (2010) is the current accepted smoke management plan for the State of Montana.

Air quality is addressed for every prescribed burn in the individual prescribed fire plan. The Forest Service Handbook requires a documented burn plan that contains all of the elements outlined in the 2014 Interagency Prescribed Fire Planning and Implementation Procedures Guide (NIFC, 2014). This guide prompts the burn plan author to address all laws and regulations concerning smoke management as well as the potential for localized nuisance smoke impacts.

In 1998, the Environmental Protection Agency released the Interim Air Quality Policy on Wildland and Prescribed Fires (“Interim Policy”) (EPA, 1998a). The document was published with the intent of integrating two public policy goals: “(1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility.”

The Montana/Idaho Airshed Group (2010) defines impact zones as areas identified as smoke sensitive or with existing air quality problems. Within the affected environment, these areas include Eureka, Libby, Thompson Falls, Missoula, and Kalispell. Impact zones are created for populated areas where air quality concerns to public health arise as National Ambient Air Quality Standards are sometimes exceeded or are close to being exceeded. Areas with higher populations generally exist in valley bottoms where mixing and dispersion of air is reduced. Sources of pollution within these impact zones, including smoke, are closely monitored and regulated.

Visibility

The scenic vistas of the nation's national parks and wilderness areas are protected under amendments of the Clean Air Act. There are three classifications (I, II, and III) where emissions of particulate matter and sulfur dioxide are to be restricted. The restrictions are most severe in class I areas and are progressively more lenient in class II and III areas, with class III not exceeding the National Ambient Air Quality Standards. The most stringent protection is required for Federal class I areas, which include wilderness areas exceeding 500 acres. Congress declared the following as a national visibility goal for these areas: "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution" (42 U.S.C. § 7491 Sec. 169A).

Mandatory class I areas within the affected environment for the amendment include the Bob Marshall Wilderness Area, Cabinet Mountains Wilderness Area, Gates of the Mountains Wilderness Area, Scapegoat Wilderness Area, and Selway-Bitterroot Wilderness Area, which are managed by the Forest Service, and Glacier National Park, which is managed by the National Park Service.

According to the Environmental Protection Agency (EPA, 1998b), the pollutants that contribute to reduced visibility on the worst days for Glacier National Park are primarily sulfates (utility and industrial boilers) and organic carbon (vehicles and other industrial processes) and, to a lesser and relatively equal degree, nitrates (vehicles and industrial boilers), elemental carbon (diesel, wood, other combustion), and soil dust.

Visibility for NFS lands within the NCDE is monitored at five sites—Glacier National Park, Monture, Gates of the Mountains, Sula, and Cabinet Mountains—via the Interagency Monitoring of Protected Visual Environments (IMPROVE) network.

6.12.5 Environmental consequences

Management direction for alternative 1—No action

Existing forest plans and amendment management direction, with applicable permit and contract-specific terms and conditions, represent the existing management being used by the amendment forests to address air quality. This direction is represented by the no-action alternative. Because there would be no changes to current management direction, there would be no direct, indirect, or cumulative effects for any of the amendment forests under the no-action alternative. However, because the no-action alternative is the baseline to which the other alternatives are compared, it is important to understand which actions would continue under this alternative. This section includes a summarization of current management direction for each amendment forest and an evaluation of effects and trends of continuing that management.

Helena National Forest

Current direction is to maintain the existing air quality on the Forest and provide for no significant deterioration in class I areas. Specifically, the airsheds for the Bob Marshall, Scapegoat, and Gates-of-the-Mountains Wilderness Areas are managed to meet class I air quality standards, and the airshed for the Great Bear and the Bob Marshall addition in the Lewis and Clark National Forest are managed to meet class II. Current direction also includes guidance to manage activities that affect air quality in compliance with Federal and State standards, the Montana Cooperative Smoke Management Plan, and, through cooperation with the Montana Air Quality Bureau's Prevention of Significant Deterioration of Air Quality program, with the State implementation plan. Direction in

the plan specific to the fire management program is to permit fire in wilderness to the maximum possible, as constrained by agreements with the Montana/Idaho State Airshed Group.

Kootenai National Forest

Current forestwide direction is to meet applicable Federal, State, or tribal air quality standards. Prescribed burning is planned to meet those standards, including areas classified as class I airsheds (i.e., Cabinet Mountains Wilderness) and nonattainment areas (i.e., Libby, Montana). Additionally, the Forest is cooperating with Federal, State, tribal, and local air quality agencies as appropriate in meeting applicable air quality requirements.

Within the Libby geographic area, because the airshed that surrounds the community of Libby is a nonattainment area for exceeding the allowable air quality standards for fine particulate matter, Lincoln County has established burning restrictions that limit the ability of the Kootenai National Forest to use planned ignitions in the area.

Lewis and Clark National Forest

Current plan direction is to manage the airshed in the Bob Marshall and Scapegoat Wilderness Areas to meet class I air quality standards and to manage the airshed in the Great Bear and the Bob Marshall addition to meet class II air quality standards.

Lolo National Forest

Current direction for the Lolo National Forest is to maintain air quality at a level adequate for the protection and use of NFS lands without exceeding Federal and State air quality standards. Additionally, prescribed fire objectives for smoke management are to meet Montana/Idaho Airshed Group constraints. The airsheds of the Bob Marshall, Scapegoat, and Selway-Bitterroot Wilderness Areas are managed (primarily via wilderness fire management plans) to meet class I air quality standards. The Lolo plan also requires, where manageable or negotiable, identification and mitigation of outside air quality influences, particularly when a “prevention of significant deterioration action” that may impact the wilderness is received from the Montana Department of Environmental Quality.

Direct and indirect effects for the no-action alternative—All forests

Air quality for all Forests under the no-action alternative would experience continued short- and long-term effects under current management. Continued use of prescribed fire has the greatest potential to influence short-term air quality and visibility in local areas. All Forests have plan components (i.e., current management direction) that require meeting air quality standards established by Federal and State agencies through requirements of State implementation plans and smoke management plans. Current direction influences the use of prescribed fire by restricting how much vegetation can be burned and when and where burns can occur. Limited use of prescribed fire affects the rate and volume of smoke and particulate emissions, which in turn limits impacts to visibility.

Alternative 2 modified and alternative 3

Management direction for alternative 2 modified and alternative 3

Effects of forestwide direction, management area direction, and geographic area direction for air quality

Air quality for all Forests under the action alternatives would experience short- and long-term effects under proposed management. Use of prescribed fire has the greatest potential to influence short-term air quality and visibility in local areas. All action alternatives must meet air quality standards established by Federal and State agencies through requirements of State implementation plans and smoke management plans. Use of prescribed fire under the action alternatives would be restricted by how much vegetation can be burned and when and where burns can occur. The costs of conducting prescribed fires also increase as a result of burning regulations, which also affects how much vegetation is burned. These limitations on the use of prescribed fire affect the rate and volume of smoke and particulate emissions, which in turn limits impacts to visibility.

Because there would be no changes to current management direction that would directly impact prescribed burning, there would be no direct, indirect, or cumulative effects for any of the amendment forests directly related to air quality or visibility from the proposed alternatives.

Cumulative effects

None.

Effects summary

Because there would be no changes to current management direction that would directly impact prescribed burning, there would be no direct, indirect, or cumulative effects for any of the amendment forests directly related to air quality or visibility from the proposed alternatives.

6.13 Recreation and Access

6.13.1 Introduction

The national forests within the NCDE are comprised of diverse vegetation, magnificent mountains, wild rivers, and abundant wildlife. The public is attracted to the area, which offers opportunities for a variety of recreation activities. Viewing the grizzly bear and other wildlife is an integral part of the recreational experience.

Naturally, as people visit and recreate in the NCDE, the potential exists for grizzly bears and humans to interact. Recreation activities and grizzly bear-human interactions have been monitored and evaluated over the last 25 years. Particular efforts that are deemed effective in managing grizzly bear-human interactions include

- information and education about recreating and living in bear country;
- implementation of food storage orders to reduce grizzly bear-human conflict;
- limiting human development and access within bear areas; and
- responses of managers to grizzly bear-human conflicts.

6.13.2 Regulatory framework

Organic Administration Act of June 4, 1897 (30 Stat. 11, as amended): This act authorizes the establishment of national forests.

Multiple-Use Sustained-Yield Act of June 12, 1960 (Pub. L. 86-517, 74 Stat. 215): This act provides direction to the NFS lands to provide access and recreation opportunities. The act states, “The policy of Congress is that national forests are established and administered for outdoor recreation . . .”

National Forest Roads and Trails Act of October 13, 1964 (Pub. L. 88-657, 78 Stat. 1089, as amended): This act declares that an adequate system of roads and trails be constructed and maintained to meet the increasing demand for recreation and other uses. This act authorizes road and trail systems for the national forests. It authorizes granting of easements across NFS lands, construction and financing of maximum economy roads (Forest Service Manual 7705), and imposition of requirements on road users for maintaining and reconstructing roads, including cooperative deposits for that work.

National Trails System Act of October 2, 1968 (Pub. L. 90-543, 82 Stat. 919, as amended): This act establishes the National Trails System and authorizes planning, right-of-way acquisition, and construction of trails established by Congress or the Secretary of Agriculture.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (Pub. L. 93-378, 88 Stat. 476, as amended): This act declares (per Sec. 10) that “the installation of a proper system of transportation to service the NFS . . . shall be carried forward in time to meet anticipated needs on an economical and environmentally sound basis.”

Federal Land Policy and Management Act of October 21, 1976 (Pub. L. 94-579, 90 Stat. 2742, as amended): This act declares (per Sec. 102) that “the public lands be managed in a manner that . . . will provide for outdoor recreation and human occupancy and use.”

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (Pub. L. 93-378, 88 Stat. 476, as amended): This act declares (per Sec. 10) that “the installation of a proper system of transportation to service the NFS . . . shall be carried forward in time to meet anticipated needs on an economical and environmentally sound basis.”

6.13.3 Key indicators for analysis

Key indicators for recreation and access include the following:

- number of developed recreation sites with overnight capacity in the primary conservation area,
- acres of denning habitat open to over-snow use during den emergence time period, and
- change in motorized access for roads, trails and areas.

6.13.4 Methodology and analysis process

Information sources

The Forest Service’s INFRA database was used to determine mileage and/or acreage for roads, trails, and areas open to motorized use.

Analysis area

The analysis of indirect effects is focused on those portions of the national forest where grizzly bear habitat management direction would apply. This varies by alternative as follows:

- Under the no-action alternative (existing forest plan direction for each of the national forests), habitat management direction would be applied to the NCDE recovery zone within grizzly bear management units as defined in the 1993 Recovery Plan and where applicable to specific management situations as defined in the 1986 Interagency Grizzly Bear Guidelines.
- Under the action alternatives, amended management direction would apply to NFS lands within a larger area. This larger area was identified by the draft Conservation Strategy in recognition of the expansion of the bear population into areas outside the recovery zone, the attendant need to establish appropriate management direction in those areas, and the desirability of providing connectivity with grizzly bear populations in other recovery zones. The analysis area is divided into a primary conservation area (referred to as the NCDE recovery zone in the no-action alternative) and management zones 1 and 2, as defined in the draft Conservation Strategy.

6.13.5 Affected environment

Recreation and access on all amendment forests

Recreational use within the analysis area is well established and is an integral part of the management and use of the land. Opportunities provided include a range from semi-primitive nonmotorized cross-country travel to motorized summer and winter travel on a well-developed transportation system; remote backpacking and horse camping to developed campgrounds with tables, toilets, and other amenities; and a feeling of remoteness and solitude to one associated with the presence of other users.

Developed recreation sites

Developed recreation sites provide much of the infrastructure necessary for the enjoyment of a wide variety of recreation activities in the analysis area. Table 210 identifies the number of recreation sites by categories of developed recreation sites and by Forest within the primary conservation area. In addition to specific categories such as campgrounds or trailheads, the other developed recreation category includes day-use sites such as boating and fishing facilities; administrative sites such as cabin rentals; and residences such as recreation residences and summer home complexes that were established from the 1920s through the early 1960s and are a permitted use of the national forests.

Table 210. Number of developed recreation sites by categories and by amendment forest in the primary conservation area

Forest	Developed campgrounds	Day Use	Trailheads	Administrative sites	Overnight sites/building	Residences
Helena	3	8	17	3	0	0
Kootenai	19	20	40	2	5	0
Lewis and Clark	14	7	52	25	7	99
Lolo	3	7	24	6	3	0

In the primary conservation area, there are 39 campgrounds to provide an overnight experience and 133 trailheads to provide access into the national forests. Each developed recreation site has an estimated capacity that varies by site type. **Error! Not a valid bookmark self-reference.** summarizes overnight capacity at developed sites.

Developed recreation sites are of concern because frequent or prolonged human occupancy may result in increased bear attractants and grizzly bear mortality risk. There is no history of grizzly bear mortalities associated with developed recreation sites on the Lewis and Clark National Forest, Helena National Forest, Kootenai National Forest, or Lolo National Forest.

Table 211. Overnight developed sites capacity on the amendment forests in the primary conservation area

Forest	Campground Capacity ¹	Cabins Capacity ¹	Residence Capacity ¹	Lodges Capacity ¹
Helena	35	0	0	0
Kootenai	112	5	0	0
Lewis and Clark	148	25	99	3
Lolo	15	3	0	0

1. Measurement of capacity varies by site type. Campgrounds are by number of sites in the campground; cabins and residences are by number of permits or complexes; and lodge capacity is by number of rooms.

Motorized travel routes—All amendment forests

Travel routes include the roads and trails. Table 212 shows the miles of motorized access routes open for travel (year-around or seasonally) by Forest based on the baseline GIS data. Within a Forest, open motorized access routes are further distinguished by the miles within the primary conservation area, zone 1 (within and outside the demographic connectivity areas), and zone 2 (table 212). Table 213 displays acres and miles of motorized over-snow vehicle use within the primary conservation area and zones 1 and 2, and table 214 displays the acres and miles of motorized over-snow vehicle use outside of denning season within the primary conservation area.

Table 212. Miles of open roads and motorized trails within the primary conservation area (PCA), zones 1 and 2, and demographic connectivity areas (DCAs) by amendment forest

Forest	Open Roads (mile)	Motorized Trails (mile)
Helena PCA	124	21
Helena zone 1	302	34
Helena zone 2	879	66
Kootenai PCA	110	0
Kootenai zone 1, within Salish DCA	871	4
Kootenai Zone 1, outside of Salish DCA	25	9
Kootenai zone 2	—	—
Kootenai “bears outside recovery zone” area	805	0
Lewis and Clark PCA	99	71
Lewis and Clark zone 1	—	—
Lewis and Clark zone 2	—	—
Lolo PCA	90	7
Lolo zone 1, within the Ninemile DCA	553	42
Lolo zone 1, outside of the Ninemile DCA	324	2
Lolo zone 2	< 1	—

Table 213. Motorized over-snow vehicle use routes and motorized over-snow vehicle use areas within the primary conservation area (PCA) and zones 1 and 2, by amendment forest

Forest	Motorized Over-Snow Vehicle Use Routes (miles)	Motorized Over-Snow Vehicle Use Areas (acres)
Helena PCA	97	63,754
Helena zone 1	72	129,485
Helena zone 2	238	255,812
Kootenai PCA	294	106,155
Kootenai zone 1	1,282	270,845
Kootenai zone 2	n/a	n/a
Lewis and Clark PCA	60	29,181
Lewis and Clark zone 1	NA	NA
Lewis and Clark zone 2	NA	NA
Lolo PCA	77	76,280
Lolo zone 1	716	319,731
Lolo zone 2	0	38

Table 214. Acres/miles of motorized over-snow vehicle routes/areas outside of denning season within the primary conservation area by amendment forest

Forest	Motorized Over-Snow Vehicle Use Routes (miles)	Motorized Over-Snow Vehicle Use Areas (acres)
Helena	14	63,754
Kootenai	294	106,155
Lewis and Clark	36	0
Lolo	54	73,476

Forest plan direction and changes in developed site capacity in the primary conservation area

Helena National Forest

Under the existing Helena forest plan, there is a forestwide standard stating that new campgrounds and other developed recreation facilities, such as boat ramps or picnic areas, will generally not be constructed. Existing developed recreation sites will be maintained, but emphasis instead is given to providing dispersed recreation opportunities.

Kootenai National Forest

The forest plan direction is to have recreation facilities at key locations to accommodate concentrations of use and protect the natural resources of the area. Dispersed camping opportunities consider resource concerns, activity conflicts, and overuse. For food and garbage storage, these would not contribute to conflicts between recreation users and wildlife.

Lewis and Clark National Forest

The forest plan forestwide direction is to increase recreational use of camping, picnicking, and other developed site opportunities from 198,500 to 230,100 recreation visitor days by 2030 by expanding existing sites and developing new recreation sites. Developed recreation sites may be closed, eliminated, or relocated if they provide little or no opportunity, are in conflict with other values, or are not cost efficient in the service they provide.

There is also direction to manage fee campgrounds, heavy-use campgrounds, and heavy-use picnic areas at full service levels. Low-use campgrounds and picnic areas will be managed at a reduced service level. When there are user conflicts or damage to Forest resources and recreation facilities, patrols and educational programs will be increased as necessary. All facilities will be maintained to protect investment and provide safe, sanitary, and reasonably attractive sites.

The forest plan also requires using the management guidelines in appendix I of the Interagency Wildlife Management Guidelines to avoid or mitigate conflicts between developed recreation and threatened and endangered species.

Lolo National Forest

The forest plan direction for developed recreation is to maintain recreation at the current levels. The Lolo has the following forest plan direction:

- The Forest Service will not significantly expand the capacity of developed recreation sites on the Lolo National Forest during the next 10-year period (1986 to 1995). Emphasis will be placed on increasing the use of existing sites by making them usable by a wide segment of society, including the elderly and handicapped. Those existing sites receiving low levels of public use or that are not cost effective to operate will be considered for temporary or permanent closure.
- In management area 7, developed campgrounds or picnic areas will be maintained and rehabilitated but generally not expanded beyond present capacity.
- In management area 11, developed recreation facilities, such as campgrounds or picnic grounds, will not be constructed.
- In management areas 16, 17, 18, 21, 22, 23, 24, 25, 26, and 27, a variety of dispersed recreation activities are permitted and may be supported by construction of trails and trailhead facilities. Developed campgrounds and similar facilities would not be constructed.
- In management areas 19, 20, and 21, developed recreation facilities will not be constructed.

Current use and trends

There is a national visitor monitoring program across NFS lands by which Forests monitor visitation every five years through exit surveys. Table 215 shows visitation results by Forest, the year it was sampled, recreational visits, wilderness visits, and percentage of visitors living within 100 miles of the Forest (USDA, 2017b). Table 215 indicates that a majority of users live within 100 miles—the Helena National Forest at 88 percent, the Lolo National Forest at 83 percent, the Kootenai National Forest at 72 percent, whereas the Lewis and Clark National Forest is lower at 49 percent.

Table 215. Recreation visits, wilderness visits, and percentage of visitors living within 100 miles by amendment forest

National Forest	Year Sampled	Recreational Visits	Wilderness Visits and Percentage of Total Recreational Visits	Visitors Living within 100 Miles of Forest (%)
Helena	2013	322,000	4,000 (1%)	88
Kootenai	2012	468,000	12,000 (3%)	72
Lewis and Clark	2012	269,000	23,000 (9%)	49
Lolo	2011	1,266,000	16,000 (1%)	83

Visitor use

Main recreational activities

Table 216 shows that walking or hiking and hunting are in the top five main activities for all four Forests, followed by driving for pleasure as a top five main activity for three Forests. Viewing natural features and cross-country skiing were in the top five main activities for two Forests. Hunting is the top main activity for both the Helena and Lewis and Clark National Forests, whereas hiking or walking is the top main activity for the Lolo and Kootenai National Forests. Hunting is a significant use in the NCDE and holds high potential for grizzly bear-human conflicts because bears are attracted to the kills and gut piles (see section 6.5.5 for more details on grizzly bear-hunter conflict). Hunters may use the services of an outfitter and guide.

Table 216. Top five recreational activities by amendment forest

Activities	Helena (%)	Kootenai (%)	Lewis and Clark (%)	Lolo (%)
Hunting	20	16	28	15
Hiking or walking	15	20	7	16
Driving for pleasure	—	5	10	6
Viewing natural features	13	14	—	—
Cross-country skiing	7	—	—	15
General relaxing	—	—	11	—
Downhill skiing	—	—	14	—
Fishing	—	9	—	—
Other activity	16	—	—	—
Other nonmotorized	—	—	—	12

6.13.6 Environmental consequences

Helena National Forest

Alternative 1—No action

There would be very little change to developed recreation sites (3 campgrounds with capacity at 35 and 17 trailheads) on the Helena National Forest. The current forestwide standard states that new campgrounds and other developed recreation facilities (excluding trailheads) will generally not be constructed, existing ones will be maintained, and emphasis will be given to dispersed recreation opportunities. Recreational use is expected to increase in the analysis area over time. Use may be affected by bear use of the area, grizzly bear-human conflicts, and restrictions on new developed recreation facilities. With this standard restricting new developed recreation facilities such as campgrounds, picnic areas, and boat ramps, these areas may reach capacity with limited ability to expand to meet increased demand. Popular dispersed camping areas may become less available to visitors during peak times of the year. Resource issues such as the presence of human waste and soil compaction in heavily used dispersed sites may appear as use increases in dispersed sites.

Under the no-action alternative, the Forest Service would continue to implement the standard limiting open road density in management situations 1 and 2 to less than or equal to 0.55 miles/square mile to minimize human-caused grizzly bear mortality. The Forest must implement terms and conditions of the 2006 biological opinion (USFWS, 2006) within the recovery zone. Within the recovery zone (primary conservation area), the Forest cannot increase open and total motorized access routes densities, and no net decrease is allowed in secure core in all three grizzly bear subunits. Generally, in the recovery zone (primary conservation area) the miles of open roads and trails would stay the same. However, it is difficult to make direct correlations between miles and how implementation of a route standard would affect road mileage.

There would be no change to motorized over-snow vehicle use under the no-action alternative.

Effects common to alternative 2 modified and alternative 3

Recreational use is expected to increase in the analysis area over time. Although the current forestwide standard does not generally allow construction of new developed recreation facilities, the standard does not include trailheads. Under alternative 2 modified and alternative 3, recreational use may be affected by grizzly bear use in the area, grizzly bear-human conflicts, and restrictions on new recreation developments—in this case, trailheads managed for overnight use by the public.

Standard NCDE-STD-AR-05 limits the increase in developed recreation sites to one per bear management unit per decade. There is one bear management unit, shared with the Lolo National Forest, within the primary conservation area on the Helena National Forest. Thus, the Forest has the ability to add one developed recreation site designed and managed for overnight use within the primary conservation area in the next 10 years. In addition, this standard identifies conditions that are not considered an increase from the baseline, including the following:

- a change in the number or overnight capacity of developed recreation sites that is necessary to comply with Federal laws (e.g., Federal Rehabilitation Act);
- a change in the number or overnight capacity of developed recreation sites that is necessary to address grizzly bear-human conflicts, resource damage, or human safety concerns; and
- an increase in the number of developed recreation sites due to the Forest Service acquiring lands with developed recreation sites.

It is unknown how many additional new developed recreation sites may be added with these exemptions, but given the current forest plan standard limiting new recreation facilities development, the number is likely very low, although the number of new trailheads may be increased. In addition, if the Forest proposes any further increase in the number or capacity of developed recreation sites that are designed and managed for overnight use in the bear management unit (i.e., more than one per decade), such an increase must be offset by reduction of an equal amount at another recreation site(s) in the same bear management unit so that there is no net increase in overnight capacity in the bear management unit. This allows some flexibility to increase developed recreation sites that have reached capacity while decreasing sites that may be less used and not meeting capacity.

As grizzly bear populations remain stable or increase, some people may shift their uses to areas not occupied by grizzlies or rely upon uses where they have an increased sense of security, such as using a hard-sided camper or developed campgrounds, day hiking on heavily used trails, or relying upon guided services. For other people, recreating in bear country would be an added attraction and offer the allure of wild country.

As recreational use increases while increases in developed recreation sites are restricted, users may turn to different strategies as developed recreation sites reach capacity. Potential outcomes of restricting developed site capacity include the following:

- change in use from developed recreation sites to dispersed sites, e.g., camping in undesignated areas;
- change in the time visitors use the areas to a different time of year, such as spring or fall when use is lower;
- change in uses to other areas on the amendment forests or to off-Forest areas where use is lower
- use of the national reservation system at campgrounds that have reached capacity to assist users to be successful in camping at specific campgrounds that have reached capacity; and
- creation of new developed recreation sites by private enterprises on private land to accommodate increasing use.

Alternative 2 modified

Amendment standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline for the percent of secure core in bear management subunits.

Therefore, the existing on-the-ground motorized access would be maintained in the primary conservation area.

Standard NCDE-STD-AR-04 would permit restricted roads within the primary conservation area to be temporarily opened for public motorized use to allow authorized uses such as firewood gathering, provided the period of use would not exceed 30 consecutive days, would occur outside of spring and fall bear hunting seasons and would not occur in secure core. This would allow for increased public access on a temporary basis.

Standard NCDE-STD-AR-07 would require new or reauthorized permits for ski areas on NFS lands that operate during the non-denning season to include mitigation measures that reduce the risk of grizzly bear-human conflicts within the primary conservation area. The Helena National Forest does not have any existing ski areas within the primary conservation area. Any new developments would require mitigation measures. However, the potential for new ski area developments in this area is low.

Alternative 2 modified would add NCDE-STD-AR-08, which would not allow any increase above the baseline acreage of areas and miles of routes open to motorized over-snow vehicle use in the primary conservation area during the den emergence time period (i.e., late spring). This would maintain the existing (baseline) opportunities for motorized over-snow vehicle use in the den emergence period within the primary conservation area.

Alternative 3

All motorized standards in alternative 2 modified are the same for alternative 3. Standard NCDE-STD-AR-02 retains baseline motorized access. Standards NCDE-STD-AR-07 and 08 are the same as under alternative 2.

Kootenai National Forest

Alternative 1—No action

There would be little change to developed recreation sites within the primary conservation area (19 campgrounds, 40 trailheads, 20 day-use sites, and 5 cabins) on the Kootenai National Forest.

The Kootenai forest plan was revised in 2015. The revised plan includes the 2011 record of decision that amended the forest plan for motorized access management within the Selkirk and Cabinet-Yaak grizzly bear recovery zones as well as areas occupied by bears that are outside the recovery zones. The revised forest plan also established motorized access direction applicable to the NCDE.

Under the Kootenai forest plan, road densities are limited to no more than the existing baseline of open and total motorized route density in its two bear management units within the NCDE and no net increase in linear miles of motorized routes within the “bears outside recovery zone” area. Thus, there would be no change in wheeled motorized access under the no-action alternative.

Forestwide standard FW-STD-WL-05 prohibits grooming of snowmobile routes in grizzly bear core habitat in the spring after April 1 of each year. In addition, FW-GDL-WL-01 states that management activities should avoid or minimize disturbance in areas of predicted denning habitat during spring emergence (April 1 through May 1). The biological opinion on the forest plan (USFWS, 2013b) includes a requirement for the Kootenai National Forest and the USFWS to cooperatively develop a plan to monitor the scope and magnitude of late-season snowmobiling (post-April 15) in the Cabinet-Yaak and NCDE recovery zones. Under the no-action alternative, with the exception of limiting the grooming of routes after April 1, there is no effect to over-snow vehicle use.

Effects common to alternative 2 modified and alternative 3

Recreational use is expected to increase in the analysis area over time. Use may be affected by grizzly bear use of the area, grizzly bear-human conflicts, and restrictions on new recreation developments, in this case, trailheads.

Standard NCDE-STD-AR-05 limits the increase in developed recreation sites designed and managed for overnight use to one per bear management unit per decade. There are two bear management units within the primary conservation area on the Kootenai National Forest. Thus, the Forest has the ability to increase by two developed recreation sites in the primary conservation area in the next 10 years. In addition, this standard identifies conditions that are not an increase from the baseline, which include the following:

- a change in the number or overnight capacity of developed recreation sites that is necessary to comply with Federal laws (e.g., Federal Rehabilitation Act);

- a change in the number or overnight capacity of developed recreation sites that is necessary to address grizzly bear-human conflicts, resource damage, or human safety concerns; and
- an increase in the number of developed recreation sites due to the Forest Service acquiring lands with developed recreation sites.

It is unknown how many additional new developed recreation sites may be increased with these exemptions. In addition, if the Forest proposes any further increase in the number or capacity of developed recreation sites that are designed and managed for overnight use in the bear management unit (i.e., more than one per decade), such an increase must be offset by reduction of an equal amount at another recreation site(s) in the same bear management unit so that there is no net increase in overnight capacity in the bear management unit. This allows some flexibility to increase developed recreation sites that have reached capacity while decreasing sites that may be less used and not meeting capacity.

As grizzly bear populations remain stable or increase, some people may shift their uses to areas not occupied by grizzlies or rely upon uses where they have an increased sense of security, such as using a hard-sided camper or developed campgrounds, day hiking on heavily used trails, or relying upon guided services. For other people, recreating in bear country would be an added attraction and would offer the allure of wild country.

As recreational use increases while increases in developed recreation sites are restricted, users may use different strategies as developed recreation sites reach capacity. Potential outcomes of restricting developed site capacity are

- change in use from developed recreation sites to dispersed sites, e.g., camping in undesignated areas;
- change in the time visitors use the areas to a different time of year, such as spring or fall when use is lower;
- change in uses to other areas on the amendment forests or to off-Forest areas where use is lower;
- use of the national reservation system at campgrounds that have reached capacity to assist users to be successful in camping at specific campgrounds that have reached capacity; and
- creation of new developed recreation sites by private enterprise on private land to accommodate increasing use.

Alternative 2 modified

Under alternative 2 modified, standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline for the percent of secure core in bear management subunits. Kootenai forest plan standard FW-WL-STD-03 is to maintain or improve open motorized route density, total motorized route density, and secure core in bear management subunits in the NCDE. Thus, there would be no change in wheeled motorized access under this alternative.

Under alternative 2 modified, standard NCDE-KNF Zone 1-STD-01 states that the Kootenai National Forest portion of zone 1 and the Salish demographic connectivity area would be managed according to FW-STD-WL-02. Thus, there would be no change in wheeled motorized access for zone 1 and the Salish demographic connectivity area under this alternative.

Under alternative 2 modified, standard NCDE-STD-AR-08 would be added, which would not allow any increase above the baseline in the acreage of areas and miles of routes open to use by over-snow

vehicles in the den emergence time period (i.e., late spring) within the primary conservation area. This would limit acres and miles to current levels (see the “Affected environment” section above), with no additional opportunities to expand over-snow vehicle use in the den emergence time period.

Under this alternative, standard NCDE-STD-07 would require new or reauthorized permits for ski areas on NFS lands that operate during the non-denning season to include mitigation measures that would reduce the risk of grizzly bear-human conflicts within the primary conservation area. The Kootenai National Forest does not have any existing ski areas within the primary conservation area. Any new developments would require mitigation measures. However, the potential for new ski area developments in this area is low.

Under alternative 2 modified, standard NCDE-STD-AR-04 would permit restricted roads within the primary conservation area to be temporarily opened for public motorized use to allow authorized uses such as firewood gathering, provided the period of use would not exceed 30 consecutive days, would occur outside of spring and fall bear hunting seasons, and would not occur in secure core. This would allow for increased public access on a temporary basis.

Alternative 3

Standards NCDE-STD-AR-02 and NCDE-KNF Zone 1-STD-01 would be the same under this alternative as under alternative 2 modified, retaining existing motorized access. Standard NCDE-STD-AR-04 under alternative 3 would not allow roads to be temporarily opened within secure core. Thus, this alternative would not allow as much temporary access as found under alternative 2 modified. Under this alternative, standard NCDE-KNF Zone 1-STD-02 would require no net increase in the miles of roads open to public motorized use during the non-denning season in the portion of zone 1 that is outside the “bears outside the recovery zone” area. This would limit access to current levels in this area.

