Conservation Strategy for the Grizzly Bear in the Northern Continental Divide Ecosystem

2019

TABLE OF CONTENTS

List of Figures……..2

List of Tables……...3

Acronyms…….4

Memorandum of Understanding……..6

Preface……..8

Executive Summary……...14

Chapter 1: Introduction and Background……...20

Chapter 2: Demographic Monitoring and Management……49

Chapter 3: Habitat Monitoring and Management……..59

Chapter 4: Conflict Prevention, Response and Conflict Bear Management……102

Chapter 5: Implementation and Evaluation…….114

Chapter 6: Regulatory and Conservation Framework…….121

Glossary……...145

Literature Cited……150

Appendices……...171

Suggested citation for this document:

NCDE Subcommittee. 2019. Conservation strategy for the grizzly bear in the Northern Continental Divide Ecosystem. (170 pages + appendices)

LIST OF FIGURES

Figure 1 Grizzly bear recovery zones in the lower-48 States……...21

Figure 2 Grizzly bear management zones……33

Figure 3 Bear Management Units (BMUs), Bear Management Subunits (BMU subunits), and Occupancy Units in the NCDE Primary Conservation Area……..36

Figure 4 Estimated population size and estimated probability that the population was >800 during 2004–2018, based on current observed vital rates……52

Figure 5 Example of assignment and evaluation of annual thresholds for two hypothetical management periods beginning in 2013, including observed parameters for the years 2013–2017……57

Figure 6 Estimated distribution of grizzly bears during 2007–2016……58

Figure 7 Map of "protected areas" in the NCDE Primary Conservation Area and Management Zones……63

Figure 8 Rocky Mountain Front Mineral Withdrawal Area, where no new energy leases or mineral claims may be made on USFS or BLM managed lands……...90

LIST OF TABLES

Table 1 Causes of grizzly bear mortalities in the NCDE, 1998-2017……38

Table 2 Documented occupancy by grizzly bear females with dependent young (cubs, yearlings, or 2-year-olds) within the 23 BMUs of the Primary Conservation Area and the 7 occupancy units of Zone 1, NCDE, 2004-2017……51

Table 3 Example of assignment and evaluation of annual thresholds for two hypothetical management periods beginning in 2013, including observed parameters for the years 2013–2017……56

Table 4 Land ownership and management within the NCDE Primary Conservation Area and Management Zones……64

Table 5 Hypothetical example of how temporary changes in OMRD, TMRD, and secure core would be implemented for a project……..69

Table 6 Active cattle and/or sheep grazing allotments in the PCA baseline……..78

ACRONYMS USED IN THIS DOCUMENT

APD – Application for Permit to Drill

BE – Bitterroot Ecosystem

BIA – Bureau of Indian Affairs

BIR – Blackfeet Indian Reservation

BLM – Bureau of Land Management

BMU – Bear Management Unit

BNSF – Burlington Northern Santa Fe Railroad

CEM – Cumulative Effects Model

CS&KT – Confederated Salish and Kootenai Tribes

CYE – Cabinet-Yaak Ecosystem

DMA – Demographic Monitoring Area

DNRC – Montana Department of Natural Resources and Conservation

DPS – Distinct Population Segment

EIS – Environmental Impact Statement

FIR – Flathead Indian Reservation

GIS – Geographic Information System

GNP – Glacier National Park

GYE – Greater Yellowstone Ecosystem

HCP – Habitat Conservation Plan

I&E – Information and Education

IGBC – Interagency Grizzly Bear Committee

IRA – Inventoried Roadless Area

MEPA – Montana Environmental Policy Act

MFWP – Montana Fish, Wildlife & Parks

MOU – Memorandum of Understanding

NCE – North Cascades Ecosystem

NCDE – Northern Continental Divide Ecosystem

NEPA – National Environmental Policy Act

NF – National Forest

NFS – National Forest System

NPS – National Park Service

PCA – Primary Conservation Area

PECE – Policy for Evaluation of Conservation Efforts

OMRD – Open Motorized Route Density

SE – Selkirk Mountains Ecosystem

TLMD – Trust Land Management Division

TRU – Total Reported and Unreported mortality

TMRD – Total Motorized Route Density

TNC – The Nature Conservancy

USDA – United States Department of Agriculture

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

WMA – Montana Fish, Wildlife & Parks Wildlife Management Area

MEMORANDUM OF UNDERSTANDING

DETAILING AGENCY AGREEMENT TO IMPLEMENT THIS CONSERVATION STRATEGY

The agencies signing this Conservation Strategy agree to use their respective authorities to maintain and enhance the recovered status of the grizzly bear in the Northern Continental Divide Ecosystem (NCDE) by implementing the regulatory mechanisms, interagency cooperation, population and habitat management and monitoring, and other provisions of the Conservation Strategy as per the details and responsibilities described in this document. All signatories recognize that each has statutory responsibilities that cannot be delegated and that this agreement does not and is not considered to abrogate any of their statutory responsibilities. This agreement is subject to and is intended to be consistent with all appropriate Federal and State laws. Funding of this MOU is subject to approval and appropriations by State, Tribal, and Federal entities. All agencies will take appropriate steps within their obligatory authorities and identified roles to seek funding to implement this document. The adequacy of the regulatory mechanisms demonstrated by this Conservation Strategy are dependent upon funding being available to fully implement the management and monitoring actions detailed in this document. To address the need for long-term coordination among signatory agencies, this Conservation Strategy would remain in effect beyond recovery, delisting, and the minimum post-delisting monitoring period as described in the USFWS's Final Rule to delist grizzly bears in the NCDE. Every five years, the NCDE Coordinating Committee will evaluate this Conservation Strategy and revise it as appropriate to ensure the conservation of grizzly bears in the NCDE.

_____

Regional Forester Date
U.S. Forest Service, Northern Region

_____

Director Date
Montana Fish, Wildlife & Parks

_____

Regional Director Date
National Park Service, Intermountain Region

State Director Date
Bureau of Land Management, Montana

Director Date
Montana Department of Natural Resources and Conservation

Western Regional Director Date
USDA APHIS, Wildlife Services

Deputy Bureau Director – Field Operations Date
Bureau of Indian Affairs

Regional Director Date
U.S. Fish and Wildlife Service, Region 6

Tribal Council Chairman Date
Confederated Salish and Kootenai Tribes

Tribal Business Council Chairman Date
Blackfeet Nation

PREFACE

Development of this Conservation Strategy began in 2009, when the Northern Continental Divide Ecosystem (NCDE) Subcommittee appointed State, Tribal and Federal representatives to the Interagency Conservation Strategy Team. The NCDE Subcommittee is one of the ecosystem subcommittees established under the Interagency Grizzly Bear Committee (IGBC), a larger interagency body formed to help ensure recovery of viable grizzly bear populations and their habitat in the lower-48 States through interagency coordination of policy, planning, management, and research. The NCDE Conservation Strategy Team included representatives from Montana Fish, Wildlife &Parks (MFWP); the Montana Department of Natural Resources and Conservation (DNRC); the Blackfeet Nation; the Confederated Salish and Kootenai Tribes (CS&KT); the National Park Service (NPS); the U.S. Forest Service (USFS); the U.S. Fish and Wildlife Service (USFWS); the U.S. Geological Survey (USGS); the Bureau of Land Management (BLM); and USDA Wildlife Services.

This interagency team of biologists, researchers, and managers worked on this Conservation Strategy from 2009–2013. At that time, although not required to do so, the agencies agreed to release a draft of the Conservation Strategy and the USFWS opened a 60-day public comment period via a notice of availability published in the Federal Register on May 3, 2013 (78 FR 26064). Over 2,400 comments and three peer reviews were received on that 2013 draft Conservation Strategy.

During the next several years (2014–2016), other agency priorities within USFWS reduced the time available for concerted work on developing responses to public comments and on subsequent revision of the draft Conservation Strategy. However, during this time, work continued on other documents and efforts related to the management of NCDE grizzly bears and their habitat (i.e., USFS Forest Plan revision and amendment processes, USFWS Habitat-Based Recovery Criteria, etc.).

In 2017, the NCDE Subcommittee re-assembled the Grizzly Bear Conservation Strategy team to respond to the public comments and to update and revise the draft Conservation Strategy in response to those comments and to new information, as appropriate. Although some editing was also done to reduce redundancy and improve clarity, effort was made to keep as much of the Conservation Strategy as possible compared to when the public reviewed it in 2013.

The following chapter by chapter summary is provided to assist the reader in understanding the general types of revisions that were made to the Conservation Strategy since the 2013 draft version.

Chapter 1 – Introduction and Background

We reorganized and streamlined Chapter 1 to reduce redundancy, improve flow, and clarify discussions. We revised zone descriptions to improve clarity and to reflect the increases in grizzly bear numbers and distribution since the draft Conservation Strategy was released in 2013. We

also removed detailed discussion about Endangered Species Act (ESA) requirements (e.g., recovery criteria, post-delisting monitoring, and status review triggers) and refer readers to the USFWS source documents (e.g., Recovery Plan, potential delisting rule) to reduce confusion between ESA requirements and agency commitments to maintain a recovered population (see Glossary) after the population is delisted and ESA-required post-delisting monitoring has concluded.

Chapter 2 – Demographic Monitoring and Management

The changes in Chapter 2 are due to availability of new science and response to public and peer comments. Since the draft Conservation Strategy was prepared in 2013, several additional analyses have been completed (Costello et al. 2016), which have provided us with better information about the population changes since 2004 (both numerically and geographically), increased our understanding of the level of uncertainty in our estimation of population size, and laid the groundwork for an improved monitoring approach using stochastic population modeling.

The revised Chapter 2 addresses the most common public comment issues, including concerns about the goal of a population size of 800 bears, the proposed mortality limits, the levels of uncertainty, and the opportunities for connectivity with other ecosystems. The draft Conservation Strategy included four standards addressing population size and mortality rates; the revised CS instead includes three objectives, with four thresholds and two monitoring requirements.

To meet Objective 1, to "maintain a well-distributed grizzly bear population within the Demographic Monitoring Area (DMA)," we have established a threshold that retains the occupancy requirement for females with offspring within the Primary Conservation Area (PCA, see Glossary) from the draft Conservation Strategy, and added a requirement for occupancy of Zone 1.

A substantive change in the revised Conservation Strategy is the approach of using stochastic population modeling, with continual updating of vital rates, to establish survival and mortality thresholds for specified management periods. The thresholds established for these management periods must be consistent with Objective 2, a modification of the goal of maintaining a minimum of 800 bears within the PCA and Zone 1 stated in the draft Conservation Strategy. In the revised Conservation Strategy, Objective 2 is to "manage mortalities from all sources to support an estimated probability of at least 90% that the grizzly bear population within the DMA remains above 800 bears, considering the uncertainty associated with all of the demographic parameters." Importantly, given the commitment to incorporate all forms of uncertainty into the population modeling, this objective necessitates maintaining an actual population size that is likely closer to 1,000 bears, and an even higher population size should uncertainty increase.

We developed three thresholds to accomplish Objective 2. For management of independent female survival within the DMA, we have retained the draft Conservation Strategy requirement of survival of an estimated probability of at least 90%, and have added that the threshold rate must be adjusted upward as needed so that it remains consistent with Objective 2. For management of independent

female mortality within the DMA, we have retained the draft Conservation Strategy requirement of ≤10% as a maximum, but have added that the threshold percent must be adjusted downward as needed so that it is also consistent with Objective 2. For management of independent male mortality, we have revised the draft Conservation Strategy requirement of ≤20% to a threshold of ≤15%, provided that it is consistent with the established female thresholds and Objective 2.

Lastly, we have added an additional Objective 3 to "monitor demographic and genetic connectivity among populations," through biennial estimation of the spatial distribution of the entire NCDE population and DNA analyses of population of origin for sampled bears to detect movements of individuals to and from other populations.

Chapter 3 – Habitat Management and Monitoring

In revising Chapter 3, we addressed public comments, corrected any inconsistent use of terminology, and reorganized some sections to reduce redundancy, improve flow, and clarify the intent. We changed the term used to describe agency commitments under the Conservation Strategy to "objectives" to avoid confusion, because the meaning and use of the terms "standards" and "guidelines" differ between the agencies. The use of the term "objectives" in this Conservation Strategy does not change the way the terms "standard" or "guideline" are used or applied relative to each agency's land use management plan that provides the required regulatory direction when agency actions are implemented.

We received many questions and comments about the baseline to be used in the PCA, so a section was added to Chapter 3 that provides the rationale for how and why 2011 was selected as the baseline year, under what circumstances adjustments can be made to the baseline, and to which habitat features and management activities the baseline will be applied and monitored.

We streamlined the lists of Application Rules by removing terms and definitions that are contained in the Glossary, adopting a consistent format, eliminating duplication, and removing any material that is not needed to assist with implementation. The developed recreation site (see Glossary) objectives and Application Rules were modified to more clearly explain that the primary concern related to these sites is grizzly bear mortality risk, and to distinguish the direction applicable to sites that are designed and managed for overnight use versus the direction applicable to sites with day use only.

Chapter 4 – Conflict Prevention, Response and Management

Overall, in revising this chapter we incorporated public comment, updated pertinent sections, and removed redundant language to increase concision and clarity. To begin, we elaborated on agricultural damage from grizzly bears to explain producer responsibility and department response. Additionally, we addressed the issue of areas near residential areas sometimes providing important habitat, but that excessive bear use may be considered a conflict if complaints occur. We also clarified that only maintained orchards receiving damage are conflict situations

since many abandoned apple trees are used by grizzly bears without causing problems. We added more language on increasing positive human attitudes towards grizzlies. Further, we included a statement that education and other conflict prevention efforts will be initiated in areas where we expect grizzlies in the future (connectivity areas). Next, we added two additional education messages – the tourism and cultural benefits of grizzly bears, and proper use of conflict prevention tools. We updated food storage orders as more have been established in the past five years. Also, we added information on other sanitation efforts such as carcass removal and bear-resistant grain bin doors.

Across our "Non-Lethal Conflict Prevention Tools and Techniques" and "Management Bear Direction and Conflict Response" sections we simplified language and updated information. In the "Non-Lethal Conflict Prevention" section, we broke the information into three separate paragraphs for better organization: introduction, homeowner tools, and agency techniques. The "Conflict Response" section was simplified because much of the language was redundant.