Lewis and Clark National Forest

Alternative 1—No action

There would be little change to developed recreation sites within the primary conservation area (14 campgrounds, 52 trailheads, 7 day-use sites, 6 cabins, and 1 overnight site) on the Lewis and Clark National Forest.

The Lewis and Clark forest plan does not contain a road density standard for the NCDE recovery zone. There would be no change in wheeled motorized vehicle access under the no-action alternative.

Within the NCDE recovery zone, no snowmobiling is allowed after April 1 except on three main access roads, where it is allowed as long as snow conditions permit. Snowmobiles are not allowed to leave these roads. There would be no change to motorized over-snow vehicle use under the no-action alternative.

Effects common to alternative 2 modified and alternative 3

Recreational use is expected to increase in the analysis area over time. The current forestwide standard of generally not allowing developed recreation facilities does not include trailheads. Use may be affected by grizzly bear use of the area, grizzly bear-human conflicts, and restrictions on new recreation developments designed and managed for overnight public use.

Standard NCDE-STD-AR-05 limits the increase in developed recreation sites designed and managed for overnight use to one per bear management unit per decade. There are six bear management units, with one bear management unit shared with the Helena National Forest, within the primary

conservation area on the Lewis and Clark National Forest. Thus, the Forest has the ability to increase five to six developed recreation sites in the primary conservation area in the next 10 years. In addition, this standard identifies conditions that are not considered an increase from the baseline, which include the following:

- a change in the number or overnight capacity of developed recreation sites that is necessary to comply with Federal laws (e.g., Federal Rehabilitation Act);
- a change in the number or overnight capacity of developed recreation sites that is necessary to address grizzly bear-human conflicts, resource damage, or human safety concerns; and
- an increase in the number of developed recreation sites due to the Forest Service acquiring lands with developed recreation sites.

It is unknown how many new developed recreation sites may be added under these conditions. In addition, if the Forest proposes any further increase in the number or capacity of developed recreation sites that are designed and managed for overnight use in the bear management unit (i.e., more than one per decade), such an increase must be offset by reduction of an equal amount at another recreation site(s) in the same bear management unit so that there is no net increase in overnight capacity in the bear management unit. This allows some flexibility to increase developed recreation sites that have reached capacity while decreasing sites that may be less used and not meeting capacity.

As grizzly bear populations remain stable or increase, some people may shift their uses to areas not occupied by grizzlies or rely upon uses where they have an increased sense of security, such as using a hard-sided camper or developed campgrounds, day hiking on heavily used trails, or relying upon guided services. For other people, recreating in bear country would be an added attraction and would offer the allure of wild country.

As recreational use increases while increases in developed recreation sites are restricted, users may turn to different strategies as developed recreation sites reach capacity. Potential outcomes of restricting developed site capacity include the following:

- change in use from developed recreation sites to dispersed sites, e.g., camping in undesignated areas;
- change in the time visitors use the areas to a different time of year, such as spring or fall when use is lower;
- change in uses to other areas on the amendment forests or to off-Forest areas where use is lower;
- use of the national reservation system at campgrounds that have reached capacity to assist users to be successful in camping at specific campgrounds that have reached capacity; and
- creation of new developed recreation sites by enterprise on private land to accommodate increasing use.

Alternative 2 modified

Standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline for the percent of secure core in bear management subunits. Although there could be no net increase in motorized access, the Forest would have the ability to decrease access in one area to increase access in another area within the bear management subunit.

Standard NCDE-STD-AR-04 would permit restricted roads within the primary conservation area to be temporarily opened for public motorized use to allow authorized uses such as firewood gathering, provided the period of use would not exceed 30 consecutive days, would occur outside of spring and fall bear hunting seasons, and would not occur in secure core. This would allow for continued public access on a temporary basis. Under this alternative, standard NCDE-STD-08 would not allow any increase above the baseline in areas or routes open to use by motorized over-snow vehicle use in the non-denning (i.e., late spring) time period. This would not change snowmobiling opportunity during the den emergence time period, since no snowmobiling has been allowed within the recovery zone after April 1, except on three main access roads where it is allowed as long as snow conditions permit.

Under this alternative, standard NCDE-STD-07 would require new or reauthorized permits for ski areas on NFS lands that operate during the non-denning season to include mitigation measures that would reduce the risk of grizzly bear-human conflicts within the primary conservation area. The Teton Pass Ski Resort on the Forest would require mitigation measures upon reauthorization of their permit.

Alternative 3

Standard NCDE-STD-AR-02 would be the same under this alternative as under alternative 2 modified, retaining existing motorized access with no increase in motorized access. Standard NCDE-STD-AR-04 under alternative 3 would not allow roads to be temporarily opened within secure core. Thus, the effects of this alternative are the same as alternative 2 modified with respect to motorized public access.

Lolo National Forest

Alternative 1—No action

Under the current forest plan there is a forestwide standard that the Forest would not significantly expand the capacity of developed recreation sites on the Forest during the next 10-year period. There would be no change to developed recreation sites within the primary conservation area (3 campgrounds, 24 trailheads, 7 day-use sites, 3 overnight sites) on the Lolo National Forest with this alternative.

The current Lolo forest plan does not require management for grizzly bears or their habitat outside of the recovery zone. The forest plan restricts open road densities to 1.1 miles/square mile in highly productive big game summer range and requires that management of roads be coordinated with other resource objectives, including grizzly bear habitat. In 1996, USFWS administratively amended the 1982 biological opinion on the Lolo forest plan and also provided an incidental take statement regarding access management and grizzly bears within the recovery zone (USFWS, 1996). The terms and conditions included, in part, a requirement that no more than 19 percent of a subunit exceed 1 mile/square mile of open motorized route density, that no more than 19 percent of a subunit exceed 2 miles/square mile of total motorized route density, and that the minimum secure core of a subunit be at least 68 percent, all to be achieved within five years. Five of the seven bear management subunits on the Lolo National Forest fully meet the criteria. The Mission subunit does not, but the Forest Service manages less than 75 percent of the land in this subunit; therefore, this subunit has been managed for no net loss. The Swan subunit also does not meet all of the criteria, and in 2011 the Lolo National Forest reinitiated consultation for this subunit. In recognition of its unique characteristics, the requirements were modified to no more than 17 percent total motorized route density, no more than 31 percent open motorized route density with no more than 22 percent open

motorized route density during the spring, and at least 55 percent secure core. Under this alternative, these requirements would remain in place.

The USFWS issued a biological opinion and incidental take statement on August 30, 2004, for areas outside the recovery area where grizzly bears were then present (USFWS, 2004). The biological opinion required the Lolo National Forest to contact the USFWS if a net increase in permanent system roads exceeds 2 linear miles in the distribution area outside the recovery zone during the subsequent four-year period. Since 2004, no new permanent roads have been constructed in the grizzly bear distribution area outside of the NCDE recovery zone, and 5.14 miles have been decommissioned in the distribution area. The 2004 biological opinion and incidental take statement was extended by USFWS on June 14, 2012 (USFWS, 2012). The term and condition was administratively amended as follows: The Forest will contact the USFWS if more than 2 miles of new permanent road over the 2004 baseline, or 7.14 miles total, will be constructed over the next 10 years in the distribution area outside of the NCDE recovery zone. Although increased access is limited, there is no change in current wheeled motorized access outside of the recovery zones.

The Lolo forest plan does not restrict over-snow vehicle use during the den emergence period. However, groomed snowmobile routes and snowmobile play areas are concentrated outside the recovery zone, except for the large block of former Plum Creek Timber land in the Mission subunit, and on NFS lands in the lower elevation areas in the Swan subunit and in the Dun Creek drainage in the Mor-Dun subunit. Spring road closures are in place around Morrell Falls, Richmond Peak, and Clearwater Lake to specifically protect grizzly bear from snowmobile and other motorized disturbance during the non-denning period from April 1-June 30. There would be no change in motorized over-snow vehicle use in this alternative.

Effects common to alternative 2 modified and alternative 3

Recreational use is expected to increase in the analysis area over time. Although the current forestwide standard generally does not allow increasing developed recreation facilities, this standard does not include trailheads. Use may be affected by grizzly bear use of the area, grizzly bear-human conflicts, and restrictions on new developed recreation sites.

Standard NCDE-STD-AR-05 limits the increase in developed recreation sites designed and managed for overnight use to one per bear management unit per decade. There are three bear management units within the primary conservation area on the Lolo National Forest, with one bear management unit shared with the Flathead National Forest and another shared with the Helena National Forest. Thus, the forest has the ability to increase one to three developed recreation sites in the primary conservation area in the next 10 years. In addition, this standard identifies conditions that are not considered an increase from the baseline, which include the following:

- a change in the number or overnight capacity of developed recreation sites that is necessary to comply with Federal laws (e.g., Federal Rehabilitation Act);
- a change in the number or overnight capacity of developed recreation sites that is necessary to address grizzly bear-human conflicts, resource damage, or human safety concerns; and
- an increase in the number of developed recreation sites due to the Forest Service acquiring lands with developed recreation sites.

It is unknown how many additional new developed recreation sites may be increased under these conditions. In addition, if the forest proposes any further increase in the number or capacity of developed recreation sites that are designed and managed for overnight use in the bear management unit (i.e., more than one per decade), such an increase must be offset by reduction of an equal

amount at another recreation site(s) in the same bear management unit so that there is no net increase in overnight capacity in the bear management unit. This allows some flexibility to increase developed recreation sites that have reached capacity while decreasing sites that may be less used and not meeting capacity.

As grizzly bear populations remain stable or increase, some people may shift their uses to areas not occupied by grizzlies or rely upon uses where they have an increased sense of security, such as using a hard-sided camper or developed campgrounds, day hiking on heavily used trails, or relying upon guided services. For other people, recreating in bear country would be an added attraction and an allure of wild country.

As recreational use increases while increases in developed recreation sites are restricted, users may use different strategies as developed recreation sites reach capacity. Potential outcomes of restricting developed site capacity are

- change in use from developed recreation sites to dispersed sites, e.g., camping in undesignated areas;
- change in the time visitors use the areas to a different time of year, such as spring or fall when use is lower;
- change in uses to other areas on the amendment forests or to off-Forest areas where use is lower;
- use of the national reservation system at campgrounds that have reached capacity to assist users to be successful in camping at specific campgrounds that have reached capacity; and
- creation of new developed recreation sites by private enterprise on private land to accommodate increasing use

Alternative 2 modified

Standard NCDE-STD-AR-02 would require no net increase from the baseline for total motorized route density and open motorized route density within bear management subunits and no net decrease from the baseline for the percent of secure core in bear management subunits. Therefore, the existing motorized access would be maintained.

Standard NCDE-STD-AR-04 would permit restricted roads within the primary conservation area to be temporarily opened for public motorized use to allow authorized uses such as firewood gathering, provided the period of use would not exceed 30 consecutive days, would occur outside of spring and fall bear hunting seasons, and would not occur in secure core. This would allow for continued public access on a temporary basis.

Under alternative 2 modified, a standard (NCDE-LNF Zone 1-STD-01) would be added to the Lolo National Forest portion of zone 1, including the Ninemile demographic connectivity area, requiring no net increase from the baseline in the density of roads (zone 1) or routes (Ninemile demographic connectivity area) open to public motorized use on NFS lands. This would not affect existing motorized use but would continue to restrict future increases similar to alternative 1.

Under this alternative, standard NCDE-STD-07 would require new or reauthorized permits for ski areas on NFS lands that operate during the non-denning season to include mitigation measures that reduce the risk of grizzly bear-human conflicts within the primary conservation area. The Lolo National Forest does not have any existing ski areas within the primary conservation area. Any new developments would require mitigation measures. However, the potential for new ski area developments in this area is low.

This alternative would add standard NCDE-STD-AR-08, which would not allow any increase above the baseline in the acreage of areas or miles of routes open to use by motorized over-snow vehicle use in the den emergence time period (i.e., late spring) within the primary conservation area. This would limit acres and miles to current levels (see the “Affected environment” section above).

Alternative 3

Standard NCDE-STD-AR-02 would be the same under this alternative as under alternative 2 modified, retaining existing motorized access with no increase in motorized access. Standard NCDE-STD-AR-04 under alternative 3 would not allow roads to be temporarily opened within secure core. Thus, the effects of this alternative would be the same as under alternative 2 with respect to motorized public access.

In this alternative, on lands outside of the Ninemile demographic connectivity area but within the Lolo National Forest portion of zone 1, there would be no net increase in miles of roads open to public motorized use on NFS lands above the baseline (NCDE-LNF-Zone 1-STD-01). Within the Ninemile demographic connectivity area, there would be no net increase in miles of roads or trails open to public motorized use during the non-denning season (NCDE-LNF-Zone 1-STD-02). This would not affect existing motorized use, but it would continue to restrict future increases, similar to alternative 2 modified.

Cumulative effects

The analysis area for cumulative effects includes the amendment forests and adjacent public lands, including the Flathead National Forest, Glacier National Park, Montana State lands, and county and local parks. These public lands provide a wide range of recreation opportunities in addition to the amendment forests.

The amendment forests have experienced many changes in recreation since they were established. Initially, recreation was light and concentrated in only a few popular areas. There were few campgrounds or other sites developed until the Civilian Conservation Corps era, when many developed sites and trails were constructed. Another major boom in recreation occurred after World War II through the early to mid-1960s as post-war populations started heading to the national forests, demanding more and better recreation facilities.

Since the 1970s, interest in and appreciation of the environment has increased national forest recreation visitation and has shifted activities and expectations. As temperatures increase during the summer and the majority of the Forest is free from snow cover, many people venture out onto the national forests for relief from the heat and to pursue traditional outdoor recreational opportunities.

Technical advancements in motorized over-snow vehicles now allow the average visitor to travel many places where only skilled riders traveled as recently as five years ago. The development of the all-terrain vehicle has added a new motor vehicle use in the summer and allows many people to travel on routes into areas that they may not have been able to travel into previously. Lastly, the development of the mountain bike in the 1980s has added a summer nonmotorized use.

All of these issues, along with several others, have led to more crowded recreation experiences during peak use times, increasing levels and range of demands on natural resources and resource managers, and more conflicts among the users themselves.

Continuing changes in equipment technology used for recreational purposes on the Forest will have impacts on new uses or existing uses and on how and where people recreate. These changes in uses may alter the recreational experience in some areas. As populations in Montana increase, the demand

for recreational opportunities and open space will grow. Land management agencies will continue to provide a variety of recreation opportunities but are not likely to be able to meet all the demand for every activity. Both alternatives 2 modified and alternative 3 provide the same opportunity for meeting the increasing demands for additional and varied recreation opportunities

6.14 Energy and Mineral Resources

6.14.1 Introduction

Energy and mineral resources are an important part of the nation's resource base. Minerals are resources of the national forests and are important to the nation's welfare. The national forests contain much of the country's remaining stores of mineral resources. Prime examples include: the national forests of the Rocky Mountains, the Basin and Range Province, the Cascade-Sierra Nevada Ranges, and the Alaska Coast range.

Geologically, NFS lands contain some of the most favorable host rocks for mineral deposits. Approximately 6.5 million acres are known to be underlain by coal. Approximately 45 million acres, or one quarter of NFS lands, have potential for oil and gas, and about 300,000 acres within the Pacific Coast and Great Basin States have potential for geothermal resource development.

The USFS classifies minerals into three management categories.

- **Locatable minerals:** Includes commodities such as gold, silver, copper, zinc, nickel, lead, platinum, etc., and some nonmetallic minerals such as asbestos, gypsum, and gemstones. Lands that are open to location under the Mining Law of 1872 guarantees U.S. citizens the right to prospect and explore lands reserved from the public domain and open to mineral entry. The right of access for exploration and development of locatable mineral is guaranteed.
- **Salable minerals:** Includes common varieties of sand, stone, gravel, cinders, clay, pumice, and pumicite. The Forest Service has the authority to dispose of these materials on public lands through a variety of methods. The disposal of these materials is discretionary.
- **Leasable minerals:** Includes commodities such as oil, gas, coal, geothermal, potassium, sodium phosphates, oil shale, sulfur, and solid leasable minerals on acquired lands.

6.14.2 Regulatory framework

Law and executive orders

Surface management authority

Organic Administration Act of June 4, 1897 (30 Stat. 11, as amended; 16 U.S.C. § 473 et seq.): This act provides the Secretary of Agriculture the authority to regulate the occupancy and use of NFS lands. It provides for the continuing right to conduct mining activities under the general mining laws if the rules and regulations covering NFS lands are complied with. This act recognizes the rights of miners and prospectors to access NFS lands for all proper and lawful purposes, including prospecting, locating, and developing mineral resources.

Multiple-Use Sustained-Yield Act of June 12, 1960 (Pub. L. 86-517, 74 Stat. 215; 16 U.S.C. 528 et seq.): This act requires that NFS lands be administered in a manner that considers the values of the various resources when making management decisions and specifically provides that nothing in the act be construed to affect the use or administration of the mineral resources on NFS lands.

Wilderness Act of September 3, 1964 (Pub. L. 88-577, 78 Stat. 890; 16 U.S.C. § 1121, et seq.):

This act provides that, subject to valid rights existing prior to January 1, 1984, wilderness areas are withdrawn from all forms of appropriation and disposition under the mining and mineral leasing laws. Subsequent acts designating additional NFS lands as wilderness may contain specific provisions concerning mineral activities. Patents issued under the mining laws for mining claims staked after passage of this act within wilderness areas shall reserve the surface rights to the United States. The act provides for reasonable access to valid mining claims and other valid occupancies inside wilderness areas. The act also requires the survey of wilderness areas by the U.S. Geological Survey on a planned, recurring basis consistent with the concept of wilderness preservation to determine the mineral values that may be present.

National Environmental Policy Act (NEPA) of 1969, January 1, 1970 (Pub. L. 91-190, 83 Stat.

852; 42 U.S.C. § 4331 et seq.): This act requires Federal agencies to use a systematic interdisciplinary approach to ensure the integrated use of natural and social sciences in planning and decisionmaking. It also requires an analysis of probable environmental effects of proposed Federal actions. Generally, decisions on mineral and energy development are subject to this law.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (Pub. L. 93-378, 88 Stat. 476; 16 U.S.C. § 1600 et seq.): This act directs the assessment of all resources on NFS lands to determine the desired level of future production from Forest Service programs. Once approved, the policy statement and recommended program serve as a guide to future Forest Service planning and a basis for future budget proposals.

National Forest Management Act (NFMA) of October 22, 1976 (Pub. L. 94-588, 90 Stat. 2949; 16 U.S.C. § 1600 et seq.): This act requires the Forest Service to establish a comprehensive system of land and resource planning, including the development and maintenance of a comprehensive and detailed inventory of lands and resources. The act also specifies the use of a systematic interdisciplinary approach to achieve integrated consideration of the physical sciences in planning for the management and use of NFS lands and resources.

Mineral management authorities

U.S. Mining Laws Act of May 10, 1872 (17 Stat. 91, as amended, 30 U.S.C. § 22 et seq.): This act (often referred to as the General Mining Act of 1872) sets forth the principles of discovery, right of possession, assessment work, and patent for hard-rock minerals on lands reserved from the public domain. The law applies to lode, placer, and mill-site claims and to tunnel sites. Except as otherwise provided, all valuable mineral deposits, and the lands in which they are found, are free and open to exploration, occupation, and purchase under regulations prescribed by law.

Organic Administration Act of 1897 (30 Stat. 11, as amended, 16 U.S.C. § 473 et seq.): This act reserved lands for national forest purposes and opened them to operation under U.S. mining laws, provided individuals/operators comply with the rules and regulations of the Secretary of Agriculture. This act authorizes the Secretary of Agriculture to regulate occupancy and use of the national forests. The act permits access to national forests for all lawful purposes, including prospecting, locating, and developing mineral resources.

Weeks Law Act of March 1, 1911 (Pub. L. 61-435, 72 Stat. 1571, as amended, 16 U.S.C. § 480 et seq.): This act authorizes the Federal government to purchase lands for stream-flow protection and to maintain the acquired lands as national forests.

Mineral Resources on Weeks Law Lands Act of March 4, 1917 (Pub. L. 64-390, 39 Stat. 1149, 16 U.S.C. § 520): This act authorizes the Secretary of Agriculture to issue permits and leases for

prospecting, developing, and utilizing hard-rock minerals on lands acquired under the authority of the act. This authority was later transferred to the Secretary of the Interior.

Mineral Leasing Act of February 25, 1920 (Pub. L. 66-146, 41 Stat. 437 as amended, 30 U.S.C. § 181 et seq.): This act authorizes the Secretary of the Interior to issue leases for the disposal of certain minerals (coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, and gas). The act applies to NFS lands reserved from the public domain, including lands received in exchange for timber or other public domain lands and lands with minerals reserved under special authority.

Clarke-McNary Act of June 7, 1924 (Pub. L. 68-270, 43 Stat. 653 as amended, 16 U.S.C. § 505 et seq.): All lands to which title is accepted under section 7 of this act become national forest lands, subject to all laws applicable to the lands acquired under the Weeks Act of March 1, 1911.

Mineral Materials Act of July 31, 1947 (Pub. L. 80-291, 61 Stat. 681, as amended, 30 U.S.C. § 601 et seq.): This act provides for the disposal of mineral materials on the public lands through bidding, negotiated contracts, and free use.

Mineral Leasing Act for Acquired Lands of August 7, 1947 (Pub. L. 80-382, 61 Stat. 913, as amended, 30 U.S.C. § 351 et seq.): This act extends the provisions of the mineral leasing laws to federally owned mineral deposits on acquired NFS lands and requires the consent of the Secretary of Agriculture prior to leasing.

Multiple Use Mining Act of July 23, 1955 (Pub. L. 84-167, 69 Stat. 368, as amended, 30 U.S.C. § 601 et seq.): This act requires the disposal of common varieties of sand, stone, gravel, pumice, pumicite, and cinders under the provisions of the Materials Act of July 31, 1947, and gives to the Secretary of Agriculture the authority to dispose of these materials. It also provides that rights under any mining claim located under the mining laws are subject to the right of the United States to manage and dispose of surface resources.

Geothermal Steam Act of December 24, 1970 (Pub. L. 91-581, 84 Stat. 1566, 30 U.S.C. § 1001-1025): This act provides the Secretary of the Interior the authority to lease NFS lands for geothermal steam development, subject to the consent and conditions the Secretary of Agriculture may prescribe.

Mining and Minerals Policy Act of December 31, 1970 (Pub. L. 91-631, 84 Stat. 1876, 30 U.S.C. § 21a): This act states that the continuing policy of the Federal government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly and economic development of domestic mineral resources.

Federal Coal Leasing Amendments Act of August 4, 1976 (90 Stat. 1083, 30 U.S.C. § 201 et seq.): This act amended the Mineral Lands Leasing Act of February 25, 1920 (para. 3) by specifying that coal leases on NFS lands may be issued only after the consent of the Secretary of Agriculture and adherence to conditions the Secretary may prescribe. The act also provides that no lease shall be issued unless the lands involved in the lease have been included in a comprehensive forest land and resource management plan and the sale is compatible with the plan. The act authorizes the issuance of a license to conduct exploration for coal.

Federal Land Policy and Management Act of October 21, 1976 (Pub. L. 94-579, 90 Stat. 2713, 43 U.S.C. § 1701 et seq., 7 U.S.C. § 1212a, 16 U.S.C. § 478a, 1338a): This act defines procedures for the withdrawal of lands from mineral entry. It reserves to the United States the rights to prospect for, mine, and remove the minerals in lands conveyed to others and requires the recordation of claims with the Bureau of Land Management.

Surface Mining Control and Reclamation Act of August 3, 1977 (Pub. L. 95-87, 91 Stat. 445, 30 U.S.C. § 1201-1328): This act provides for cooperation between the Secretary of the Interior and the States in the regulation of surface coal mining. It also restricts or prohibits surface coal mining operations on NFS lands, subject to valid existing rights and compatibility determinations.

Energy Security Act of June 30, 1980 (Pub. L. 96-294, 94 Stat. 611, 42 U.S.C. § 8855): This act directs the Secretary of Agriculture to process applications for leases and permits to explore, drill, and develop resources on NFS lands, notwithstanding the current status of the forest land and resource management plan.

National Materials and Minerals Policy, Research and Development Act of October 2, 1980 (94 Stat. 2305, 30 U.S.C. §1601-1605): This act restates congressional intent to promote policies that provide for an adequate and stable supply of materials while considering long-term needs, a healthy environment, and natural resource conservation. The act also requires the Secretary of the Interior to improve the availability and analysis of mineral data in Federal land use decisionmaking.

Federal Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. § 181 et seq.): This act expands the authority of the Secretary of Agriculture in the management of oil and gas resources on NFS lands. The Bureau of Land Management cannot issue leases for oil and gas on NFS lands over the objection of the Forest Service. The Forest Service must approve all surface-disturbing activities on NFS lands before operations commence.

Federal Cave Resources Protection Act of 1988 (102 Stat. 4546; 16 U.S.C. § 4301-4309): Provides for the protection and preservation of caves on Federal lands.

Omnibus Parks and Public Lands Management Act of 1996 (Pub. L. 104-333, 110 Stat. 4093, 16 U.S.C. § 497c): This act automatically withdraws from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral and geothermal leasing all lands located within the boundaries of ski area permits.

Energy Policy Act of 2005 (Pub. L. 109-58): Directs Federal agencies to undertake efforts to ensure energy efficiency and the production of secure, affordable, and reliable domestic energy.

Tax Relief and Health Care Act of 2006 Title IV-Sec. 403 (Pub. L. 109-432: Division C, Title IV, Sec. 403): This act withdraws Federal land on the Rocky Mountain Front portion of the Lewis and Clark National Forest and a small area of the Flathead National Forest from future location, entry, and patent under the mining laws and disposition under the mineral and geothermal leasing laws.

Omnibus Public Land Management Act of 2009, Subtitle D Paleontological Resources Preservation Act (Pub. L. 111-11, 123 Stat. 117, 16 U.S.C. 470aaa to aaa-11): This act provides for the management, collection, and protection of paleontological resources. The act authorizes the Secretary of Agriculture or the Interior, as appropriate, to issue such regulations as appropriate to carry out the act.

McKeon National Defense Authorization Act for Fiscal Year 2015—Sec. 3063 North Fork Watershed Protection Act of Dec. 19, 2014 (P. L. 113-291: 128 Stat. 3828): Subject to valid existing rights, this act withdraws certain Federal lands in the North Fork withdrawal area located in Flathead County, Montana, from all forms of location, entry, and patent under the mining laws and from disposition under all laws relating to mineral leasing and geothermal leasing.

Executive Orders and Reorganization Plan

Reorganization Plan No. 3 of 1946 (60 Stat. 1097; 5 U.S.C. Appendix): This transferred the functions of the Secretary of Agriculture with respect to permits and leases for hard-rock minerals on acquired Weeks Law land to the Secretary of the Interior. However, Secretary of Agriculture consent to the issuance of permits or leases is required.

Executive Order 13211 issued May 18, 2001: This executive order titled “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use” requires Federal agencies to prepare and submit a Statement of Energy Effects to the Office of Management and Budget describing the effects of certain regulatory actions on energy supply distribution, or use.

Executive Order 13212 issued May 18, 2001: This executive order titled “Actions to Expedite Energy-Related Projects” requires Federal agencies to take actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.

Code of Federal Regulations

36 CFR § 228—Minerals: These regulations set forth rules and procedures governing use of the surface of NFS lands in conjunction with operations authorized by the general mining laws, oil and gas leasing, and mineral material disposal laws.

- Subpart A: Locatable Minerals
- Subpart B: Leasable Minerals (reserved)
- Subpart C: Disposal of Salable Minerals (Mineral Materials)
- Subpart D: Miscellaneous Minerals Provisions
- Subpart E: Oil and Gas Resources

36 CFR § 251—Land Uses

36 CFR § 290—Cave Resources Management

36 CFR § 291—Paleontological Resources Preservation

43 CFR § 2300—Land Withdrawals

Other regulation, policy, and guidance

Interagency agreements

The Forest Service has entered into interagency agreements with agencies within the Department of the Interior to cooperate and coordinate in the management of federally owned minerals within NFS lands. The principal agreements include the following:

- a November 8, 1946, agreement with the Bureau of Land Management detailing procedures for mineral leases and permits administered under section 402 of the Reorganization Plan No. 3 of 1946;
- a May 18, 1957, memorandum of understanding with the Bureau of Land Management describing work procedures for land applications, mining claims, and patents;
- a May 20, 1980, memorandum of understanding with the Bureau of Land Management describing the coordination of activities under the Federal coal management program;

- a November 26, 1980, cooperative agreement with the U.S. Geological Survey for operations under solid mineral leases and permits;
- a December 3, 1981, memorandum of understanding with the U.S. Geological Survey and the Bureau of Land Management for the geothermal steam leasing program;
- a December 11, 1989, memorandum of understanding with the Montana Department of Environmental Quality (formerly Montana Department of State Lands) to promote efficiency and effectiveness in administration and regulation of mineral resources;
- a July 31, 1990, memorandum of understanding with the Office of Surface Mining Reclamation and Enforcement describing the management of surface coal mining operations on NFS lands;
- an April 14, 2006, memorandum of understanding between the Department of the Interior (Bureau of Land Management) and Department of Agriculture (Forest Service) to establish joint Bureau of Land Management and Forest Service policies and procedures for managing oil and gas leasing and operational activities pursuant to oil and gas leases on NFS lands; and
- a February 24, 2012, memorandum of understanding with the Department of the Interior for cooperation and coordination in cave and karst resources management.

6.14.3 Key indicators for analysis

The key indicators for energy and mineral resources are the following:

- locatable minerals: acres available for mineral entry (not withdrawn);
- leasable minerals: acres available for leasing proposals and proposed no surface occupancy acreages; and
- salable minerals: acres available for disposal of mineral materials.

6.14.4 Methodology and analysis process

The acres that are available for locatable mineral resource development are determined by subtracting the number of acres that are withdrawn from the total number of acres for the affected Forests.

The number of acres that are withdrawn from mineral entry is a matter of record. By law, the Bureau of Land Management keeps official records in the General Land Office.

The number of acres that are available for leasing proposals is determined by subtracting the number of acres that are legally unavailable from the total number of acres on the affected Forests.

Lands that are legally unavailable for leasing include the following:

- lands withdrawn from mineral leasing by an act of Congress or by an order of the Secretary of the Interior;
- lands recommended for wilderness allocation by the Secretary of Agriculture;
- lands designated by statute as wilderness study areas, unless oil and gas leasing is specifically allowed by the statute designating the study area; and
- lands within areas allocated for wilderness or further planning in Executive Communication 1504.

The number of acres that are available for disposal of mineral materials is determined by subtracting from the total number of acres on the Forests the number of acres where the Forest Service has proposed closing areas to disposal of mineral materials.

Information sources

The Bureau of Land Management keeps official records on active and closed mining claims on public lands. Current records are kept in the LR2000 database. These records document mining claims on the national forests. Published and unpublished mineral resource assessments and maps produced by the Forest Service, Bureau of Land Management, U.S. Geological Survey, and Montana Bureau of Mines and Geology were reviewed to determine the occurrence potential for minerals, oil and gas, and geothermal resources.

Incomplete and unavailable information

There is no incomplete or unavailable information pertinent to energy and minerals.

Analysis area

The analysis area is the NFS lands within the Kootenai, Helena, Lewis and Clark, and Lolo National Forests.

6.14.5 Affected environment

Helena and Lewis and Clark National Forests

Approximately 850,000 acres (about 86 percent) of the Helena National Forest are open to locatable mineral development, and about 1 million acres (about 58 percent) of the Lewis and Clark National Forest are open to the location of mining claims. The Helena National Forest has had substantially more mining claim and mining activity than the Lewis and Clark National Forest because of the differences in geology and occurrence of locatable mineral resources. However, both of the Forests have had historic placer and lode deposit mining and continue to have this kind of mining activity. Primary mineral deposits that have been developed to date include placer gold as well as lode deposits of gold, silver, copper, lead, zinc, and sapphires.

Most of the current operations are small scale, conducted by one or two individuals on a part-time basis. These operations are at a hand scale, small-equipment scale, or a mixture of both. Generally, these operations individually result in much less than an acre of disturbance on an annual basis. Annually, the Forests administer 25-40 small-scale placer mining projects that range from hand-scale work to small-scale equipment work.

Currently, there are no authorized oil and gas leases in effect for the Helena portion of the Helena-Lewis and Clark National Forest. In 2012 there were 19 oil and gas leases on the Helena National Forest, but these leases were terminated by the Bureau of Land Management because of failure to pay the annual rental fees. Eight lease requests, covering about 15,259 acres, have been deferred pending the resolution of oil and gas leasing in roadless areas in the south Big Belts. These leases are believed to have been requested in connection with a gas drilling project that occurred in 2004-2006 near Ringling, Montana.

On the Lewis and Clark portion of the Helena-Lewis and Clark National Forest, most of the Rocky Mountain Ranger District was identified as discretionarily unavailable for leasing, excluding 19 suspended leases that existed at the time of the analysis and the 1997 Record of Decision for Oil and Gas Leasing (see figure 1-80). In December 2006, as part of the Tax Relief and Health Care Act of

2006, Congress withdrew from leasing any additional NFS lands on the Rocky Mountain Front. The suspended leases were not part of the withdrawal as they represent a prior existing right. Of the 19 suspended oil and gas leases, 16 were canceled by the Bureau of Land Management in 2016. Two leases are canceled but remain in an authorized status pending the outcome of litigation. There are no pending oil and gas lease parcels and no other areas under lease on the Lewis and Clark National Forest.

Figure 1-80 shows the oil and gas occurrence potential for the two Forests. The Lewis and Clark National Forest ranges from very low to moderate potential for the occurrence of oil and gas. Most of the Helena National Forest is rated as having a very low potential for the occurrence of oil and gas, but about 20 percent of the Forest does have moderate potential (Long, 1989a, 1989b, 1990a, 1990b, 1990c, 1990d). A final EIS for oil and gas leasing on the Helena National Forest completed in April of 1995 predicted that any wells drilled on the Forest would not produce any oil or gas (USDA, 1995b, p. E-23).

There is a low potential for the occurrence of geothermal resources on both the Helena National Forest and the Lewis and Clark National Forest (Sonderegger & Bergantino, 1981). There is also a very low potential for the occurrence of coal or other solid leasable minerals in the area. Figure 1-81 shows areas of each Forest that have moderate to high potential for locatable mineral deposits. Most of the Helena National Forest has moderate to high occurrence potential areas, whereas only about 25 percent of the Lewis and Clark National Forest has moderate to high occurrence potential.

Salable mineral uses and developed pits are very common on the Jefferson Division of the Lewis and Clark National Forest portion of the analysis area. These are largely pits related to road development and maintenance. This is due to the extensive level 3 road network on the division and the distance from commercial sources. The Helena National Forest portion of the analysis area has recurring salable minerals uses but at a much lower level and with very few developed pits.

The analysis area has several desirable landscaping stone varieties, including rounded boulders in the Helena area and red, slabby quartzite of the Flathead Sandstone in the Little Belts and in the south Big Belts. So far these sources have not been extensively developed. Annually, the analysis area issues about 10-20 free use mineral material permits and has about 10 in-service project uses. The average yearly in-service use is about 3,000-5,000 cubic yards combined of mineral material of all types per year. Primary materials used include crushed aggregate, pit run, and riprap.

Salable mineral resources development in the analysis area is usually connected to road development activities conducted by the agency. In particular, the Jefferson Division (Little Belts, Castles, Crazies, Highwoods, and Snowies geographic areas) has about 80 inventoried material sites that were developed for road base and surfacing materials for the Forests' system roads. Inventory results indicate that the pit areas collectively represent about 75 acres of disturbance.

Kootenai National Forest

A variety of mineral deposit types and mineral resources, including gold, silver, and copper, occur within the boundaries of the Kootenai National Forest. On the Kootenai National Forest, there are about 150,100 acres currently withdrawn from mineral entry, leaving approximately 2,069,900 acres available for locatable mineral resource development.

There are three large-scale locatable mineral mining operations at different stages of development and/or permitting.

- Troy Mine—Shut down and moving into reclamation phase;

- Rock Creek Mine—Forest Service in the process of completing a supplemental final EIS; and
- Montanore—Federal and State agencies in the process of completing a supplemental draft EIS.

Across the Kootenai National Forest, there are approximately 27 approved mine plans for various small-scale locatable lode and placer mining operations. The Kootenai National Forest annually receives around 10 to 15 notices of intent per year, which often lead to mining operations requiring plans. Much of the Forest is rated as having moderate to high potential for locatable mineral occurrence (see figure 1-81).

No leasable minerals are presently being produced on the Kootenai National Forest, and the anticipated demand for leases is expected to remain low. There is no potential for the occurrence of geothermal resources on the Kootenai National Forest (Sonderregger & Bergantino, 1981). There is low potential for the occurrence of oil and gas on most of the Forest and moderate potential on a small, eastern portion of the Forest (Long, 1997) (see figure 1-80).

About 37,300 acres are under lease(s) on the Kootenai National Forest at this time (see figure 1-79). All leases are currently suspended in accordance with the 1985 court decision of *Conner v. Burford*. About 127,800 acres are legally unavailable for mineral leasing, leaving approximately 2,091,200 acres available for mineral leasing.

The primary salable material mined on the Forest is crushed rock used for road surfacing. The demand for quality rock sources is often dependent upon the locations of active management operations and the needs for resource protection. Presently there is an adequate supply of rock sources of suitable quality across the Forest for in-service construction uses. There is a public demand for salable materials, predominantly used for construction and landscaping purposes. On average, there are approximately 175 contracts administered annually on the Kootenai National Forest for personal use, public works, or commercial uses. About 1,447,000 acres on the Kootenai National Forest (65 percent) currently allow for the disposal of mineral materials, leaving approximately 772,000 acres (35 percent) where mineral material disposal is not allowed or should not occur.

Lolo National Forest

There are 158,945 acres withdrawn from mineral entry on the Lolo National Forest, leaving 2,237,961 acres open for locatable mineral development. Areas withdrawn from mineral entry include designated wilderness areas and administrative and recreation sites with an investment in facilities. The bulk of the production from small- to moderate-sized mines in or near the Lolo National Forest (especially near Superior) has been from lead, silver, and zinc. The recovery of gold constituted only a minor amount of the production from any of these mines. Some areas on the Lolo National Forest have a moderate to high potential for occurrence of locatable minerals (see figure 1-81).

The Lolo National Forest currently administers six active mine plans, two pending mine plans, one pending notice of intent, and five notices of intent sites located on the Missoula, Superior, and Ninemile Ranger Districts. Locatable mining activities on the Lolo National Forest are typically small-scale, part-time operations. Gold extraction is the primary aim of operations on Ninemile and Superior Ranger Districts, but finding crystals is the objective on Missoula Ranger District.

The number of recreational Forest users who prospect with hand tools is unknown, but judging from the associated surface disturbance, the crystal digging areas on Missoula Ranger District by Lolo Pass seem to get the greatest number of users. On average four notices of intent are received by the

Forest each year. There are typically five or fewer authorized mine plans authorized in any given year. Thirty-three mineral material sites are mostly used for road maintenance.

The Lolo National Forest has four leases covering 8,396 acres that were suspended in 1985 following the *Conner v. Burford* lawsuit. Most of the Lolo National Forest has low to very low potential for the occurrence of oil and gas, but there is moderate potential on the southeastern part of the Forest adjacent to the southern end of the Flathead National Forest (Long, 1991, 1997) (see figure 1-80).

Coal-bearing units do occur, either at the surface or at depth, west of Missoula near Frenchtown and in the Ninemile Valley area. However, there is no potential for development because the deposits are not large enough to be economic. There is no potential for the occurrence of coal bed methane. There is no potential for geothermal development (Sonderegger & Bergantino, 1981).

6.14.6 Environmental consequences

Alternative 1 and alternative 2 modified

There would be no further impacts to exploration or development of locatable, leasable, and salable minerals since existing access and acres open to minerals would remain the same under these alternatives, with one exception described below. Grizzly bear conservation measures are already in place and would continue to make any mineral exploration or mining project (including oil and gas) more expensive or costly due to required mitigation actions and monitoring.

Under alternative 1 on the Helena National Forest, no surface occupancy would be allowed in management situation 1 within the grizzly bear recovery zone on the Lincoln Ranger District. In management situation 2, no surface occupancy would be applied to overlapping occupied denning and summer habitat. Timing limitations would apply in management situation 2 to grizzly bear denning areas (October 15 to April 15) and spring habitat (April 1 to June 30). Under alternative 2 modified, there would be a requirement for no surface occupancy in the primary conservation area. This would make it more difficult and expensive to explore and develop oil and gas resources by prohibiting road and drill pad construction within the primary conservation area on all of the Forests. Oil and gas exploration might become infeasible over much of the primary conservation area on the Helena, Kootenai, Lewis and Clark, and Lolo National Forests, which, as described above, have mostly low to very low potential for occurrence of oil and gas.

There would be no change to acres available for minerals (locatables, leasables, and salables) under either alternative.

Alternative 3

This alternative would extend the no surface occupancy requirement for future oil and gas activity to management zone 1 areas of the Forests. A no surface occupancy stipulation would be applied in these areas and would make it more difficult and expensive to explore and develop oil and gas resources by prohibiting road and drill pad construction within zone 1 areas on all of the Forests. Oil and gas exploration may become infeasible over much of the primary conservation area and zone 1 acreage on the Helena, Kootenai, Lewis and Clark, and Lolo National Forests, which, as described above, have mostly low to very low potential for occurrence of oil and gas. Exploration and development of locatable and salable minerals would not be affected by a no surface occupancy stipulation applied to leasable minerals.

Only a northwestern portion of the Helena National Forest lies within the proposed primary conservation area and management zone 1 area; most of the Forest would be within management zone 2, so oil and gas leases on most of the Forest would not be affected by the proposed no surface occupancy stipulations for those management areas. The Lewis and Clark National Forest would not be affected by the proposed no surface occupancy stipulations because the area that is open for leasing on the Forest would be within management zone 3. Most of the Flathead National Forest would be within the primary conservation area, with the remainder within management zone 1. Most of the Kootenai National Forest would be outside of the primary conservation area and management zone 1, but a small area of the Forest adjacent to the Flathead National Forest would be within the primary conservation area. The Lolo National Forest, where it's adjacent to the Flathead National Forest and the Helena National Forest, would be within the primary conservation area, and a small area south and west of that would be within management zone 1, with the remaining Forest outside of these conservation management areas.

There would be no change to acres available for minerals (locatables, leasables, and salables) under this alternative.

Cumulative effects

Cumulative effects evaluate the potential impacts to mineral resources from alternative 2 modified when combined with past, present, and reasonably foreseeable actions. All lands within the amendment forests' geographic area boundaries form the geographic scope for cumulative effects. The temporal bound would be the life of the forest plans, which is estimated to be 15 years.

In order to integrate the contribution of past actions to the cumulative effects of the alternatives, existing conditions are used as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior actions that have affected access and might contribute to cumulative effects.

Mineral resources across the Forests are likely to be influenced by a variety of factors, and, as described in the "Affected environment" section, there are a number of actions that may occur over the life of the forest plans. Requests for approval of small lode and placer mining operations can be expected to continue, but it is not possible to predict how many may be submitted in any given year or how many might be approved. Across the amendment forests, a reduction in access results in a decrease in opportunities to access lands open for mineral development. Past, present, and reasonably foreseeable project-level activities within the NCDE are expected to include actions that would improve other resource conditions through road storage and decommissioning activities. This could result in a reduction in opportunities for future mineral exploration and mining projects. No surface occupancy stipulations applied to future oil and gas leases in the primary conservation area and zone 1 areas would increase drilling costs and in many areas would make oil and gas exploration and development infeasible.

6.15 Livestock Grazing

6.15.1 Introduction

Livestock grazing on NFS land is a valuable resource to livestock owners, has been a legitimate use of public lands since the inception of the NFS, and has become an import part of the culture of the rural western United States. The objectives for Forest Service management of rangelands include managing range vegetation to provide ecosystem diversity and ecosystem and environmental quality while maintaining relationships with livestock owners, meeting the public's needs for rangeland

uses, providing for livestock forage; maintaining wildlife food and habitat, and providing opportunities for economic diversity.

Rangeland management is an essential part of the multiple-use strategy used by the Forest Service. Rangelands are primarily managed for forage. Forage is a provisionary service in that it is a tangible product from an ecosystem that humans use for nutrition, materials, or energy. As a tangible product, forage is managed by the Forest Service to be sustainable by ensuring that it will be available for future generations while still providing the rangeland's ecosystem services. The Forest Service divides rangelands into allotments to monitor, inventory, and manage livestock herds and the available forage and maintain the overall rangeland health. Additionally, the Forest Service manages forage in transitory ranges. Transitory range is defined as forested lands that are suitable for grazing for a limited time following a timber harvest, fire, or other landscape events (Spreitzer, 1985).

Grazing permits are issued to eligible commercial livestock owners to graze livestock within designated allotments. To determine the correct livestock numbers per allotment, or stocking rate, rangeland managers use animal unit months. An animal unit month is the amount of dry forage required by one mature cow of approximately 1,000 pounds or its equivalent for one month based on a forage allowance of 26 pounds per day. An animal unit month is also used to help calculate grazing fees. Recreation visitor livestock and permitted outfitter and guide pack and saddle livestock are not included as commercial livestock.

Livestock grazing management is established through forest plans, allotment management plans, and the Forest Service grazing guidelines. These plans are developed to be comprehensive and utilize public involvement and sound science. Plans are revised and updated to ensure that livestock grazing management decisions are based on existing and future ecological, social, cultural, and economic conditions.

6.15.2 Regulatory framework

Key laws and executive orders

Federal law

These Federal acts and executive orders, along with other land use laws, executive orders, and policies, guide the management of rangeland resource and commercial livestock grazing on NFS lands. Other laws pertinent to rangeland management and livestock grazing on NFS lands can be found in Forest Service Manual 2200.

Organic Administration Act of 1897: This act authorizes the President to modify or revoke any instrument creating a national forest; states that no national forest may be established except to improve and protect the forest within its boundaries, for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. Authorizes the Secretary of Agriculture to promulgate rules and regulations to regulate the use and occupancy of the national forests.

Granger-Thye Act of 1950: This act provides for issuance of term grazing permits for up to 10 years. It also provides for the use of grazing receipts for range improvement work.

Multiple-Use Sustained-Yield Act of 1960: This act provides that national forests are established and administered for several purposes, including livestock grazing. This act also authorizes the Secretary of Agriculture to develop the surface renewable resources of national forests for multiple

use and sustained yield of the services and products to be obtained from these lands, without impairment of the productivity of the land.

Wilderness Act of 1964: This act provides that livestock grazing, and the activities and facilities needed to support it, are allowed to continue in wilderness areas where such grazing was established before designation.

National Historic Preservation Act of 1966: This act secures protection of archaeological resources and sites on public and Native American Indian lands.

National Environmental Policy Act of January 1, 1970: This act directs all Federal agencies to consider and report the potential environmental impacts of proposed Federal actions. The act also established the Council on Environmental Quality.

Clean Water Act of 1972: This act sets the basic structure for regulating discharges of pollutants to waters of the United States.

Endangered Species Act of 1973: This act protects animal and plant species currently in danger of extinction (endangered) and those that may become endangered in the foreseeable future (threatened). The act provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through Federal action and by encouraging the establishment of State programs.

Forest and Rangeland Renewable Resource Planning Act of 1974: This act directs the Secretary of Agriculture to develop a process for the revision of NFS land and resource management plans, including the identification of the suitability of lands for resource management.

Federal Land Policy and Management Act of 1976: This act states that public lands will be managed in a manner that will provide food and habitat for fish, wildlife, and domestic animals.

Public Rangelands Improvement Act of 1978: This act recognizes the need to correct unsatisfactory conditions on public rangelands by increasing funding for maintenance and management of these lands.

Rescission Act of 1995: This act directs the Forest Service to complete site-specific NEPA analyses and decisions on allotments on a scheduled basis.

Other regulation, policy, and guidance

The following regulations and policies have been passed in support of these laws previously presented:

Departmental Regulation, Number 9500-5, dated December 15, 1983, subject: Policy on Range.

Forest Service Rangeland Management Directives, including the following rangeland management manuals and handbooks:

- Forest Service Manual 2200—this manual summarizes laws and regulations governing rangeland management and forest planning.
- Forest Service Handbook 2209.13—Grazing Permit Administration Handbook
- Forest Service Manual 2600—this manual summarizes laws and regulations governing fish and wildlife.

- Forest Service Handbook 2609.13—Wildlife and Fisheries Program Management Handbook

Other agreements and plans

The following agreements and plans also support the Forest Service's rangeland management program:

Memoranda of understanding for forage reserves. Forage reserves are allotments under a term grazing permit but may be utilized by other permittees that have been temporarily displaced due to wild or prescribed fire, drought, or other situations that have made forage available.

Non-use for resource protection agreements. These agreements may be entered into to provide long-term non-use needed to address recovery of rangeland resource conditions, provide forage on a temporary basis to allow resource recovery on other grazing units, provide temporary resolution of conflicts created by predation on livestock, or provide supplemental forage in times of drought to assist area livestock operators and lessen the resource impacts of grazing.

Allotment management plans. Developed through site-specific environmental analysis, an allotment management plan uses forest plan direction and current issues to determine desired conditions and a broad strategy on how to meet desired conditions. These plans describe site-specific grazing strategies, stocking, structural and non-structural range improvement needs, and coordination with other resources.

6.15.3 Key indicators for analysis

The key indicators for livestock grazing are as follows:

- permitted use, measured as the acres of NFS land in active grazing allotments;
- forage, via suitability and utilization for cattle, measured as animal unit months of cattle grazing; and
- forage, via suitability and utilization for sheep, measured as animal unit months of sheep grazing.

Methodology and analysis process

All alternatives include management standards and guidelines that describe actions that may, or may not, impact the management of grazing livestock within the amendment forests. For the purpose of this analysis, each alternative is evaluated using one or more of the key indicators to determine the overall impact to livestock grazing within NFS land. The impact of each alternative is compared to the no-action alternative.

Assumptions

In all quantitative and qualitative analyses, the following assumptions are used to determine the degree of impacts to livestock grazing. These assumptions are based on previous assessments, professional judgment, and Forest Service range management directives.

- Livestock and native herbivores that use rangelands can remove plant material, trample soils, and alter water flow patterns. However, with proper management these impacts are insignificant when compared with the natural resilience of ecosystems (Holling, 1973).
- Livestock grazing would be managed to meet specific standards and guidelines for rangeland health, including riparian standards and guidelines. In addition, range improvements would be

used to meet standards and guidelines for rangeland health and to achieve rangeland management goals.

- The type of grazing in each allotment would remain the same. Additionally, the animal unit months for each allotment would not be expected to increase; they would remain at approximately the current levels.
- Impacts on livestock grazing are generally the result of activities that affect forage levels or the limiting of access to designated allotments such that livestock could no longer use rangelands.
- Grazing allotments would remain open as long as there continues to be demand. If there is a permittee willing to vacate their allotment, it can be closed and the permit can be terminated to reduce the potential risk of grizzly bear-human conflict. The decision to close an allotment and terminate a permit may be based on the demand for permitted use and utilization of forage or whether the land is dedicated to another purpose.

Limitations

The livestock grazing analysis is limited to the active allotments within the primary conservation area and zone 1, that is, allotments within the Helena-Lewis and Clark National Forest, Kootenai National Forest, , and Lolo National Forest.

Information sources

Information sources include literature, records, and documentation review and information from Forest Service range program assessments and information from Forest Service range program managers.

Incomplete and unavailable information

Information sources used contained sufficient information to complete this analysis. Project-level analysis may require site-specific data to conduct an impact analysis.

Analysis area

The analysis area for rangelands and allotments includes NFS lands in the NCDE that may be affected by plan components for livestock grazing. The analysis area includes rangeland within active allotments on Forest Service System land within the Helena-Lewis and Clark National Forest, Kootenai National Forest, and Lolo National Forest (see figure 1-69). For the purposes of the cumulative effects analysis, properties adjacent to the Flathead National Forest are considered in respect to the associated permit-holding ranch operations and potential impacts to open space.

6.15.4 Affected environment

Historically, livestock grazing has occurred on the many range allotments on NFS lands within the primary conservation area and associated zones. However, because of the decline in the livestock grazing industry in the area and a reduction in the number of acres identified as suitable for livestock grazing as well as a decrease in acreage providing forage for livestock, the overall use of range allotment has decreased from historical highs. With a decline in grazing, active allotments are administratively closed when they are no longer being used by the user.

Active allotments represent the current grazing activity within the Forests. Grazing allotments that are not active are not likely to continue because of the lack of demand for their use. Currently, there are 65 active livestock grazing allotments inside the primary conservation area and zone 1 across all national forests in the NCDE (62 cattle and 3 sheep) (acres shown in table 217; animal unit months

shown in table 218). The Helena-Lewis and Clark, Kootenai, and Lolo National Forests currently have 58 range allotments within the primary conservation area and zone 1. Allotments in zones 2 and 3 are not analyzed because there will be no change in management direction for those zones. The primary conservation area contains 32 active allotments consisting of 219,235 acres that support approximately 156,493 animal unit months. Figure 1-69 shows the livestock grazing allotments inside the primary conservation area and zone 1.

Allotment acres were calculated by GIS and may not exactly match actual allotment acres or those acres within the allotment that are suitable for grazing. Even though some allotments contain very small amounts of suitable acres, grazing may still be occurring based on site-specific conditions not covered in this analysis. Changes to suitability may occur at the project scale using site-specific data.

Based on the definition of the primary conservation area, grazing allotments within the primary conservation area are more likely to experience higher densities of grizzly bears. Zone 1 allotments are expected to currently have lower densities of bears than those inside the primary conservation area. Zones 2 and 3 are adjacent to zone 1 on the Helena-Lewis and Clark National Forest and are expected to have the lowest density of grizzly bears.

Grizzly bear-livestock conflicts

There is a potential for grizzly bear-livestock conflicts to occur where livestock operations are on or adjacent to NFS lands. Reported conflicts are associated with sheep or young cattle (Wilson et al., 2005). Of the 290 human-caused grizzly bear mortalities in the NCDE between 1998 and 2011, 21 of them (7 percent) were the result of livestock depredations (USFWS, 2013c). Most livestock-related grizzly bear-livestock conflicts have occurred on private lands or on the Blackfoot Indian Reservation along the Rocky Mountain Front, east of the Continental Divide, and are not associated with operations using NFS lands. The low incidence of grizzly bear mortalities due to livestock conflicts on NFS lands can be attributed to regulations and practices used to minimize grizzly bear-livestock conflicts.

Grizzly bear-sheep conflicts

There are 33 active allotments within the primary conservation area, and of these allotments, one is stocked with sheep: the Keep Cool Liverpool. There are 35 active allotments within zone 1, and of these allotments, two are stocked with sheep: the Canyon Creek Sandborn, and the Horsefly. All of the sheep allotments are located on the Helena National Forest.

To mitigate for potential grizzly bear-livestock conflicts as they relate to sheep grazing, a number of practices and regulations are used to minimize conflicts. Practices include the reduction of possible bear attractants near grazing sheep herds and allotments/pastures as a whole. These measures include the reporting and removal of livestock carcasses immediately upon discovery, the removal of boneyards within allotments, and the use of bear-resistant food storage for all livestock food. The sheep on the Keep Cool Liverpool allotment are never bedded down at night on the national forest but return to private land at night. Further practices include the reduction and minimization of poor or inadequate livestock management practices that would attract bears or cause a conflict.

Current condition, resource indicators for permitted use

There are 463,452 acres of NFS land identified as part of active grazing allotments within the primary conservation area and zone 1 within the Helena National Forest, Kootenai National Forest, Lewis and Clark National Forest, and Lolo National Forest (table 219).

Table 217. Livestock grazing allotments and acreages within each national forest, the primary conservation area, and zone, as of 2015 (source: USFS INFRA database, 2015)¹

Forest	Active Allotments	Acreage of Active Allotments	Acreage of Active Cattle Allotments (# of Allotments)	Acreage of Active Sheep Allotments (# of Allotments)	Acreage of Active Cattle Allotments in PCA (# of Allotments)	Acreage of Active Sheep Allotments in PCA (# of Allotments)	Acreage of Active Cattle Allotments in Zone 1 (# of Allotments)	Acreage of Active Sheep Allotments in Zone 1 (# of Allotments)
Flathead ¹	7	72,540	72,540 (7)	0	33,460 (3)	0 (0)	39,080 (4)	0 (0)
Helena	77	473,107	456,741 (74)	16,336 (3)	16,000 (3)	8,534 (1)	55,349 (11)	7,800 (2)
Kootenai	17	245,373	245,373 (17)	0 (0)	5,400 (1)	0 (0)	187,942 (12)	0 (0)
Lewis and Clark	148	746,313	746,313 (148)	0 (0)	153,801 (23)	0 (0)	0 (0)	0 (0)
Lolo	13	127,297	127,297 (13)	0 (0)	2,040 (1)	0 (0)	26,586 (4)	0 (0)
Total amendment forests	255	1,592,090	1,575,724 (252)	16,336 (3)	177,241 (28)	8,543 (1)	269,877 (27)	7,800 (2)
Total all forests	262	1,664,630	1,648,264 (259)	16,336 (3)	210,701 (31)	8,534 (1)	308,957 (31)	7,800 (2)

1. Inclusion of the Flathead National Forest is for cumulative effects discussion. See section 3.24 of this final EIS for a detailed discussion of livestock grazing on the Flathead National Forest.

Table 218. Total animal unit months (AUMs) of active permits for each national forest, the primary conservation area, and zone 1, as of 2015 (source: USFS INFRA database, 2015)¹

Forest	Active Allotments	Sheep Animal Unit Months (AUM) of Active Allotments	Total Cattle AUMs of Active Allotments	Total Cattle Animal Unit Months of Active Allotments in PCA	Total Sheep AUM Months of Active Allotments in PCA	Total Cattle AUM of Active Allotments in Zone 1	Total Sheep AUM of Active Allotments in Zone 1
Flathead ¹	7	0	1,078	497	0	587	0
Helena	77	820	41,906	1,585	133	3,031	687
Kootenai	17	0	4,887	442	0	3,097	0
Lewis and Clark	148	0	79,270	153,801	0	0	0
Lolo	13	0	3,018	35	0	331	0
Total amendment forests	255	820	129,081	155,863	133	6,459	687
Total all forests	262	820	130,159	156,360	133	7,046	687

1. Inclusion of figures for the Flathead National Forest is for the cumulative effects discussion. See section 3.24 of this final EIS for a detailed discussion of livestock grazing on the Flathead National Forest.

Table 219. Current conditions for permitted sheep and cattle animal unit months in active allotments and suitability and utilization

Resource Element	Resource Indicator	Measure	Existing Condition (Alternative 1)
Use	Permitted use	Acres and percentage of active allotments in the PCA and zone 1	463,452 acres
Forage	Suitability and utilization	Sheep animal unit months/available forage in the PCA and zone 1	820 sheep animal unit months
Forage	Suitability and utilization	Cattle animal unit months/available forage in the PCA and zone 1	162,322 cattle animal unit months

There are 58 active allotments within the three amendment Forests. The largest acreage and number of livestock grazing allotments occurs on the Helena-Lewis and Clark National Forest (table 217). Within the primary conservation area, this Forest also permits the largest number of animal unit months (table 218). Within zone 1, the Kootenai National Forest has the largest acreage of cattle grazing allotments.

Current condition, resource indicators for suitability and utilization

There are 163,122 animal unit months on all active grazing allotments within the primary conservation area and zone 1 within the Helena-Lewis and Clark National Forest, Kootenai National Forest, and Lolo National Forest (table 218). Table 219 provides a summary of the sheep and cattle animal unit months in active allotments.

The majority of cattle animal unit months occur on the Lewis and Clark National Forest (table 218), and this Forest also has the majority of cattle animal unit months within the primary conservation area. Within zone 1, the Kootenai National Forest has the majority of active cattle animal unit months.

The majority of sheep animal unit months occur on the Helena National Forest (table 218). Within the primary conservation area and zone 1, the Helena National Forest is the only Forest with active sheep allotments.

6.15.5 Environmental consequences

These sections describe the effects of implementation of the action alternatives on livestock grazing. The action alternatives are described in chapter 4. Effects are analyzed in relation to the no-action alternative. Each alternative would have a varying effect on livestock grazing. Grazing use would be managed similarly under all alternatives. The standards and guidelines are designed to protect upland and riparian resources, manage noxious weeds, and manage grazing allotments to support continued recovery of the NCDE grizzly bear population in all action alternatives. A discussion of the social and economic impacts on livestock grazing can be found in section 6.18.

Alternative 1—No action

Helena National Forest

The Helena National Forest would continue to graze livestock on the permitted 77 allotments. The issuance of permits and management of livestock grazing allotments would continue in accordance with the current forest plan and allotment plans.

There are three active sheep allotments and animal unit months within the primary conservation area and zone 1. The Interagency Grizzly Bear Committee guidelines would help reduce livestock impacts to important grizzly bear habitats and would assist in the management of grizzly bear-livestock conflict situations. To comply with the terms and conditions of the 2014 incidental take statement, no new sheep allotments will be allowed within the grizzly bear recovery zone.

Special provisions could be included in existing livestock grazing permits, including the three active sheep allotments, that require proper storage of food, carcass removal, and bringing in livestock at night, all to limit grizzly bear-livestock conflicts.

The potential for impacts associated with livestock grazing on the Helena National Forest would be expected to be moderate to low. This is higher than the risk on the other Forests because of the presence of domestic sheep, but this risk is reduced by existing regulations and guidance to reduce potential grizzly bear-livestock conflicts. Continued implementation of management direction under the no-action alternative regarding livestock grazing would be expected to be compatible with sustaining the continued recovery of the NCDE grizzly bear population. However, the risk of conflicts would be higher on the Helena National Forest than on the other Forests because of the existing sheep allotments.

Lewis and Clark National Forest

The Lewis and Clark National Forest will continue to graze livestock on the permitted 148 allotments. The issuance of permits and management of livestock grazing allotments will continue in accordance with the current forest plans and allotment plans.

The Forest's existing forest plan includes a forestwide standard that requires that grazing, which affects grizzly bears and/or their habitat, will be made compatible with grizzly needs or such uses will be disallowed or eliminated. In addition, forest plan appendix I, Interagency Wildlife Management Guidelines, provides the following grizzly bear management guidelines specifically oriented towards livestock grazing:

- Livestock grazing on important spring habitat for grizzly bears should be deferred until after July 1.
- Boneyards and livestock dumps are prevalent along the East Front and are frequented by grizzly bears. Ranchers and landowners should be encouraged to place carcasses of dead livestock and garbage on remote areas of their land. Dead cows and calves should be hauled a considerable distance from calving grounds to discourage bears from feeding on carrion and newborn calves.
- Sheep grazing allotments in management situation 1 should be eliminated.
- In riparian habits that receive high amounts of bear use, fencing to exclude livestock grazing and trampling may be necessary where livestock turn-out dates prior to July 1 are allowed.

There are 21 cattle grazing allotments, but no sheep grazing allotments, within the recovery zone on the Lewis and Clark National Forest. Current grazing allotments and intensity of use would continue under the no-action alternative.

Under the no-action alternative, livestock grazing is not anticipated to displace grizzly bears or negatively impact important bear food production areas. Based on the lack of sheep allotments and no recent history of conflicts, the potential for impacts associated with livestock grazing on the Lewis and Clark National Forest is expected to be low. Continued implementation of management direction under the no-action alternative regarding livestock grazing is expected to be compatible with sustaining the recovery of the NCDE grizzly bear population.

Kootenai National Forest

The Kootenai National Forest would continue to graze livestock on the permitted 17 allotments. The issuance of permits and management of livestock grazing allotments would continue in accordance with the current forest plans and allotment plans.

There is one cattle grazing allotment on 4,880 acres in the NCDE recovery zone. Eleven allotments overlap the area outside the recovery zone in the Tobacco “bears outside recovery zone” area. There have been no grizzly bear-livestock conflicts associated with allotments on the Kootenai National Forest.