Chapter 5 – Implementation and Evaluation

In revising Chapter 5, we incorporated public comment, updated pertinent sections, and removed redundant language to increase clarity. We had an opportunity to interview members working with the Greater Yellowstone Coordinating Committee about their Conservation Strategy's implementation chapter and incorporate any lessons learned. Much of the public comment received regarding Chapter 5 was related to the composition of the Coordinating Committee. We did address additional agency representation from Federal land managers not previously represented. We added USDA Wildlife Services to the Coordinating Committee. We also added the USFWS recovery coordinator and USGS, both in an advisory capacity. We emphasized opportunities for work groups and/or task forces to help address future challenges to address the important role Non-Government Organizations can contribute.

We made some changes to Management Review triggers, to reflect Chapter 2 (demographic) and Chapter 3 (habitat) monitoring and management objectives. The Management Review information is in Chapter 5's "Evaluation and Consequences Related to Monitoring Results" subchapter, which was reorganized for better continuity.

Also added is a commitment to reviewing the Conservation Strategy every five years after adoption. The Coordinating Committee will evaluate the regulatory mechanisms (see Glossary), interagency cooperation, population and habitat management and monitoring, and other provisions of this Conservation Strategy and will revise this Conservation Strategy as appropriate to ensure conservation of the grizzly bear in the NCDE.

Chapter 6 – Regulatory and Conservation Framework

This chapter summarizes the relevant State, Tribal and Federal regulatory mechanisms that are in place to help conserve grizzly bears and grizzly bear habitat in the NCDE if there are no ESA protections. Minor revisions were made to some sections to improve clarity and accuracy.

Questions have arisen about opportunities for public review and comment on this Conservation Strategy. The NCDE Grizzly Bear Conservation Strategy is not a decision document that requires public review and input. This document describes the commitments the agencies are making relative to how they will cooperate and coordinate management of grizzly bears and grizzly bear habitat if NCDE grizzly bears are no longer protected by the ESA; but the agency commitments themselves are contained in the State, Federal and Tribal management plans, etc. that have been developed during processes that included public review and comment.

That said, opportunity for public review and comment was provided for the draft NCDE Conservation Strategy. The more than 2,400 comments that were received were reviewed and responses to the concerns raised are provided in Appendix 1. This information was used to help revise portions of the Conservation Strategy where appropriate. In addition to the public comments received, responses from three peer reviewers were also received. The peer reviewers were in agreement that the NCDE Conservation Strategy is sufficient to maintain a recovery grizzly bear population.

Furthermore, there has also recently been public review and comment solicited and received on a number of important components of this Conservation Strategy. The grizzly bear habitat management direction contained within the Flathead National Forest (NF) Plan revision and the Forest Plan amendments for the Helena-Lewis & Clark NF, Lolo and Kootenai NF received extensive public comment. There is intentional alignment between the grizzly bear habitat management and monitoring components included in these Forest Plan revision and amendment efforts with objectives that are included in the Conservation Strategy. Additionally, the Habitat-Based Recovery Criteria for the NCDE that the USFWS published in the Federal Register received a large amount of public input. These Habitat-based Recovery Criteria, which are now a supplement to the Grizzly Bear Recovery Plan, were developed to align with the habitat management and monitoring objectives for the PCA that are contained in the Conservation Strategy.

MFWP is developing an Administrative Rule for its NCDE grizzly bear population management objectives that are described in the Conservation Strategy. There will be public review and comment opportunities included in this rulemaking process. Components of the Conservation Strategy, including the underlying Tribal, Federal, and State plans and regulations, will be included in any Proposed Rule that the USFWS may publish relative to delisting the NCDE grizzly bear population, which would be available for public review and comment. In addition, MFWP is developing an Administrative Rule for its NCDE grizzly bear population management objectives that are described in the Conservation Strategy. There will be public review and comment opportunities included in this rulemaking process.

In sum, the Conservation Strategy provided here will guide management of a healthy grizzly bear population in the NCDE after delisting from the Endangered Species Act. It contains commitments to manage the population and habitat at or improved upon specific levels, and to monitor population and habitat metrics. In addition, it describes how the State, Federal, and Tribal agencies will work together and coordinate to ensure its successful implementation. It is intended that this document will be adaptable in response to ongoing review and consideration of new information by the Coordinating Committee.

This Conservation Strategy is the culmination of many years of work by an interagency team of biologists, researchers and managers who have assembled the best information available on maintaining a recovery grizzly bear population within the NCDE. It is also the culmination of a revision process that has included multiple agency reviews, independent peer reviews and opportunities for public input.

EXECUTIVE SUMMARY

Chapter 1 – Introduction and Background

The overarching goal of this Conservation Strategy, and the signatory agencies, is to maintain a recovered, genetically diverse grizzly bear population throughout the Demographic Monitoring Area (DMA: the Primary Conservation Area (PCA) and Zone 1) while maintaining demographic and genetic connections with Canadian populations and providing the opportunity for demographic and/or genetic connectivity with other ecosystems (Cabinet-Yaak, Bitterroot, Greater Yellowstone). This Conservation Strategy was developed by an interagency team of State, Tribal, and Federal managers and scientists to describe the coordinated management and monitoring efforts necessary to maintain a recovered grizzly bear population in the Northern Continental Divide Ecosystem (NCDE) and to document the commitment of these agencies to this shared goal. This Conservation Strategy provides a cohesive umbrella for all signatories to operate under and reference, but each signatory has their own legal process and authority to implement the Conservation Strategy. This Conservation Strategy would remain in effect beyond recovery, delisting, and the minimum five-year post-delisting monitoring period required by the Endangered Species Act (ESA). The agencies are committed to be responsive to the needs of the grizzly bear through adaptive management (see Glossary) actions based on the results of detailed annual population and habitat monitoring.

The purposes of this Conservation Strategy are to:

- Describe and summarize the coordinated strategies, standards, and guidelines developed for managing the grizzly bear population, human-grizzly bear conflicts (see Glossary), and grizzly bear habitat to ensure their continued conservation in the NCDE;
- Compile and reference the regulatory mechanisms, legal authorities, policies, management documents, and monitoring programs that will maintain the recovered grizzly bear population;
- Document the commitments agreed upon by the participating agencies.

Within the NCDE, the grizzly bear population and its habitat will be managed using an approach that identifies a PCA and three additional management zones (Zone 1, Zone 2, and Zone 3: see Figure 2). The PCA is the area currently known as the NCDE Grizzly Bear Recovery Zone. This is where the most conservative habitat protections would remain, with maintenance of habitat conditions that were compatible with the increasing grizzly bear population from 2004–2011. Grizzly bears are also expected to occupy habitat outside the PCA in Zones 1 and 2 where they may serve as a source population to other grizzly bear ecosystems in the lower-48 States. Habitat and population protections would vary by management objective in these Zones with more protections in areas identified as Demographic Connectivity Areas (DCAs, see Glossary). In

contrast to Zones 1 and 2, Zone 3 does not provide habitat linking to other grizzly bear ecosystems. Grizzly bears currently occupy Zone 3 (adjacent to Zone 1), and their numbers are expected to increase, but this may be incompatible with human presence because these areas often lack forest cover, land ownership is mostly private, and agricultural uses predominate. In Zone 3, grizzly bear occupancy will not be actively discouraged and will be managed primarily though conflict response.

Relationship to Other Plans

Relationships with State, Federal, and Tribal plans are discussed throughout the Conservation Strategy. In the NCDE, land and resource management plans for National Forests (NF), National Parks, Bureau of Land Management (BLM), the Blackfeet Indian Reservation (BIR), the Flathead Indian Reservation (FIR), and Montana Department of Natural Resources and Conservation (DNRC) have incorporated, or will prior to any delisting rule, the habitat objectives and other relevant provisions of the Conservation Strategy. Montana Fish, Wildlife & Parks (MFWP) is considering an administrative rule making process to incorporate relevant provisions of the Conservation Strategy later in 2018.

Chapter 2 – Demographic Monitoring and Management

To maintain a healthy, recovered grizzly bear population in the NCDE, it is necessary to have adequate numbers of bears that are well distributed with a balance between reproduction and mortality. This section details the demographic monitoring protocols and management objectives developed to maintain and enhance a recovered grizzly bear population in the NCDE. These will be focused within the DMA (Figure 2). Because grizzly bears are a difficult species to monitor, multiple objectives and thresholds are identified to provide sufficient information upon which to base management decisions.

As described earlier in this summary, the goal of the Conservation Strategy is to maintain a recovered, genetically diverse grizzly bear population throughout the DMA while maintaining demographic and genetic connections with Canadian populations and providing the opportunity for demographic and/or genetic connectivity with other ecosystems. This will be achieved by the meeting the following objectives:

- Objective 1: Maintain a well-distributed grizzly bear population within the DMA;
- Objective 2: Manage independent female survival and independent male and female mortalities from all sources to support a 90% or greater estimated probability that the grizzly bear population within the DMA remains above 800 bears, considering the uncertainty associated with all of the demographic parameters; and

- Objective 3: Monitor demographic and genetic connectivity among populations.

Chapter 3 – Habitat Management and Monitoring

The goal of habitat management in this Conservation Strategy is to provide reasonable assurance that habitat on Federal, State, and Tribal lands will continue to be managed to levels that support a stable to increasing grizzly bear population in the NCDE. Therefore, the general approach is to maintain the habitat conditions that existed during the period when the NCDE grizzly bear population was stable to increasing. Habitat management objectives are specific to the PCA and Zones 1, 2, and 3 (Figure 2), each with varying levels of habitat protections depending on their relative importance to the NCDE grizzly bear population. Each zone is a mosaic of land ownerships, with different types of resource management that reflect the mandates and interests of each agency or Tribal government.

Based on the best available science, this Conservation Strategy focuses habitat management on the following key habitat features and human activities in the NCDE: (1) secure core and the density of open and total motorized routes; (2) developed recreation sites; (3) livestock allotments; (4) vegetation management; and (5) oil and gas and/or hardrock mining activities. These features were selected for consideration because of their potential to impact habitat availability and/or increase the risk of grizzly bear mortality within the NCDE. In addition, in order to manage mortality of grizzly bears at sustainable levels, anthropogenic food (see Glossary), garbage, and other attractants (see Glossary) associated with resource management activities that increase the risk of grizzly bear mortality will be managed. Requiring proper storage of food and attractants has been demonstrated to be an effective tool to promote public safety and to reduce grizzly bear mortality risk.

The PCA has the most rigorous habitat protections in order to achieve the goal of continual occupancy by a source population of grizzly bears. Habitat conditions that were compatible with an increasing population under baseline conditions will be maintained. Habitat management in the PCA will be focused on maintaining or improving upon baseline levels of secure core and motorized route density, developed recreation sites, and livestock allotments. Attractant storage rules will be in place on Federal, State and Tribal lands in the PCA.

As described in the Grizzly Bear Recovery Plan (USFWS 1993), Bear Management Units (BMUs (see Glossary)), and BMU subunits are used for habitat evaluation and population monitoring within the PCA (Figure 3). A BMU is an area large enough to meet the yearlong habitat needs of both male and female grizzly bears, while BMU subunits represent the approximate size of a female grizzly bear's annual home range. The NCDE Recovery Zone was divided into 23 BMUs and 126 BMU subunits. This Conservation Strategy will continue to use these BMUs and BMU subunits as a tool for managing and monitoring certain habitat conditions and management activities within the PCA.

Management Zone 1 surrounds the PCA. The PCA and Zone 1 together comprise the DMA, the area within which population data are collected and mortality limits apply. Here, habitat

protections will focus on managing motorized route densities within levels specified in current Federal, State, and Tribal land use plans because these are known to have been compatible with a stable to increasing grizzly bear population. Attractant storage rules would be implemented on Federal, Tribal, and most State lands. On the northwest and southwest corners of Zone 1, there are two DCAs that are intended to support female occupancy and eventual dispersal to the Cabinet-Yaak (CYE) and Bitterroot (BE) ecosystems. In the Salish and Ninemile DCAs, habitat protections will focus on no net increase in motorized route miles or density and managing current roadless areas as stepping stones to other ecosystems.

Management Zone 2 will be managed to provide the opportunity for grizzly bears to move between the NCDE and adjacent ecosystems (e.g., the GYE). Habitat management direction compatible with the goal of providing for genetic connectivity will be maintained on Federal and State lands. Attractant storage rules would be implemented on most Federal and State lands.

Management Zone 3 consists of other areas within the NCDE. Efforts here will be focused on prevention and response to human-grizzly bear conflicts. There is no need for habitat protections specifically developed for grizzly bears on Federal and State lands in Zone 3 in order to support recovery of the NCDE population. The extent of Zone 3 will be determined in the USFWS' Final Rule delisting grizzly bears in the NCDE.

Chapter 4 – Conflict Prevention, Response, and Conflict Bear Management

The grizzly bear population in the NCDE has expanded its distribution while the number and distribution of people living and recreating in grizzly bear habitat have increased. For grizzly bear conservation to be successful, providing habitat on the landscape is not enough. For grizzly bears to survive, people must accept the grizzly bear as a cohabitant of the land. Tolerance can be maintained when the public has confidence that management agencies will respond quickly and appropriately to human-grizzly bear conflicts and when the public has the knowledge to understand and avoid human-grizzly bear conflicts. The objective of conflict management is to maximize human safety and minimize property losses while maintaining a viable population of grizzly bears (Dood et al. 2006). When human-grizzly bear conflicts are not adequately addressed, there are negative consequences for the individual bear and the people involved, and support for grizzly bear management and conservation is undermined.

The emphasis of grizzly bear conflict management will be quick response by management authorities, removal of the source of the conflict where possible, and the use of non-lethal solutions. Depending on the circumstances of the conflict, appropriate responses may include:

- Proactively removing or securing attractants
- Public education and outreach
- Discouraging the grizzly bear from visiting the site using non-lethal methods (e.g., aversive conditioning (see Glossary))
- Reactively or preemptively capturing and translocating a grizzly bear to a new area

- Removing the bear from the wild, including lethal control

The focus and intent of conflict grizzly bear management inside and outside the PCA will rely on strategies and actions to prevent human-grizzly bear conflicts. Securing potential attractants is the single most effective way to prevent bears from becoming habituated (see Glossary) or food conditioned (see Glossary), thereby limiting human-caused grizzly bear mortality, human-grizzly bear encounters, and other human-grizzly bear conflicts. Rules requiring attractants to be stored in a bear-resistant manner on most public lands will continue under this Conservation Strategy. The NCDE's existing Information & Education (I&E) subcommittee will continue to coordinate outreach efforts to ensure the consistency of messages. All grizzly bear conflicts, relocations, and removals will be documented and reported annually in the NCDE Annual Report.