The revised forest plan includes measures to address potential mortality risks to bears associated with livestock grazing. Few acres are subject to livestock grazing, existing allotments are not expected to increase, and there is no history of grizzly bear-human conflicts or management actions in these subunits related to grazing. Food storage and sanitation orders in effect on the Kootenai National Forest also help to minimize the potential for attractant-related human-caused grizzly bear mortality. In its biological opinion, USFWS (2013b) concluded that implementation of the revised forest plan direction related to livestock grazing would not be expected to result in habituation of grizzly bears leading to conflicts in the NCDE subunits.

Based on the few acres subject to livestock grazing in the primary conservation area and the lack of history of grizzly bear and livestock conflicts, the potential for impacts associated with livestock grazing on the Kootenai National Forest appears to be low. Continued implementation of management direction under the no-action alternative regarding livestock grazing is expected to be compatible with sustaining the recovery of the NCDE grizzly bear population.

Lolo National Forest

The Lolo National Forest would continue to graze livestock on the permitted 13 allotments. The issuance of permits and management of livestock grazing allotments would continue in accordance with the current forest plans and allotment plans.

There is one cattle grazing allotment in the NCDE recovery zone and no sheep grazing allotments. There have been no grizzly bear-livestock conflicts associated with allotments on the Lolo National Forest.

Based on the few acres subject to livestock grazing in the primary conservation area and the lack of history of grizzly bear and livestock conflicts, the potential for impacts associated with livestock grazing on the Lolo National Forest appears to be low. Continued implementation of management direction under the no-action alternative regarding livestock grazing is expected to be compatible with sustaining the recovery of the NCDE grizzly bear population.

Alternative 2 modified

Helena National Forest

The Helena National Forest would continue to graze livestock on the permitted allotments inside the recovery zone. Rangeland management would continue to issue permits and manage allotments in a way to minimize the risk of grizzly bear-livestock conflicts. To minimize this risk, allotments that are no longer in use would be closed, and there would be requirements to immediately report and remove livestock carcasses, keep livestock out of bear food production areas, and minimize bear attractants from livestock grazing operations.

Potential impacts associated with livestock grazing on the Helena National Forest are expected to be moderate to low because of the standards and guidelines aimed at avoiding or minimizing potential grizzly bear-livestock conflicts.

This management direction is expected to reduce grazing opportunities within the primary conservation area because

- sheep grazing permits in non-use status would not be able to increase allowable animal unit months when returning to use (NCDE-STD-GRZ-02),
- there would be no net increase in the number of active sheep or cattle allotments above the current condition (NCDE-STD-GRZ-04 and 05),
- the number of open or active sheep grazing allotments would be reduced if an opportunity arises with willing permittees (NCDE-GDL-GRZ-01), and
- allotment management plans and plans of operation would specify needed measures to protect key grizzly bear food production areas from conflicting and competing use by livestock (NCDE-GDL-GRZ-02).

Under this alternative, management direction would maintain the number of sheep and cattle allotments within the primary conservation area. Furthermore, under this alternative, sheep grazing animal unit months would not increase beyond the existing levels.

Lewis and Clark, Kootenai, and Lolo National Forests

The Lewis and Clark National Forest would continue to graze livestock on the permitted allotments in the primary conservation area. Rangeland management would continue to issue permits and manage allotments in a way to minimize the risk of grizzly bear-livestock conflicts. To minimize this risk, range management would close allotments that are no longer in use, immediately report and remove livestock carcasses, keep livestock out of bear food production areas, and minimize bear attractants from livestock grazing operations.

Potential impacts associated with livestock grazing on the Lewis and Clark National Forest is expected to be low.

Under alternative 2 modified, the management direction is expected to limit grazing opportunities within the primary conservation area because

- Sheep grazing permits in non-use status would not be able to increase allowable animal unit months when returning to use (NCDE-STD-GRZ-02),
- there would be no net increase in the number of active cattle allotments above the current condition (NCDE-STD-GRZ-05),
- allotment management plans and plans of operation would specify needed measures to protect key grizzly bear food production areas from conflicting and competing use by livestock (NCDE-GDL-GRZ-02).

Under this alternative, management direction would limit the number cattle allotments within the primary conservation area more than the no-action alternative. On these national forests, there are no active sheep grazing allotments within the primary conservation area to be affected.

Alternative 3

Helena National Forest

The management direction under this alternative is the same as under alternative 2 modified except that some standards and guidelines for leasable minerals and livestock grazing would apply not only to the primary conservation area but also to zone 1 including the demographic connectivity area. Within the primary conservation area, sheep grazing allotments would be closed if the opportunity arises, with a willing permittee, to reduce grizzly bear-livestock conflicts (NCDE-STD-GRZ-07). There is only one active sheep allotment in the primary conservation area. The effects of implementation of this alternative would be the same as alternative 2 modified in the primary conservation area but also would allow no net increase above the baseline in the number of cattle allotments in zone 1. Additionally, no increase in animal unit months of sheep would be allowed.

Lewis and Clark National Forest

The management direction under this alternative is the same as alternative 2 modified with the exception that some management direction for livestock grazing would also be extended to zone 1, of which there are only eight acres on the Lewis and Clark National Forest. The effects of implementation of this alternative would be the same as alternative 2 modified in the primary conservation area, with no measurable difference in zone 1 as compared to both the no-action alternative and alternative 2 modified.

Kootenai National Forest

The management direction under this alternative is the same as under alternative 2 modified in the primary conservation area, with additional restrictions in zone 1.

Lolo National Forest

The management direction under this alternative is the same as under alternative 2 modified in the primary conservation area, with additional restrictions in zone 1. The effects of implementation of this alternative would be the same as alternative 2 modified in the primary conservation area and would be more than the no-action alternative in zone 1.

Cumulative effects

Spatial and temporal context for effects analysis

The spatial boundaries for analyzing the cumulative effects to livestock grazing are the active grazing allotments within the NCDE and all the amendment forests, including the Flathead National Forest, because these are the most likely locations for potential grizzly bear-livestock conflicts on public land. Grizzly bear-livestock conflicts may occur outside of these areas for a variety of reasons, including livestock attractants such as carcasses. These conflicts would not limit permitted use of grazing allotments or the suitability and utilization of available forage. The temporal boundaries begin at the baseline year (2011) to the present because this establishes a reference point from which to establish animal unit months and permitted use for grazing allotments that can be used in implementation of proposed standards and guidelines.

Past, present, and reasonably foreseeable activities relevant to cumulative effects analysis

Approximately 7 percent (21 of 290) of all human-caused grizzly bear mortalities in the NCDE between 1998 and 2011 were attributed to management removal actions associated with livestock depredations. This type of human-caused mortality is the main impact to grizzly bears in the NCDE associated with livestock. Most livestock-related grizzly bear mortalities occur on private lands or on

the Blackfeet Indian Reservation along the Rocky Mountain Front east of the Continental Divide. The primary conservation area in this area extends up to 18.5 miles east of Federal management boundaries and includes large areas of private ranchlands and tribal grazing allotments. Indirect impacts on grizzly bears attributed to attractants can be effectively minimized with requirements to securely store and/or promptly remove attractants associated with livestock operations (e.g., livestock carcasses, livestock feed). Current levels of grazing intensity in forested environments are not displacing grizzly bears in significant ways and are not likely to affect vegetation structure enough to result in direct competition for forage species on public lands within the NCDE, as evidenced by the increasing population trend in the NCDE.

In the NCDE, most livestock depredations by grizzly bears occur on sheep or young cattle. Although grizzly bears frequently coexist with large livestock (i.e., adult cattle) without preying on them, when grizzly bears encounter smaller animals such as calves, domestic sheep, goats, or chickens, they will often attack and kill them (Northrup et al., 2012; Orme & Williams, 1986). Honeybees, which are classified as livestock in Montana (Montana Code Annotated 15-24-921), can also be attractants to some grizzly bears. If repeated depredations occur, managers may relocate bears or remove them from the population. As such, areas with domestic livestock have the potential to become population sinks (Knight, Blanchard, & Eberhardt, 1988). Because of the increased risk to grizzly bears posed by actions taken to protect sheep and other small livestock, these types of allotments are placed outside of grizzly bear habitat where possible.

In contrast, there are a number of permitted grazing operations for horses and mules in the NCDE, primarily on NFS land and generally associated with outfitter and guide operations or Forest Service administrative use. There is no evidence of conflict with bears resulting from attractants, depredation, or forage competition related to horse and mule use under these permits.

Furthermore, it would be illegal for a member of the public to kill a grizzly bear to protect livestock unless it is “in the act” of attacking or killing livestock, as evidenced by an injured or dead animal.

Effects determination

Technically, there likely would be an effect to sheep and cattle grazing operations for the length of the proposed amendment within the primary conservation area and zone 1 of the NCDE because of the formal acceptance and implementation of the proposed standards and guidelines (e.g., removal of carcasses, bringing in livestock at night, food storage orders) designed to reduce potential grizzly bear-livestock conflicts. The substantial change is that these standards and guidelines also would address closing allotments that are no longer in use, not permit new livestock grazing allotments, and not increase permitted animal unit months within current sheep grazing allotments. However, current livestock grazing practices within the NCDE (e.g., removal of carcasses, bringing livestock in at night, food storage orders) are already in place via previously applied orders and are already compatible with NCDE habitat standards and mitigation for reducing grizzly bear-livestock conflicts. It is likely that effects would only adversely impact livestock grazing when increased permitted use is desired. Overall, effects beneficially impact livestock grazing through the reduction of grizzly bear-livestock (and, indirectly, grizzly bear-human) conflicts.

6.16 Heritage Resources

6.16.1 Introduction

Heritage resources include cultural resources and American Indian rights and interests. Both topics are presented within this section.

6.16.2 Cultural resources

Cultural resources are defined by the National Historic Preservation Act and by Forest Service Manual 2300, section 2360, as an object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, or archaeological sites, structures, places, or objects and traditional cultural properties.

Historic properties include cultural sites that reflect past use of the area, having value as defined by the National Register of Historic Places (also known as the National Register) criteria for eligibility for their association with important events, association with important people in our history, distinctive historical or architectural style, and potential to provide information about the past. A property can be eligible under one or more of these criteria and generally is at least 50 years old.

The section 106 and 110 process of the National Historic Preservation Act includes identifying historic properties through field inventory, evaluating sites for potential inclusion in the National Register, and then selecting sites to formally nominate to the National Register. Through this process, current and potential impacts to eligible properties are identified and protection measures designed and implemented.

Cultural resources include the entire spectrum of resources for which the Forest Service's heritage program is responsible, from artifacts to cultural landscapes, without regard to eligibility for listing in the National Register of Historic Places (Forest Service Manual 2360).

6.16.3 Regulatory framework

National Historic Preservation Act of 1966 (Pub. L. 89-665, as amended, 91-423, 94-422, 94-458 and 96-515):

Section 101(a)(8): Gives the Secretary of the Interior the responsibility and authority to assess "significant threats" to properties included in, or eligible for inclusion in, the National Register in order to determine the kinds of properties that may be threatened, ascertain the causes of the threats, and develop and submit to the President and Congress recommendations for appropriate action.

Section 106: Requires each agency to take into account the effects of its actions on historic properties prior to approving expenditure of Federal funds on an undertaking or prior to issuing any license. Furthermore, an agency must afford the Advisory Council on Historic Preservation (an independent Federal agency created by the National Historic Preservation Act) an opportunity to comment on any of the agency's undertakings that could affect historic properties.

Section 110(a)(2)(A): Directs Federal agencies to establish "a preservation program for the identification, evaluation, and nomination to the National Register of Historic Places, and protection of historic properties" to "ensure that such properties under the jurisdiction or control of the agency are identified, evaluated, and nominated to the National Register." This requires development of a schedule for the identification, evaluation, and nomination of unrecorded sites.

36 CFR § 800: Provides explicit direction for the identification of sites, the determination of project effects on sites, requirements for consultation with State historic preservation officers and the Advisory Council on Historic Preservation, and developing agreements.

36 CFR § 79: Establishes standards, procedures, and guidelines to be followed by Federal agencies to preserve collections of prehistoric and historic material remains and associated records that are recovered in conjunction with Federal projects and programs under certain Federal statutes. This action should ensure that federally owned and administered collections of prehistoric and historic material remains and associated records are deposited in repositories that have the capability to provide adequate long-term curatorial services.

36 CFR § 60: Sets forth basic procedures of evaluation and nomination of sites to the National Register of Historic Places, procedures for the operations of State historic preservation officers, and minimum qualification standards for cultural resource professionals.

36 CFR § 219.24: Provides guidance for addressing cultural and historic sites in forest plans. Forest planning shall provide for the identification, protection, interpretation, and management of significant cultural resources on NFS lands. Forest planning shall provide an overview of known data relevant to history, ethnography, and prehistory of the area under consideration, including known cultural resource sites; identify areas requiring more intensive inventory; provide for evaluation and identification of appropriate sites for the National Register of Historic Places; provide for establishing measures for the protection of significant cultural resources from vandalism and other human depredation and natural destruction; identify the need for maintenance of historic sites on, or eligible for, inclusion in the National Register; and identify opportunities for interpretation of cultural resources for the education and enjoyment of the American public.

Executive Order 11593 of 1971, Protection and Enhancement of the Cultural Environment: States that the Federal government will provide leadership on preserving, restoring, and maintaining the historic and cultural environment of the nation. Directs Federal agencies through Federal plans and programs to preserve cultural resources and contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historic, architectural, or archaeological significance. It orders Federal agencies to locate, inventory, and nominate to the National Register all properties under their control or jurisdiction that meet the criteria for nomination. It also directs Federal agencies to exercise caution during the interim period to ensure cultural resources under their control are not inadvertently damaged, destroyed, or transferred.

Archaeological Resources Protection Act of 1979 (Pub. L. 96-95, section 2a, and 43 CFR 7): The Congress finds:

- Archaeological resources on public lands and Indian lands are an accessible and irreplaceable part of the nation's heritage;
- These resources are increasingly endangered because of their commercial attractiveness;
- Existing Federal laws do not provide adequate protection to prevent the loss and destruction of these archaeological resources and sites resulting from uncontrolled excavations and pillage; and
- A wealth of archaeological information has been legally obtained by private individuals for noncommercial purposes that could voluntarily be made available to professional archaeologists and institutions.

Section 470ii(c): States that "Each Federal land manager shall establish a program to increase public awareness of the significance of the archaeological resources located on public lands and Indian lands and the need to protect such resources." It further directs that an annual report of such progress will be submitted to Congress. Section 470mm directs Federal agencies to

- develop plans for surveying lands under their control to determine the nature and extent of archaeological resources on those lands;
- prepare a schedule for surveying lands that are likely to contain the most scientifically valuable archaeological resources; and
- develop documents for the report of suspected violations of this act and establish when and how those documents are to be completed by officers, employees, and agents of their respective agencies.

Native American Graves Protection and Repatriation Act of 1990 (Pub. L. 101-601, 25 USC 3001-3013) and 43 CFR § 10: Addresses the rights of lineal descendants and members of Indian tribes, Alaska Native, and native Hawaiian organizations to certain human remains and precisely defined cultural items. It covers items currently in Federal repositories as well as future discoveries. The law requires Federal agencies and museums to provide an inventory and summary of human remains and associated funerary objects. The law also provides for criminal penalties in the illegal trafficking in Native American human remains and cultural items.

Executive Order 13287 of 2000, Preserve America: Reinforces the Federal government policy for “protection and enhancement of America’s historic treasures, and to recognize and treat cultural resources as assets. Federal agencies shall advance this policy through the protection of, continued use of, and reinvestment in, the Federal government’s historic buildings and sites and by conforming to the highest standards of care for, and consideration of, the unique cultural heritage of communities, and of the Nation.” Each agency is directed to (a) review its regulations, management policies, and general operating procedures for compliance with section 110 of the National Historic Preservation Act and (b) develop annual goals and measures as part of their compliance with the Government Performance and Results Act (Pub. L. 103-62) and report annually on the protection of historic and archeological properties within its care. The order also encourages the formation of partnerships with Indian tribes, State and local governments, and the private sector to promote public understanding of the preservation and use of historic properties.

Executive Order 13007, 1996 (Indian Sacred Sites): Directs Federal agencies to the extent practicable to accommodate access to and ceremonial use of sacred sites by Indian religious practitioners while avoiding adversely affecting the sites and while maintaining the confidentiality of the sites.

6.16.4 Key indicators for analysis

Ground disturbance is a key consideration when determining impacts to cultural resources as ground disturbance may totally or partially expose properties. Adverse impacts to cultural resources can be further exacerbated by interactions with fire, weather events, human actions, and environmental change. The following key indicators were used to measure differences among the alternatives for cultural resources:

- ground disturbance: degree of activity or natural condition that poses a potential threat to cultural resources; and
- access to sacred sites: degree of activity that changes access to sacred sites.

6.16.5 Methodology and analysis process

Analysis methods used for historic properties include a review and synthesis of all pertinent literature, records, and documentation available on the history and prehistory of the Forests. This

information includes not only that which is available from a variety of generalized sources but also information resulting from several decades of Forest Service cultural resource inventories. Information on previously documented sites can be an indicator of the type, frequency, and location of sites likely to be found within the analysis area.

Information sources

Information sources include literature, records, and documentation review as well as information from Forest Service cultural resource inventories and from Forest Service archaeologists.

Incomplete and unavailable information

No Forest has been fully assessed for cultural resources; however, many acres have been inventoried. These inventories have generally occurred in areas where there have been management activities in association with vegetation and fuels treatment, recreation development, special uses, and engineering projects. Information is continuously updated in conjunction with completed surveys and research.

Analysis area

The geographic scope of the analysis for cultural resources is the NFS lands of the amendment forests that lie within the NCDE primary conservation area, zones 1 through 2, and the Salish and Ninemile demographic connectivity areas. This area represents the NFS lands where changes might occur from activities that would result from the alternatives. The same area is used for the analysis of cumulative effects.

6.16.6 Affected environment

Historic properties reflect the prehistoric and historic past. The prehistoric period is that time that predates the written history of a people. Through the use of geological, biological, sociological, and archaeological evidence, the prehistory of people within the NCDE goes back to at least the Middle Paleoindian period (8,000-10,000 years B.P.) as defined in North American archaeology (McLeod & Melton, 1986). These people were mobile hunters and gatherers who took advantage of the area's plant, animal, and aquatic life and mineral resources. Tribal uses of these lands from the earliest times included travel routes and occupation sites occurring along major rivers and connecting across mountain divides and continuing onto the Plains to the east.

Prehistoric sites can take the form of camps, trails, rock art, culturally scarred trees, quarries, burial grounds, and other types of sites. Most of the sites are campsites of small, transient groups moving into or through the mountains and are located in areas accessible to high country and ample game and fish sources. Native American tribes such as the Bitterroot Salish, Kootenai, Pend d'Oreille, Nez Perce, and Blackfoot Tribes were some of the last prehistoric groups to inhabit the area. The Confederated Salish and Kootenai Tribes and the Blackfoot Tribe have reserved treaty rights to use these lands for traditional uses. Certain sites are still in use by Native Americans exercising their rights under the American Indian Religious Freedom Act.

The written history in the area began with the trappers' and explorers' journals written in the early 1800s. Early traders were sent throughout the region by the Hudson's Bay Company and other fur trade companies. The remainder of the historic period is marked by the coming of the railroads, which opened land to miners scouring the forests for gold and silver. Mining camps turned into towns, and the demand for lumber ushered in the early loggers. The Homestead Act of 1862 provided opportunities for anyone willing to apply, file for deed of title, and improve 160 acres of land to become landowners. The fur trade, missions, mining, homesteading and agriculture,

transportation, logging, and public land management are activities represented by recorded sites on the Forests.

The prehistoric and historic periods left marks on the landscape that are visible today as cultural sites. Overviews of the identified sites are presented by Forest below. Information on cultural sites is kept on file as hard copy site and inventory forms as well as in GIS and the Forest Service's National Heritage INFRA database.

Information concerning the nature and location of certain archaeological resources is confidential and not subject to public disclosure per Pub. L. 96-95 [16 U.S.C. 470hh Section 9 (a and b)].

Helena-Lewis and Clark National Forest

The most recent information available for cultural resources is from the combined Helena-Lewis and Clark assessment (USDA, 2015a).

Approximately 1,850 cultural resource sites are currently identified on the Helena-Lewis and Clark National Forest. In accordance with criteria in 36 CFR § 60.4, eight cultural resources are listed in the National Register of Historic Places. In addition to the listed sites, one traditional cultural district (Badger-Two Medicine), related to tribal cultural values, is identified as well as two national historic trails (Cokahlarishkit/Lewis and Clark Trail and the Continental Divide National Scenic Trail). Another 944 cultural resources have been formally determined to be eligible for listing on the National Register by the Forest Service and the Montana State Historic Preservation Officer but have not yet been formally nominated to the National Register. There are 1,507 known cultural resource sites not yet evaluated that are therefore considered to be significant, or National Register-eligible, and require management consideration by the Helena-Lewis and Clark National Forest. To date, 344 cultural resource sites have been formally determined to be historically insignificant and not eligible for listing on the National Register and thus may fall outside of management concern. This site total is a small fraction of what exists on the Helena- Lewis and Clark National Forest because a significant area of the Forest has not been surveyed for cultural resources. Additionally, an untold number of potential traditional cultural properties exists across the Forest.

On the Forest, 120 sites have been identified as priority heritage assets. These are a subset of cultural resources that receive special agency designation and management in accordance with criteria in Forest Service Manual 2360.5. Priority heritage assets are resources of distinct value that are, or should be, actively maintained and that meet one or more specific criteria. Priority heritage assets represent a cross-section of significant cultural resources reflecting multiple historic themes across the Forest. More detailed information about the Helena-Lewis and Clark's cultural resources may be found in their assessment (USDA, 2015a).

Kootenai National Forest

The Kootenai National Forest has conducted cultural resource inventories in areas of planned projects and to date has completed 3,242 investigations covering 1,709,332 acres of surveyed land. Through cultural resource surveys, 1,759 cultural sites have been identified within the Forest, including 1,138 historic sites and 624 prehistoric sites. Of the historic sites, 353 have been determined not eligible and 151 have been determined eligible to the National Register of Historic Places. Another 634 historic sites have not yet been evaluated. Of the prehistoric sites, 54 have been determined not eligible and 306 have been determined eligible to the National Register, with 261 prehistoric sites not yet evaluated. If the artifacts present at a location do not warrant formal recording as a formal site, they are recorded as "isolated finds." There are 48 historic and 44 prehistoric isolated finds on the Kootenai National Forest. In addition to the known historic and

prehistoric sites, it is likely that many more will be uncovered as projects are planned for areas previously unexamined. Detailed information about the Kootenai's cultural resources can be found in the Kootenai forest plan final EIS (USDA, 2013b).

Lolo National Forest

Approximately 744 cultural resource sites are currently identified on the Lolo National Forest. In accordance with criteria in 36 CFR § 60.4, seven cultural resource sites on the Forest are listed in the National Register of Historic Places. In addition to the National Register-listed sites, one traditional cultural property site related to tribal cultural values is identified as well as three national historic trails. Another 136 cultural resources have been formally determined to be eligible for listing in the National Register by the Forest Service and the Montana State Historic Preservation Officer but have not yet been formally nominated to the National Register. There are 460 cultural resource sites not yet evaluated that are therefore considered significant, or National Register-eligible, and require management consideration by the Lolo National Forest. To date, 140 cultural resource sites have been formally determined to be historically insignificant and not eligible for listing in the National Register and thus may fall outside of management concern. This site total is a small fraction of what exists on the Lolo because a significant portion of the Forest has not been surveyed for cultural resources. Additionally, an untold number of potential traditional cultural properties may exist across the Forest (Mandella, 2015).

The Lolo National Forest has surveyed over 42,000 acres in the analysis area. In that area, there are 291 cultural resource sites, including 197 historic sites, 91 prehistoric sites, and 3 historic and prehistoric multicomponent sites. Of these sites, 2 (historic) are listed in the National Register; 60 are eligible (54 historic, 5 prehistoric, and 1 multicomponent sites); 187 are unevaluated (105 historic, 80 prehistoric, and 2 multicomponent sites); and 42 are not eligible (36 historic and 6 prehistoric sites) (Mandella, 2015).

6.16.7 Environmental consequences

Compliance with section 106 of the National Historic Preservation Act and 36 CFR § 800 regulations is required for Forest Service activities and is fulfilled by a process to establish the presence of historic properties within the area of potential effect for each alternative through background research, State Historic Preservation Officer consultation, and an appropriate level of field investigation. When consultation is conducted, the magnitude of the undertaking, its likely effects, and any alternatives are taken into account as well as the views of the State Historic Preservation Officer, the Tribal Historic Preservation Office, and other interested parties.

Each Forest is required to consult with Native American traditional religious leaders on any project having the potential to affect Native American cultural sites, including burial and ceremonial sites, or practices. These consultation requirements would apply to all alternatives.

Effects to eligible historic properties can be either “no adverse” or “adverse.”

- No adverse effects could include stabilizing a historic property such as controlling erosion of an archaeological site, restoring and maintaining a historic building, or reducing fuels concentrations around a historic property. This kind of treatment is designed and agreed upon through consultation conducted under section 106 of the National Historic Preservation Act with the State Historic Preservation Officer.
- Adverse effects are impacts to the integrity of the property that destroy a portion of, or the entire, property. A direct adverse impact occurs during the activity itself, such as when a road is built

through a historic property and the construction process destroys the site. Indirect adverse impacts are a side effect of the activity or occur after the activity is complete; an example is runoff from a road that eventually erodes a historic property adjacent to it. Adverse impacts can be mitigated or avoided altogether through project design. These mitigation or avoidance measures are agreed to in consultation conducted under section 106 of the National Historic Preservation Act with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

Effects to cultural resources are caused by implementing the proposed amendments as well as by largely uncontrollable secondary effects such as those from public use, vandalism, and natural causes (e.g., wind and water erosion). Direct project actions that threaten cultural resources include surface-disturbing activities that are conducted and controlled by the Forest Service or authorized by Forest Service permits, including timber and silvicultural management, prescribed fire, wildlife and fisheries management, road and trail construction, facilities construction and maintenance, recreational use and management, and special-use authorizations to third parties.

Cultural resources were considered during effects evaluations as known, not known but suspected, and unknown. Known cultural resources are those that have been evaluated through field survey and reported to the State Historic Preservation Officer. Not known but suspected cultural resources are those within unsurveyed areas that lie within locations that are known, or suspected, to have had prehistoric or historic presence. Unknown cultural resources are unknown by direct survey and involve areas where no prehistoric or historic presence is suspected. Even though field surveys for cultural resources are required prior to implementation of ground-disturbing project activities under *all* alternatives, qualitatively, the effects analysis assumed that cultural resources existed in the areas discussed but had not been discovered.

Alternative 1—No action

Existing forest plans and amendment management direction, with permit and/or contract-specific terms and conditions, is the current management being used by the amendment forests to address cultural resources. This current direction includes forestwide goals, objectives, desired conditions, standards, and guidelines pertaining to cultural resources. This direction represents the no-action alternative and is the baseline to which the alternatives are compared. Thus, it is important to understand what actions would continue under the no-action alternative.

Management direction

Under current forest plans for the amendment forests, management direction requires identification, evaluation, nomination, protection, and interpretation of cultural resources. The management direction includes forestwide goals, objectives, desired conditions, standards, and guidelines. Coordination and consultation with the State Historic Preservation Office is also required prior to ground-disturbing activities. Any project effects to sites either eligible for or listed in the National Register of Historic Places must be taken into consideration prior to project implementation. Protection protocols and mitigation measures are used if cultural resources or sacred sites are inadvertently discovered during project activities. Amendment forests' heritage programs address known and unknown cultural resources and properties and locations of historic significance via management direction in current plans.

Indirect effects of the no-action alternative, amendment forests

Under the no-action alternative for the amendment forests, identification, evaluation, nomination, protection, and interpretation of cultural resources would continue. Coordination and consultation with the State Office of Historic Preservation would continue. Sites eligible for listing in the

National Register of Historic Places would continue to be evaluated and formally nominated to the National Register. Protection protocols and mitigation measures would still be used if cultural resources are inadvertently discovered.

Impacts to known and unknown cultural resources and sacred sites under the no-action alternative were considered in reference to the disturbance associated with continuing management and the proposed implementation of the amended forest plans and are summarized below.

Grizzly bear habitat, motorized use and access, recreation developments

Under the no-action alternative, ground disturbance with management activities associated with grizzly bear habitat; road management, maintenance and, as applicable, closure activities; and use, maintenance and construction of recreation developments may result in inadvertent discovery of and/or damage to cultural resources or sacred sites. If cultural resources or sacred sites are encountered during management activities, protection protocols would be required and implemented under the no-action alternative to protect and mitigate any impacts to these resources. No impacts to known cultural resources or sacred sites were identified.

Alternative 2 modified

Management direction

No management direction specific to the heritage program and cultural resources is being proposed with the proposed amendment for any of the amendment forests. Thus, no management direction for cultural resources is being revised, augmented, or removed, and current management direction for each of the amendment forests would be retained.

Indirect effects of alternative 2 modified

The effects to cultural resources as a result of alternative 2 modified are determined and defined by survey and consultation requirements at the project level. However, to estimate effects prior to consultation, alternative 2 modified is contrasted to the no-action alternative to estimate whether the alternative would increase, decrease, or result in no change to the potential for adverse effects to cultural resources.

There would be no direct effects to cultural resources from the proposed amendments. Effects to cultural resources would be indirect by virtue of other programs within the amendment forests (and the Flathead National Forest) that implement the forest plans. These effects would be similar across the amendment forests and are summarized below.

Grizzly bear habitat

Ground disturbance with management activities could result in inadvertent discovery of and potential damage to cultural resources or sacred sites within grizzly bear habitat. However, unlike the no-action alternative, some activities (e.g., logging operations) might be temporarily restricted during the spring to avoid grizzly bear disturbance and displacement. These temporary restrictions might reduce the potential for ground disturbance that would result in inadvertent discovery and damage to cultural resources during the restricted time. However, this reduction might be negligible in contrast to the no-action alternative because the restrictions would be short-term under alternative 2 modified. Regardless, if cultural resources or sacred sites are encountered, protection protocols would still be applicable under alternative 2 modified to mitigate impacts.

Motorized use and access

To decrease the potential for grizzly bear-human conflicts, road densities would be maintained at the 2011 baseline and management activities that may require access and/or motorized use would be limited within the primary conservation area and zone 1 during the non-denning season. In the spring, when grizzly bears emerge from their dens, which is generally the time when motorized over-snow vehicle use may still be occurring, alternative 2 modified restrictions would lessen the potential, over the no-action alternative, for ground disturbance that could affect cultural resources. The potential for surface disturbance could still exist should over-snow vehicle operators choose to drive over thin snowpack or through bare ground areas where cultural resources may exist, but over-snow vehicle operators generally choose to operate on sufficient snowpack to avoid damage to their vehicles. Thus, ground disturbance to cultural resources would not be anticipated with the protections proposed under alternative 2 modified.

Recreation

Ground disturbance may result from the construction, use, and maintenance of new recreation developments. Under alternative 2 modified, the number of new recreation developments in the primary conservation area would be restricted. In contrast to the no-action alternative, this restriction would result in a reduction of ground disturbance and an associated reduction in the potential for inadvertent discovery of and damage to cultural resources. Regardless, if cultural resources or sacred sites are encountered, protection protocols would still be applicable under alternative 2 modified to mitigate impacts.

Alternative 3*Management direction*

Alternative 3 does not propose management direction specific to cultural resources.

Indirect effects of alternative 3

The effects to cultural resources under alternative 3 are primarily the same as those presented under alternative 2 modified. The only difference is that alternative 3 proposes a no surface occupancy stipulation for new oil and gas leases in zone 1 as well as in the primary conservation area, which might decrease ground disturbance under this alternative in zone 1 (see section 6.14, Energy and Mineral Resources, for a discussion of applicable areas). Thus, the additional protections under alternative 3 are somewhat more beneficial to cultural resources than alternative 2 modified.

Cumulative effects

The effects that past activities have had on cultural resources are discussed in the “Affected environment” section and are reflected in the current condition. Therefore, past activities are not carried forward into the cumulative effects analysis. Cumulative effects include the effects of implementing the amended forest plan on the amendment forests and the revised forest plan on the Flathead National Forest.

Under alternative 2 modified, the amended forest plan components would be implemented the same across the four forests. No impacts to known cultural resources or sacred sites are currently identified. Ground disturbance could result in the inadvertent discovery of and potential damage to cultural resources. The Forest Service has site-specific requirements, including cultural resource surveys, the NEPA process, consultation protocols, and protective measures to address these discoveries.

Effects determination

No changes to the current management of cultural resources for any of the amendment forests are proposed. No known cultural resources or sacred sites are affected. Ground disturbance associated with implementing alternative 2 modified or alternative 3 may result in the inadvertent discovery of and potential damage to cultural resources or sacred sites. Protection protocols are in place under all alternatives to mitigate impacts due to inadvertent discoveries of cultural resources and sacred sites.

Alternative 2 modified and alternative 3 are anticipated to result in less potential for ground disturbance than the no-action alternative because of limitations on new recreation developments and restrictions on motorized use/project activities associated with certain roads in the primary conservation area and zone 1. However, temporary spatial and temporal restrictions might adversely impact access to sites of cultural importance. Project-level evaluation and consultation, as applicable, would be required to determine the exact extent and magnitude of adverse effects.

6.17 American Indian Rights and Interests

6.17.1 Introduction

The Forest Service has obligations under the American Indian Religious Freedom Act of 1978 to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian [Pub. L. 95-442]. Executive Order 13007 of 1996 further directs Federal agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and to avoid adversely affecting such sites. Consultation with recognized tribal governments is further defined and required by the Native American Graves Protection and Repatriation Act of 1990 (Pub. L. 101-106), the 1992 amendments to the National Historic Preservation Act, and the 1999 revisions to the implementing regulations in 36 CFR § 800, Protection of Historic Properties. These obligations are applicable to all management actions no matter where they occur on the Forests.

6.17.2 Regulatory framework

Hellgate Treaty of 1855: The Flathead, Kootenai, and Upper Pend d'Oreille Indian Tribes have reserved rights under the Hellgate Treaty of 1855 (July 16, 1855). These rights include the “right of taking fish at all usual and accustomed places, in common with citizens of the Territory, and of erecting temporary buildings for curing; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.” The Federal government has trust responsibilities to tribes under a government-to-government relationship to ensure that the tribes’ reserved rights are protected. Consultation with the tribes in early phases of project planning helps the Forest Service meet their trust responsibilities.

National Historic Preservation Act of 1966 (Pub. L. 89-665, as amended, 91-423, 94-422, 94-458, and 96-515) and 36 CFR § 800 and 36 CFR § 7: This act pertains to tangible properties (buildings, structures, sites, or objects) that are important in history and prehistory. It requires agencies to consider the effects of undertakings on properties eligible to or listed in the National Register of Historic Places by following the regulatory process specified in 36 CFR § 800. The portions of that act that relate specifically to coordination with Indian tribes were added in the 1992 amendments and reflect the increased importance placed on tribal relations. A section of the act directs State and Federal governments to assist in the establishment of preservation programs on Indian lands. These sections include

- section 2: It shall be the policy of the Federal government, in cooperation with other nations and in partnership with the State, local governments, Indian tribes, and private organizations and individuals, to
 - ♦ (2) provide leadership in the preservation of the prehistoric and historic resources of the United States and of the international community of nations and in the administration of the national preservation program.
 - ♦ (6) assist State and local governments, Indian tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

National Environmental Policy Act of 1969 (Pub. L. 91-190) and 40 CFR § 1500-1508: Federal agencies invite Indian tribes to participate in forest management projects and activities that may affect them.

National Forest Management Act of 1976 (Pub. L. 4-588): Directs consultation and coordination of NFS planning with Indian tribes.

American Indian Religious Freedom Act of 1978 (Pub. L. 95-341 as amended, and 103-344): The act states that “it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to site, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites.”

Agencies must make a good faith effort to understand how Indian religious practices may come into conflict with other forest uses and consider any adverse impacts on these practices in their decisionmaking practices. Intangible, religious, ceremonial, or traditional cultural values and concerns that cannot be tied to specific cultural sites/properties are considered under the American Indian Religious Freedom Act.

Archaeological Resources Protection Act of 1979 (Pub. L. 96-95) and 43 CFR § 7: Establishes a permit process for the management of cultural sites on Federal lands that provides for consultation with affected tribal governments.

Native American Graves Protection and Repatriation Act of 1990 (Pub. L. 101-601, 25 USC 3001-3013) and 43 CFR § 10: Addresses the rights of lineal descendants and members of Indian tribes, Alaska Native, and native Hawaiian organizations to certain human remains and precisely defined cultural items. It covers items currently in Federal repositories as well as future discoveries. The law requires Federal agencies and museums to provide an inventory and summary of human remains and associated funerary objects. The law also provides for criminal penalties for illegal trafficking in Native American human remains and cultural items.

Interior Secretarial Order 3175 of 1993: Establishes the responsibility of all agencies to carry out the trust responsibilities of the Federal government and assess the impacts of their actions on Indian trust resources. It requires consultation with tribes when impacts are identified.

Religious Freedom Restoration Act of 1993 (Pub. L. 103-141): Establishes a higher standard for justifying government actions that may impact religious liberties.

Executive Order 12866 of 1993, Regulatory Planning and Review: Enhances planning and coordination with respect to both new and existing regulations. Makes the process more accessible

and open to the public. Requires agencies to seek views of tribal officials before imposing regulatory requirements that might affect them.

Executive Order 12898 of 1994, Environmental Justice in Minority Populations and Low-Income Populations: Directs Federal agencies to focus on the human health and environmental conditions in minority and low-income communities, especially in instances where decisions may adversely impact these populations.

Executive Order 13007 of 1996, Indian Sacred Sites: This order acknowledges the role of Federal agencies to protect and preserve the religious practices and places of federally recognized tribes and enrolled tribal members. It also requires agencies to consult with federally recognized tribes to address tribal concerns for sacred sites on public land and to ensure access to religious places and avoidance of adverse effects to sacred sites in accordance with existing legislation.

Executive Order 13175 of 2000, Consultation and Coordination with Indian Tribal Governments: Provides direction for consultation with tribal governments for formulating or implementing policies that have tribal implications. Also provides direction regarding consultation and coordination with Indian tribes relative to fee waivers. Calls upon agencies to use a flexible policy with tribes in cases where proposed waivers are consistent with applicable Federal policy objectives. Directs agencies to grant waivers in areas where the agency has the discretion to do so when a tribal government makes a request. When a request is denied, the agency must respond to the tribe in writing with the rationale for denial.¹

36 CFR § 261 Prohibitions in Areas Designated by Order; Closure of National Forest System Lands to Protect Privacy of Tribal Activities (2011): “provides regulations regarding special closures to provide for closure of NFS lands to protect the privacy of tribal activities for traditional and cultural purposes to ensure access to NFS land, to the maximum extent practicable, by Indian and Indian tribes for traditional and cultural purposes.”

36 CFR § 223.239 and 223.240, Sale and Disposal of National Forest System Timber, Special Forest Products, and Forest Botanical Products: Section 223.239 provides regulations for free use without a permit for members of tribes with treaty or other reserved rights related to special forest products and also free use without a permit upon the request of the governing body of a tribe. Section 223.240 provides regulations regarding harvest of special forest products by tribes with treaty or other reserved rights.

¹ Section 2 of this Executive Order states: “In formulating or implementing policies that have tribal implications, agencies shall be guided by the following fundamental principles:

- The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection. The Federal Government has enacted numerous statutes and promulgated numerous regulations that establish and define a trust relationship with the United States.
- Our Nation, under the law of the United States, in accordance with treaties, statutes, Executive Orders, and judicial decisions, has recognized the right of Indian tribes to self-government. As domestic dependent nations, Indian tribes exercise inherent sovereign powers over their members and territory. The United States continues to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, tribal trust resources, and Indian treaty and other rights.
- The United States recognizes the right of Indian tribes to self-government and supports tribal sovereignty and self-determination.”

6.17.3 Key indicators for analysis

The measurement indicators for American Indian rights and interests are identified and defined by tribes through consultation with the Forest Service on proposed actions. Consultation provides the opportunity for tribes to identify potential effects to tribal interests, including to native knowledge, tribally affiliated cultural resources, sacred sites, treaty rights, and religious freedom.

Ground disturbance is a key consideration for effects because ground disturbance may negatively impact sacred sites and areas. These impacts can be further exacerbated by interactions with fire, weather events, human actions, and environmental change. Access to sacred areas to exercise religious ceremonies and freedoms is another key consideration for effects. Management actions that change access could either beneficially or negatively impact the exercise of treaty rights and expression of religious freedom. The following key indicators were used to measure differences among the alternatives:

- disturbance: degree of activity or natural condition that poses a potential threat to sacred sites; and
- access: degree of activity or condition that poses a potential change to access to areas of Native American interest.

6.17.4 Methodology and analysis process

Effects to tribal interests are known only through direct tribal consultation between the Forest Service and affected tribes. Prior to consultation, effects can only be estimated qualitatively.

Information sources

Land use management plans, heritage reports, and information from Forest Service heritage resource specialists who consult with tribal members directly are the primary sources of information used for the analysis.

Incomplete and unavailable information

The Forest Service is not aware of all sites and interests of tribal importance. The Forest Service relies on its relationship and consultation with tribes to be informed as to where and what interests may be impacted by Forest Service proposed actions. The consultation process affords both tribes and the Forest Service opportunities to identify sites, interests, and values of tribal importance as well as to identify mitigations and avoidance and protective measures to preserve tribal interests.

Analysis area

The geographic scope of the analysis for American Indian rights and interests is the NFS lands of the amendment forests that lie within the NCDE primary conservation area, zones 1 and 2, the Salish and Ninemile demographic connectivity areas. This area represents the NFS lands where changes may occur from activities that result from the alternatives.

For cumulative effects, the analysis area also includes the NFS lands of the Flathead National Forest in the NCDE management zones and may extend spatially beyond these areas.

6.17.5 Affected environment

Information shared by tribes through consultation, at formal meetings, and via correspondence and conversations with individuals provides a rich source of information on tribal perspectives, resource uses, topics of interest, and the unique relationships tribes have with Federal agencies. As a recent

example, writing to the Forest Service on behalf of the Nez Perce Tribe, Tribal Executive Committee Chairman Anthony Johnson states:

The grizzly bear (*ḡáḡaac* in the Nez Perce language) is a species of great cultural and treaty-reserved significance to the [Nez Perce] Tribe. Grizzly bear were common across much of the aboriginal Nez Perce homeland for millennia. The grizzly bear was extirpated from our region in recent memory, and today, despite population gains in the NCDE, Greater Yellowstone Ecosystem, and elsewhere in the northern Rockies, *ḡáḡaac* remains largely absent from the Bitterroot Mountains and areas to the west. The restoration of this once common species across the region, and particularly within the Nez Perce homeland, is very important to the Tribe. (A. D. Johnson, 2015, July 16)

Consultation with tribes on proposed actions provides an important opportunity for the tribes to express information and concerns and the opportunity for the Forest Service to consider these during evaluation of proposed actions.

For this analysis, Native Americans associated with the analysis area, existing tribal rights, known concerns, and areas of known tribal importance are discussed in this section. Existing information was used to assess the condition and trend of resources that affect tribal rights and areas of tribal importance.

Helena-Lewis and Clark National Forest

Historically, the NFS lands on the Helena-Lewis and Clark National Forest were the ancestral homeland and travel way of native bands now referred to as the Assiniboine, Blackfeet, Chippewa Cree, Confederated Salish and Kootenai, Crow, Eastern Shoshone, Gros Ventre, Sioux, Nez Perce, Northern Arapahoe, Northern Cheyenne, Shoshone-Bannock, and Little Shell Tribes (USDA, 2015a). Most active among these groups were those historically known as the Blackfeet, Gros Ventre, Salish, Shoshone, and Kootenai.

Culturally important plant and fungi species that have been used historically and/or currently for ceremonies, rituals, nutrition, or medicinal purposes occur on the Forest. Small camas (*Camassia quamash*), thinleaf huckleberry (*Vaccinium membranaceum*), chokecherry (*Prunus virginiana*), common beargrass (*Xerophyllum tenax*), and bitterroot (*Lewisia rediviva*) are all culturally important plant species that occur on the Forest.

Key features of the area important to Native Americans include the Cokahlarishkit/Lewis and Clark Trail (24LC1210), which extended through the upper Blackfoot Valley and over the Continental Divide into central Montana, and various geographical areas and landmarks within the upper Blackfoot River drainage that are culturally important to the Salish Tribe. These have Salish place-names that are associated with families and events in traditional Salish life. This place-name information is highly regarded and confidential.

Additionally, the Badger-Two Medicine Traditional Cultural District is a watershed area on the Rocky Mountain Front that lies within part of the Lewis and Clark National Forest and embodies the history and life of the Blackfeet Nation. More information on this topic can be found in the Helena-Lewis and Clark Assessment (USDA, 2015a).

Kootenai National Forest

There are five federally recognized American Indian nations with cultural affiliation on the Kootenai National Forest: the Kootenai Tribe of Idaho, the Kalispel Tribe, the Coeur d'Alene Tribe, the

Spokane Tribe, and the Confederated Salish and Kootenai Tribes. The aboriginal territory of the Kalispel, Coeur d'Alene, and Spokane Tribes overlap with the territory now managed by the Kootenai National Forest along the Clark Fork Valley and with the territory used by the Kootenai Tribe of Idaho and the Confederated Salish and Kootenai Tribes. The entire Forest is within aboriginal territory of the Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho.

The Kootenai National Forest meets its treaty responsibilities with assistance from a tribal liaison from the Confederated Salish and Kootenai Tribes, a position that has been in place since 1981. The liaison is informed of planned projects on the Forest and coordinates with the appropriate tribal departments and Tribal Council, as well as with members of the Kootenai Tribe of Idaho, to identify issues. These issues are discussed with Forest Service line officers, who take these issues into consideration in making management decisions. Additional information on this topic can be found in the final EIS for the Kootenai National Forest's Revised Land Management Plan (USDA, 2013b).

Lolo National Forest

The Lolo National Forest is the traditional homeland of the Kootenai and Salish people as well as the Coeur d'Alene and Nez Perce people. Roughly 10,000 years of hunter-gatherer land use created numerous occupational sites, lithic scatters, rock cairns, burials, game drives/traps, and culturally modified trees throughout the Lolo National Forest. Occupational sites are usually limited to the major river drainages such as the Blackfoot and Clark Fork Rivers. In addition, hunter-gatherers frequented higher-elevation mountainous areas during the summer months, such as those along the Idaho/Montana State line or the Cabinet/Coeur d'Alene Divide. Prehistoric travel routes were developed and usually were restricted to major creek drainages as well as saddle and ridge systems. These higher-elevation areas provided hunter-gatherers with a wide range of resources, from roots, seeds, and berries to deer, elk, and mountain sheep.

The Confederated Salish and Kootenai Tribes of Montana, which includes the Kootenai, the Bitterroot Salish, and the Pend d'Oreille Salish peoples, have reserved treaty rights in the analysis area under the Hellgate Treaty of 1855. The Coeur d'Alene Tribe has stated that the area west of the St. Regis confluence of the Clark Fork River is traditional lands, and this area is adjacent to the NCDE amendment area. The Nez Perce Tribe also has lands adjacent to the NCDE amendment area.

The Nez Perce and Confederated Salish and Kootenai Tribes have a strong working relationship with each other as well as with the Lolo National Forest. Although both tribes reserve the right to consult with any action proposed by the Lolo, the Nez Perce Tribe has assumed consultation lead for proposed actions anywhere along U.S. Highway 12 and areas south of Interstate 90. The Confederated Salish and Kootenai Tribes have assumed consultation lead for actions proposed in areas north of the Interstate 90 corridor as well as other parts of the Lolo National Forest.

The Confederated Salish and Kootenai Tribes manage the Tribal Mission Mountains Wilderness that is adjacent to the federally designated Mission Mountains Wilderness on the Forest. The tribes offer recreational use on some of the tribal lands (recreation permit required), but some tribal lands are reserved for tribal members only. On the Lolo National Forest, the tribes are concerned with major ridge systems, including but not limited to the Reservation Divide between the Ninemile Ranger District and the Flathead Indian Reservation, the Ninemile Divide between Ninemile Creek and the Clark Fork River, the divide between Jocko River and Gold Creek and the Rattlesnake Wilderness, and all areas along the Clark Fork River, the Jocko River, and Blackfoot River travel corridors (Mandella, 2015). Additional information on this topic can be obtained through the Lolo National Forest Heritage Program.

6.17.6 Environmental consequences

This section discusses the effects to American Indian rights and interests from implementing the alternatives.

Alternative 1—No action, Helena-Lewis and Clark, Kootenai, and Lolo National Forests

Management direction for alternative 1—No action

Under current forest plans for the amendment forests, management direction requires coordination with Native American tribes on rights and interests issues and concerns. This current direction includes forestwide goals, objectives, desired conditions, standards, and guidelines pertaining to American Indian rights and interests. Specific issues addressed via direction and consultation in the current plan include marked and unmarked burial sites, areas of sacred or religious significance, and the accuracy of portrayals of Native Americans in displays and interpretive sites.

Indirect effects of alternative 1—No action

Effects to tribal interests, including native knowledge, tribally affiliated cultural resources, sacred sites, treaty rights, and religious freedom are identified and defined by tribes through consultation on proposed actions. Under the no-action alternative, the amendment forests would continue to meet their obligations to tribes via consultation requirements. The effects of the no-action alternative are presented in the context of these resources and uses for comparison to the action alternatives.

Grizzly bear habitat

Ground disturbance in conjunction with management activities may occur in grizzly bear habitat, and sites of Native American interest may be potentially encountered in these areas. Consultation would be required and implemented under the no-action alternative prior to project implementation to identify, discuss, protect, and mitigate potential impacts to Native American sites as well as to address conservation concerns associated with the grizzly bear and its habitat associated with project areas.

Access and motorized use

Each of the forest plans and associated biological opinions contain road density requirements within the recovery zone and areas outside the recovery zone that are occupied by grizzly bears. Ground disturbance in conjunction with road management, maintenance, and/or closure activities and public use of roads may occur, and Native American sites may be encountered. Consultation requirements would be implemented under the no-action alternative during road-related activities to protect and mitigate impacts to Native American sites and access to these sites.

Recreation

Ground disturbance may occur in conjunction with recreational use and facilities, and Native American sites may be encountered in areas with these activities. Consultation requirements would be implemented under the no-action alternative to protect and mitigate impacts to Native American sites.

Alternative 2 modified, Helena-Lewis and Clark, Kootenai, and Lolo National Forests

Management direction for alternative 2 modified

Alternative 2 modified does not propose changes in management direction specific to American Indian rights and interests.

Indirect effects of alternative 2 modified

The effects to tribal interests are defined by tribes and disclosed by the tribes to the Forest Service during consultation. For purposes of this analysis, effects of alternative 2 modified are contrasted to the no-action alternative to estimate whether this alternative would increase, decrease, or result in no change to the potential for adverse effects to American Indian rights and interests.

Under alternative 2 modified, there would be no change proposed to current management direction related to American Indian rights and interests for any of the amendment forests. The following consequences of implementing the amendments might have potential impacts to other resource areas and might indirectly impact American Indian rights and interests.

Grizzly bear habitat

Ground disturbance in conjunction with management activities might impact grizzly bear habitat, which might also be located in areas with Native American interests on amendment forest NFS lands.

Consultation would be required and implemented under alternative 2 modified prior to project implementation to identify, discuss, protect, and mitigate potential impacts to Native American sites as well as to address conservation concerns associated with the grizzly bear and its habitat associated with project areas.

Access and motorized use

To decrease the potential for grizzly bear-human conflicts, this alternative would limit road densities to the 2011 baseline and would limit certain management activities within the primary conservation area and zone 1, such as management of vegetation, livestock grazing, and minerals and energy development. These restrictions might result in less overall ground disturbance and less potential for impacts to physical sites of Native American interest. However, the same temporary restrictions to use of roads might make certain areas temporarily more difficult to reach and require nonmotorized travel methods, which might increase travel times by minutes (feet) to hours (miles) depending on the specific locality.

Recreation

Ground disturbance might still occur in conjunction with recreational use and facilities, and Native American sites might still be encountered in these areas with these activities. Implementing this alternative would allow only one increase in the number or capacity of developed recreation sites with overnight use per bear management unit per decade. These restrictions might decrease the potential for impacts over the no-action alternative to American Indian rights and interests. Consultation requirements would still be required and implemented under alternative 2 modified to identify, protect, and mitigate impacts to Native American sites and interests.

Alternative 3, Helena-Lewis and Clark, Kootenai, and Lolo National Forests

Management direction

Alternative 3 does not propose management direction specific to American Indian rights and interests.

Indirect effects of alternative 3

The effects to tribal interests under alternative 3 would be the same as those presented under alternative 2 modified.

Cumulative effects

The effects that past activities have had on American Indian rights and interests are discussed in the “Affected environment” section and are reflected in the current condition. Therefore, past activities are not carried forward into the cumulative effects analysis.

Consultation requirements would still be required and implemented under all alternatives. Concerns regarding cumulative effects would also be discussed at this time to identify, protect, and mitigate impacts to Native American sites and interests.

Effects determination

No changes to current management for American Indian rights and interests for any of the amendment forests are proposed. Alternative 2 modified is anticipated to result in less potential for ground disturbance because of certain limitations for new recreation developments and motorized roads and trails. Consultation would still be required to determine the extent of adverse effects.

6.18 Social and Economic

6.18.1 Introduction

The analysis of the impacts of the alternatives on the social and economic environment is conducted by employing a key ecosystem services framework (Olander et al., 2015), which identifies how ecosystem services and/or multiple uses contribute, either directly or indirectly, to economic and social sustainability. In this analytical context, key ecosystem services are defined as those societal benefits the Forests and forest management activities support. These benefits can be either direct or indirect but must meet the following criteria:

- they are of value to people, either to those living in the analysis area and/or to the general public; and
- they are likely to be affected by the alternatives.

6.18.2 Regulatory framework

The following is a select set of statutory authorities that govern the evaluation of social and economic resources. They are briefly identified and described below to provide context to the management and evaluation of the resource. Many other laws, regulations, and policies not described below also guide the management of these resources.

National Forest Revenue Act (amended 1908): Requires 25 percent of revenues generated by NFS lands to be paid to the States for use by the counties in which the lands are situated for the benefit of public schools and roads.

Multiple-Use Sustained-Yield Act of 1960: Identifies principles for managing the resources of the NFS. The direction to manage these resources for the greatest good over time includes the use of economic and social analysis to determine management of the NFS.

National Environmental Policy Act of 1969: Mandates consideration of the consequences to the quality of the human environment from proposed management actions. The agency must examine the potential impacts to physical and biological resources as well as potential socioeconomic impacts (40 CFR § 1508.14).

Forest and Rangeland Renewable Resources Planning Act of 1974: As amended by the National Forest Management Act of 1976, requires consideration of potential economic consequences of land management planning.

Executive Order No. 12898 on Environmental Justice (issued February 11, 1994): Mandates Federal agencies to make achieving environmental justice part of their mission. This includes identification and response to disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

Secure Rural Schools and Community Self-Determination Act of 2000: Designed to stabilize annual payments to States and counties containing NFS lands and public domain lands managed by the Bureau of Land Management. Funds distributed under the provisions of this act are for the benefit of public schools, roads, and related purposes.

6.18.3 Indicators and methodology

The Forests and the Forest Service provide many societal benefits, including clean air, carbon sequestration, clean water, and fire suppression. The focus of this analysis are those key benefits that are most likely to be affected by the alternatives. The subset of key societal benefits the Forests and the Forest Service provide, which may be affected by the alternatives, fall under the categories of traditional, cultural, and spiritual values and health and safety. These benefits contribute to social sustainability by enhancing the quality of life of beneficiaries. Specifically, the benefits under traditional, cultural, and spiritual values include recreation, cultural and heritage values, and inspirational values. The health and safety benefit most likely to be affected by the alternatives is the minimization of bear-human conflict. These social benefits are described in following sections.

Traditional, cultural, and spiritual values

- recreation: access to outdoor recreation activities and opportunities to connect with nature;
- inspirational/existence values: ability to be inspired by wild places and appreciate the existence of wild places and wildlife (for this generation and subsequent generations); and
- other traditional/cultural/heritage values: ability to access cultural and traditional sites, ability to engage in traditional and cultural activities including ranching, grazing, hunting, and wildlife viewing, and ability to engage in rural lifestyles.

Health and safety

- minimizing bear-human conflict: reducing the risk of conflict between bears and humans (and human interests such as livestock).

These benefits were identified through public comments and in consultation with resource specialists. The key social benefits listed above are the indicators that are used to determine whether,

and/or to what extent, the alternatives may impact the social environment and contribute to social sustainability.

These societal benefits are used and/or valued differently by different groups and communities. In the “Affected environment” section, the local beneficiaries are described in detail. In the “Environmental consequences” section, the alternatives are assessed to determine whether, and/or to what extent, these social benefits will be affected.

6.18.4 Social affected environment

The NCDE social and economic analysis area includes the 12 counties of Montana that have land within the primary conservation area and zone 1. These counties are shown in table 220. The other 16 counties with NFS land in zones 2 and 3 are not included in the social and economic analysis area because the only standard that affects the NFS lands in zone 2 is the application of food storage orders. No additional direction is proposed under any alternative for zone 3. Because social and economic effects may extend beyond the boundaries of the 12-county social and economic analysis area, regional and national attachments to the NCDE are also presented in this discussion.

The NCDE is part of a larger system, the Crown of the Continent, which contains the counties included in this analysis. A 2011 report by Headwaters Economics found that “the Crown region is closely tied to both the amenity qualities and productive values of its wild lands and working landscapes” (Headwaters Economics, 2011).

Table 220. Counties of the social and economic analysis area and location in the primary conservation area and Zone 1 of the draft Conservation Strategy area

County	Location in Draft Conservation Strategy Area
Flathead	PCA and zone 1
Glacier	PCA and zone 1
Granite	Small section of zone 1
Lake	PCA and zone 1
Lewis and Clark	PCA and zone 1
Lincoln	PCA and zone 1
Mineral	Zone 1 only
Missoula	PCA and zone 1
Pondera	PCA and zone 1
Powell	PCA and zone 1
Sanders	Zone 1 only
Teton	PCA and zone 1

Population and demographics

Land ownership, land settlement, and land uses

The primary conservation area and zone 1 of the NCDE encompasses about 164,000 square miles of northwestern Montana and includes Glacier National Park, parts of the Flathead and Blackfeet Indian Reservations, parts of four national forests (Flathead, Helena-Lewis and Clark, Kootenai, and Lolo), public lands managed by the Bureau of Land Management, and a significant amount of State and private lands. Also within this region are four wilderness areas (Bob Marshall, Mission Mountains,

Great Bear, and Scapegoat), one wilderness study area (Deep Creek North), and one scenic area (Ten Lakes).

Within the basins and valleys of the NCDE, farms and ranches and small rural communities reflect the historical settlement since Europeans moved westward after Lewis and Clark explored in the early 1800s (social and economic information relative to the Native American tribes in the region is found in the following subsection titled Treaties and Tribal Uses). Some remnants of logging and mining and associated settlements are also interspersed throughout the area. Metal ore mining is still active in Lincoln County and was active in Lewis and Clark County prior to the shutdown of the Drumlummon Mine in 2013. Oil and gas development is also important in Glacier County. Many rural towns got their start, and are still supported to some extent, by ranching, logging, mining, and western culture (see section 6.18.6, “Economic affected environment,” for more information on the economic dependency of these counties on wildland-related industries).

As shown in table 221 and figure 86, the 12 counties in the social and economic analysis area include more than 19.8 million acres, of which approximately 31 percent are private lands, nearly 50 percent are lands under Federal management, and 13 percent are tribal lands. The majority (86 percent) of the Federal land is managed by the Forest Service.

Table 221. Land ownership and percent of total in social and economic analysis area

County	Private (acres)	Federal (acres)	State (acres)	Tribal (acres)	Other (acres)	Total (acres)
Flathead	739,690	2,419,670	131,472	27,310	n/a ¹	3,318,142
Glacier	161,511	402,508	8,280	1,369,886	–	1,942,186
Granite	372,244	703,838	20,476	–	72	1,096,630
Lake	124,580	172,005	64,058	678,824	n/a	1,039,469
Lewis and Clark	884,980	1,069,522	177,490	–	1,627	2,133,617
Lincoln	487,513	1,726,388	75,341	–	–	2,289,242
Mineral	78,079	641,343	63,299	–	–	782,721
Missoula	653,805	716,196	173,944	99,045	1,873	1,644,863
Pondera	711,734	108,791	57,160	161,651	–	1,039,336
Powell	542,322	727,599	130,517	–	–	1,400,438
Sanders	279,950	925,504	66,814	427,761	–	1,700,028
Teton	1,053,930	254,496	130,416	–	10	1,438,852
Analysis area total	6,090,338	9,867,860	1,099,267	2,764,477	3,582	19,825,524

¹ n/a = not applicable

Data source: U.S. Geological Survey, Gap Analysis Program, 2012, Protected Areas Database of the United States version 1.3 (Headwaters Economics)

The primary conservation area and zone 1 of the NCDE within the 12-county area encompass about 10.5 million acres (53 percent) of the 12-county area, which is mainly under public ownership. As grizzly bears extend their range beyond these areas, increasingly more private lands may be affected. The alternatives apply direction only for public lands managed by the Forest Service (i.e., NFS lands).

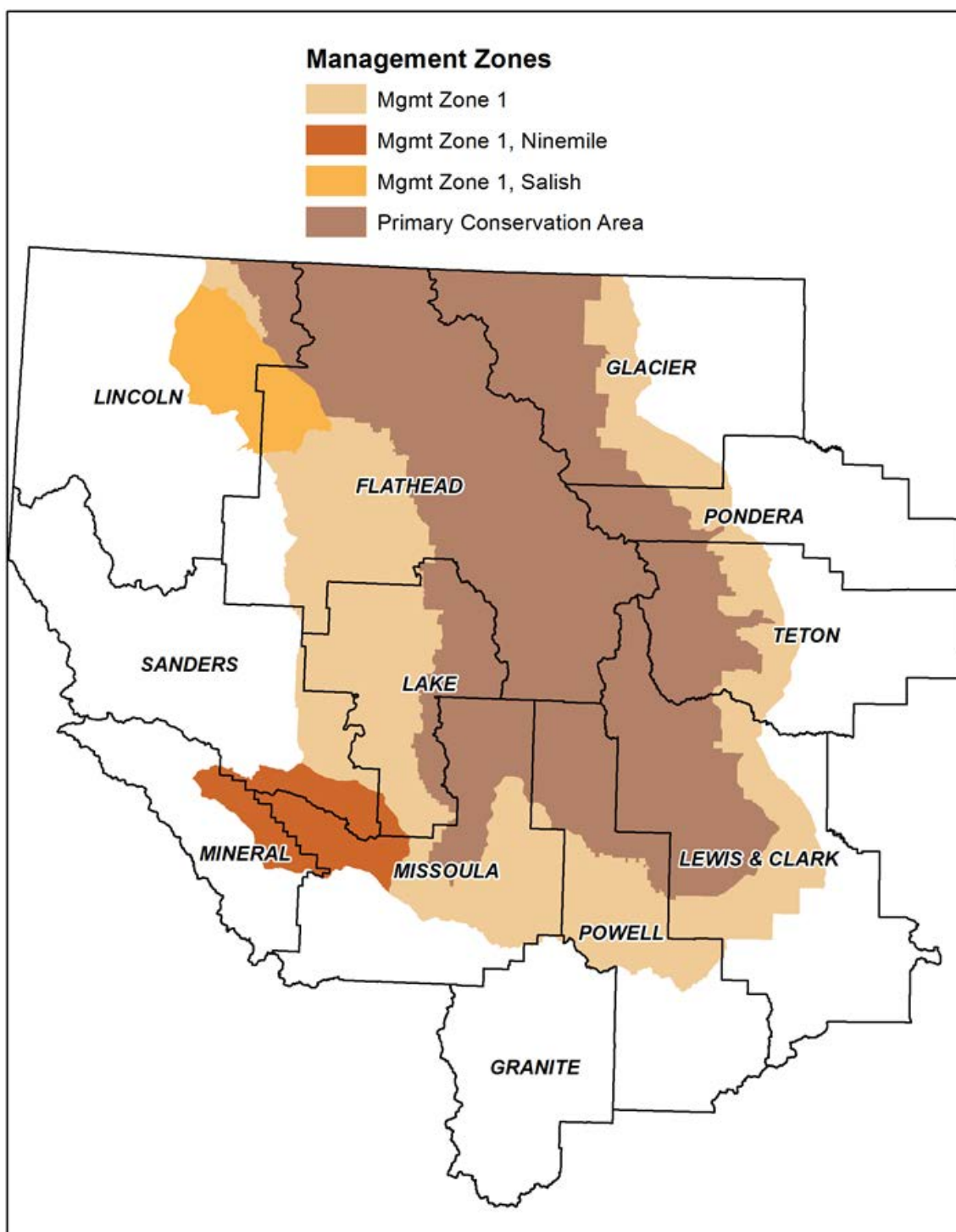


Figure 86. The 12 counties in the social and economic analysis area

Map Source: USDA Forest Service, Northern Region, 2015

Data Source: County data from U.S. Census; GIS management area data from USDA Forest Service Northern Region, Flathead National Forest, spatial data library, T:\FS\NFS\Flathead\Project\SO\Planning\ForestPlanRevision.