Chapter 5 – Implementation and Evaluation

Upon implementation of this Conservation Strategy, the NCDE Coordinating Committee will replace the current NCDE Subcommittee, although its membership will remain largely the same. The Coordinating Committee will evaluate implementation of this Conservation Strategy, promote the exchange of data and information about the NCDE grizzly bear population among agencies and the public, and make recommendations to the management agencies regarding implementation of this Conservation Strategy. The Coordinating Committee will continue to communicate with the IGBC. The Coordinating Committee is not a decision-making body, although it may provide recommendations to member agencies from time to time. The Coordinating Committee does not supersede the authority of the management agencies beyond the specific actions agreed to as signatories to this Conservation Strategy.

Once adopted by the agencies, this Conservation Strategy's goals, objectives, and/or monitoring procedures may only be changed through a clear demonstration of need based on biological data, the best available science, and/or new techniques. Any such amendments will be subject to public review and would be guided by and consistent with the agreements reached in this Conservation Strategy and its overall goal to maintain a recovered grizzly bear population in the NCDE and conserve its habitat.

The Coordinating Committee will be supported and informed by the NCDE I&E Team and Monitoring Team. The I&E Team will be comprised of information/education specialists from the signatory agencies. The goal of this team will be to work with agencies, Tribes, elected officials, non-governmental organizations and the public to share knowledge and increase understanding of grizzly bears, their habitat, conflict prevention and management actions. The NCDE Monitoring Team will take the lead in preparing an annual monitoring report with staff support from the Coordinating Committee member agencies. Monitoring results and analysis will be provided to the Coordinating Committee and the public. If there are deviations from any of the

population and/or habitat objectives and/or thresholds stipulated in this Conservation Strategy, a Management Review will be initiated. A Management Review examines management of habitat, populations, or efforts of participating agencies to complete their required monitoring. The NCDE Monitoring Team is not responsible for completing impact analyses for projects proposed by any agency; such analyses are the responsibility of the agency making the proposal. The Coordinating Committee will respond to the Monitoring Review with actions to address the deviations from the population or habitat standards. If desired population and habitat objectives specified in this Conservation Strategy are not being met, and cannot be met in the opinion of the Coordinating Committee, then the Coordinating Committee may request the USFWS conduct a status review to determine if protections under the ESA are warranted.

Chapter 6 – Regulatory and Conservation Framework

The management of grizzly bears and the habitats they require for survival are dependent upon the laws, regulations, agreements, and management plans of the State, Tribal, and Federal agencies in the NCDE. This chapter documents the regulatory mechanisms and conservation framework that would continue in the absence of ESA protections. These laws, regulations, and agreements provide the legal basis for coordinating management, controlling mortality, providing secure habitats, managing human-grizzly bear conflicts, regulating hunters and hunting seasons, limiting motorized access where necessary, controlling livestock allotments, regulating oil and gas development, mitigating large scale mining operations, maintaining education and outreach programs to prevent conflicts, monitoring populations and habitats, and requesting management and petitions for relisting when necessary.

CHAPTER 1: INTRODUCTION AND BACKGROUND

The overarching goal of this Conservation Strategy, and the signatory agencies, is to maintain a recovered, genetically diverse grizzly bear population throughout the Demographic Monitoring Area (DMA) while maintaining demographic and genetic connections with Canadian populations and providing the opportunity for demographic and/or genetic connectivity with other ecosystems (Cabinet-Yaak, Bitterroot, Greater Yellowstone).

This Conservation Strategy will serve as the management plan for grizzly bears in the Northern Continental Divide Ecosystem (NCDE) after the population is removed from the list of threatened and endangered species. The Conservation Strategy contains commitments to manage the population and habitat and to monitor NCDE grizzly bear population and habitat metrics. In addition, it describes how the State, Federal and Tribal agencies will work together and coordinate to ensure its implementation. The management agencies – Montana Department of Fish, Wildlife and Parks (MFWP); the Montana Department of Natural Resources and Conservation (DNRC); the Blackfeet Nation; the Confederated Salish and Kootenai Tribes (CS&KT); National Park Service Glacier National Park (GNP); the U.S. Forest Service (USFS); the U.S. Fish and Wildlife Service (USFWS); U.S. Geological Survey (USGS); and the Bureau of Land Management (BLM) – have documented their commitment to implementing the Conservation Strategy by signing a Memorandum of Understanding (see p. 7).

Conservation Strategy Setting

Grizzly bears currently occupy four ecosystems in the lower-48 States, including the NCDE, Greater Yellowstone (GYE), Cabinet-Yaak (CYE), and Selkirk (SE) (Figure 1). The NCDE holds the largest population of grizzly bears in the lower-48 States and is contiguous with a Canadian population. Two additional ecosystems, the North Cascades (NCE) and Bitterroot (BE), are currently unoccupied by breeding populations.

The original Recovery Zone (USFWS 1993) for the NCDE is situated in northwestern Montana, and includes GNP, parts of the Flathead Indian Reservation (FIR) and Blackfeet Indian Reservation (BIR), parts of four NFs (Flathead NF, Helena-Lewis and Clark NF, Kootenai NF, and Lolo NF), BLM lands, and a significant amount of State and private lands. Also within this ecosystem are all or parts of 5 Federally designated Wilderness Areas (Bob Marshall, Great Bear, Mission Mountains, Rattlesnake, and Scapegoat), Tribal Wilderness Area (Mission Mountains) designated by the CS&KT, and one federally designated Wilderness Study Area (Ten Lakes).

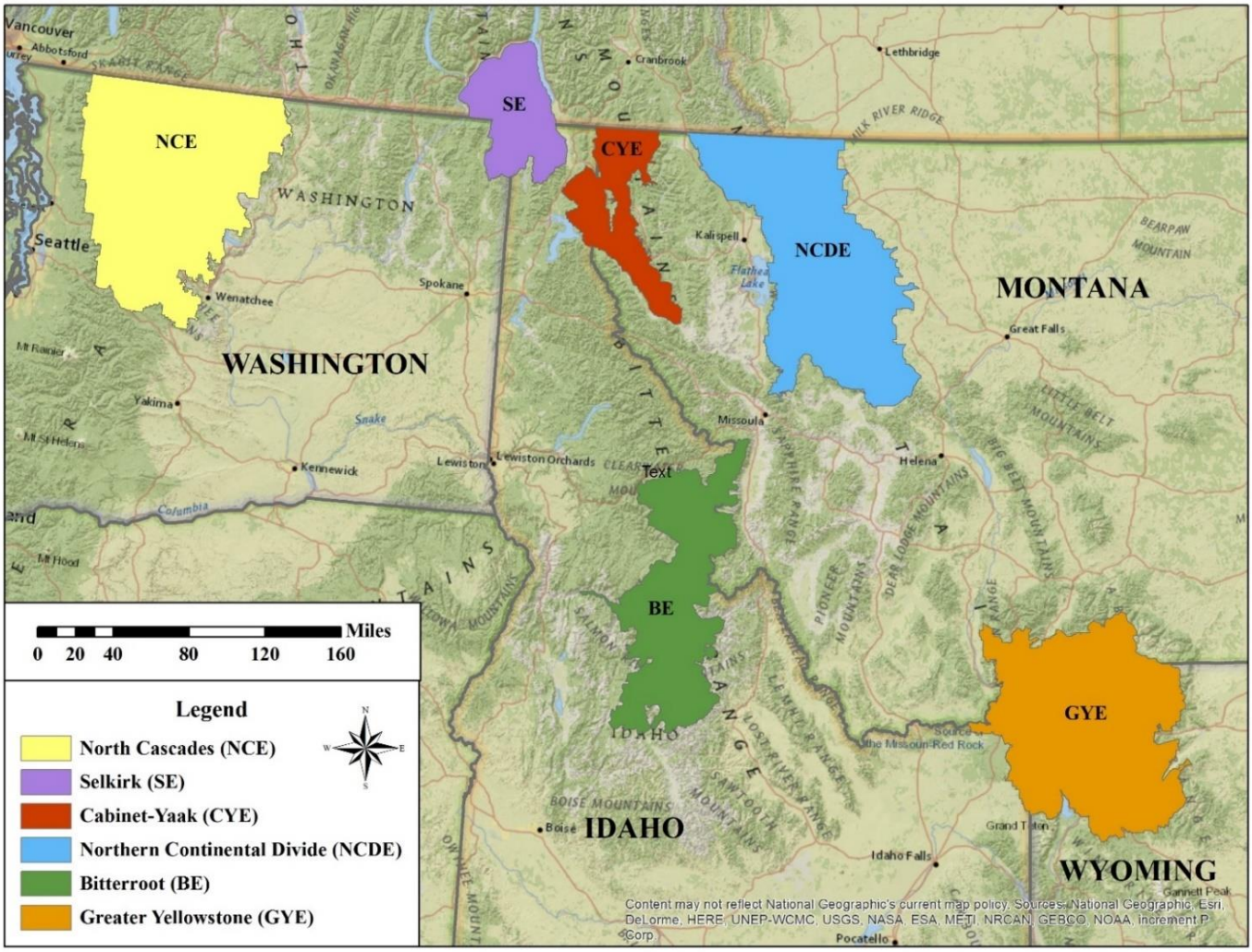

Figure 1. Grizzly bear recovery zones in the lower-48 States. (USFWS 1993)

Purpose and Need

Grizzly bears (*Ursus arctos*) are a "conservation-reliant" species (Scott et al. 2005), therefore there is a need to coordinate management of the population across multiple land ownerships and jurisdictions over the long term. The Conservation Strategy will serve this need after Federal protections have been removed and recovery criteria no longer apply. The Conservation Strategy will remain in place after the ESA-required post-delisting monitoring period has concluded. The recovery criteria are detailed in the USFWS Recovery Plan (USFWS 1993, USFWS 2018) and the post-delisting monitoring plan will be part of any potential delisting rule for the NCDE grizzly bear population.

The purposes of this Conservation Strategy are to:

- Document the regulatory mechanisms (see Glossary), legal authorities, policies, management documents, and monitoring plans that will maintain a recovered grizzly bear population.
- Summarize the strategies, goals, and objectives for managing the grizzly bear population, human-grizzly bear conflicts, and grizzly bear habitat that will ensure continued conservation in the NCDE after delisting.
- Coordinate grizzly bear conservation efforts among State, Tribal and Federal agencies.

Ultimately, the effectiveness of the commitments in this Conservation Strategy, including the habitat protections, will be demonstrated by maintaining a healthy, well-distributed grizzly bear population. Habitat protections, demographic objectives, and monitoring methods in this Conservation Strategy may be subject to revision in the future based on the best available science (see Chapter 5 for further details).

Implementation of Conservation Strategy

Recovery of the grizzly bear population in the NCDE has been possible because of the partnerships between Federal and State agencies, multiple Tribes, county and city governments, educational institutions, numerous organizations, private landowners, and the public who live, work, and recreate in the NCDE and surrounding lands. Federal, State, and Tribal agencies responsible for grizzly bear management developed this document because maintaining a healthy, recovered grizzly population depends on the effective continuation of these partnerships to manage and conserve the NCDE grizzly bear population and its habitat.

In order to attain the objectives established by the Grizzly Bear Recovery Plan in 1984, the Assistant Secretary for Natural Resources and Environment of the U.S. Department of Agriculture and the Assistant Secretary for Fish and Wildlife and Parks of the United States Department of the Interior found it to be in the best interest of the grizzly bear to establish the Interagency Grizzly Bear Committee (IGBC). In the Memorandum of Agreement establishing the IGBC they also formed the Yellowstone and Northern Ecosystem (NCDE) subcommittees. As part of IGBC's responsibilities, it reviews and approves actions proposed by the subcommittees. The Conservation Strategy is one such action.

Implementation of this Conservation Strategy requires continued cooperation between Federal, State, and Tribal agencies. Upon implementation of this Conservation Strategy, the NCDE Coordinating Committee will replace the current NCDE Subcommittee. The Coordinating Committee will provide oversight, coordinate and evaluate implementation of this Conservation Strategy, promote the exchange of data and information about the NCDE grizzly bear population among agencies and the public, and make recommendations to the management agencies. The

Coordinating Committee will continue to inform the IGBC about the NCDE grizzly bear population (Chapter 5).

The NCDE is a dynamic environment and an effective management plan requires flexibility to adapt management objectives, monitoring techniques, and habitat protections, if appropriate, based on the best available science. Every five years, the Coordinating Committee will evaluate the regulatory mechanisms, interagency cooperation, population and habitat management and monitoring, and other provisions of this Conservation Strategy and make revisions as appropriate to ensure conservation of the grizzly bear in the NCDE. Chapter 5 outlines additional situations in which the Coordinating Committee will review the Conservation Strategy and revise as necessary and appropriate.

Grizzly Bear Ecology

Behavior and Life History

Adult grizzly bears are normally solitary except when females have dependent young (cubs, yearlings, or 2-year-olds; Nowak and Paradiso 1983). They are not territorial and home ranges of adult bears frequently overlap (Mace and Waller 1997a, Schwartz et al. 2003b). Home range size is affected by resource availability, sex, age, and reproductive status (LeFranc et al. 1987, Blanchard and Knight 1991, Mace and Waller 1997b). Generally, females with cubs-of-the-year or yearlings have the smallest annual home range sizes (Aune and Kasworm 1989, Blanchard and Knight 1991, Mace and Waller 1997b, Mace and Roberts 2011).

The annual home range of adult male grizzly bears in the NCDE ranges from 146–588 square miles (mi^2) (377–1,522 square kilometers (km^2)), while female ranges are typically smaller, between 26–94 mi^2 (74–242 km^2) (Aune and Kasworm 1989, Mace and Waller 1997a, Waller 2005, Mace and Roberts 2011). Females inside GNP generally had smaller home ranges than those outside the Park, which is possibly due to the higher density of both bears and resources inside GNP (Mace and Roberts 2011). In the Swan Mountains of the NCDE, home range size was largest in the spring and smallest in the fall for both sexes (Mace and Waller 1997a). The large home ranges of grizzly bears, particularly males, enhance genetic diversity in the population by enabling males to mate with numerous females (Blanchard and Knight 1991, Craighead et al. 1995, Mikle et al. 2016).

Young dispersing female grizzly bears establish home ranges overlapping their mother's (Waser and Jones 1983, Schwartz et al. 2003b). Radio-telemetry and genetic data suggest females establish home ranges an average of 6.1–8.9 mi (9.8–14.3 km) away from the center of their mother's home range, whereas males generally disperse further, establishing home ranges roughly 18.6–26 mi (29.9–42.0 km) away from the center of their mother's (McLellan and Hovey 2001, Proctor et al. 2004).

Grizzly bear mating occurs from May through July with a peak in mid-June (Craighead and Mitchell 1982, Nowak and Paradiso 1983). Although females mate in spring and early summer, their fertilized embryos do not implant in their uterus until late fall. Female grizzly bears only have cubs if they obtain enough fat over the summer and fall to survive the winter and nurse cubs for 2–3 months inside the den (Schwartz et al. 2003b, Schwartz et al. 2006, Robbins et al. 2012). Age of first reproduction and litter size may be related to nutritional state (Stringham 1990, McLellan 1994, Hilderbrand et al. 1999, Mattson 2000). Average age of first reproduction in the NCDE is 5.7 years old but can vary from 3–8 years of age (Costello et al. 2016). Mean litter size in the NCDE is 2.1 with a range from 1–3 cubs (Costello et al. 2016). Cubs are born in the den in late January or early February and remain with the female for 1.5–2.5 years, making the average time between successful litters in the NCDE (i.e., the interbirth interval) three years (Costello et al. 2016). Grizzly bears have one of the slowest reproductive rates among terrestrial mammals in North America, resulting primarily from the reproductive factors described above (Nowak and Paradiso 1983, Schwartz et al. 2003b). Given the above factors, it may take a single female up to 10 years to replace herself in a population (USFWS 1993). Grizzly bear females cease reproducing some time in their mid-to-late 20s (Aune et al. 1994, Schwartz et al. 2003a).

Grizzly bears are quite variable in their selection of denning habitat and structures (Schwartz et al. 2003). Grizzly bears usually dig dens on steep slopes where wind and topography cause an accumulation of deep snow and where the snow is unlikely to melt during warm periods. In addition, grizzly bears are more likely to den in areas with greater canopy cover (Pigeon et al. 2016a) and at elevations above 6,371 feet (>1,942 meters) (Mace and Waller 1997a). Grizzly bears entered dens at later dates in years of higher fall food availability (e.g., berries) and exited dens later in the spring when denned at higher elevation, with colder spring temperatures, and with increased snowfall (Pigeon et al. 2016b, Johnson et al. 2018 (black bears, *Ursus americanus*)). Extrapolating from the elevations, slopes, aspects, and vegetation types for dens used by grizzly bears within distinct areas of the NCDE, it appears that more than 29% (2,631 mi^2, 6,815 km^2) of the Primary Conservation Area (PCA, Figure 2) is potential denning habitat so its availability is not considered a limiting factor for grizzly bears in the NCDE (MFWP, unpublished data).

Grizzly bears in the NCDE occupy dens for 4–6 months each year, beginning in October, November, or December (Mace and Waller 1997b, Linnell et al. 2000). Grizzly bears along the Rocky Mountain Front have recently begun to hibernate away from mountainous terrain, several miles out on the high plains. Since first documented in 2010, four different adult female grizzly bears have excavated dens at least six times and hibernated either in open rolling prairie or plains coulee habitats; distances ranging 7–31 mi (11–50 km) east of the front foothills, and at elevations as low as 3,580 ft (1,090 m) with two females giving birth to litters while hibernating in prairie dens (Carney and Madel, personal communication 2018).

The use of “day dens” by female grizzly bears with litters in the east front plains has also been documented during active, foraging season months — May through September — and should not

be confused with winter hibernation. Of four day dens investigated since 2012, all were excavated on steep northern aspects off prairie bench edges, and appear to be used as security and thermal cover during periods of warm ambient temperatures (Madel 2018, personal communication).

Females generally stay in their dens longer than males, with females with cubs-of-the-year being the latest to emerge (Mace and Waller 1997b, Pigeon et al. 2016b). Denning increases survival during periods of low food availability, deep snow, and low air temperature (Craighead and Craighead 1972). Due to their relatively constant body temperature in the den (Nowak and Paradiso 1983), hibernating grizzly bears can be easily aroused and have been known to exit or relocate dens when disturbed by seismic or mining activity (Harding and Nagy 1980) or other human activities (Swenson et al. 1997), although den abandonment is rare and usually occurs early in the denning season (see Glossary) (Reynolds et al. 1986, Swenson et al. 1997, Hegg et al. 2010). Dens are rarely used twice by an individual, although the same general area may be used multiple times, with females displaying stronger area fidelity than males (Schoen et al. 1987, Mace and Waller 1997b, Linnell et al. 2000).

In preparation for hibernation, bears increase their food intake dramatically during a stage called hyperphagia (see Glossary, Craighead and Mitchell 1982). During hyperphagia, excess food is deposited as fat, and grizzly bears may gain as much as 3.64 lb/day (1.65 kg/day) (Craighead and Mitchell 1982). Grizzly bears must consume high caloric foods in order to build up fat reserves to survive denning and post-denning periods (Rode and Robbins 2000). These layers of fat are crucial to the hibernating bear as they provide a source of energy and insulate the bear from cold temperatures, and are equally important in providing energy to the bear upon emergence from the den when food is still sparse relative to metabolic requirements (Craighead and Mitchell 1982).

Nutritional Ecology

The NCDE is a highly diverse landscape encompassing a wide array of habitat types and bear foods. Plant communities vary from short grass prairie and grain and hay fields on the eastern foothills to extensive conifer forests at mid-elevation to subalpine and alpine meadows at high elevations. Grizzly bears are successful omnivores, and in many areas of the NCDE are largely herbivorous (Kendall 1986, Jacoby et al. 1999, Schwartz et al. 2003b, Teisberg et al. 2015). Grizzly bear diets are characterized by high variability among individuals, seasons, and years (Servheen 1981, Mattson et al. 1991a, Mattson et al. 1991b, Schwartz et al. 2003b, LeFranc et al. 1987, Felicetti et al. 2003, Felicetti et al. 2004). They opportunistically seek and consume the most nutritious plant and animal foods available to them. Grizzly bears will consume almost any food available, including living or dead mammals or fish, insects, worms, plants, human-related foods, and garbage (Knight et al. 1988, Mattson et al. 1991a, Mattson et al. 1991b, Schwartz et al. 2003b, Gunther et al. 2014). In areas where animal matter is less available, berries, grasses, roots, bulbs, tubers, seeds, and fungi are important in meeting protein and caloric requirements (LeFranc

et al. 1987, Schwartz et al. 2003b). Even in areas where meat is abundant, grizzly bears forage on berries to maximize energy intake and mass gain (Robbins et al. 2007, Erlenbach et al. 2014).

Grizzly bears display great diet plasticity and switch food habits according to which foods are available (Servheen 1981, Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, LeFranc et al. 1987, Aune and Kasworm 1989, Schwartz et al. 2003b, Gunther et al. 2014). Mattson et al. (1991a) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have options in years when preferred foods are scarce. In the GYE, Blanchard and Knight (1991) noted that, "After 10 years of food habits data collection, new feeding strategies continued to appear annually in this population."

Fecal analysis, direct observation, and stable isotope analyses have been used to determine diets of grizzly bears in the NCDE and nearby areas (Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, Hamer and Herrero 1987, LeFranc et al. 1987, Aune and Kasworm 1989, Hilderbrand et al. 1996, White et al. 1998, Robbins et al. 2004, Teisberg et al. 2015). Using scat analysis and direct observation, many studies have confirmed that NCDE grizzly bears eat different foods in different seasons, depending on their availability (Servheen 1981, Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, LeFranc et al. 1987, Aune and Kasworm 1989). With the use of correction factors to account for digestibility, scat analysis allows direct comparison of foods among seasons and individuals (Hewitt and Robbins 1996).

Using stable isotope analysis, Teisberg et al. (2015) investigated the proportion of animal matter and vegetation in grizzly bear diets throughout different areas in the NCDE, concluding that males consume more animal matter than females or subadults. Adult female and subadult diets were 35% and 46% animal matter, respectively, while adult male diets included 60% animal matter. Animal matter included insects, fish, livestock, wild ungulates, and other mammals. Plant matter included grasses, forbs, roots, and berries. Grizzly bears in the southwestern, southern, and eastern portions of the NCDE consumed significantly more animal matter than bears in the interior and western portions. Grizzly bears on the East Front consumed the highest proportions of animal matter at 71% while the lower Swan River and lower South Fork of the Flathead had the lowest proportions of animal matter at 21%. Similarly, Jacoby (1999) and Mowat and Heard (2006) used stable isotope analysis to document that in the Swan Mountains, GNP, and the Canadian portion of the North Fork of the Flathead River, the amount of animal matter consumed when all age and sex classes were pooled ranged from 12–22%. On the BIR and FIR, which flank the eastern and western edges of the mountainous core that characterizes the PCA, adult female diets consisted of 73% animal matter; adult male diets included 69% animal matter; and subadult males and females derived 66% of their diets from meat (Jacoby et al. 1999). This increase in the amount of animal matter consumed when living within the foothills and prairies adjacent to mountainous areas is consistent with other studies of bear diet. Using fecal analysis, Aune and Kasworm (1989) found that meat, primarily from ungulates, was the third most utilized food source during spring for grizzly bears on the Rocky Mountain Front (foothills) of the NCDE. Similarly, using fecal

analysis, Munro et al. (2006) found that at the peak of meat consumption in early June in Alberta, the diets of foothills bears contained more than double the amount of meat (49%) than those of mountain bears (20%).

Upon den emergence, bears in the NCDE may search avalanche chutes for animal carcasses before descending to lower elevations seeking newly emerging vegetation, neonate ungulates, and carrion. In recent years, a few grizzly bears have been documented denning on the plains (Rocky Mountain Front). From den emergence until early summer, grizzly bears typically subsist on the roots of sweet vetches (*Hedysarum boreale* and *H. sulfurescens*), biscuit root (*Lomatium* species), glacier lilies (*Erythonium grandiflorum*), and western spring beauty (*Claytonia lanceolata*); berries from the previous year's crop of bearberry (*Arctostaphylos uva-ursi*); vegetation from grasses, sedges, cow parsnip (*Heracleum* species), and angelica (*Angelica* species); and deer (*Odocoileus species*), elk (*Cervus Canadensis*), or domestic livestock meat, available in the form of neonate fawns or calves and carrion resulting from winter related die-off and calving season mortality (Servheen 1981, Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, LeFranc et al. 1987, Aune and Kasworm 1989, Madel 2009).

During summer, before berry crops are available, grizzly bears in the NCDE may eat the roots of western spring beauty and glacier lilies and the vegetation of *Ligusticum* species, sweet cicely (*Osmorhiza* species), grasses, *Equisetum* species, cow parsnip, and *Angelica* species (LeFranc et al. 1987, Aune and Kasworm 1989, McLellan and Hovey 1995). Consumption of insects, especially ants, peaks during summer months. Many grizzly bears also begin to feed on army cutworm moths (*Euxoa auxiliaris*) in GNP from late June through mid-September (White et al. 1998). In the Mission Mountains, grizzly bears may feed on army cutworm moths from the beginning of July through the end of August (Chapman et al. 1955, Servheen 1983, Klaver et al. 1986). Grizzly bears have also been observed feeding on army cutworm moths in the Scapegoat Wilderness (Sumner and Craighead 1973, Craighead et al. 1982) and the Rocky Mountain Front (Aune and Kasworm 1989). Once berries become available, grizzly bears in the NCDE may consume huckleberries (*Vaccinium* species), soap berries (*Shepherdia canadensis*), serviceberries (*Amelanchier alnifolia*), hawthorn berries *(Crataegus douglasii*), and chokecherries (*Prunus* species); and to a lesser degree alderleaf buckthorn berries (*Rhamnus alnifolia)* and mountain ash berries (*Sorbus species*) (Servheen 1981, Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, LeFranc et al. 1987, McLellan and Hovey 1995). The amount and species of berries in bear diets vary annually based on annual fruit production and distributions (McLellan and Hovey 1995).

During late summer to fall, grizzly bears in the NCDE may continue to eat berries but will also consume more meat (mostly from hunter gut piles and hunter wounded animals) and the roots/bulbs/corms of sweet vetches and biscuit roots (Kendall 1986, Mace and Jonkel 1986, Martinka and Kendall 1986, LeFranc et al. 1987, Aune and Kasworm 1989, McLellan and Hovey 1995). Prior to the spread of white pine blister rust (*Cronartium ribicola*) in the NCDE, grizzly

bears fed on whitebark pine seeds from late summer through fall when and where they were available, primarily in the Whitefish Range and along the Rocky Mountain Front (Shaffer 1971, Mace and Jonkel 1986, Aune and Kasworm 1989, Kendall and Arno 1990). Whitebark pine mortality rates from the early-to-mid 1990s indicate that 42–58% of all trees surveyed within the NCDE were dead with 48–83% of trees surveyed showing signs of blister rust infection (Kendall and Keane 2001). Due to this widespread mortality from blister rust, whitebark pine has been functionally extinct for at least 40 years (Kendall and Keane 2001, pp. 228–232), yet the NCDE grizzly bear population has continued to increase and thrive with an estimated 765 bears in 2004, and a subsequent average 2–3 percent annual rate of growth (Kendall et al. 2009, Mace et al. 2012, Costello et al. 2016). In summary, the varying climate, topography, and vegetative conditions in the NCDE provide for a variety of habitats and foods for bears to consume.

Grizzly Bear Connectivity, Genetic Health, and Population Structure

Grizzly bears live at relatively low population densities, disperse slowly, and are vulnerable to human-caused mortality. Therefore, anthropogenic fragmentation of historically contiguous grizzly bear populations is common where they occur in proximity to human population centers (Forman and Alexander 1998, Proctor et al. 2012, Lindenmayer and Fischer 2006).

Genetic sampling and radio telemetry have been used to examine movements, genetic diversity, and population structure within the NCDE (Kendall et al. 2008, Kendall et al. 2009, Mace et al. 2012, Proctor et al. 2012, Mikle et al. 2016). Heterozygosity values are a useful, relative measure of genetic diversity, which is an indicator of whether a population is isolated or connected to other populations. Measures of heterozygosity from the NCDE obtained between 1990 and 2012 are similar to those from undisturbed populations in Canada and Alaska, leading to the conclusion that the NCDE population has high genetic diversity and is sufficiently connected to other populations.