Population trends

As shown in table 222, approximately 363,614 people resided within the 12-county area in 2012. The population in the analysis area increased 77.4 percent from 1970 to 2012; however, some counties saw large increases in population while others lost population during this time. The county with the largest percent increase in population was Flathead County, at 130.7 percent, whereas Teton and Pondera Counties saw a decrease in population. From 2000 to 2012, the population of the 12-county area increased 13.1 percent, a higher rate of growth than for either the State or the nation, which both grew in population by about 9.8 percent. Population projections done as part of the Resource Planning Act assessment (Zarnoch, Cordell, Betz, & Langner, 2010) indicate (based upon three scenarios: low population change, current trend, high population change) that the population of the 12-county area will increase from 40 to 67 percent from 2010 to 2050. Table 222 shows the projected population change, based on current trends, and shows the counties of Flathead and Missoula with the largest projected population growth during this time (90.2 and 75.5 percent, respectively) and the counties of Granite and Pondera with the lowest projected growth (4.5 and 0.6 percent, respectively).

Table 222. Historical and projected population (based on current growth trends) by county

Forest/County	Population 1970 ¹	Population 2000 ¹	Population 2012 ¹	Change 1970-2012 ¹ (%)	Change 2000-2012 ¹ (%)	Projected Population Change 2010-2050 ² (%)
Flathead	39,716	74,471	90,967	130.7	22.2	90.2
Glacier	10,823	13,247	13,422	26.7	1.3	27.7
Granite	2,729	2,830	3,083	13.9	8.9	4.5
Lake	14,592	26,507	28,794	98.6	8.6	54.4
Lewis and Clark	33,455	55,716	63,432	93.9	13.8	36
Lincoln	18,065	18,837	19,594	7.9	4.0	8.1
Mineral	2,965	3,884	4,203	40.5	8.2	38.7
Missoula	58,472	95,802	109,402	89.8	14.2	64.4
Pondera	6,707	6,424	6,147	-8.1	-4.3	-0.6
Powell	6,666	7,180	7,067	6.5	-1.6	16
Sanders	7,112	10,227	11,421	60.4	11.7	18.2
Teton	6,131	6,445	6,082	-1.3	-5.6	23.1
Analysis area total	207,433	321,570	363,614	77.2	13.1	56.7

1. Data source: Economic Profile System—Human Dimensions Tool Kit (Headwaters Economics)

2. 2010-2050 Projections (Zarnoch et al., 2010)

Similar to many areas in the western United States, population growth is due mostly to the influx of natural amenity migrants—people who migrate to the NCDE area for its natural amenities (such as scenic beauty, outdoor recreational pursuits, and less crowding and congestion). The area has diversified from a historical dependency upon agriculture, mining, and logging to increases in service sectors and other occupations. According to a report by Headwaters Economics (2011), the region is relatively urban compared to the eastern part of Montana. The area contains two micropolitan statistical areas (Kalispell and Helena), which is defined by the U.S. Census Bureau as having one urban cluster of at least 10,000 but less than 50,000 people. Missoula is defined as a

metropolitan statistical area (having at least one urbanized area of 50,000 or more inhabitants), one of only three in the State (the other two being Great Falls and the Billings area). As Headwaters Economics states in their report, “despite the many small towns scattered throughout the region, three-quarters of the residents do not live in a rural area.”

In the past several decades, the conversion of open space and agricultural land to residential development has occurred at a rapid pace in many parts of the United States. The popularity of exurban lot sizes (lots between 1.7 and 40 acres) in much of the country has exacerbated this trend (i.e., low-density development resulting in a larger area of land converted to residential development). This pattern of development reflects a number of factors, including demographic trends, the increasingly “footloose” nature of economic activity (i.e., the economic activity can be conducted virtually and is not tied to a specific geographical location or employment site), the availability and price of land, and preferences for homes on larger lots. These factors can place new demands on public land managers as development increasingly pushes up against public land boundaries. For example, human-wildlife conflicts and wildfire threats may become more serious issues for public land managers where development occurs adjacent to public lands. In addition, there may be new demands for recreation opportunities and concern about the commodity use of the landscape (e.g., timber, agriculture, and mining) (Headwaters Economics, Economic Profile System–Human Dimensions Tool Kit).

Population growth is often a key metric used to describe human effects on natural resources. However, in most geographies, land consumption (the area of land used for residential development) is outpacing population growth. In these areas, land consumption is strongly related to wildlife habitat loss and the degree to which public lands are bordered by residential development.

The impact of residential development on ecological processes and biodiversity on surrounding lands is widely recognized. They include changes in ecosystem size, with implications for minimum dynamic area, species-area effect, and trophic structure; altered flows of materials and disturbances into and out of surrounding areas; effects on crucial habitats for seasonal and migration movements and population source/sink dynamics; and exposure to humans through hunting, exotic species, and disease (Hansen & DeFries, 2007; Hansen et al., 2005).

Residential acreage in the social and economic analysis area increased by 151,115 acres (44.4 percent) from 2000 to 2010 (see table 223). Flathead County had the greatest increase in residential acres, where residential acres increased by 47,980 acres (a 37.7 percent increase). However, the largest percent increase occurred in Lincoln County, where the amount of residential land increased 75.5 percent, which amounted to an increase of 22,974 acres. Most of the counties in the analysis area also saw increases in lot sizes, with a change in residential acres per person of about a third of an acre. The largest changes in average lot size occurred in Lincoln and Sanders Counties, where lot sizes increased by approximately one acre.

The types of settlement and land uses that occur on private lands affect grizzly bears. Managing food and garbage (e.g., bear-resistant garbage containers) and other bear attractants (e.g., domestic animal foods and bird feeders) has become a more common practice in rural areas and towns. The security of bears and bears’ use of natural food sources can be compromised as rural lands are developed and even sparsely settled. These changes in land use affect bears regardless of alternative and are considered cumulative impacts.

Table 223. Residential development, 2000-2010

County	2000 (acres)	2010 (acres)	Change 2000 to 2010 (acres)	Change 2000 to 2010 (%)	Acres per person in 2000	Acres per person in 2010	Change 2000 to 2010 (acres per person)
Flathead	127,381	175,361	47,980	37.7	1.7	1.9	0.2
Glacier	3,815	4,564	749	19.6	0.3	0.3	0.0
Granite	4,079	6,384	2,305	56.5	1.4	2.1	0.6
Lake	35,413	51,236	15,823	44.7	1.3	1.8	0.4
Lewis and Clark	47,120	65,553	18,433	39.1	0.8	1.0	0.2
Lincoln	30,414	53,388	22,974	75.5	1.6	2.7	1.1
Mineral	5,591	7,419	1,828	32.7	1.4	1.8	0.3
Missoula	61,236	86,864	25,628	41.9	0.6	0.8	0.2
Pondera	1,306	1,420	114	8.7	0.2	0.2	0.0
Powell	3,656	6,103	2,447	66.9	0.5	0.9	0.4
Sanders	17,434	29,666	12,232	70.2	1.7	2.6	0.9
Teton	2,550	3,152	602	23.6	0.4	0.5	0.1
Analysis area (acres)	339,995	491,110	151,115	44.4	1.1	1.3	0.3

Recreation

The spectacular scenery and outdoor recreational opportunities of the area draw many tourists to the area. The current density of motorized routes across the Forests provides ample opportunities for recreation during both winter and summer seasons. For more details on recreation access and facilities across the Forests, see section 6.13.

According to the National Park Service, in 2015 Glacier National Park alone attracted 2.4 million visitors who spent \$199 million and supported 3,474 jobs in the gateway communities surrounding the park (Cullinane & Koontz, 2016). Information on recreational use on the national forests is only available at the Forest level and so cannot be directly associated with the lands encompassed by the NCDE. However, the most recent National Visitor Use Monitoring surveys (USDA, 2017b) estimate the following annual visitation for the Forests connected with the NCDE:

- Flathead National Forest: 885,000 visitors (data collected in 2010)
- Helena National Forest: 454,000 visitors (data collected in 2008)
- Kootenai National Forest: 468,000 visitors (data collected in 2012)
- Lewis and Clark National Forest: 269,000 visitors (data collected in 2012)
- Lolo National Forest: 1,266,000 visitors (data collected in 2011)

Inspirational and existence values

Perceptions of grizzly bears and bear management

The values that people hold for wildlife have important implications for management of wildlife in Montana, including the grizzly bear. Some people hold existence values for natural resources in general and for grizzly bears in particular (Brookshire, Eubanks, & Randall, 1983). 'Existence value' is the notion that the resource has an inherent value even if it is never 'used' or consumed. Although

it is not possible to determine, with existing data, what percentage of the population in the analysis area (or of the general public) holds existence values towards grizzly bears, there have been studies indicating that Montana residents are likely to hold these values.

A 2009 MFWP research summary (Teel, Lewis, & McCoy, 2009) describes the types of values that people hold for wildlife and their implications for management. The summary cites a 2005 study entitled “Wildlife Values in the West” (Teel, Dayer, Manfredo, & Bright, 2005), which describes four types of people associated with these values:

- **Utilitarian.** These individuals believe that wildlife should be used and managed primarily for human benefit. Individuals with a strong utilitarian orientation are more likely to prioritize human well-being over wildlife in their attitudes and behaviors. They are also more likely to find justification for treatment of wildlife in utilitarian terms and to rate actions that result in death or harm to wildlife as being acceptable.
- **Mutualist.** These individuals view wildlife as capable of living in relationships of trust with humans, as if part of an extended family, and as deserving of rights and caring. Those with a strong mutualism orientation are less likely to support actions resulting in death or harm to wildlife, more likely to engage in welfare-enhancing behaviors for individual wildlife (e.g., feeding), and more likely to view wildlife in human terms (e.g., Bambi).
- **Pluralist.** These individuals hold both a mutualist and a utilitarian value orientation towards wildlife. Which of the orientations plays a role is dependent upon the given situation. For certain issues, pluralists are likely to respond in a manner similar to that of utilitarians, whereas for other issues they may behave more like mutualists.
- **Distanced.** These individuals do not hold either a utilitarian or a mutualism orientation. As their label suggests, they tend to be less interested in wildlife and wildlife-related issues. The distanced individual is also more likely than the other value types to express fear, or concern for safety, while in the outdoors due to the possibility of negative encounters with wildlife (e.g., risk of being attacked or of contracting a disease).

The 2005 study showed that three quarters of Montanans held utilitarian or pluralistic values (47 percent utilitarian and 27 percent pluralist). The numbers were slightly higher for landowners (61 percent utilitarian and 16 percent pluralist) as compared to the general public. The smallest group was classified as distanced. However, the study states that as Montana continues to grow and develop, the views may change to more of a mutualist view, as has occurred in many other areas of the West. Those with a mutualist view are most likely to hold existence values towards grizzly bears.

Opinion surveys on grizzly bears

People’s acceptance of changing bear distribution and bear management contributes to the ultimate success in perpetuating the bear’s recovery, public safety, and ease with which agencies can effectively manage for the bear. Public views regarding the grizzly bear and its management have been expressed through the development of the draft Conservation Strategy, State grizzly bear management plans, public scoping activities on proposed actions, and many other local and regional efforts. Generally, public comments on grizzly bear management efforts diverge in their tolerance for increasing and expanding bear populations and in their acceptance of protection measures. These divergent views are discussed as environmental views and multiple-use views later in this section. Divergent views tend to be held by narrow segments of the public at opposing ends of the opinion spectrum, and more moderate views tend to be embraced by a broader segment of the public. Opinion surveys conducted with statistical reliability can help to understand public sentiment and its distribution.

A survey of Lincoln and Sanders County residents was conducted in 2007 (Canepa, Annis, & Kasworm, 2008). The survey was designed to measure public understanding of grizzly bears and management in the Cabinet Mountains and Yaak Valley of Montana (hereafter referred to as the Cabinet-Yaak Ecosystem). The survey focused primarily on knowledge, opinions, and informational sources about grizzly bears in the Cabinet-Yaak Ecosystem, knowledge and support of grizzly bear recovery, and opinions about management activities and recreation. Some of the survey results are summarized below:

- Although 54 percent of respondents believed that grizzly bears can be dangerous to humans, more than 70 percent indicated that grizzly bears belong in the Cabinet-Yaak Ecosystem and should be preserved as a symbol of our national heritage.
- Ninety percent of respondents felt that humans can prevent most conflicts with grizzly bears, and the majority stated that they would even accept changes to current garbage disposal methods if it would help prevent problems with grizzly bears.
- Although the survey revealed that 57 percent of respondents supported grizzly bear recovery in the Cabinet-Yaak Ecosystem, the level of support decreased to 44 percent when respondents were asked about achieving a grizzly bear population goal of 100 bears.
- One third of respondents stated that they were unaware of the current road restrictions on national forest lands. In addition, 69 percent stated that grizzly bear recovery efforts had not negatively affected their employment or recreation opportunities.
- When asked about support for the current (2007) road restrictions, 49 percent supported and 42 percent were opposed to them. Fifty-eight percent were opposed to any additional road restrictions in the future, and 31 percent were in support.

Thought not specific to the NCDE area, a survey of Wyoming residents conducted in 2001 for the Wyoming Game and Fish Department examined attitudes towards grizzly bears and opinions on the possible removal of the grizzly bear from listing under the Endangered Species Act. Duda and others (2001) found that a supermajority (74 percent) of Wyoming residents believed that grizzly bears were a benefit to Wyoming and an important component of the ecosystems that they occupy. The researchers also found that opinions regarding efforts to increase the populations of grizzly bears in Wyoming were divided between support and opposition. Slightly more Wyoming residents (42 percent) supported efforts to increase the grizzly bear population than opposed (39 percent) such efforts. Support for efforts to increase the grizzly bear population increased considerably (from 42 to 61 percent) when efforts to increase the grizzly bear population were coupled with the idea that groups of wildlife managers would be stationed locally to help track bears, inform and educate people, and resolve conflicts. Two of the top three reasons given for opposing efforts to increase the grizzly bear population dealt with the danger grizzly bears can pose to humans (36 percent) and livestock (18 percent) (Duda et al., 2001).

The researchers also found an equal division between Wyoming residents who think they would continue to use (48 percent) and those residents who would discontinue using (44 percent) the outdoor areas where they currently recreate if those areas were occupied by grizzly bears (Duda et al., 2001).

Another opinion survey examined the political and social viability of predator compensation programs in the west and offers insights from ranchers and the public at large in Idaho, Montana, and Wyoming (Montag, Patterson, & Sutton, 2003). The survey found large disparities in the social acceptability of grizzly bears between livestock owners and the public at large. With regard to views

that grizzly bears “are an important part of the ecosystems they occupy,” the survey found the following:

- nineteen percent, 45 percent, and 25 percent of the livestock owners sampled from 12 community zones in Idaho, Montana, and Wyoming, respectively, agreed with the statement; and
- fifty-one percent, 63 percent, and 65 percent of the public randomly sampled from Idaho, Montana, and Wyoming, respectively, agreed with the statement.

With regard to the statement “I would like to see populations of grizzly bears increase in my area,” the survey found the following:

- ninety-two percent, 81 percent, and 91 percent of the livestock owners sampled from 12 community zones in Idaho, Montana, and Wyoming, respectively, resoundingly disagreed with the statement; and
- sixty-six percent, 57 percent, and 60 percent of the public randomly sampled across Idaho, Montana, and Wyoming, respectively, disagreed with the statement.

The division between support of efforts to increase grizzly bear populations and opposition (as shown in the opinion polls) is also reflected in the differing viewpoints expressed during the public involvement activities associated with the proposed amendments.

Public scoping comments

Public scoping comments were reviewed to identify the values, beliefs, and attitudes of Forest stakeholders related to the proposed forest plan amendments and, more specifically, to ascertain whether or not communities hold existence values around grizzly bears.

Values are “relatively general, yet enduring, conceptions of what is good or bad, right or wrong, desirable or undesirable.”

Beliefs are “judgments about what is true or false—judgments about what attributes are linked to a given object. Beliefs can also link actions to effects.”

Attitudes are “tendencies to react favorably or unfavorably to a situation, individual, object, or concept. They arise in part from a person’s values and beliefs regarding the attitude object” (Allen et al., 2009).

The public comments are largely consistent with the survey findings, discussed above, on views towards grizzly bears. Most comments are accepting of grizzly bears on the landscape and highlight the existence value of wildlife. However, they differ in their views on the type and extent of access and use restrictions that are necessary to protect grizzly bear habitat. The public comments also reflect diverse values related to human uses of forest lands.

Commenters differ in their beliefs on the relationship between human uses and grizzly bear habitat. One commenter states that “motorcycles do not belong in a location where grizzlies will then become accustomed to human noises and will make them more comfortable moving further into the populated valley. Additionally, noise from motorcycles is unwanted in an otherwise peaceful location” (comment 296-3). This, and related comments, reflect attitudes that motorized use imposes costs on both wildlife habitat and quiet recreation users.

In contrast, other commenters question the necessity of restrictions on motorized access to protect grizzly habitat. For instance, one commenter notes that “the Forest Service has taken the approach

that motorized use and human activity has been the biggest threat to bear populations when in reality it has been a simple ban on hunting grizzlies that has brought about the large rebound in grizzly populations. . . . The Forest Service is still pushing for minimum road and motorized trail densities claiming that high motorized use in critical habitat is the equivalent to the taking of a grizzly. How is it possible that restrictive motorized use is still needed when the recovery has already taken place?” (comment 357-1). Similarly, another commenter expresses concern that the Forest Service’s grizzly bear management activities may outlive their usefulness, noting that the Forest Service should develop “provisions for removing unneeded restrictions on some of the motorized travel once the grizzly is delisted” (comment 382-4).

Some commenters believe that the conflict between motorized uses and grizzly bear habitat are overestimated: “I fail to see how these restrictions are warranted regarding snowmobile use in the wilderness study area and the Ten Lakes area. If the Forest Service is placing these snowmobile restrictions for the purpose of limiting conflict between snowmobilers and grizzly bears in the area, then I have to say that there is no conflict. It is well known that black bears and grizzly bears hibernate in November and usually emerge in late March or April. If they are denning during this time then there is no conflict. Furthermore it is rare to see any wildlife be it mountain goats, elk, moose, deer or wolves. The high elevation areas are covered in deep mountain snow during this time so the wildlife is at lower elevations. I am alert to wildlife and enjoy viewing wildlife at all times of the year. It is safe to say that for 10 trips into the backcountry, we might cut a rabbit track, magpie or crow track only once. If the wildlife was there we would see them or evidence of them” (comment 381-2).

A number of these concerns are based on the perceived economic cost of access restrictions: “We need fewer gates and more access to our forest for recreational opportunities such as hiking, camping, boating, fishing, huckleberry picking, hunting, snowmobiling, bicycling, horseback riding, etc. all adding economic value in our community. Having more access also helps with fire suppression when needed in remote areas” (comment 421-7). Grizzly bear habitat protection is seen, by some commenters, as the origin of these restrictions, with one comment letter arguing, “Grizzly bear management has been the primary driver for road closures, trail closures and logging cancellations” (comment 357-1).

However, proponents of management actions that protect grizzly bear habitat also frequently cite economic considerations and the tourism value of wildlife habitat. For instance, one commenter noted that “wildlife viewing is one of the top two reasons people decide their travel destination will be Montana. Expenditures for travel/tourism in Montana are greatest around Glacier National Park, the Flathead National Forest and Yellowstone National Park, but this is true throughout the west and central Rocky Mountain front, and non-resident expenditures are very significant” (comment 388-19).

Other commenters argue that the existing NFS road system is excessive, financially unsustainable, and a threat to wildlife-related values. For example, one commenter stated, “The proposal weakens protections for [water quality, fish, wildlife, and visual quality], retaining the bloated 3,500-mile road system needed to log the inflated timber base rather than removing roads to protect resources and ease the burden on taxpayers” (comment 167-4). Furthermore, another commenter noted, the size of the current road system makes it infeasible to maintain: “Many Forests have bloated road networks of 1,000-3,000 miles, but budgets to maintain only a fraction of them. Closing many of these roads and restoring the habitat is both fiscally and ecologically wise” (comment 318-1).

Cultural and heritage values

Cultural and heritage values are described as the activities, values, preferences, and ways of living in a particular place and time. For more details on historic and tribal uses, see sections 6.16 and 6.17.

Rural lifestyles

The U.S. Census Bureau's urban-rural classification is fundamentally a delineation of geographical areas, identifying individual urban areas and then defining "rural" as encompassing all population, housing, and territory not included in a defined urban area. The Census Bureau delineates urban areas after each 10-year census by applying specified criteria to the census and other data. In 2010, the Census Bureau identified two types of urban areas:

- urbanized areas of 50,000 or more people and
- urban clusters of at least 2,500 and less than 50,000 people.

Thus, in the affected environment, "rural" encompasses all population, housing, and territory not included within these definitions (USCB, 2016).

The USDA Economic Research Service classifies rural counties in a number of ways. One way is by the Urban Influence Codes (ERS, 2013). The 2013 Urban Influence Codes form a classification scheme (shown in table 224) that distinguishes metropolitan counties by the population size of their metro area (codes 1 and 2) and nonmetropolitan counties (codes 3 through 12) by the size of the largest city or town and proximity to metro and micropolitan areas. Noncore counties are those counties not classified as a metropolitan or micropolitan statistical area.

Table 224. USDA Economic Research Service Urban Influence Code classification scheme

Code	Classification
1	In large metro area of 1+ million residents
2	In small metro area of less than 1 million residents
3	Micropolitan area adjacent to large metro area
4	Noncore adjacent to large metro area
5	Micropolitan area adjacent to small metro area
6	Noncore adjacent to small metro area and contains a town of at least 2,500 residents
7	Noncore adjacent to small metro area and does not contain a town of at least 2,500 residents
8	Micropolitan area not adjacent to a metro area
9	Noncore adjacent to micro area and contains a town of at least 2,500 residents
10	Noncore adjacent to micro area and does not contain a town of at least 2,500 residents
11	Noncore not adjacent to metro or micro area and contains a town of at least 2,500 residents
12	Noncore not adjacent to metro or micro area and does not contain a town of at least 2,500 residents

Table 225 shows the urban influence rating for the counties in the social and economic analysis area, sorted in ascending order. Missoula County is considered a small metropolitan county. Lake and Powell Counties, with a ranking of 6, are classified as noncore, adjacent to a small metro area, and containing a town of at least 2,500 residents. Four of the counties have a ranking of 7 (Granite, Mineral, Sanders, and Teton) and are considered noncore but adjacent to a small metro area and not containing a town of at least 2,500 residents. Flathead and Lewis and Clark Counties (classified as 8) are micropolitan areas not adjacent to a metro area. Lincoln County (with a classification of 11) is noncore, adjacent to a micropolitan area and contains a town of at least 2,500 residents. Finally, the

last two counties (Glacier and Pondera) shown in table 225, with a score of 11, are classified as noncore, not adjacent to a metro or micro area, and containing a town of at least 2,500 residents.

Table 225. Amendment forest counties, by Economic Research Service rural-urban continuum code

County	Urban Influence Code ¹
Missoula County	2
Lake County	6
Powell County	6
Granite County	7
Mineral County	7
Sanders County	7
Teton County	7
Flathead County	8
Lewis and Clark County	8
Lincoln County	9
Glacier County	11
Pondera County	11

1. See table 224 for description of codes.

Social assessments completed for some of the Forests in the area (Kootenai and Nez Perce-Clearwater) discuss how most of these communities and residents have a close relationship with the Forests through recreational pursuits, reliance upon products such as firewood and wild game, or as a part of living in a scenic, rural landscape (Russell & Adams-Russell, 2004a, 2004b). Although many residents of local communities value their small town atmosphere and values, they are also aware of the pressures of change. Community and county planning have been more on the forefront in recent years, although community members desire to maintain local control.

Examples from county growth policies in the social and economic analysis area highlight some of the values held by residents of the area. These examples are drawn from the growth policies for Flathead, Powell, Granite, and Mineral Counties.

- Flathead County: Maintaining the identity of rural communities is one of the objectives of the Flathead County Growth Policy. This objective states, “Preserving the rural lifestyle is a primary goal identified by many Flathead County residents. The ability to live ‘the simple life’ and own land in a safe, quiet, and environmentally pristine neighborhood away from cities is a characteristic many residents value.” Other objectives are to properly manage and protect the natural and human environment and promote the cultural resources and heritage of Flathead County while limiting interference with private land management opportunities (FBOCC, 2012).
- Powell County: This county’s growth policy includes goals to foster and preserve the identity of the rural agricultural areas and rural communities and the continuance of the small town and rural lifestyles of the county (PCBCC-MT, 2006).
- Granite County: This county’s growth policy includes goals to encourage new growth to locate near existing communities where services can be efficiently provided and the loss of agricultural and forest land is minimized; promote the protection of the rivers and streams and flood areas, riparian areas, and wetlands in the county; and retain or promote public access to recreational

and cultural areas such as forests, lakes, rivers, streams, and geologic, scenic, and historic sites (Michnevich et al., 2013).

- Mineral County: This county's growth policy includes establishing land use patterns that accommodate growth, preserve the identity and character of existing communities, and minimize conflicts with agriculture and existing businesses and industries while protecting and conserving the natural resources, clean air and water, and environment. The policy also promotes land use patterns that balance economic benefits and environmental stewardship and preserve the quality of life for all residents of the county, including residents in towns and unincorporated communities (MCBCC-MT, 2008).

Resource values and uses

Consumptive uses of natural resources, particularly ranching and logging, continue to be part of the livelihoods and lifestyles in the NCDE area.

Ranchers graze cattle, horses, sheep, and goats on the four Forests in the NCDE area. The majority of livestock grazing use occurs on the Helena-Lewis and Clark National Forest. Grizzly bear predation on livestock can reduce support for grizzly bear conservation measures among livestock permittees. The opinion survey results discussed above reveal that support for grizzly bears on the landscape is meaningfully lower among livestock operators than the general public. Therefore, social aversion to grizzly bears and associated conservation measures are more likely to occur in the parts of the primary conservation area that overlap with the Helena-Lewis and Clark National Forest.

Timber is removed from the forests for both commercial and personal use. Fuelwood is used for home heating throughout the social and economic analysis area. Granite, Lincoln, Mineral, and Sanders Counties are particularly reliant on wood for home heating, where more than 30 percent of households in each county report wood as their primary heating fuel (USCB, 2013). Fuelwood collection is part of both livelihoods and lifestyles in the analysis area. In addition to serving as an affordable home-heating source, fuelwood collection is tied to Western heritage values. Restrictions on motorized access can affect the ability of people to harvest timber and collect firewood.

The economic contribution analysis in section 6.18.6 provides more detail on the role of recreation, public land grazing, and timber harvesting in local communities and economies.

Health and Safety

Minimizing bear-human conflicts

Through educational campaigns, food storage regulations, and restrictions on access to areas where grizzly bears are likely to be active, the Forest Service and other State and local agencies work to minimize bear-human conflicts.

Environmental justice

Environmental justice is the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of environmental justice is for Federal agency decisionmakers to identify impacts that are disproportionately high and adverse with respect to minority and low-income populations and identify alternatives that will avoid or mitigate those impacts.

The emphasis of environmental justice is on health effects and/or the benefits of a healthy environment. The Council on Environmental Quality has interpreted health effects broadly: "Such

effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities or Indian Tribes . . . when those impacts are interrelated to impacts on the natural or physical environment” (CEQ, 1997, p. 26).

Table 226 displays the share of the population by race and ethnicity in the analysis area. Most counties are predominantly White and have a similar racial and ethnic composition as the State overall. However, Glacier, Lake, and Pondera Counties have large shares of Native American residents.

Table 226. Race and ethnicity by county

Location (County)	Two or More Races	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Hispanic or Latino (Any Race)
Flathead	1.9	95.5	0.2	1.6	0.5	0	0.3	2.4
Glacier	1.6	32.1	0.1	65.2	0.5	0.1	0.5	2
Granite	1.6	97.4	0.1	0.9	0	0	0	1.6
Lake	6.6	69.7	0.2	22.7	0.5	0	0.4	3.8
Lewis and Clark	2.2	93.6	0.4	2.8	0.5	0.1	0.4	2.6
Lincoln	0.8	95.9	0.1	2.1	0.8	0.1	0.1	2.4
Mineral	0.1	98.1	0.6	0.9	0.1	0	0.1	1.8
Missoula	2.7	92.7	0.4	2.7	1.1	0.1	0.3	2.8
Pondera	2	82.5	0.6	14.2	0.3	0	0.4	1.6
Powell	1.6	92.4	0.4	4.2	0.6	0.3	0.5	2.6
Sanders	1.9	91.9	0.1	5.6	0.1	0	0.3	2.2
Teton	1.3	95.6	0.1	2	0.3	0	0.7	1.4
Montana (State)	2.4	89.4	0.4	6.5	0.6	0.1	0.6	3.1

Data source: U.S. Census Bureau 2013 (Headwaters Economics, 2015).

Table 227 displays the share of people living below the poverty level in each analysis area county and the State. Most counties have similar rates of poverty to the State overall. However, in Glacier, Lake, and Sanders counties more than one-fifth of residents are in poverty. These data reveal substantial overlap between minority status and poverty rates. Glacier County has the highest rate of poverty, with one third of residents living below the poverty level. Glacier County also has the largest minority population, with approximately two thirds of residents identifying as Native Americans.

The four counties identified in this section (Glacier, Lake, Pondera, and Sanders) meet environmental justice standards. Management actions that have the potential to disproportionately and adversely affect low-income and minority populations are examined in the “Environmental consequences” section.

Table 227. Poverty rates by county

Location (County)	Percent of People Below Poverty Level
Flathead	14.2
Glacier	33.7
Granite	15.1
Lake	22.4
Lewis and Clark	10.4
Lincoln	17.9
Mineral	18.4
Missoula	16.5
Pondera	17.5
Powell	15.3
Sanders	22
Teton	15.1
Montana (State)	15.2

Data source: U.S. Census Bureau 2013 (Headwaters Economics, 2015).

6.18.5 Social environmental consequences

Effects common to all alternatives

Under all three alternatives, land ownership, land settlement, and land use trends will continue to influence natural resource management. Population trends for the affected environment are upward sloping, particularly in Flathead and Missoula counties. As such, it is likely that there will be increased visitation to Forest lands and, in turn, increased likelihood of bear-human encounters. These future conditions underscore the need to provide comprehensive policies that both protect bear habitat and minimize the likelihood of bear-human conflict.

Alternative 1 —No action

Recreation

Access to recreation under the no-action alternative will continue at the current levels across the Forests. See section 6.13 for details on each Forest.