Kendall et al. (2009) identified six subpopulations in the NCDE based on genetic analyses. However, the genetic differentiation values observed among the different areas within the NCDE were generally low. There are few geographical barriers thought capable of creating genetic discontinuities in the NCDE and generally the subpopulation boundaries did not coincide with natural or anthropogenic geographic features. Genetic differentiation between subpopulations decreased when genetic data from 1976–1998 was compared to data from 1999–2006, a finding consistent with demographic recovery of the population (Kendall et al. 2009). The only suggestion of human-caused fragmentation was on the western side of the U.S. Highway 2 / Burlington Northern Santa Fe (BNSF) rail line corridor between GNP and NF lands where human-caused mortality had higher mortality rates from vehicle and train collisions compared to other areas within the ecosystem. However, mortality as a result of train collisions has decreased in the last several years as a result of mitigation measures implemented by BNSF. There was little genetic differentiation across the eastern portion of the corridor but at the western end where highway

traffic volumes and human densities were three times higher, differentiation indicated reduced gene flow in 2004 (Kendall et al. 2009). In recent years, connectivity within the ecosystem has mostly restored the genetic diversity across the ecosystem. Mikle et al. (2016) evaluated changes in genetic diversity between 2004 and 2012. Initial diversity was moderate in three southern regions of the NCDE (e.g., observed Heterozygosity (Ho) – 0.69, 0.67, and 0.70), generally lining up with three of the subpopulations identified in Kendall et al. (2009).

The U.S. Highway 2 corridor may be causing fragmentation of habitat and contributing to separation of subpopulations within the NCDE. However, current levels of documented movements of both male and female bears across this corridor are maintaining demographic and genetic connectivity (Miller and Waits 2003, Waller and Servheen 2005).

Connectivity in grizzly bear populations should be examined in terms of both genetic and demographic health (Proctor et al. 2012). While male or female movements can enhance genetic diversity and reduce genetic fragmentation (i.e., provide genetic connectivity) (Miller and Waits 2003, Proctor et al. 2005), female movements are necessary to enhance a small population's growth rate (i.e., provide demographic connectivity) (Proctor et al. 2012). Proctor et al. (2012) used genetic information and movement data from radio-collared grizzly bears between 1979 and 2007 to assess fragmentation in grizzly bear populations in the U.S. and Canada. Data from radio-collared bears demonstrated that both male and female grizzly bears moved across the U.S.-Canadian border on the northern edge of the NCDE. Based on 11 movements (10 males and one female) between the NCDE and areas north of Highway 3 in Canada, Proctor et al. (2012) concluded that the NCDE population (south of the Canadian border) is connected to and functions as part of a larger grizzly bear population in the U.S.-Canadian border region. As an example, more than 50% of bears detected in southwestern Alberta from 2011–2014 were bears that also had detections in the U.S. or B.C., further supporting substantial connectivity across the boundary (Morehouse et al. 2016). Based on those movements and on measures of genetic diversity, they also concluded that there is currently little risk of significant reduction in the present high levels of genetic diversity.

Overall, the NCDE is genetically well connected to Canadian populations and its population size ensures demographic and genetic health. Accordingly, one goal of this Conservation Strategy is that the NCDE may eventually serve as a source population for genetic and demographic rescue, if necessary, of other grizzly populations in the lower-48 States. Based on analyses of movements made by NCDE and GYE bears fitted with GPS collars, Peck et al. (2017) delineated potential movement paths that would provide the opportunity for male-mediated gene flow between the NCDE and GYE. Model predictions indicated that male grizzly bear movement between the ecosystems could involve a variety of routes, and verified observations of grizzly bears outside occupied range supported this finding. Peck at al. (2017) reported that the closest proximity between the estimated occupied range for these two populations was about 68 mi in 2014 and similar analysis indicated the distance decreased to 56 mi by 2016. This distance is within the

range of maximum dispersal distances (42–109 mi) documented for populations in the Rocky Mountain region (Blanchard and Knight 1991, McLellan and Hovey 2001, Proctor et al. 2004), indicating that male dispersal between the populations is plausible. In addition, six of the 14 reported observations of grizzly bears outside of occupied range occurred at least 37–71 mi from the distribution of either population, indicating that movements of this magnitude have already occurred (Peck et al. 2017). In fact, in the absence of DNA, it is impossible to ascertain the population of origin for several of these long-distance movements, given that they were roughly equidistant from the ranges of the two populations.

Grizzly Bear Status & Management

The key to successful management of grizzly bears is to balance multiple land uses, public safety, and careful consideration of grizzly bear needs. Human-caused mortality is a limiting factor for nearly all grizzly bear populations in the lower-48 States. This Conservation Strategy aims to manage mortality at a level that will sustain a recovered population through habitat protections that minimize mortality risk while emphasizing conflict prevention, conflict response, and decisions grounded in scientific data and monitoring. On both public and private lands, public information and education efforts play an integral role in minimizing human-grizzly bear conflicts. Similarly, the responsive management of grizzly bear conflicts that occurred while grizzly bears have been listed as a "threatened" species under the Endangered Species Act (ESA), will continue.

Management Zones

Monitoring and management of the NCDE grizzly bear population and habitat will involve a number of spatial units and zones. There are two principal purposes for delineating these areas. One purpose is to delineate specific areas for population and/or habitat monitoring protocols. For example, areas known as Bear Management Units (BMUs) within the PCA are used for monitoring for reproductive female grizzly bear occupancy (Chapter 2) and developed recreation sites (Chapter 3, Figure 3, see Glossary). Similarly, thresholds for survival and mortality (Chapter 2) are calculated for and applied within an area known as the Demographic Monitoring Area (DMA); the PCA and Zone 1 (Figure 2). In addition, separate habitat objectives apply within Zone 1 and the Demographic Connectivity Areas (DCAs) within Zone 1 (Figure 2). In these instances, the mapped boundaries of units are important for assessment of management goals, because their evaluation requires counts or measurements that must be spatially explicit. We must recognize that habitat conditions may be similar across boundaries and that individual bears and the bear population may utilize areas on both sides of boundaries. Conflict management will follow the approach of the management zones but managers will have discretion based on the situation, as described in Chapter 4.

Within the NCDE, the grizzly bear population and its habitat will be managed using an approach that identifies a PCA and three additional management zones: Zone 1; Zone 2; and Zone 3 (Figure 2). The PCA (8,926 mi^2, 23,118 km^2) is the area currently known as the NCDE Grizzly Bear Recovery Zone (USFWS 1993). The PCA represents the core habitat for grizzly bears in the NCDE and is expected to support the highest densities of bears. It will be managed as a source area where the objectives are continual occupancy by grizzly bears and maintenance of habitat conditions that are compatible with long-term population stability. It is mostly comprised of public land (85%) and is the area where the most conservative habitat protections apply. Here, large blocks of secure habitat will be maintained (Chapter 3). Attractant storage rules will be implemented on Federal, Tribal, and most State lands.

Grizzly bears are also expected to occupy habitat outside the PCA within Zones 1, 2, and 3. Unlike the PCA, these other zones each include substantial areas of high human densities, some of which may be incompatible with grizzly bear occupancy. Outside of the PCA, future occupancy is anticipated where it is biologically suitable and socially acceptable.

Management Zone 1 (7,514 mi^2, 19,460 km^2) provides a buffer around the PCA, where the population objective is continual occupancy by grizzly bears. Here, habitat protections will focus on managing open motorized route densities at or below baseline levels (see Glossary) as specified in current Federal and Tribal land use plans because these are known to be compatible with a stable to increasing grizzly bear population. Attractant storage rules will be implemented on Federal, Tribal, and most State lands. In addition, occupancy of this area by grizzly bears will allow for future connectivity with other grizzly bear ecosystems. On the northwest and southwest corners of Zone 1, there are two DCAs with specific habitat measures to support female grizzly bear occupancy and eventual dispersal to the CYE and BE. In these DCAs, habitat protections will focus on limiting open motorized routes during the non-denning season, and managing current roadless areas as stepping stones to other ecosystems.

The PCA and Zone 1 together (16,439 mi^2, 42,578 km^2) will be the area within which population data are collected and mortality limits apply, as described in Chapter 2. This combined area will be referred to as the DMA.

In Management Zone 2 (7,280 mi^2, 18,854 km^2), the objective is to maintain existing resource management and recreational opportunities and allow agencies to respond to demonstrated conflicts (as defined in Chapter 4) with appropriate management actions. Public lands in Zone 2 will be managed to provide the opportunity for grizzly bears to move between the NCDE and adjacent ecosystems (i.e., the GYE or the BE). Here, the management emphasis will be on conflict prevention and response. Attractant storage rules will be implemented on most Federal and State lands. Grizzly bears will not be captured and removed unless there are conflicts that can only be solved by capture and relocation or removal of the offending bear.

Other areas within the NCDE are referred to as Zone 3. In contrast to Zones 1 and 2, Zone 3 does not provide habitat linking to other grizzly bear ecosystems. Grizzly bears currently occupy parts of Zone 3 (adjacent to Zone 1), and their numbers are expected to increase, but this may be incompatible with human presence because land ownership is mostly private and agricultural uses predominate. In Zone 3, grizzly bear occupancy will not be actively discouraged. Grizzly bears will not be captured and removed just because they occur in Zone 3, nor will they be captured and removed from Zone 3 unless there are conflicts that can only be resolved by capture and relocation or removal of the offending bear. Grizzly bears will be managed primarily through conflict response. Although currently depicted in Figure 2, the geographic extent of Zone 3 will be determined in the USFWS' Final Rule delisting grizzly bears in the NCDE.

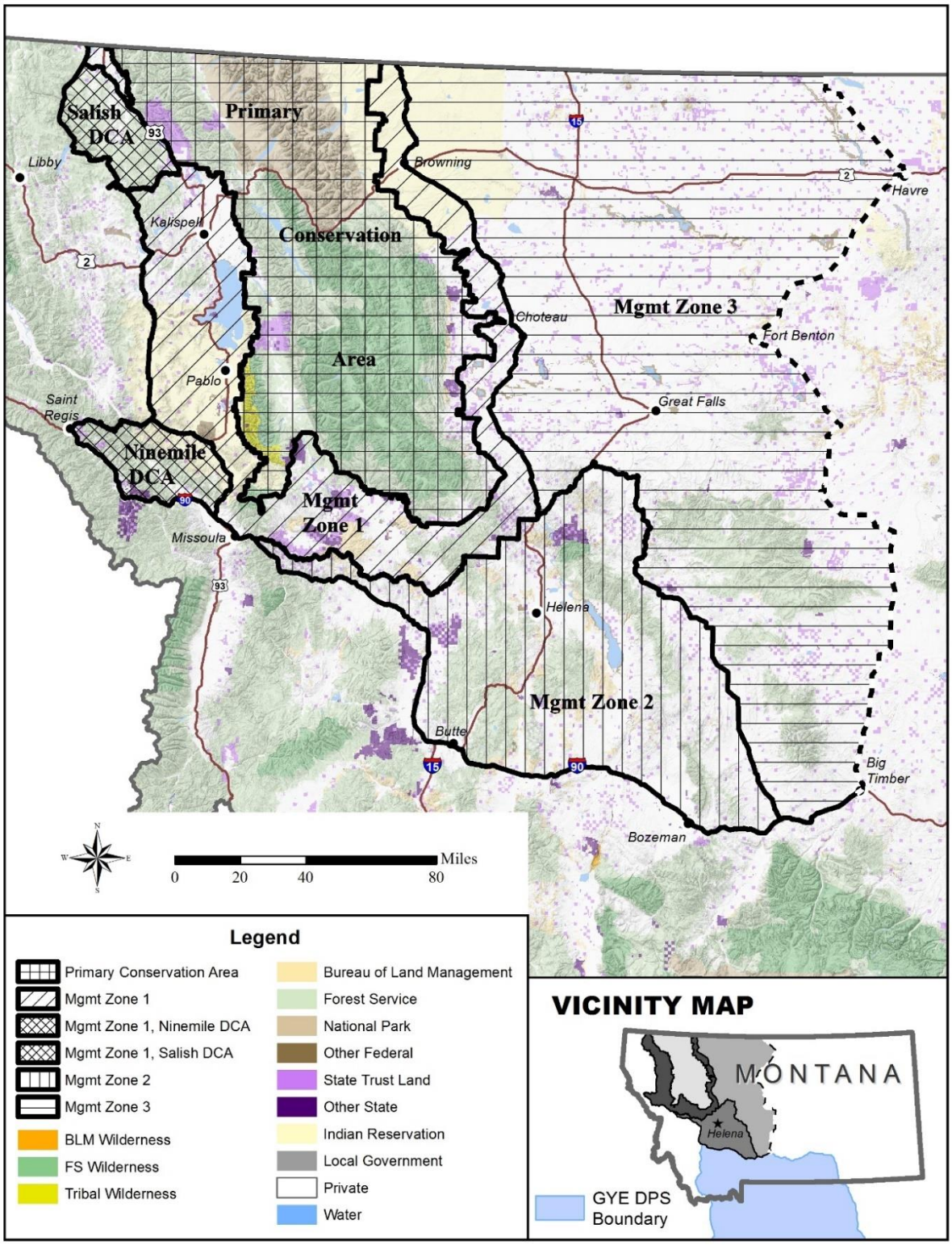

Figure 2. Grizzly bear management zones. The eastern boundary of Zone 3 will be determined in the USFWS' Final Rule delisting grizzly bears in the NCDE.

Current Status

As a result of ongoing efforts of multiple agencies and partners, the NCDE Subcommittee believes the grizzly bear population in the NCDE is recovered from threats to its long-term persistence. The USFWS has stated it is moving forward with its intentions to delist the NCDE population. Although certain specific activities have the potential to impact individual grizzly bears, the management commitments contained in this Conservation Strategy ensure these activities will not threaten the long-term persistence of the grizzly bear population as a whole.

The NCDE population of grizzly bears is contiguous with grizzly bears in Canada, resulting in high genetic diversity (Proctor et al. 2012, Mikle et al. 2016, Morehouse et al. 2016). Grizzly bears are well distributed throughout the PCA and Zone 1, although density is higher inside the PCA (Kendall et al. 2008, 2009, Mace and Roberts 2011). In 2004, grizzly bear population density was highest inside GNP with approximately 30 bears per 386 mi^2 (1,000 km^2) (Kendall et al. 2008). This is equivalent to approximately one bear per 13 mi^2 (33 km^2). Genetic sampling between 2004 and 2012 documented increases in density across the NCDE, especially south of U.S. Highway 2 (Kendall et al., in prep).

Females with young have been documented consistently in all 23 BMUs within the PCA, as well as throughout Zone 1 and in some areas of Zone 3 along the Rocky Mountain Front (Costello et al. 2016, Costello and Roberts 2016, Costello and Roberts 2017, Costello and Roberts 2018) (Figure 3). While the Recovery Plan (USFWS 1993, p. 62) identified sightings of females with cubs as a method to estimate minimum population size, it also recognized that, "Because of the forested nature of much of the NCDE…the calculated minimum number of females with cubs will underestimate the actual number (population size)." Kendall et al.'s (2009) estimate of total population size was more than double the minimum population size estimate based on sightings of females with cubs, further corroborating the difficulty of using this parameter as an indicator of population size in this ecosystem. Since 2004, sightings of females with cubs have not been consistently collected, and this method is no longer used to estimate minimum population size. Instead, radio-telemetry, DNA samples, and mortalities are used to provide distribution data and annual population growth rates that are applied to Kendall et al.'s (2009) population size estimate to project an index of total population size since 2004.

Beginning in 2004, ecosystem-wide studies were initiated to evaluate the status and trend of the NCDE population. Using non-invasive sampling methods and capture-mark-recapture models, Kendall et al. (2009) estimated there were approximately 765 (95% confidence interval (CI) = 715–831) grizzly bears in the NCDE in 2004. An interagency monitoring program was also expanded in 2004 to use live capture and radio-telemetry techniques to: assess population trend from survival and reproductive parameters; document population distribution and occupancy of reproductive females within the DMA; estimate total numbers of mortalities of independent bears (see Glossary) (≥2 years old) within the DMA; and provide data and analyses to meet other management needs (Mace et al. 2005). Using data from radio-marked bears during 2004–2014, Costello et al. (2016) estimated survival rates of 0.55 (plus or minus (±) 0.07 standard error (SE),

0.64 (± 0.08 SE), 0.95 (± 0.014 SE), and 0.90 (± 0.054 SE) for cubs, yearlings, independent females, and independent males, respectively. They detected no temporal trend in survival rates for independent or dependent bears (see Glossary) during the 2004–2014 study period. They estimated an annual proportion of females with cubs of 0.287 (± 0.031 SE), a mean litter size of 2.10 (± 0.050 SE), and an unbiased age of primiparity (Garshelis et al. 1998) 5.8 years (± 0.262 SE). Based on stochastic population modeling of these observed vital rates, they estimated the annual population growth rate was 1.023, or 2.3% growth per year. Assuming an initial population size of 765 individuals in 2004 (Kendall et al. 2009), the median estimated population size was 960 grizzly bears in 2014 with a 95th percentile of 837–1,089 individuals. Stochastic modeling indicated a 0.5% chance that the NCDE grizzly bear population declined during 2004–2014. No change in these vital rates has been observed during 2015–2017, and updated analysis indicates the estimated population size in 2017 was 1,029 individuals with a 95th percentile of 884–1,190 (MFWP, unpublished data).

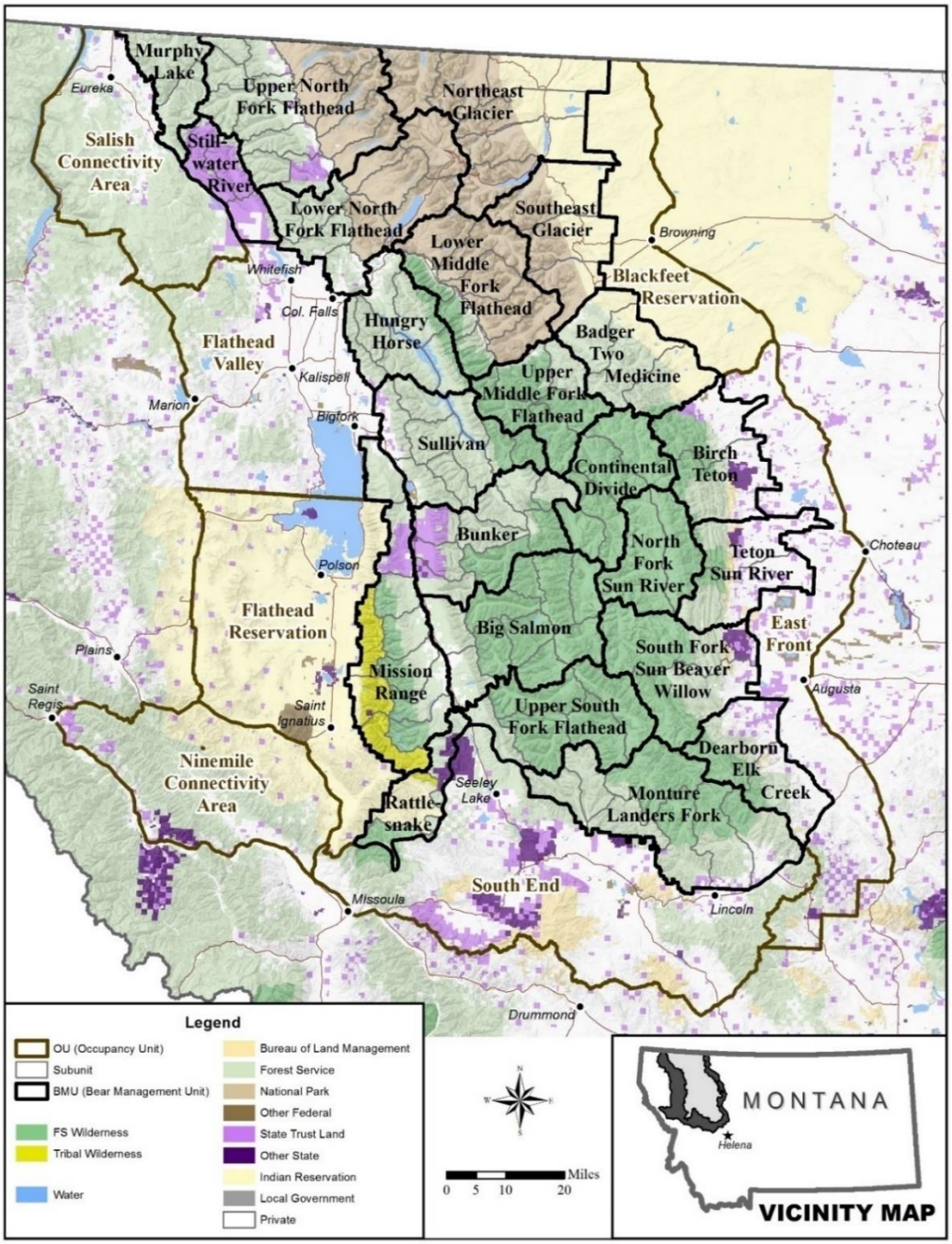

Figure 3. Bear Management Units (BMUs) and Bear Management Subunits (BMU subunits (see Glossary)) within the NCDE Primary Conservation Area, and Occupancy Units (see Glossary) within Zone 1. BMU subunits are outlined in light gray. The DMA includes Occupancy Units that are subdivisions of Zone 1 for population monitoring purposes. BMUs are within the PCA for habitat and population management and monitoring while Occupancy Units are within Zone 1 for population monitoring.

Grizzly Bear Population Management

Overview

Wildlife and habitat population managers rely on a number of factors when gauging the status of a population. Those factors include population size, trend (i.e., increasing, decreasing, or stable), density, distribution, levels of genetic diversity, reproductive rates, survival rates, and mortality causes. While population size is a well-established measure of resilience, it is currently not possible to obtain a reliable population estimate on an annual basis within the NCDE due to the difficulty of sighting individual bears and the high costs of more intensive methods. However, it is not necessary to estimate population size every year if its value at a given time is known and there is a reliable estimate of population trend. In the NCDE, we know the population consisted of approximately 765 (95%CI = 715 – 831) individuals in 2004 and that it has been increasing approximately 2–3% annually since then (Kendall et al. 2009, Mace et al. 2012, Costello et al. 2016, MFWP, unpublished data). This trend estimate incorporates all sources of mortality, both known and unknown, and assures managers that mortality has been at or below levels that will sustain the grizzly bear population.

Survival and reproduction are the two demographic vital rates driving whether the grizzly bear population increases, decreases, or remains stable (i.e., trend). Demographic parameters influencing trend include age-specific survival, sex-specific survival, age of first reproduction, average number of cubs per litter, the time between litters, age ratios, sex ratios, and immigration and emigration. These data are used to determine if the population is increasing or decreasing and possible reasons for any changes (Anderson 2002, Mills 2007, Mace et al. 2012).

Grizzly Bear Survival in the NCDE

Survival in the NCDE is influenced by age, sex, reproductive status, and location (i.e., proximity to humans and human activities). While individual grizzly bears in the NCDE die from natural causes, particularly dependent cubs and yearlings, human-caused mortality is the driving force behind independent grizzly bear survival rates. Of 439 grizzly bear mortalities documented in the NCDE DMA between 1998 and 2017, 88% were human-caused (Table 1). An additional 41 grizzly bears mortalities were documented in the NCDE outside of the DMA, 98% of which were human-caused. Despite these mortalities, the survival rate for adult females, the single most important cohort affecting population trend, is high: 0.95 ± 0.014 SE (Costello et al. 2016). In the NCDE, the top three sources of documented human-caused mortality in the DMA are: management removals (see Glossary) (30%), illegal kills (22%), and defense of life kills (15%) (Table 1). Management removals of bears following human-grizzly bear conflicts are sometimes necessary.

Management removals occurred as a result of site conflicts associated with anthropogenic attractants (50%), livestock depredation (41%), human safety issues (6%), and the humane euthanasia of injured or diseased bears (4%). The majority of management removals result from attractant-related conflicts at sites associated with frequent or permanent human presence. Unsecured attractants such as garbage, human foods, pet/livestock foods, bird food, livestock carcasses, wildlife carcasses, barbeque grills, compost piles, orchard fruits, or vegetable gardens are usually the source of these conflicts and subsequent removals. These conflicts involved food-conditioned bears actively seeking out unsecured attractants or bears that were habituated to human presence seeking natural sources of food in areas near human structures or roads (see Glossary). While these mortalities are clearly related to human attractants, they are also related to attitudes and personal knowledge about and tolerance toward grizzly bears.

Table 1. Causes of grizzly bear mortalities in the NCDE, 1998-2017. This table includes known and probable mortalities for all age classes, inside and outside the DMA, including 136 dependent young (124 inside and 12 outside).

	Within DMA			Outside DMA		
Cause[1]	Number	Average /year	Percent of total	Number	Average /year	Percent of total
Human-caused	387	19	88%	41	2	98%
Natural	22	1	5%	0	0	0%
Undetermined	30	2	7%	1	0	2%
Total	439	22		42	2	
Human cause[1]	Number	Average /year	Percent of human-caused	Number	Average /year	Percent of human-caused
Management removal	117	6	30%	11	1	27%
Illegal[2]	87	4	22%	12	1	29%
Defense of life	57	3	15%	11	1	27%
Automobile collision	46	2	12%	1	<1	2%
Train collision	35	2	9%	3	<1	7%
Mistaken identification	19	1	5%	0	0	0%
Accidental[3]	14	1	4%	3	<1	7%
Augmentation[4]	12	1	3%	0	0	0%

[1] Orphaned dependent offspring were classified according to cause of death of their mother.
[2] Illegal included poaching, malicious, and defense of property kills.
[3] Accidental included capture-related, drowning, and poisoning mortalities.
[4] Bears translocated to augment the CYE were counted as mortalities in the NCDE.

Illegal killing of grizzly bears is a significant source of mortality in the NCDE (Table 1). Prompt and efficient management of bears involved in conflict, coupled with outreach and education, may positively influence human attitudes about grizzly bears and help to reduce illegal killings (Servheen et al. 2004).

From 1998–2017, 29% of human-caused grizzly bear mortalities in the DMA were accidental or unintentional. This includes 81 mortalities due to collisions with vehicles or trains, 19 grizzly bears mistakenly harvested by black bear hunters, 12 mortalities related to capturing and handling, one accidental poisoning, and one accidental drowning in an irrigation canal. Mistaken identity mortalities, which are one source of illegal kills, are sometimes not reported, making it difficult or impossible to distinguish them from malicious kills. When capturing and handling grizzly bears for research and management, agency personnel use established protocols that are periodically updated to incorporate the latest veterinary medical techniques to minimize grizzly bear mortality risk and increase human safety. New technologies that identify grizzly bear activity (e.g. cameras), reduce non-target captures, and alert personnel immediately when an animal has been captured (e.g. automatic text alerts) are incorporated as they become available.

Grizzly bear mortalities related to hunting accounted for 16% of human-caused mortalities in the NCDE between 1998 and 2017. While many of these were related to people incorrectly identifying their targets during black bear or big game hunting seasons, the majority involved people shooting a grizzly bear in self-defense while hunting other species (e.g., elk, game birds, etc.). Currently there are outreach programs in place that are targeted at hunters to emphasize patience, awareness, and correct identification of targets so that grizzly bear mortalities are reduced. The State of Montana requires all black bear hunters to pass a Bear Identification Test before receiving a black bear hunting license (see http://fwp.state.mt.us/bearid/). Montana includes grizzly bear encounter management as a core subject in basic hunter education courses (Dood et al. 2006) and in all big game hunting regulations, and encourages hunters to carry and know how to use bear spray.

Grizzly Bear Habitat Management

The overall goal of habitat management in this Conservation Strategy is to sustain a recovered grizzly bear population in the NCDE. The management focus is on limiting human-caused mortality by securing anthropogenic attractants and instituting restrictions on human access.

Habitat Requirements

Grizzly bears use a variety of habitats in the NCDE. In general, a grizzly bear's daily movements are largely driven by the search for food, mates, cover, security, and/or den sites. In the western portion of the ecosystem, Waller and Mace (1997) and Mace et al. (1997) demonstrated that avalanche chutes are important to bears during spring, summer, and autumn. Other open-canopied habitats such as shrub lands and places where timber has been harvested are also frequented by bears throughout the year. Mid- to high-elevation slab rock and meadow habitats possess many

foods dug by bears. Grizzly bears use closed canopy forests less than expected during all seasons. Along the Rocky Mountain Front on the east side of the PCA, grizzly bears selected riparian zones during all seasons, up to 20 miles (32 kilometers) from the mountain front (Aune and Kasworm 1989), and occasionally over 50 miles (80 kilometers) (Mace and Roberts 2011). Shrub lands were important during autumn to bears in this area.