Inspirational and existence values

The existing forest plans, together with food storage orders, travel plans, and biological opinions that provide mandatory terms and conditions to avoid or minimize incidental take, have been effective in contributing to the improved status of the NCDE grizzly bear population. Continued implementation of the no-action alternative would be compatible with contributing to the recovery of the NCDE grizzly bear population. However, the existing forest plans lack some of the components that are needed to provide the regulatory mechanisms that would support delisting of the NCDE population, and most do not provide specific management direction for areas outside the recovery zone that are now occupied by bears. Therefore, under this alternative, it is expected that the grizzly bear would remain under the protection of the Endangered Species Act.

Cultural and heritage values

Under the no-action alternative, grazing allotments would remain unchanged and communities in the affected environment would continue to enjoy a mix of urban and rural lifestyles. Access to Forest lands for cultural and heritage activities such as collection of firewood, visiting cultural sites, and wildlife viewing would continue.

Health and safety: Minimizing grizzly bear-human conflict

Measures that make food, garbage, and livestock carcasses inaccessible to bears through proper storage or disposal are very effective in reducing grizzly bear-human conflicts and the potential for injuries or mortalities. Efforts by the Forest Service to keep these attractants unavailable to bears, including the food storage orders shown in table 184, would continue under this alternative. However, some portions of national forests that are outside the recovery zone but are now occupied by grizzly bears are not covered by food/attractant storage orders or by specific management direction to coordinate grizzly bear habitat and human uses. There may be a higher risk of grizzly bear-human conflicts developing in those areas.

Alternative 2 modified

Recreation

Under alternative 2 modified, new developed recreation sites or expansion of existing sites with overnight use would be limited within the primary conservation area to no more than one per bear management unit per decade. This would limit the availability of developed sites in response to increased use. See section 6.13.6 for a detailed description of this limitation.

Under this alternative, restricted roads outside of secure core in the primary conservation area may be temporarily opened for public motorized use. Therefore, under this alternative, the public has less opportunity for motorized access to recreate and connect with nature, compared to alternative 1.

Inspirational and existence values

Under alternative 2 modified, a consistent set of forest plan components would be incorporated into the forest plans that would contribute to sustaining recovery of the NCDE grizzly bear population and provide for adequate regulatory mechanisms to support potential future delisting. Successful recovery and delisting of the grizzly bear could provide for greater inspiration and existence values as compared to the no-action alternative.

Cultural and heritage values

Under alternatives 2 modified and 3, restricted roads within the secure core of the primary conservation area would not be temporarily opened for public motorized use. This would allow the public fewer opportunities to participate in traditional and cultural activities such as collecting firewood and visiting cultural sites. Refer to section 6.15 for alternative 2 modified effects on grazing.

Health and safety: minimizing grizzly bear-human conflict

Under alternative 2 modified, a consistent set of forest plan components (desired conditions, standards, and guidelines) would be incorporated across the NCDE aimed at reducing the risk of grizzly bear-human conflicts associated with motorized access, recreation, vegetation management, livestock grazing, and minerals and energy development. As a result, efforts to minimize bear-human conflict might be more effective, as compared to alternative 1. This could result in fewer conflicts between bears and humans as well as between bears and livestock.

Alternative 3

Recreation

Under alternative 3, new developed recreation sites or expansion of existing sites would be limited within the primary conservation area to no more than one per bear management unit per decade. This would limit the availability of developed sites in response to increased use. Under this alternative, restricted roads within the secure core of the primary conservation area would not be allowed to be temporarily opened for public motorized use, the same as under alternative 2 modified. Both alternatives would also add NCDE-STD-AR-07, which requires ski areas that operate in the non-denning season to include mitigation measures to reduce the risk of grizzly bear-human conflicts, and NCDE-STD-AR-08, which prevents increase above the baseline in acreage of areas and miles of routes open to over-snow use during the den emergence period. See section 6.13.6 for a detailed description of these limitations.

Inspirational/existence values

Under alternative 3, some forest plan components in addition to those under alternative 2 modified would be incorporated into the forest plans. Most of the standards and guidelines pertaining to livestock grazing would be extended to zone 1. Within both the primary conservation area and zone 1, new oil and gas leases should include a no surface occupancy stipulation. These measures would be more protective of grizzly bear habitats and populations compared to alternative 1 and alternative 2 modified. As a result, this alternative provides for the greatest inspiration and existence values compared to all other alternatives.

Cultural/heritage values

Under alternatives 2 modified and 3, restricted roads within the secure core of the primary conservation area would not be temporarily opened for public motorized use. This would allow the public fewer opportunities to participate in traditional and cultural activities such as collecting firewood and visiting cultural sites.

Health and safety: Minimizing grizzly bear-human conflict

Under alternative 3, vegetation guidelines would be extended to the demographic connectivity areas as well as the primary conservation area, and most of the livestock grazing standards and guidelines would be extended to zone 1. As a result, efforts to minimize bear-human conflict might be more effective compared to alternative 1 and alternative 2 modified. This could result in fewer conflicts between grizzly bears and humans compared to alternative 1 and alternative 2 modified.

Cumulative effects

Climate change is predicted to increase the number of hot days in the region, leading to increased summer recreation and cultural visits to the Forests (Hand & Lawson, in press). As such, there may be added demand for recreation facilities in summer months.

Under all alternatives, provisions to manage for grizzly bear habitat and bear-human conflict on Forest lands will continue. These policies include food storage orders, bear-resistant containers, information/education campaigns, maintaining and improving grizzly habitat, and minimizing bear-human conflict. A portion of the NCDE area is located on private lands, and these landowners are under no obligation to manage for grizzly bears or their habitat except for the Endangered Species Act prohibitions against unauthorized take. This could provide greater economic opportunity for private recreation in the region.

Recreation, cultural/heritage values, inspirational/existence values, and measures to minimize bear-human conflict are provided for under all alternatives but to varying degrees. As natural amenity migration increases, the demand for outdoor recreation and the cultural value of wildlife viewing may increase. The new wave of natural amenity migrants moving to urban areas will not be as likely to own livestock and thus may be more likely to hold existence values for wildlife and favor conservation of grizzly bear habitat over grazing and timber harvest (Montag et al., 2003).

6.18.6 Economic affected environment

Rural areas surrounding Forests are often dependent upon Forest resources for much of their economic well-being. Understanding the economic context of the area surrounding the four Forests in the NCDE area provides important information to land managers because the economy of the local area influences and is influenced by the management of the Forests. Long-term, steady growth of population, employment, and real personal income is generally an indication of a healthy, prosperous economy. Conversely, erratic growth, no growth, or long-term decline in these indicators generally indicate a struggling economy. Growth can benefit the general population of a community, especially by providing economic opportunities, but it can also stress a community and lead to income stratification.

The following subsections provide information on sectors of the economy particularly influenced by national forest management; employment and income trends by type of industries; and Federal land payments and their importance to county revenue for the counties in the analysis area.

Commodity sectors

Table 228 shows the percent of total employment in 2012 accounted for by the commodity sectors (timber, mining, and agriculture) in the analysis area. Agriculture provides more employment generally; however, the amount of agricultural employment varies widely by county. Agriculture is more important to the 12-county area than the employment numbers suggest. The percentage of land area in farms is very high in some instances. Several counties have more than 50 percent of their land area in farms, including Lake County (58.3 percent), Teton County (67.1 percent), Glacier County (81.9 percent), and Pondera County (92.1 percent). The largest number of farms are associated with crop farming or beef cattle ranches and farms, each accounting for around 25 percent of the total farms in an area.

Information from the Montana Bureau of Business and Economic Research (McIver, Sorenson, Keegan, Morgan, & Menlove, 2013) indicates that by 2012, timber employment accounted for 2.1 percent of total private employment in the analysis area and ranged from a low of zero in Glacier and Pondera counties to a high of nearly 26 percent in Mineral County. The only other county with more than 10 percent of its employment in timber-related sectors in 2012 was Powell County at 23.7 percent. By comparison, as recently as 1998, timber employment accounted for 5.8 percent of the employment in the analysis area.

Table 228. Commodity sectors and percent of total employment in 2012

County	Timber ¹ (percent)	Mining ¹ (percent)	Agriculture ² (percent)
Flathead	3.1	0.1	1.8
Glacier	0.0	4.7	9.3
Granite	9.8	1.2	8.4
Lake	2.3	0.0	9.5

County	Timber ¹ (percent)	Mining ¹ (percent)	Agriculture ² (percent)
Lewis and Clark	0.2	0.8	1.5
Lincoln	5.1	4.3	3.7
Mineral	25.8	0.0	3.9
Missoula	1.2	0.2	0.9
Pondera	0.0	0.8	15.0
Powell	23.7	0.6	9.1
Sanders	6.4	2.2	10.6
Teton	0.4	0.0	20.0
Analysis Area	2.1	0.5	3.0

1. Data for timber and mining are from County Business Patterns (Headwaters Economics), which excludes proprietors, government, and railroads.

2. Data for agriculture are from the Bureau of Economic Analysis (Headwaters Economics).

Mining employment accounted for a very small percentage of employment in the area in 2012, 0.5 percent, compared to 2.2 percent for the State and 0.6 percent for the nation. The two counties with the largest amount of employment in mining are Glacier (4.7 percent) and Lincoln (4.3 percent). Mining employment has increased substantially, however, since 1998, when mining employment accounted for only 0.19 percent of employment in the area.

Travel and tourism

Table 229 shows the percent of total private employment in industries that include travel and tourism for the primary analysis area. Total private employment as shown here does not include employment in government, agriculture, railroads, or self-employment because these are not reported by County Business Patterns. From 15.1 to 30.6 percent of total private employment in the social and economic analysis area is associated with industries connected to travel and tourism, with most of that associated with the accommodation and food sector. From 1998 to 2012, travel and tourism employment grew from 18,801 to 23,327 jobs, a 24.1 percent increase. In 2012, Granite County had the largest percent of total travel and tourism employment (30.6 percent) and Teton County had the smallest (15.1 percent). In comparison, travel and tourism employment accounted for about 20 percent of employment in the State of Montana and 15.2 percent in the nation.

Table 229. Percent of total private employment in industries that include travel and tourism, 2012

County	Accommodation and Food Services (percent)	Arts, Entertainment, and Recreation (percent)	Passenger Transportation (percent)	Retail Trade (percent)	Total Travel and Tourism (percent)
Flathead	13.8	3.4	0.3	3.1	20.5
Glacier	14.9	1.1	0.0	5.1	21.2
Granite	16.2	0.6	0.0	13.7	30.6
Lake	12.4	1.1	0.0	3.4	16.9
Lewis and Clark	12.8	2.7	0.2	2.2	17.9
Lincoln	11.9	2.6	0.0	3.3	17.7
Mineral	10.8	2.6	0.0	16.0	29.4
Missoula	12.8	2.7	0.5	3.3	19.3

County	Accommodation and Food Services (percent)	Arts, Entertainment, and Recreation (percent)	Passenger Transportation (percent)	Retail Trade (percent)	Total Travel and Tourism (percent)
Pondera	10.7	2.4	0.0	4.1	17.2
Powell	12.2	4.9	0.1	2.8	20.0
Sanders	15.1	1.0	0.0	5.9	22.0
Teton	9.4	1.0	0.3	4.4	15.1
Analysis Area	13.0	2.7	0.3	3.3	19.3

Source: County Business Patterns 2012 (Headwaters Economics)

Employment

The economy in the social and economic analysis area is growing rapidly, outpacing the State of Montana as well as the nation as a whole. From 1970 to 2012, more than 140,026 new jobs were created. Employment growth in Flathead, Lake, Lewis and Clark, and Missoula Counties accounted for the majority of the change.

Table 230 shows that from 2001 to 2012, jobs in services-related industries grew from 131,587 to 154,693, an 18 percent increase, while jobs in non-services-related industries shrank from 36,862 to 32,968, an 11 percent decrease. During this same period, jobs in government grew from 33,604 to 37,581, a 12 percent increase.

Table 230 also shows that in 2012, the three industry sectors with the largest number of jobs were government (37,581 jobs), retail trade (26,398 jobs), and health care and social assistance (26,355 jobs). From 2001 to 2012, the three industry sectors that added the most new jobs were health care and social assistance (5,943 new jobs); real estate, rental, leasing (4,215 new jobs); and government (3,977 new jobs). The sectors losing the most employment from 2001 to 2012 were non-services sectors such as construction and manufacturing, which together lost nearly 4,000 jobs.

Table 230. Employment by industry within the 12 county analysis area, 2001-2012

Industry	2000 Employment ^a	2012 Employment ^a	Change (2000-2012)
Total employment (number of jobs)	203,444	227,236	23,792
Non-services-related	36,862 ^b	32,968 ^b	-3,894
Farm	7,342	6,923	-419
Forestry, fishing, & related activities	3,075 ^b	2,615 ^b	-460
Mining (including fossil fuels)	904 ^b	1,862 ^b	958
Construction	14,588 ^b	13,574 ^b	-1,014
Manufacturing	10,953 ^b	7,994 ^b	-2,959
Services-related	131,587 ^b	154,693 ^b	23,106
Utilities	753 ^b	821 ^b	68
Wholesale trade	4,762 ^b	4,793 ^b	31
Retail trade	25,096	26,398	1,302

Industry	2000 Employment ^a	2012 Employment ^a	Change (2000-2012)
Transportation and warehousing	6,202 ^b	5,815 ^b	-387
Information	4,106 ^b	3,485 ^b	-621
Finance and insurance	7,435 ^b	8,853 ^b	1,418
Real estate and rental and leasing	6,929 ^b	11,144 ^b	4,215
Professional and technical services	11,340 ^b	13,018 ^b	1,678
Management of companies and enterprises	638 ^b	919 ^b	281
Administrative and waste services	8,233 ^b	11,193 ^b	2,960
Educational services	2,182 ^b	3,383 ^b	1,201
Health care and social assistance	20,412 ^b	26,355 ^b	5,943
Arts, entertainment, and recreation	5,435 ^b	7,162 ^b	1,727
Accommodation and food services	16,427 ^b	18,528 ^b	2,101
Other services, except public administration	11,637 ^b	12,826 ^b	1,189
Government	33,604	37,581	3,977

a. Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional economic accounts, 2014, table CA25N, <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=7#reqid=70&step=24&isuri=1&7022=11&7023=7&7001=711&7090=70>.

b. Estimated data from Headwaters Economics for data that was not provided by the Bureau of Economic Analysis (Headwaters Economics).

Income

Total personal income has grown in recent years in the social and economic analysis area, with more than \$8,925 million in new income earned between 1970 and 2012. This was a higher rate of growth than for either the State or the nation. As with employment, the major contributors to this growth were the counties of Flathead, Lake, Lewis and Clark, and Missoula.

Non-labor income is a combination of dividends, interest and rent, and transfer payments. In 2012, dividends, interest, and rent was the largest source of non-labor income in the analysis area (22.7 percent), and transfer payments was the smallest (20.3 percent). However, the greatest growth, in percentage terms, was in hardship-related transfer payments such as Medicaid and welfare, which grew from \$67 million to \$755 million from 1970 to 2012, an increase of 1,034 percent (all dollar values have been adjusted for the impact of inflation). Age-related transfer payments grew from \$232 million in 1970 to \$1,578 million in 2012, an increase of 581 percent. Dividends, interest, and rent grew from \$750 million to \$3,057 million, an increase of 308 percent.

From 2001 to 2012, personal income from services-related industries grew from \$4,316 million to \$5,439 million (in real terms), a 26 percent increase. During this same time, however, personal income from non-services-related industries shrank from \$1,378 million to \$1,279 million (in real terms), a 7 percent decrease. Personal income from government jobs grew from \$1,750 million to \$2,224 million (in real terms), a 27 percent increase.

Wildland dependency

Wildland dependency is a measure of a community's reliance on industries tied to natural resource-based industries. Wildland dependency is calculated as the percentage of county total labor income (employee compensation and proprietor income) earned in five wildland resource areas (timber, mining, grazing, recreation, and wildlife) and Federal wildland-related employment (e.g., Forest Service, Department of the Interior agencies, etc.) (Gebert & Odell, 2007). The National Forest-Dependent Rural Communities Economic Diversification Act of 1990 (Pub. L. 101-624) defined a county as wildland dependent if 15 percent or more of its total county labor income (primary and secondary income) came from industries associated with forest resources. Primary income is income derived directly from the industrial sectors constituting the primary wildland industries, and secondary income is that derived from indirect and induced effects associated with primary income (also known as the multiplier effect) (Gebert & Odell, 2007). Indirect effects are felt by the producers of materials used by the directly affected industries. Induced effects occur when employees of the directly and indirectly affected industries spend the wages they receive.

Wildland dependency calculations for the social and economic analysis area are provided in table 231 by county. In 2010, half of the counties met the 15 percent criterion for wildland dependency: Glacier, Granite, Lincoln, Mineral, Powell, and Sanders Counties. Counties that had been wildland dependent in 2000 but no longer met the criterion in 2010 included Flathead and Teton Counties. The remaining four counties (Lake, Lewis and Clark, Missoula, and Pondera) did not meet the 15 percent criterion for dependency in either year. All counties, with the exception of Lewis and Clark and Pondera Counties, saw a substantial drop in wildland dependency over the 10-year period.

Table 231. Wildland dependency (percent of total county labor income derived from wildland-based industries) for the analysis area counties, 2010, and change from 2000

County	Grazing (%)	Timber (%)	Mining (%)	Govt. (%)	Rec. (%)	Total Primary (%)	Secondary (%)	Total (%)
Flathead	0.1	3.7	1.4	1.9	1.3	8.4	4.7	13.1
% change	0.0	-2.0	0.9	0.5	-3.8	-4.5	-2.6	-7.1
Glacier	0.5	0.1	4.7	4.0	4.1	13.4	2.4	15.8 ^a
% change	-0.5	-0.3	3.3	-0.5	-6.5	-4.6	-6.8	-11.4
Granite	0.3	9.5	1.8	4.8	4.7	21.1	7.3	28.4 ^a
% change	-2.4	-3.2	-1.4	2.0	-3.2	-8.2	-9.6	-17.8
Lake	0.2	0.7	0.8	0.8	0.1	2.7	1.5	4.2
% change	-0.8	-3.5	0.1	0.0	-0.4	-4.7	-3.3	-8.0
Lewis and Clark	1.0	0.1	0.9	0.2	0.2	2.3	0.9	3.2
% change	0.8	-0.1	-0.6	-0.4	-0.8	-1.0	-0.6	-1.6
Lincoln	0.1	4.9	6.8	9.8	2.2	23.8	8.0	31.8 ^a
% change	-0.1	-21.3	6.7	3.7	-2.5	-13.4	-11.6	-25.0
Mineral	< 0.1	11.4	0.9	5.8	3.6	21.7	6.9	28.6 ^a
% change	-0.2	-1.4	-2.5	1.2	-6.5	-9.4	-11.7	-21.1
Missoula	< 0.1	1.7	0.3	3.2	0.1	5.3	2.5	7.8
% change	-0.1	-3.8	0	1.0	-0.3	-3.2	-3.7	-6.9
Pondera	1.4	0.0	2.9	0.7	0.4	5.4	2.4	7.8
% change	-0.3	-1.1	1.4	0.3	-0.6	-0.3	-2.9	-3.3

County	Grazing (%)	Timber (%)	Mining (%)	Govt. (%)	Rec. (%)	Total Primary (%)	Secondary (%)	Total (%)
Powell	2.0	8.1	0.1	2.0	2.3	13.4	5.9	19.3 ^a
% change	-0.3	-7.1	-0.6	0.3	-3.2	-12.1	-12.1	-24.2
Sanders	0.2	4.1	3.2	4.2	2.1	13.9	4.8	18.7 ^a
% change	-1.1	-4.0	2.8	0.9	-2.6	-4.1	-5.2	-9.3
Teton	1.6	0.1	3.5	2.6	0.9	8.7	3.0	11.7
Change	-2.4	-0.9	2.9	1.3	-2.8	-1.9	-6.1	-7.9

a. Wildland dependent: met or exceeded the 15 percent criterion for wildland dependency

Economic contribution of national forest management

Management of national forests contributes to the local economies by the products (e.g., timber and minerals) that are produced on the national forests and processed in the local economy; by the uses (e.g., recreation visits) that occur on the national forests; and by the service provided by employees of the national forests.

Current national forest contributions to employment and income were estimated with input-output analysis using the Impact Analysis for Planning (IMPLAN) modeling system (MIG, 2004) and the Forest Economic Analysis Spreadsheet Tool (FEAST) (Alward et al., 2010). The IMPLAN modeling system allows the user to build regional economic models of one or more counties for a particular year. The model for this analysis used the 2012 IMPLAN data. FEAST is a spreadsheet-based modeling tool that serves as an interface between user inputs and imported data from an existing IMPLAN model.

Input-output analysis is a means of examining relationships within an economy, both among businesses and between businesses and final consumers. The analysis captures monetary market transactions for consumption in a given time period. Economic contribution analysis is defined as “the gross change in economic activity associated with an industry, event, or policy in an existing regional economy” (Watson, Wilson, Thilmany, & Winter, 2007, p. 142). By using Forest Service expenditure data, resource output data, and other economic information, the IMPLAN model can describe, among other things, the jobs and income that are supported by NFS management activities. The jobs and income contributed by the NFS can be divided into three types:

- direct contributions: the contributions accruing to the original or “direct” industries providing goods and services connected to management activities;
- indirect contributions: the contributions accruing to the local sectors/industries providing inputs of goods and services to the directly affected industries; and
- induced contributions: the contributions arising from employees in the direct and indirect industries spending their earnings in the local economy.

The following subsections describe the jobs and income associated with management activities that have the potential to be affected by the alternatives. The payments to States associated with some of these industries are also discussed.

Livestock grazing

Domestic livestock grazing has been, and continues to be, an important use of national forest lands within the social and economic analysis area, particularly on the Lewis and Clark National Forest. In 2014, there were 32 grazing allotments on the lands contained within the primary conservation area.

Permits associated with allotments allow for a certain number of cattle to be grazed for a particular period of time. The number of animal unit months (also known as “AUMs,” the amount of dry forage required by one mature cow for one month) is calculated using both the period of time and the number of animals. For example, a permit that allows 100 cows to graze for a period of 3 months would equate to 300 animal unit months. The grazing permits associated with the allotments within the primary conservation area equate to approximately 12,324 animal unit months for cattle and 133 for sheep. More than 83 percent of the cattle grazing occurs on the Lewis and Clark National Forest, and 100 percent of the sheep grazing occurs on the Helena National Forest. Table 232 shows the breakdown of animal unit months in the primary conservation area by Forest.

Table 232. Animal unit months of grazing occurring in the primary conservation area by national forest, 2013

National Forest	Cattle (animal unit months)	Sheep (animal unit months)
Flathead	497	—
Helena	1,029	133
Kootenai	442	—
Lewis and Clark	10,315	—
Lolo	41	—
Total	12,324	133

Oil, gas, and minerals

There is no locatable mineral or leasable mineral production currently or in the last three years off of any of the affected lands. There is a minor amount of common variety mineral production, but that production is used by the Forest Service for internal use and, in some cases, by counties in the maintenance of shared-use roads.

Recreation and tourism

The national forests in the NCDE provide a variety of recreational experiences, ranging from day visits to destination recreational trips. Lodging, food, services, outfitting and guiding, and retail trade all are dependent to varying degrees on people visiting and recreating on the national forests. However, forest visitation numbers are collected and compiled at the Forest scale through the National Visitor Use Monitoring survey. Since the primary conservation area does not encompass all of the NFS lands in the four affected Forests, describing the economic contribution of these lands, as was done for grazing and timber, is not possible. Therefore, we describe the economic contributions of recreation activities in the social and economic analysis area in terms of employment impacts per 1,000 recreation visits.

Table 233 and table 234 show the employment response to 1,000 recreation visits for both wildlife- and non-wildlife related activities. The tables differentiate between wildlife-related visits such as hunting, fishing, and wildlife viewing and non-wildlife-related visits such as camping and hiking. Visits that include an overnight stay off of the Forest have the greatest impact, regardless of whether the visit is wildlife or non-wildlife related. Non-local visitation also creates/supports more jobs per 1,000 visits than local visitation. However, it is important to note that impacts from Forest visitation depend upon the mix of local vs. non-local use and overnight vs. day use. In some instances, non-local visitation may create the largest economic impacts in total, whereas in other cases the sheer number of local visits may create more impacts even though the per visit impacts may be lower.

Labor income impacts associated with 1,000 recreation visits are shown in table 235 and table 236. The same pattern (local vs. non-local and day use vs. overnight use) is evident. The greatest impact per 1,000 recreation visits is from wildlife-related non-local visits that include an overnight stay off of the national forest (\$94,453 in labor income for each 1,000 visits). This amounts to an average labor income of approximately \$28,622 per job (dividing the \$94,453 in labor income shown in table 235 by the 3.3 jobs shown in table 233).

Table 233. Employment per 1,000 wildlife-related (hunting, fishing, viewing) Forest visits (2012 Impact Analysis for Planning data)

Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	0.2	0.0	0.0	0.2
Local	Overnight off-Forest	0.8	0.2	0.2	1.2
Local	Overnight on-Forest	0.7	0.2	0.2	1.0
Non-local	Day use	0.2	0.0	0.1	0.3
Non-local	Overnight off-Forest	2.3	0.5	0.5	3.3
Non-local	Overnight on-Forest	1.2	0.3	0.3	1.8

Table 234. Employment per 1,000 non-wildlife-related (camping, hiking, etc.) Forest visits (2012 Impact Analysis for Planning data)

Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	0.1	0.0	0.0	0.1
Local	Overnight off-Forest	0.9	0.2	0.2	1.3
Local	Overnight on-Forest	0.4	0.1	0.1	0.7
Non-local	Day use	0.3	0.0	0.1	0.4
Non-local	Overnight off-Forest	2.4	0.5	0.5	3.4
Non-local	Overnight on-Forest	0.8	0.2	0.2	1.1

Table 235. Labor income (2012 dollars) per 1,000 wildlife-related (hunting, fishing, viewing) Forest visits

Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	4,904	1,196	1,380	7,480
Local	Overnight off-Forest	25,480	6,037	7,125	38,642
Local	Overnight on-Forest	22,341	5,387	6,271	33,999
Non-local	Day use	6,713	1,661	1,895	10,269
Non-local	Overnight off-Forest	59,867	17,173	17,413	94,453
Non-local	Overnight on-Forest	35,305	9,197	10,062	54,564

Table 236. Labor income (2012 dollars) per 1,000 non-wildlife-related (camping, hiking, etc.) Forest visits

Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	3,793	925	1,067	5,785
Local	Overnight off-Forest	23,517	6,457	6,776	36,749
Local	Overnight on-Forest	15,051	3,518	4,199	22,768
Non-local	Day use	6,689	1,599	1,874	10,161
Non-local	Overnight off-Forest	57,242	17,437	16,877	91,556
Non-local	Overnight on-Forest	22,001	5,785	6,281	34,066

Timber

The original mission of the Forest Service focused on protecting water and timber, and timber harvest continues to be an important use of many national forests, including those in the NCDE. Table 237 provides an estimate of the amount of timber harvested from the lands in the primary conservation area from 2011 to 2013, which amounted to approximately 77,919 hundred cubic feet in total or around 26,000 hundred cubic feet annually. These numbers were arrived at through a combination of GIS analysis and FACTS (Forest Service Activities Tracking System) data, which provided acres of commercial timber harvest, and estimates of volume per acre from the Northern Region.

Table 237. Acres of commercial harvest and associated volume from lands within the primary conservation area from years 2011-2013

National Forest	Acres	Volume/Acre (ccf) ¹	Volume 2011-2013	Annual Volume
Flathead	3,917	19 ²	74,423	24,808
Helena	153	14	2,907	969
Kootenai	0	—	0	0
Lewis and Clark	0	—	0	0
Lolo	31	16	589	196
All Forests (Total)	4,101	49	77,919	25,973

Source: USDA Forest Service, Forest products cut and sold from the national forests and grasslands, Acres volume per acre (Region 1), 2011-2013, <http://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml>

1. ccf = hundred cubic feet

2.* Ranged from 18-20 ccf depending upon ranger district, so the mid-point was used

Summary of economic contributions

For grazing resources, approximately 25 jobs, \$364,500 in total labor income, and \$826,000 in value added (gross regional product) are associated with the animal unit months of forage shown in Table 232. These jobs account for a little over 2 percent of the 1,209 total cattle ranching and farming jobs in the 12-county analysis area. Total jobs may include part-time positions and, as calculated, include the unpaid labor of family members; therefore, income per job tends to be low when compared to other industrial sectors.

For timber resources, the 26,000 hundred cubic feet harvested annually (three-year average) contribute to the local economy approximately 204 jobs, \$8.8 million in labor income, and \$13 million in value added. The estimates of jobs and income attributable to timber harvest and processing are highly dependent upon how the wood is being processed. To determine this estimate, the timber harvest was split into sectors as shown in table 238. The sector breakdown came from a recent analysis done for the Flathead and Helena-Lewis and Clark National Forests' plan revision efforts and recent timber projects on the Lolo National Forest. Around 97 of these jobs, \$4.2 million of labor income, and \$5.8 million in value added are directly associated with the harvesting and processing of timber within the analysis area. The remainder comes from the indirect and induced impacts.

For recreation, both local and non-local visitor expenditures contribute to the regional economy (12-county study area). Approximately 20 jobs are supported or sustained for every 1,000 visits to the Forests, along with \$580,000 in labor income and \$943,000 in value added (gross regional product).

Table 238. Processing sectors used for timber impact calculations

Forest Product Subsectors	Estimated Forest Product Distribution
Softwood sawtimber	53.4%
Softwood pulp	3.7%
Posts	0.4%
Fuelwood	19.3%
Non-saw and other products	23.2%

Table 239, table 240, table 241, and table 242 summarize the estimated annual economic contributions, in terms of employment, employee compensation, labor income, and value added, associated with management activities that have the potential to be affected by the alternatives. As previously discussed, those resource areas include timber, grazing, and recreation.

Table 239. Estimated annual average economic contribution (employment) by resource area

Resource Area	Direct ¹	Indirect + Induced ¹	Total ¹
Grazing	18	7	25
Timber	97	108	204
Recreation (per 1,000 visits, local and non-local)	14	6	20

1. Number of full-time and part-time jobs

Table 240. Estimated annual average economic contribution (employee compensation in 2012 dollars) by resource area

Resource Area	Direct	Indirect + Induced	Total
Grazing	137,972	141,609	279,581
Timber	3,839,026	3,659,141	7,498,167
Recreation (per 1,000 visits, local and non-local)	337,371	174,214	511,585

Table 241. Estimated annual average economic contribution (labor income in 2012 dollars) by resource area

Resource Area	Direct	Indirect + Induced	Total
Grazing	178,641	185,920	364,561
Timber	4,246,725	4,596,906	8,843,631
Recreation (per 1,000 visits, local and non-local)	371,182	209,484	580,666

Table 242. Estimated annual average economic contribution (value added/gross regional product in 2012 dollars) by resource area

Resource Area	Direct	Indirect + Induced	Total
Grazing	474,559	351,161	825,720
Timber	5,868,412	7,172,696	13,041,108
Recreation (per 1,000 visits, local and non-local)	571,966	371,301	943,267

Employments reported here represent the average annual full-time and part-time, seasonal and temporary jobs that can be attributed to agency management, such as animal unit months authorized and timber sales. These jobs (as with other subsequent contributions such as labor income and gross regional product) stemmed from private sector activities, including visitor spending, cattle and sheep grazing, timber harvesting and processing, and associated commodities entering the local economy. It is important to note that this analysis used IMPLAN to estimate employment response coefficients; therefore, jobs as reported here are expressed in annual averages of both full-time and part-time total wage and salary employees as well as self-employed jobs. This method of counting employment is a standard convention and is consistent with methods used by the U.S. Bureau of Labor Statistics. One cannot discern the number of hours worked or the proportion that is full time vs. part time. The impacts include both full-time and part-time employment, so a person with more than one job could show up more than once in the data. This prohibits comparisons to population data and inferences about the effect on unemployment rates.

Labor income, as reported here, is interpreted as the value of wages, benefits, and proprietors' income. Value added, or gross regional product, consists of four measures:

- employee compensation, wages and salaries plus benefits paid by local industries;
- proprietor income, income from self-employment;
- other property income, corporate income, rental income, interest, and corporate transfer payments; and
- indirect business taxes, sales, excise, fees, licenses, and other taxes paid, including non-income-based payments to the government.