Grizzly bears are long-lived, opportunistic omnivores whose food and space requirements vary depending on a multitude of environmental and behavioral factors, including the experience and knowledge of each individual bear. Grizzly bear home ranges overlap and change seasonally, annually, and with reproductive status. These factors make the development of thresholds for food resources and habitat quality difficult. However, habitat requirements for sustaining a recovered population may be established by evaluating what habitat factors (i.e. motorized access management) have been compatible with a stable or increasing grizzly bear population in the NCDE, and then using these habitat conditions as threshold values to be maintained to ensure a healthy population.

Secure Core and Motorized Access Management

The negative impacts of humans on grizzly bear survival and habitat use are well documented (Harding and Nagy 1980, McLellan and Shackleton 1988, Aune and Kasworm 1989, McLellan 1989, McLellan and Shackleton 1989, Mattson 1990, Mattson and Knight 1991, Mattson et al. 1992, Mace et al. 1996, McLellan et al. 1999, White et al. 1999, Woodroffe 2000, Boyce et al. 2001, Johnson et al. 2004, Schwartz et al. 2010, Boulanger and Stenhouse 2014). These effects range from temporary displacement to actual mortality. Grizzly bears were displaced by vehicular traffic, motorized traffic, and at times non-motorized traffic, all in the NCDE (Mace and Waller, 1996, Mace et al. 1996, Graves 2002, Waller and Servheen, 2005) and in other grizzly bear populations (McLellan and Shackleton 1988, 1989, Boulanger and Stenhouse 2014, Ladle et al. 2018). Grizzly bear populations have survived where the frequency of contact with humans was very low (Mattson and Merrill 2002) because the large expanses of relatively secure core (areas without or with low levels of permanent human presence) resulted in lower human-caused mortality. These areas are primarily associated with National Parks, Wilderness Areas, and other large blocks of public lands (IGBC 1998). Maintaining habitat security is a major goal of this Conservation Strategy.

Management of motorized access routes is one of the most effective tools available to manage human use levels and create habitat security where it is needed. Open motorized route density (OMRD, see Glossary) is a predictor of grizzly bear survival on the landscape (Schwartz et al. 2010, Boulanger and Stenhouse 2014) and is useful in evaluating habitat potential for and mortality risk to grizzly bears (Mace et al. 1996).

Managing motorized access to maintain large blocks of secure core is important to the survival and reproductive success of grizzly bears, especially adult female grizzly bears (Mattson et al. 1987, IGBC 1994, Schwartz et al. 2010, Boulanger and Stenhouse 2014). Managing motorized

access: (1) minimizes human interaction and reduces potential grizzly bear mortality; (2) minimizes displacement from important habitat; (3) minimizes habituation to humans; and (4) provides habitat where energetic requirements can be met with limited disturbance from humans (Mattson et al. 1987, McLellan and Shackleton 1988, McLellan 1989, Mace et al. 1996, Mattson et al. 1996).

High-intensity-use Non-motorized Trails

In 1994 and 1998, the IGBC task force charged with creating standard definitions and procedures for managing motorized access in grizzly bear recovery zones recommended that the impacts of "high-intensity-use" non-motorized trails be considered in calculations of "core" habitat (IGBC 1998) but emphasized that, "Motorized access is also one of the more influential parameters affecting habitat security" (IGBC 1998). Because there were no data or literature available to determine what the threshold number of parties was that defined a high-intensity-use trail or how this number may relate to grizzly bear population parameters, the threshold value was determined by a panel of experts. Since 1995, NF in the NCDE have considered non-motorized trails meeting this definition of high-intensity-use as the equivalent of an open road.

The approach to subtract high-intensity-use non-motorized trails from core habitat calculations is not clearly supported by the existing scientific literature. Although multiple studies document displacement of individual grizzly bears from non-motorized trails to varying degrees (Schallenberger and Jonkel 1980, Jope 1985, McLellan and Shackleton 1989, Kasworm and Manley 1990, Mace and Waller 1996, White et al. 1999), none of these studies documented increased mortality risk or population-level impacts as a result of displacement. In addition to the lack of data documenting a relationship between heavily used non-motorized trails and grizzly bear mortality, the difficulty of accurately measuring human use on non-motorized trails also undermines the usefulness of this habitat parameter when assessing habitat security for grizzly bears. Due to the lack of literature supporting the threshold value of 20 parties per week to define high-intensity-use in the NCDE, the subjectivity of quantifying use levels, and the lack of literature documenting population-level impacts from these heavily used non-motorized trails, we revised the definition of "core area" in this Conservation Strategy to remove consideration of high-intensity-use of non-motorized trails. This Conservation Strategy uses the term "secure core" to represent this revised definition (see Glossary). Differences in the levels of secure core versus core habitat in each BMU subunit are shown in Appendix 7.

While growing human populations ensure that human use of non-motorized trails in the NCDE will continue to increase, the effects of these future increases will be mitigated through management of motorized access and developed recreation sites, conflict prevention outreach and education, food storage orders, and continued presence of law enforcement and field staff as described in this Conservation Strategy. If research demonstrates that high-intensity-use non-motorized trails do significantly impact grizzly bear populations or that there are areas of significantly higher mortality risk near high-intensity-use non-motorized trails (as opposed to other

trails or roads), this new information will be appropriately considered and incorporated through an adaptive management approach. Revisions to this Conservation Strategy will be made if necessary to conserve the NCDE grizzly bear population.

Developed Recreation Sites on Public Lands

Developed sites can impact bears through temporary or permanent habitat loss and displacement. The primary concern regarding developed sites is direct bear mortality or removal from the ecosystem due to human-bear conflicts caused by unsecured bear attractants, habituation, and food conditioning (Mattson et al. 1987, Knight et al. 1988, Gunther et al. 2004, Servheen et al. 2004). Habituation occurs when grizzly bears encounter humans or developed sites frequently, and without negative consequences, so that the bears no longer avoid humans and areas of human activity (USFWS 1993). Habituation does not necessarily involve human-related food sources. Food conditioning occurs when grizzly bears receive human-related sources of food and thereafter seek out humans and human-use areas as feeding sites (USFWS 1993). As discussed above, half of the grizzly bears removed by management agencies were involved in conflicts related to unsecured attractants such as garbage, bird feeders, pet/livestock feed, and human foods.

Developed recreation sites refer to sites or facilities on public Federal lands with features that are intended to accommodate public use and recreation. Examples include, but are not limited to: campgrounds, trailheads, lodges, rental cabins and lookouts; summer homes; restaurants; visitor centers; and ski areas. Developed recreation sites are generally associated with frequent, overnight or prolonged human use that may increase both the levels of bear attractants and grizzly bear mortality risk.

Snowmobiling

Snowmobiling may have the potential to disturb bears while in their dens and after emergence from their dens in the spring. Because grizzly bears are easily awakened in the den (Schwartz et al. 2003b) and have been documented abandoning den sites after seismic disturbance (Reynolds et al. 1986), the potential impact from snowmobiling should be considered. Disturbance in the den could result in energetic costs (increased activity and heart rate inside the den) and possibly den abandonment, which could lead to a decline in physical condition of the individual or cub mortality (Swanson et al. 1997, Graves and Reams 2001).

The information that is available on the impacts of snowmobiling on grizzly bears is based on small sample sizes and opportunistic sightings of disturbance (USFWS 2002, Hegg et al. 2010). The available data about the potential for disturbance while denning and den abandonment from nearby snowmobiling use is extrapolated from studies examining the impacts of other human activities and is from opportunistic sightings and is based on sample sizes so small they cannot be

legitimately applied to assess population-level impacts (Harding and Nagy 1980, Reynolds et al. 1986, Hegg et al. 2010). Reynolds et al. (1986) found that grizzly bears denning within 0.9–1.0 mi (1.4–1.6 km) of active seismic exploration and detonations moved around inside their dens but did not leave them and documented only one instance of possible den abandonment due to seismic testing (i.e., detonations) within 0.1 miles (0.2 kilometers) of a den (Reynolds et al. 1986). Swenson et al. (1997) monitored 13 individual grizzly bears for at least five years each and documented 18 instances of den abandonment, 12 of which were related to human activities. They found that 72% of dens were abandoned between November and early January, before pregnant females give birth, and that 60% (n=5) of female bears that abandoned a den site before giving birth lost at least one cub in or near their new den site. The one documented observation of snowmobiling at a known den site in the lower-48 States found the bear did not abandon its den, even though snowmobiles were operating directly on top of it (Hegg et al. 2010). Again, this is only an anecdotal observation because it is based on a sample size of one. Additionally, monitoring of den occupancy for three years on the Custer-Gallatin NF in Montana (2006) did not document any den abandonment of bears observed (Gallatin NF 2006).

The best available information suggests that current levels of snowmobiling use are not appreciably reducing the survival or recovery of grizzly bears. Yet, because the potential for disturbance exists, we will evaluate new science as it becomes available.

Livestock Allotments

Livestock operations can benefit grizzly bears through the maintenance of large blocks of open rangeland and habitats that support a variety of wildlife species (Dood et al. 2006). However, when grizzly bears were 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:

- direct mortality from control actions resulting from livestock depredation;
- direct mortality due to control actions resulting from grizzly bear habituation and/or learned use of bear attractants such as livestock carcasses and feed;
- increased chances of grizzly bear-livestock conflicts;
- displacement due to livestock or related management activity;
- direct competition for preferred forage species.

Approximately 13% of all known human-caused grizzly bear mortalities in the DMA between 1998 and 2017 were due to management removal actions associated with livestock depredations. This human-caused mortality is the main impact of livestock on grizzly bears in the NCDE. Most livestock-related grizzly bear mortalities occur on private lands along the Rocky Mountain Front (RMF) and on the Blackfeet Indian Reservation (BIR), both of which are east of the Continental

Divide. The PCA in this area extends up to 18.5 miles (30 kilometers) east of Federal management boundaries and includes large areas of private ranchlands and Tribal range units. Indirect impacts on grizzly bears due to attractants can be minimized with requirements to securely store and/or promptly remove attractants associated with livestock operations (e.g., livestock carcasses, livestock feed, etc.). Current levels of grazing intensity in forested environments have not precluded an increasing grizzly bear population and are not likely to affect vegetation structure enough to result in direct competition for forage species on public lands within the NCDE.

In the NCDE, most livestock depredations by grizzly bears occur on sheep or young cattle. While grizzly bears typically coexist with larger livestock without preying on them, when grizzly bears encounter smaller animals such as orphaned or separated calves, domestic sheep, goats, or chickens, they will often kill them (Jonkel 1980, Knight and Judd 1983, Orme and Williams 1986, Anderson et al. 2002). Honeybees, classified as livestock in Montana (MCA 15-24-921), can also be attractants to 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 et al. 1988). Because of the increased risk to grizzly bears posed by actions taken to protect sheep and other small livestock, the IGBC Guidelines (USDA USFS 1986a) emphasized the reduction of these types of allotments within the Recovery Zone.

Vegetation Management and Cover

Vegetation management occurs throughout the NCDE on lands managed by the USFS, GNP, DNRC, BLM, the FIR, the BIR, MFWP, and both corporate and small private lands. Vegetation management projects may include invasive species management, restoration, timber harvest, thinning, prescribed fire, and salvage of burned, diseased, or insect-infested stands. Nearly 68% of the PCA is unavailable to general, commercial timber harvest through Federal, State or Tribal designations or conservation plans.

Vegetation management may result in either negative or positive effects for grizzly bear habitat. Potential negative effects include: removal of cover; disturbance or displacement; increased risk of human-grizzly bear conflicts; and increased mortality risk due to vehicular traffic. However, there may be positive effects (e.g., localized increases in grasses, forbs, and berry-producing shrubs) once a project is complete, provided key habitats (e.g., riparian areas) and known food production areas are maintained or enhanced.

Mineral and Energy Development

Mineral and energy development have the potential to directly and indirectly affect grizzly bears and/or their habitat. For the purposes of this Conservation Strategy, mineral development refers to surface and underground hardrock mining and coal production, whereas energy development refers to the production of oil and natural gas. As with vegetation management, the primary

concerns are related to increased grizzly bear mortality risk from associated motorized use, habituation, and/or increased human-grizzly bear encounters and conflicts. Other impacts may include permanent habitat loss, habitat fragmentation, and displacement due to surface disturbance.

Mortality risk will be largely mitigated through motorized access standards, food storage requirements, and other habitat standards described in Chapter 3, in addition to conflict management described in Chapter 4.

Climate Change

Climate change may result in a number of changes to grizzly bear habitat, including a reduction in snowpack levels, shifts in the abundance and distribution of some natural food sources (Rodriguez et al. 2007), and changes in fire regimes (Nitschke and Innes 2008, McWethy et al. 2010) that could contribute to a shorter denning season (Leung et al. 2004) and shifts in denning times (Craighead and Craighead 1972, Van Daele et al. 1990, Haroldson et al. 2002, Johnson et al. 2018 (black bears)). Most grizzly bear biologists in the U.S. and Canada do not expect habitat changes predicted under climate change scenarios to directly threaten grizzly bears (Servheen and Cross 2010). These changes may even make habitat more suitable and food sources more abundant. However, these ecological changes may also affect the timing and frequency of human-grizzly bear interactions and conflicts (Servheen and Cross 2010). In this Conservation Strategy, the denning season is considered to be December 1–April 1 west of the Continental Divide and December 1–April 15 east of the Continental Divide. These dates will be adjusted if 10-year average den emergence data for females or females with offspring shows a shift.

Because timing of den entry and emergence is at least partially influenced by food availability and weather (Craighead and Craighead 1972, Van Daele et al. 1990, Johnson et al. 2018 (black bears)), less snowpack would likely shorten the denning season as foods become available later in the fall and earlier in the spring. In the GYE, Haroldson et al. (2002) reported later den entry timing for male grizzly bears corresponding with increasing November temperatures from 1975 to 1999. Increased time outside of the den could increase the potential for conflicts with humans (Servheen and Cross 2010).