Gross regional product (or “value added” in IMPLAN) is a popular and widely used measure of economic growth that takes into account the incremental value added to a product or service at each step of the production process.

Payments to States

As the Federal government began reserving more and more of the public domain in the late 1800s, the question arose of whether or not State and local governments could tax these publicly held lands. Early in the 19th century, the U.S. Supreme Court answered “no,” holding that local governments could not tax Federal lands within their jurisdictions. Local governments then had a reason to be concerned about Federal retention of the public domain—Federal actions could affect local revenues. The reservation of public domain for forest reserves in 1891 led to a change in the relationship between the Federal government and local jurisdictions. The Federal government began providing local governments with payments in lieu of (i.e., instead of) property taxes. The forest reserves of 1891 became the national forests of 1905, and legislation passed in 1908 required the Forest Service to share 25 percent of its revenues (known as the 25 percent fund) with local governments. This legislation was followed by legislation providing for additional revenue-sharing arrangements between other Federal agencies and local governments, including the Taylor Grazing Act of 1934, revenue sharing on wildlife refuges, and so on.

Prior to 1976, all Federal payments were linked directly to receipts generated on public lands. Congress funded payments in lieu of property taxes, with appropriations beginning in 1977 in recognition of the volatility and inadequacy of Federal revenue-sharing programs. Payments in lieu of property taxes were intended to stabilize and increase Federal land payments to county governments because the payments were based largely on the amount of Federal acreage in an area rather than the amount of revenue coming from those lands. More recently, the Secure Rural Schools

and Community Self-Determination Act of 2000 (Secure Rural Schools Act) decoupled Forest Service payments from commercial receipts. The Secure Rural Schools Act received broad support because it addressed several major concerns around receipt-based programs—volatility, the payment level, and the incentives provided to counties by linking Federal land payments directly to extractive uses of public lands. The new law allowed counties the option of continuing to receive the 25 Percent Fund Act amount or electing to receive a fixed amount based on the average of the highest three years between 1986 and 1999. On October 3, 2008, the Secure Rural Schools Act was amended and reauthorized in Pub. L. 110-343. The amended Secure Rural Schools Act gives counties the option of two payment methods. The payment options are (1) a newly modified 25 Percent Fund Act payment based on a seven-year rolling average of receipts from NFS lands or (2) a share of the State payment as calculated under the new Secure Rural Schools Act. The new formula uses multiple factors, including acres of Federal land within an eligible county, average three highest 25 Percent Fund Act payments, and an income adjustment based on the per capita personal income for each county.

Figure 87 shows the different types of Federal land payments received by the counties in the analysis area in 2013. Counties where the majority of their payment comes from the Forest Service, such as Granite, Lincoln, Mineral, and Sanders Counties, would be most affected if the Secure Rural Schools Act is not reauthorized, which would cause them to revert back to 25 Percent Fund Act payments. Flathead and Powell Counties also receive a substantial amount of Forest Service payments. For Glacier, Lake, Lewis and Clark, Missoula, Pondera, and Teton Counties, the majority of their Federal land payments come from payments in lieu of property taxes.

Figure 88 shows the 25 Percent Fund Act payments received by each of the counties from 1986 to 2000 and the Secure Rural Schools Act payments they received from 2001 to 2013. The decrease in 25 Percent Fund Act payments starting around 1993 as timber harvests started to fall on NFS lands is readily apparent, particularly for those counties receiving the highest payments, such as Lincoln, Sanders, Flathead, Mineral, and Powell. Also apparent is the rise in payments that occurred in 2008.

The Secure Rural Schools Act program expired on September 30, 2014, and was not reauthorized until April 16, 2015. During that interim period (between September 2014 and April 2015), the 1908 Act, as amended, required payment distribution to States based on a 25 percent rolling average. The 25 Percent Fund Act payments were made in February based on a seven-year rolling average of receipts from national forests. Table 243 shows both Secure Rural Schools Act payments from 2013 and 2014, as well as the 25 Percent Fund Act distribution.

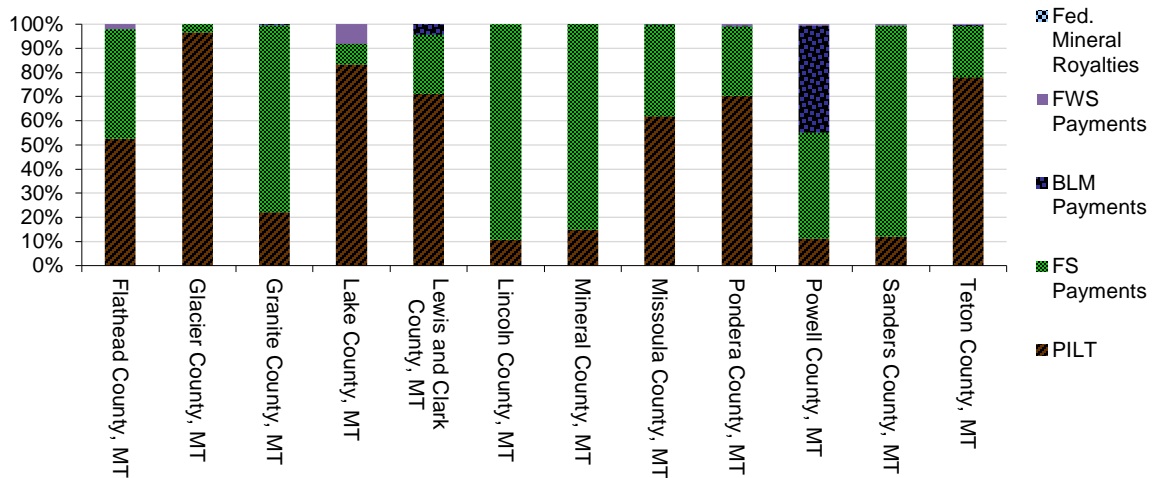


Figure 87. Components of Federal land payments to State and local governments by geography of origin, fiscal year 2013 (Headwaters Economics). FWS = U.S. Fish and Wildlife Service, BLM = Bureau of Land Management, FS = Forest Service, PILT = payment in lieu of taxes.

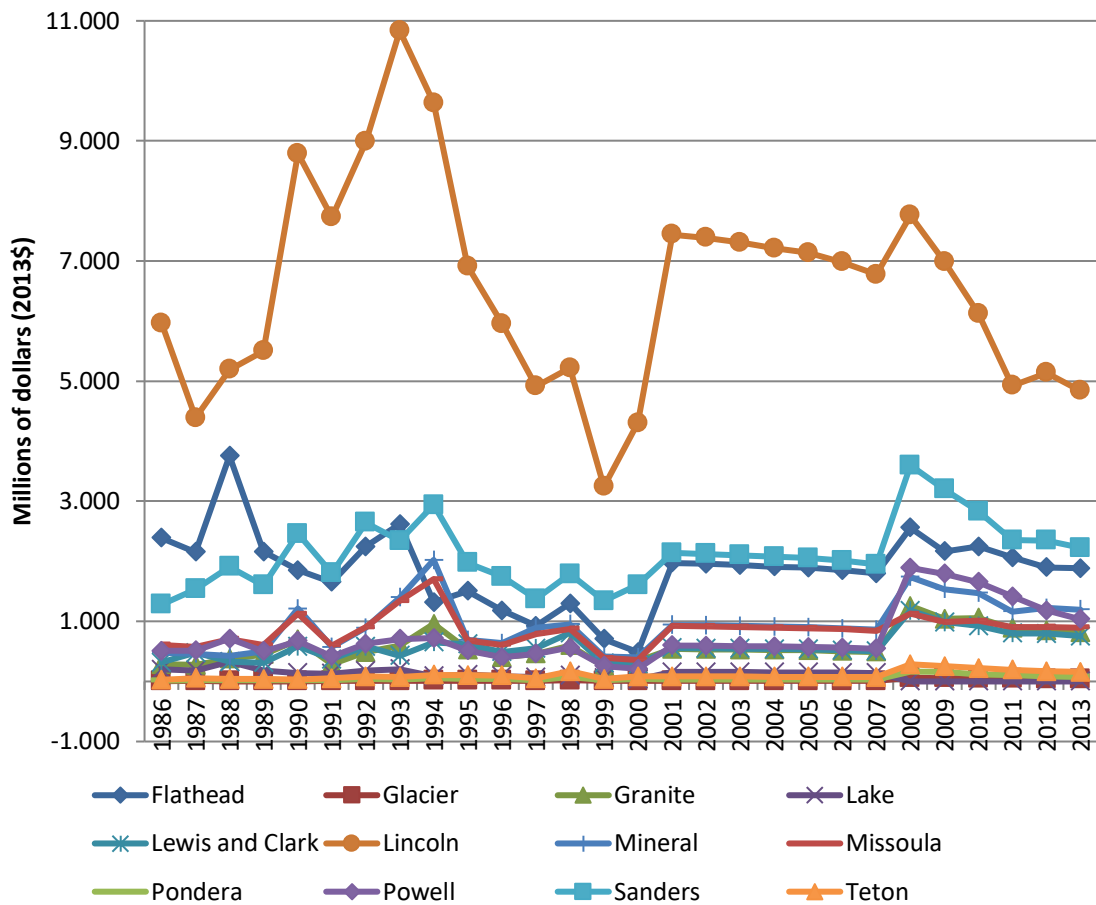


Figure 88. Forest Service payments to States: 25 Percent Fund Act payments (1986-2000) and Secure Rural School Act Payments (2001-2013) (Headwaters Economics)

Table 243. 2013-2014 Secure Rural Schools Act and 2014 25 Percent Fund payments (paid in fiscal year 2015)

County	Fiscal Year 2013 Secure Rural Schools Act Payment	Fiscal Year 2014 Secure Rural Schools Act Payment	2014 25 Percent Fund Distributions
Flathead	\$1,882,558	\$1,735,744	\$366,748
Glacier	\$32,289	\$33,934	\$1,425
Granite	\$817,747	\$756,797	\$89,666
Lake	\$0	\$0	\$34,408
Lewis and Clark	\$752,595	\$734,372	\$96,589
Lincoln	\$4,841,614	\$4,708,280	\$471,261
Mineral	\$1,197,171	\$1,173,758	\$70,271
Missoula	\$895,944	\$891,500	\$103,415
Pondera	\$79,699	\$83,789	\$5,298
Powell	\$1,036,725	\$947,068	\$101,250
Sanders	\$2,226,995	\$2,086,541	\$241,491
Teton	\$158,236	\$129,804	\$11,648

Sources: USDA Forest Service, Payments and Receipts, *Secure Rural Schools*.

<http://www.fs.usda.gov/main/pts/securepayments/projectedpayments>; USDA Forest Service, Secure Rural Schools and Community Self-Determination Act, *Secure Rural Schools*, <http://www.fs.usda.gov/main/pts/home>.

Figure 89 shows the percentage of total county general revenue that comes from Federal land payments for each county in the analysis area. The amount to which the counties rely on these funds for revenue varies widely by county and is dependent upon not only the amount of the payment but also the size of the county's overall economy and the size of its tax base. Counties with a large amount of Federal land have a smaller tax base upon which to generate revenue. Likewise, larger economies with more economic diversity tend to rely less heavily on these payments as a source of revenue, as is the case with Flathead and Missoula Counties, even though under the Secure Rural Schools Act they received fairly high payments. Lincoln County, which received the largest amount of Secure Rural Schools Act payments in the State, relies heavily upon these payments due to the fact that the amount of money is large, the size of the economy is small, and the county is made up primarily of Federal lands.

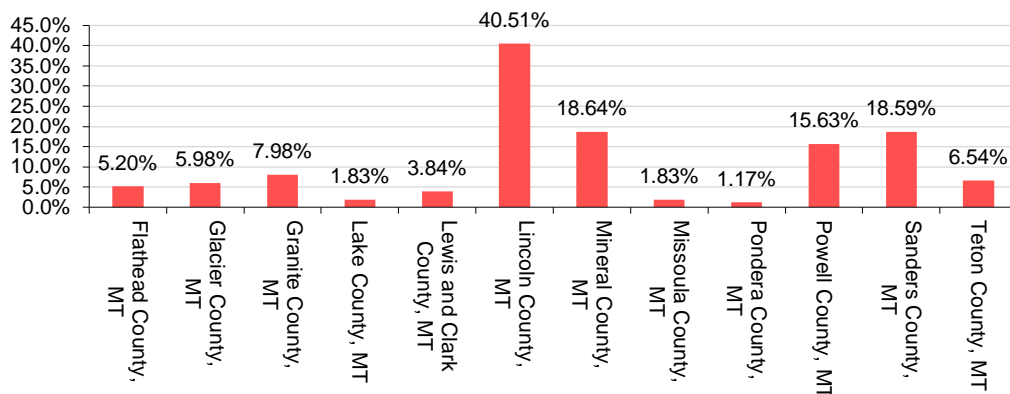


Figure 89. Federal land payments as a percentage of total county general revenue, 2007 (Headwaters Economics)

6.18.7 Economic environmental consequences

Changes in the supply of ecosystem services and the value of multiple use resources would potentially alter economic activity connected to those services or resources. Overall, the plausible economic consequences related to the NCDE amendment action alternatives would be limited in scale because the impacts to supply of services and value of resources is either limited or only qualitatively understood across alternatives. Considering key policy changes between alternatives, a transparent and possible consequence stems from changes to the availability and feasibility of future timber harvest opportunities in the primary conservation area, zone 1, and demographic connectivity areas. To a lesser extent, other possibilities include changes to recreation activity zoning (seasonally and spatially). And perhaps least transparent are the consequential connections between ecosystems (biodiversity and popular species) and long-term travel and migration patterns.

Within the NCDE multi-county analysis area, as detailed above, there is evidence of shrinking forest-related and manufacturing sectors. Across the northern Rockies, these sectors are losing significance relative to growing service sectors (i.e., a diversification of employment and income away from agriculture and natural resources). Although most rural counties and communities remain largely dependent on the aforementioned primary sectors, a vast majority of the area population, employment, and income activity does not tangibly depend on public forest resources or policy. For those employment and income sources that do depend on public forest policy, and for those rural counties and communities that do depend on the forest-related sectors, the environmental consequences are considered by alternative.

Alternative 1—No action

Timber sales

For all amendment forests, access to lands suitable for timber production within grizzly bear habitat is allowed within specified limits under the forest plans and associated requirements of biological opinions. Space and time considerations for grizzly bears limit access for commercial timber harvest as well as for stand-tending needs. To the extent that the action alternatives improve transparency for sale preparation, administration, and timber purchasers, some efficiencies may be gained as

compared to alternative 1. Quantifiable, significant economic impacts across alternatives were not determined.

Recreation

The most important recreation patterns to follow in terms of economic influence are those from non-local visitors. When non-local visitors travel in the area, their consumption of goods and services represent an important incremental increase to an area economy. To gauge non-local visitation patterns, trend observations (NVUM) are made from recreation data across national forests. Where policy decisions and non-local visitation patterns can most clearly be connected, so too can the recreation-related economic consequences of those policy decisions.

As covered in section 6.13, across all amended forests, under the no-action alternative the existing recreation capacity and infrastructure would remain relatively static over time. However, status quo restrictions on recreation site development might be in conflict with population trends and demand for overall recreation opportunities.

Alternative 2 modified

Timber sales

For the amendment forests, there is no substantive difference between alternative 1 and alternative 2 modified within the primary conservation areas in relation to access for timber harvest or stand-tending needs. For all amendment forests, both alternative 1 and alternative 2 modified would require no net increase in motorized route densities and no net decrease in secure core in the primary conservation area. In a few instances, access to secure core has been allowed through site-specific project consultation. Little change in access for timber harvest or stand-tending needs in primary core areas on the amendment forests is expected under alternative 2 modified. Again, in terms of the aggregate supply of timber resources, or opportunities for timber sales, no significant consequences are anticipated between alternative selections.

Recreation

Under alternative 2 modified, recreation patterns, especially non-local visitation into an area, would not likely be influenced by the alternative policy directions. For more information on direct recreation effects, see the recreation section 6.13.5 effects analysis.

As reviewed in section 6.13, alternative 2 modified and alternative 3 would both require permitted ski areas to work towards mitigation of grizzly bear-human conflicts within the primary conservation area. These regulatory changes would likely increase the potential cost of operations for ski areas, but these additional costs on ski area balance sheets are difficult to measure. Considering the economic consequences, it is worth noting that very few ski areas exist within the primary conservation area, and to actually affect the economy through non-local visitation, policy direction would need to increase ski ticket prices substantially or close a ski area, thus deterring recreation travel. Both of these impacts are unlikely, which limits the risks associated with alternative 2 modified or alternative 3.

Alternative 3

Timber sales

Under this alternative, the most important considerations are the expansion of vegetation management guidelines to the Salish and Ninemile demographic connectivity areas and additional

standards limiting motorized access on the Lolo National Forest. The expansion of existing vegetation guidelines to these demographic connectivity areas would not limit access for vegetation management on the Kootenai and Lolo. However, the additional standard limiting motorized routes might affect access to areas suitable for timber production or forest tending in the demographic connectivity areas (Lolo) and the portion of zone 1 and zone 2 west of Interstate 15 on the Helena National Forest.

In terms of economic consequences, the additional standard limiting motorized access routes might impact the feasibility and hence success of future timber sale activities. In a more limiting situation, the standard might isolate or close off certain lands for management. This possibility carries with it potential impacts to forestry and forest products income and jobs. The connectivity area where this would be most significant in terms of acreage would likely be the Nine Mile Ranger District of the Lolo National Forest. This district provides timber for Missoula and Sanders Counties primarily, but merchantable timber may potentially travel farther. Missoula County has limited remaining forest product manufacturing, but Sanders County would be more sensitive to changes in timber supply due to its more rural and resource-dependent economy. Sanders County maintains 6.5 percent of its private employment in forestry and forest products sectors (USCB, 2015). A more accurate account of potential impact would need to consider how much merchantable log volume would be removed from the market by the new standard relative to the all-ownership timber supply chain in this multi-county area.

Recreation

The effects on ski areas from the requirements to mitigate grizzly bear-human conflicts would be the same for alternative 2 modified and alternative 3.

Cumulative effects

Many factors influence and affect the local social and economic environment. National, State, and county policies affect population growth, demographics, and land uses. Following is a brief description of some items that are changing or may change in the future, adding to the effects on local communities from the alternatives.

Population growth and climate change

Between 2000 and 2010, the West was the fastest-growing region in the country, and this trend is expected to continue for the next 20 years (USCB, 2010). With this increased growth rate comes an increased diversification of the population. More new residents are migrating in while the adult children of families living in the region are moving out of the area to find employment. This change in population composition has added to the diversity of attitudes, lifestyles, and values of the population within the NCDE area. The social assessment found there is a concern among some stakeholders that new residents are changing the nature of their communities. As natural amenity migration increases, the demand for outdoor recreation and the cultural value of wildlife viewing may increase. The new wave of natural amenity migrants, who are moving primarily to urban areas, may be more likely to hold existence values around wildlife and favor conservation of grizzly bear habitat over grazing and timber harvest (Montag et al., 2003).

Climate change is predicted to increase the number of hot days in the region, leading to increased summer recreation and cultural visits to the Forests (Hand & Lawson, in press). As such, there may be added demand for recreation facilities in summer months.

Development of forestlands and subdivision of private timberlands

There has also been increased housing density adjacent to and within national forest boundaries, and this trend is expected to continue over the next several decades. Moderate and high increases in residential development are projected around national forests located in Montana (Stein et al., 2007). Although local urban, county, and regional planners and the public are making progress in defining desirable development and recognizing the inherent costs and effects associated with subdivision sprawl, growth will continue in some form and overall density will increase. This development would likely add pressure on adjacent Forest Service lands. The pressure would include increased demand for potentially conflicting recreation opportunities, services such as road maintenance, demand for undeveloped and semi-primitive settings, and increased fire management problems.

Montana, like many States across the West, is experiencing a massive divestiture of commercial timberlands for development and subdivisions (MTDNRC, 2010, p. 20). Corporate timberland has become more valuable for recreational or residential real estate than for timber production. This development results in increased fragmentation of forested landscapes due to increasing ex-urban migration and greater desire for recreational properties and other amenity values. Impacts of fragmentation include wildlife habitat degradation, public access issues, and increased challenges in providing public services and fire protection for new housing developments. Divestiture of corporate timberlands adds to the current trends for increased housing density within and adjacent to the national forests.

Resource development

Diversification of wood product manufacturing has historically allowed Montana mills to be more resilient in changing markets (MTDNRC, 2010). The majority of timber harvested in Montana comes off State and private lands, with one third from non-industrial private lands. The Montana Statewide Forest Resource Strategy (MTDNRC, 2010) recognizes the need to foster responsible management of private lands by integrating the harvest of traditional and non-traditional forest products as a tool for good land stewardship. The amount of timber harvest on State and private lands and adjacent national forests will affect the local economy. Additional harvest from these lands would help to stabilize local jobs and income. Any decrease in harvest would add to the decrease in associated jobs and income.

6.18.8 Environmental justice

As noted in the “Affected environment” section, minority and low-income populations (also known as environmental justice populations) are present in the analysis area. There are no significant effects to any populations across alternatives because each alternative provides for the social benefits of recreation, cultural/heritage values, inspirational/existence values, and health and safety by minimizing grizzly bear-human conflict. As such, there are no disproportionately high and adverse impacts to minority and low-income populations.

Alternative 3, which maximizes inspirational/existence values, would be likely to provide greater benefit to some environmental justice populations compared to alternative 1, as American Indian populations are known to hold strong existence values around grizzly bear (Kellert, Black, Rush, & Bath, 1996).

Alternative 2 modified, which maximizes cultural/heritage values and recreation opportunities, would be likely to provide greater benefit to environmental justice populations compared to alternative 1. Under alternative 2 modified, environmental justice populations would be afforded more access to collect firewood or other permitted activities within the primary conservation area.

6.19 Other Required Disclosures

The alternatives are programmatic in nature, consisting of forest plan components that would be applied to future management activities. They do not prescribe site-specific activities on the ground.

6.19.1 American Indian Religious Freedom Act and tribal treaty rights

Agencies must make a good faith effort to understand how Indian religious practices may come into conflict with other forest uses and consider any adverse impacts on these practices in their decisionmaking practices. A number of federally recognized American Indian nations have cultural affiliation on the NFS lands within the NCDE affected by the plan revision and plan amendments: the Kootenai, Kalispel, Coeur d'Alene, Spokane, Confederated Salish and Kootenai, Assiniboine, Blackfeet, Chippewa Cree, Crow, Eastern Shoshone, Gros Ventre, Sioux, Nez Perce, Northern Arapahoe, Northern Cheyenne, Shoshone-Bannock, and Little Shell Tribes.

The aboriginal territory of the Kalispel, Coeur d'Alene, and Spokane Tribes overlap with the territory now along the Clark Fork Valley and with the territory used by the Kootenai Tribe of Idaho and the Confederated Salish and Kootenai Tribes. The entire Kootenai National Forest is within aboriginal territory for the Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho.

Assiniboine, Blackfeet, Chippewa Cree, Confederated Salish and Kootenai, Crow, Eastern Shoshone, Gros Ventre, Sioux, Nez Perce, Northern Arapahoe, Northern Cheyenne, Shoshone-Bannock, and Little Shell Tribes

No effects on American Indian social, economic, or subsistence rights are anticipated as a result of the alternatives. No matter which alternative is chosen for implementation, the Forest Service would be required to consult with tribes, according to the consultation protocol, when management activities might impact treaty rights and/or cultural sites and cultural use. The forest plan amendments, no matter which alternative is chosen, would not propose any changes to existing direction in the amendment forests' land management plans with respect to American Indian rights and interests.

6.19.2 Unavoidable adverse effects

No unavoidable adverse effects were identified under any of the alternatives. Ground-disturbing activities could not occur without further site-specific analyses, section 7 consultation required under the Endangered Species Act, and project decision documents. For a detailed discussion of effects of this decision, see chapters 3 and 6 in this final EIS.

6.19.3 Relationship between short-term uses of the environment and long-term productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR § 1502.16). The action alternatives propose habitat protection measures for the NCDE grizzly bear population through adoption of additional desired conditions, standards, guidelines, and monitoring items. There are differences between the alternatives in the condition and use of resources, but no long-term impairment of productivity of NFS lands is anticipated under any alternative. If monitoring and subsequent evaluation indicate the plan components are insufficient to maintain long-term productivity, the forest plans will be amended.

6.19.4 Irreversible and irretrievable commitments of resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time, such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line right-of-way or road.

None of the alternatives would result in an irreversible or irretrievable commitment of resources. The action alternatives propose adoption of habitat protection measures for the NCDE grizzly bear population. No changes are made in suitability decisions, management area allocations, or recommendations for wilderness or other special areas. Ground-disturbing activities could not occur without further site-specific analyses, section 7 consultation required under the Endangered Species Act, and project decision documents. No irreversible or irretrievable commitments of resources are anticipated under any alternative.

6.19.5 Endangered Species Act

Potential effects of the forest plan amendments to plant and animal species and critical habitats listed under the Endangered Species Act are described in chapter 6 of this final EIS. A biological assessment (Warren et al., 2017) was submitted to USFWS, and section 7 consultation was completed prior to release of the final EIS and draft record of decision.

6.19.6 Energy requirements and conservation potential

Energy is consumed in the administration of natural resources from the national forests. The main activities that consume energy are timber harvest, recreational use, road construction and reconstruction, minerals and energy exploration and development, transporting and managing livestock, and administrative activities of the Forest Service and other regulatory agencies. Energy consumption is expected to vary only slightly by alternative.

6.19.7 Wetlands and floodplains

Existing forest plan management direction for these resources would be retained. None of the alternatives would have adverse effects on wetlands or floodplains.

6.19.8 Prime farmland, rangeland, or forestland

None of the alternatives would adversely affect prime farmland or rangeland. NFS lands are not considered prime forestland.

6.19.9 Effects on water quality

Section 303(d) of the Clean Water Act requires states to evaluate water quality in light of State water quality standards, report those stream segments that are impaired, and require determination of the total maximum daily load of pollutants allowed. The States in the planning area have identified impaired stream segments on NFS lands, and they are working with the agencies to determine how to reduce pollutants impacts and meet total maximum daily load requirements. The alternatives would not directly or indirectly result in further degradation of 303(d) listed waters.

6.19.10 Effects on special areas

Special areas include Wilderness areas, proposed wilderness, and Wild and Scenic and River Corridors. These areas are generally to be managed to maintain their existing character. The alternatives do not change the overall management direction of these areas.

6.19.11 Effects on other resources

Several other resources are not affected by the programmatic management direction. These include but are not limited to caves, soils, and scenery.

Chapter 7. Preparers and Contributors and Distribution of the EIS

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes, and other organizations and individuals during the development of this environmental impact statement:

7.1.1 Preparers and contributors

The list of preparers, shown in table 244, is limited to those people who were members of the interdisciplinary team working on the final documents or who made significant contributions to the draft and/or final environmental impact statement. Preparation of these documents could not have been completed without the support and assistance of numerous employees on the Flathead, Helena-Lewis and Clark, Kootenai, and Lolo National Forests, past employees on these national forests who have retired or moved to other positions, and colleagues in the Regional Office and Washington Office. We also recognize the regional and Forest leadership teams for the guidance they provided during this process.

Table 244. Preparers and contributors to the EIS

Name	Title, Unit	Contribution
Ake, Kathy	Geographic Information System (GIS) Specialist, Flathead National Forest	GIS, data analysis
Allen, Anastasia	Writer/Editor, Flathead National Forest	writing and editing
Archer, Vince	Soil Scientist, Northern Region	soils
Benton, Travis	Contractor-Ecosystem Research Group	wildlife modeling
Braun, Ann	eMNEPA Specialist	CARA database for response to comments and reporting
Chew, Jimmy	Contractor	vegetation modeling
Connell, Rick	Forest FMO, Flathead National Forest	fire management, air quality
Floch, Luke	GIS Program Manager, Flathead National Forest	GIS, mapping
Flowers, Michael	Archeologist, Flathead National Forest	heritage resources and American Indian rights and interests
Frament, Ellen	Contractor	forest vegetation and timber
Hillis, Mike	Contractor-Ecosystem Research Group	wildlife modeling
Gebert, Krista	Regional Economist, Northern Region (retired)	social sciences
Gerwe, Scott	Regional Geologist and Minerals Program Lead, Northern Region	minerals and energy resources
Greer, Kendrick	Contractor—Mason, Bruce and Girard	Spectrum Model
Helser, Micah	Flathead National Forest	writing and editing
Henderson, Eric	Regional Analyst	natural range of variation and vegetation modeling

Name	Title, Unit	Contribution
Huffine, Michael	Regional Program Manager, Minerals and Geology, Northern Region	minerals, lands, heritage, and wilderness
Jackson, James	Ecologist, Contractor	livestock grazing
Jensen, Holger	Range Program Leader	livestock grazing
Krueger, Joe	Forest Plan Revision Team Leader, Flathead National Forest	planning team lead
Kuennen, M. Reed	Wildlife Biologist, Flathead National Forest	wildlife
Larson, Jordan	Regional Economist, Northern Region	economics
Mandella, Margo	Ecologist, Contractor	writing and editing/resource assistant for non-native invasive species, sensitive plants, heritage
Manning, Cynthia	Northern Region, retired	economics
McCarthy, Dennis	Geospatial Program Manager, Flathead National Forest (retired)	GIS, mapping
McKay, Kathy	Writer/Editor, Flathead National Forest	writing and editing
Moore, Marsha	Recreation/Wilderness Planner, Flathead National Forest	recreation, wilderness, recommended wilderness, infrastructure, wild and scenic rivers
Nauertz, Elizabeth	Writer/Editor, Flathead National Forest	writing and editing
Ng, Kawa	Regional Economist, Rocky Mountain Region	economics
Rasch, Rebecca	Regional Social Scientist, Northern Region	social sciences
Rusho, Nancy	Regional Geologist, Northern Region, currently with Washington Office	mineral and energy resources
Trechsel, Heidi	Vegetation Specialist, Flathead National Forest	terrestrial ecosystems, forest vegetation, native plants, non-native plants
Van Eimeren, Pat	Fisheries Biologist, Flathead National Forest	watershed, soil, riparian, aquatic species
Warren, Nancy	Wildlife Biologist, Contractor	wildlife, threatened and endangered plants

7.1.2 Distribution of the environmental impact statement

The following agencies, organizations, and individuals have been sent copies of the final EIS or have been directed to the Flathead National Forest plan revision Internet page (www.usda.gov/goto/flathead/fpr) where the document has been posted. They are either required by regulation to be sent the EIS or have asked to be sent the document. The final EIS will also be sent to anyone else who requests it.

Federal government

- Advisory Council on Historic Preservation

- Department of Energy, National Environmental Policy Act Policy and Compliance
- Federal Aviation Administration, Northwest Mountain Region
- Federal Highway Administration (Montana Office, Helena)
- Glacier National Park
- U.S. Army Corps of Engineers, Northwestern Division
- USDA Animal and Plant Health Inspection Service, Policy and Program Development/Environmental Analysis and Documentation
- U.S. Department of Agriculture—National Agricultural Library
- U.S. Department of Agriculture, Natural Resources Conservation Service, National Environmental Coordinator
- U.S. Department of the Interior, Office of Environmental Policy and Compliance
- U.S. Environmental Protection Agency, Region 8 (Denver, Colorado)
- U.S. Environmental Protection Agency, Missoula, Montana
- U.S. Environmental Protection Agency, Helena, Montana
- Northwest Power Planning Council

State government

- Montana Department of Environmental Quality, Helena, Montana
- Montana Department of Fish, Wildlife and Parks, Missoula, Montana
- Montana Department of Fish, Wildlife and Parks, Kalispell, Montana
- Montana Department of Natural Resources and Conservation, Kalispell, Montana

Local government and others

- Flathead County Commissioners, Kalispell, Montana
- Missoula County, Planning, Montana

Tribal government

- Confederated Salish and Kootenai Tribes, Pablo and Polson, Montana
- Blackfeet Tribe
- Nez Perce Tribe

Individuals

Individuals who registered for updates on-line on the Flathead National Forest plan revision website (www.usda.gov/goto/flathead/fpr) were notified of the availability of the final EIS.

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