The hydrologic regime in the northern Rocky Mountains has changed with global climate change and is projected to change further (Bartlein et al. 1997, Cayan et al. 2001, Leung et al. 2004, Stewart et al. 2004, Pederson et al. 2011). The western U.S. will likely experience milder, wetter winters with warmer, drier summers and an overall decrease in snowpack (Leung et al. 2004, Joyce et al. 2018). While some climate models do not demonstrate significant changes in total annual precipitation for the western U.S. (Duffy et al. 2006, Whitlock et al. 2017), an increase in “rain on snow” events is expected (Leung et al. 2004, McWethy et al. 2010). The amount of snowpack and the timing of snowmelt may also change with an earlier peak stream flow each spring (Cayan et

al. 2001, Leung et al. 2004, Stewart et al. 2004, Whitlock et al. 2017). Although there is some disagreement about changes in the water content of snow under varying climate scenarios (Duffy et al. 2006), reduced runoff from decreased snowpack could translate into decreased soil moisture in the summer (Leung et al. 2004, Whitlock et al. 2017). However, Pederson et al. (2011) found that increased spring precipitation in the northern Rocky Mountains is buffering total annual stream flow thus far from these expected declines in snowpack.

Climate change could create temporal and spatial shifts in grizzly bear food sources (Rodriguez et al. 2007, Roberts et al. 2014). Changes in plant community distributions have already been documented, with species' ranges shifting further north and higher in elevation due to environmental constraints (Walther et al. 2002, Walther 2003, Walther et al. 2005) or outbreaks of insects or disease (Bentz et al. 2010). A net loss in forested areas is anticipated as forest contraction occurs more rapidly than forest expansion, with an expected increase in productivity in montane, subalpine, and alpine areas and a decrease in productivity in lower elevation, warmer, and drier sites (Whitlock et al. 2017). It is unclear whether avalanche chutes, an important habitat component to grizzly bears, will decrease, possibly as a result of decreased snowpack, or increase, as a result of increases in "rain on snow" events that may decrease the stability of snowpack. Changes in vegetative food distributions may also influence other mammal distributions, including potential prey species like ungulates (White et al. 2018). Montana is experiencing a longer growing season with an earlier spring and extended summer (Whitlock et al. 2017). While the extent and rate to which individual plant species will be impacted is difficult to foresee with any level of confidence (Walther et al. 2002, Fagre et al. 2003, Roberts et al. 2014), most bear biologists agree that grizzly bears are flexible enough in their dietary needs that they will not be impacted directly by ecological constraints such as shifts in food distributions and abundance (Servheen and Cross 2010).

Fire regimes can affect the abundance and distribution of some vegetative bear foods (e.g., grasses, berry producing shrubs) (LeFranc et al. 1987). For instance, fires can reduce canopy cover which usually increases berry production. However, excessive canopy removal due to fires or vegetation management may decrease berry production through subsequent moisture stress and exposure to sun, wind, and frost (Simonen 2000). Fire frequency and severity may increase with late summer droughts predicted under climate change scenarios (Nitschke and Innes 2008, McWethy et al. 2010, Whitlock et al. 2017). Increased fire frequency has the potential to improve grizzly bear habitat. Low to moderate severity fires may be the best for short-term improvements while high severity fires can produce long-lasting berry fields if the severity does not damage rhizomes (Simonen 2000, Zager et al. 1983). High-severity fires may reduce grizzly bear habitat quality immediately afterwards by decreasing hiding cover and delaying regrowth of vegetation, although Blanchard and Knight (1996) found that increased production of forb foliage and root crops in the years following high-intensity, widespread fires in and around Yellowstone National Park in 1988 benefited grizzly bears. Predicting the impact of potential altered fire regimes into the future would

be difficult. Because the potential for impacts exists, we will evaluate new science as it becomes available.

Population Connectivity

Connectivity among grizzly bear populations mitigates genetic erosion and increases resiliency to demographic and environmental variation. One way to mitigate potential impacts from climate change is through well-connected populations of grizzly bears in the lower-48 States and Canada. This Conservation Strategy envisions the NCDE serving as a "source population" for grizzly bear populations in the CYE, BE, and GYE. Attaining habitat connectivity between these areas would benefit multiple wildlife species and would be consistent with the USFWS Grizzly Bear Recovery Plan (USFWS 1993), the Grizzly Bear Management Plan for Western Montana (Dood et al. 2006), the Grizzly Bear Management Plan for Southwestern Montana (MFWP 2013), the interagency statement of support for the concept of linkage zones signed by the State wildlife agencies in Montana, Washington, Idaho, and Wyoming and the USFS, USFWS, USGS, NPS, and BLM (IGBC 2001), the Western Governors' Association Resolution 07-01 (2007), and Tribal forest management plans. Although connectivity to the west and south would benefit other grizzly bear populations in the lower-48 States, it is not required for a healthy NCDE grizzly bear population because of this population's large size and connectivity with populations in Canada.

Food Storage Orders

One of the most effective ways to prevent human-grizzly bear conflicts and decrease grizzly bear mortalities on public lands is to require users and recreationists in grizzly bear habitat to store their food, garbage, and other bear attractants so that they are inaccessible to bears. Securing potential attractants can prevent bears from becoming food conditioned and displaying subsequent unacceptable behavior (see Glossary). Storing attractants in a manner that prevents bears from accessing them is effective in limiting grizzly bear mortality, human-grizzly bear encounters, and human-grizzly bear conflicts. Legally enforceable attractant storage requirements on public lands have been implemented or will be implemented on 87% of lands within the PCA (all USFS, GNP, BLM, MFWP, and Tribal). Attractant storage requirements for contractors or permitted activities occur on 91% of lands inside the PCA (Food Storage with contractors/permitted activities: All NFS, GNP, BLM, MFWP, Tribal and DNRC). These provisions will continue under this Conservation Strategy (Chapter 4).

Private Land Development

Human population growth in Montana is expected to result in increased recreational use and residential development in important wildlife habitat adjacent to public lands. This increased

human presence and development can result in the loss of wildlife habitat, habitat fragmentation, and increases in human-grizzly bear conflicts, which can result in higher bear mortality rates. Activities associated with permanent human presence often result in management actions that adversely impact bears. Many of these activities occur on or are associated with private lands, which accounted for 43% of known or probable grizzly bear mortalities from 1998–2017.

The impacts of private land development on grizzly bears may be mitigated and minimized through outreach and education about avoiding human-grizzly bear conflicts, tools and infrastructure that prevent conflicts (e.g., bear resistant trash containers and electric fencing for bee hives and chicken coops), and assistance in managing conflicts. To assist counties and developers with residential development plans, MFWP developed a comprehensive GIS planning tool that identifies "Crucial Areas" for wildlife connectivity throughout the State (http://fwp.mt.gov/gis/maps/caps/). MFWP also developed the "Fish and Wildlife Recommendations for Subdivision Development in Montana: A Working Document" (MFWP 2012). This document describes how to mitigate the potential impacts of new private land development on wildlife, including bears. Management agencies have devoted significant efforts toward private landowner outreach programs to minimize human-grizzly bear conflicts and to manage bears and potential conflict situations on such sites, and are committed to continuing those efforts. MFWP, the CS&KT, and the Blackfeet Nation employ bear management specialists to manage and prevent human-grizzly bear conflicts on private lands. Similarly, the USFS and GNP employ bear rangers and recreation technicians to minimize conflicts.

CHAPTER 2: DEMOGRAPHIC MONITORING AND MANAGEMENT

Maintaining a recovered grizzly bear population in the NCDE requires adequate numbers of bears distributed across the ecosystem with balanced reproduction and mortality. This section details the demographic monitoring protocols and management objectives developed to maintain and enhance a recovered grizzly bear population in the NCDE. These will be focused within the PCA and Zone 1, together identified as the DMA (Figure 2). Because grizzly bears are a difficult species to monitor, multiple objectives and thresholds are identified to provide sufficient information upon which to base management decisions. These are drawn directly from an ecosystem-wide population trend monitoring program initiated in 2004 (Mace 2005, Mace et al. 2012, Costello et al. 2016), and thus represent a continuation of the monitoring that occurred before delisting.

Detailed information about the status of the NCDE grizzly bear population collected since 2004 (Kendall et al. 2009, Mace et al. 2012, Costello et al. 2016, USGS unpublished data) indicate that the demographic and distribution criteria outlined in the revised Grizzly Bear Recovery Plan (USFWS 1993) have been met or surpassed. Agencies responsible for management will continue their commitment to population monitoring to demonstrate that a healthy and biologically viable population is maintained. The NCDE Coordinating Committee may conduct additional monitoring or research as needed.

The overarching goal of this Conservation Strategy, and the signatory agencies, is to maintain a recovered, genetically diverse grizzly bear population throughout the DMA while maintaining demographic and genetic connections with Canadian populations and providing the opportunity for demographic and/or genetic connectivity with other ecosystems (CYE, BE, GYE). This goal will be met by achieving the following objectives. Where appropriate, measurable thresholds will be assessed annually.

Objective 1: Maintain a well-distributed grizzly bear population within the DMA

<u>Occupancy threshold:</u> Maintain the documented presence of females with dependent offspring in at least 21 of 23 BMUs of the PCA and in at least six of seven occupancy units (see Glossary) of Zone 1 at least every six years.

Adherence to this objective will be evaluated by monitoring the presence of females with dependent offspring (i.e., cubs, yearlings, or 2-year-olds) within defined geographic units, including BMUs within the PCA and Occupancy Units (OUs) within Zone 1 (Figure 3). The six-year running tally of occupancy within the PCA and Zone 1 will be reported annually by the Monitoring Team, which MFWP leads. Presence will be documented through visual observations of radio-marked females; locations of radio-marked females known to have offspring; verified remote camera photos; other verified visual observations and from known or probable mortalities of family units (death of the mother, dependent young, or both). As described in the revised

Grizzly Bear Recovery Plan (USFWS 1993), a six-year tally accounts for two breeding cycles and will make the tally less sensitive to annual differences in reporting effort or sightability. A management review will be conducted if this distribution standard is not met, for example if only 20 of the 23 BMUs have documentation of females with offspring in the last six years.

Establishment of the PCA component of the threshold represents a continuation of the occupancy targets established within the Recovery Zone prior to delisting (Grizzly Bear Recovery Plan 1993) and utilizes the same BMUs (Figure 3). Occupancy within Zone 1 represents an additional component of the threshold that will be measured within OUs including the two DCAs and other units demarcated by political boundaries (i.e., State/Tribal boundaries and MFWP regional boundaries). Occupancy within these units has been monitored and reported previously (Costello et al. 2016, Costello and Roberts 2016, Costello and Roberts 2017). Using a six-year running tally, the threshold of 21 of 23 BMUs occupied was met each year beginning in 2006, and the threshold of six of seven OUs was met each year since 2009. In fact, full occupancy of all 23 BMUs has been documented each year since 2010, and full occupancy of all seven OUs has been documented each year since 2013.

Table 2. Documented occupancy by grizzly bear females with dependent young (cubs, yearlings, or 2-year-olds) within the 23 BMUs of the PCA and the seven occupancy units of Zone 1, NCDE, 2004–2017. Year-specific occupancy is reported as yes (Y) or no (N). Shading signifies years when occupancy was verified within a six-year period ending with the current year, thus meeting the occupancy threshold for Objective 1.

Bear Management Unit (PCA)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Murphy Lake	N	N	Y	Y	N	Y	Y	N	Y	Y	N	N	N	N
Upper North Fork Flathead	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Northeast Glacier	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
Stillwater River	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N
Lower North Fork Flathead	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hungry Horse	N	N	N	N	N	N	Y	N	N	N	N	Y	Y	Y
Lower Middle Fork Flathead	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Southeast Glacier	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y
Sullivan	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y
Upper Middle Fork Flathead	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Badger Two Medicine	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y
Mission Range	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bunker	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Continental Divide	N	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N
Birch Teton	N	Y	N	N	N	N	N	Y	Y	N	N	N	Y	Y
Big Salmon	Y	N	N	Y	N	Y	N	Y	Y	N	N	N	N	N
North Fork Sun River	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Teton Sun River	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Rattlesnake	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y	N
Upper South Fork Flathead	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
South Fork Sun Beaver Willow	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Monture Landers Fork	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dearborn Elk Creek	N	N	N	N	N	Y	Y	N	Y	N	N	N	N	Y
Occupied during year	12	14	17	19	12	19	20	17	21	18	17	15	14	18
Occupied during last 6 years	12	16	21	21	21	22	23	23	23	23	23	23	23	23
Occupancy Unit (Zone 1)														
Salish Connectivity Area	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y
Flathead Valley	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Flathead Reservation	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ninemile Connectivity Area	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y
South End	N	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y
East Front	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Blackfeet Reservation	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y
Occupied during year	4	4	5	6	4	5	6	5	5	6	5	5	6	7
Occupied during last 6 years	4	5	6	6	6	6	6	6	6	7	7	7	7	7

Objective 2: Manage mortalities from all sources to support an estimated probability of at least 90% that the grizzly bear population within the DMA remains above 800 bears, considering the uncertainty associated with all of the demographic parameters.

- Independent female survival threshold: Using a six-year running average (see Glossary), maintain estimated annual survival of independent females within the Demographic Monitoring Area of at least 90% and a rate at or above the minimum level consistent with

a projected probability of at least 90% that the population within the DMA will remain above 800 grizzly bears based on population modeling.

- Independent female mortality threshold: Using a six-year running average, limit annual estimated number of total reported and unreported mortalities (TRU mortality, see Glossary) of independent females within the DMA to a number that is no more than 10% of the number of independent females estimated within the DMA based on population modeling and a number that is at or below the maximum consistent with a projected probability of at least 90% that the population within the DMA will remain above 800 bears based on population modeling.

- Independent male mortality threshold: Using a six-year running average, limit annual estimated number of TRU mortality of independent males within the DMA to a number that is no more than 15% of the number of independent males estimated within the DMA based on population modeling.

Population modeling, based on vital rates from Costello et al. (2016), indicates that the estimated probability that the population was above 800 grizzly bears increased from only 21% in 2004 to 90% in 2010, and has been ≥99% since 2012 (Figure 4). Median population estimates for those years when Objective 2 was met ranged from 885 bears in 2010 to 1,047 bears in 2018. Thus, given our current rates and levels of uncertainty, managing for a population with an estimated probability of at least 90% being above 800 bears necessitates maintaining an estimated population size of approximately 950–1,000 grizzly bears. Additionally, larger estimated population sizes would be needed if the level of uncertainty increases.

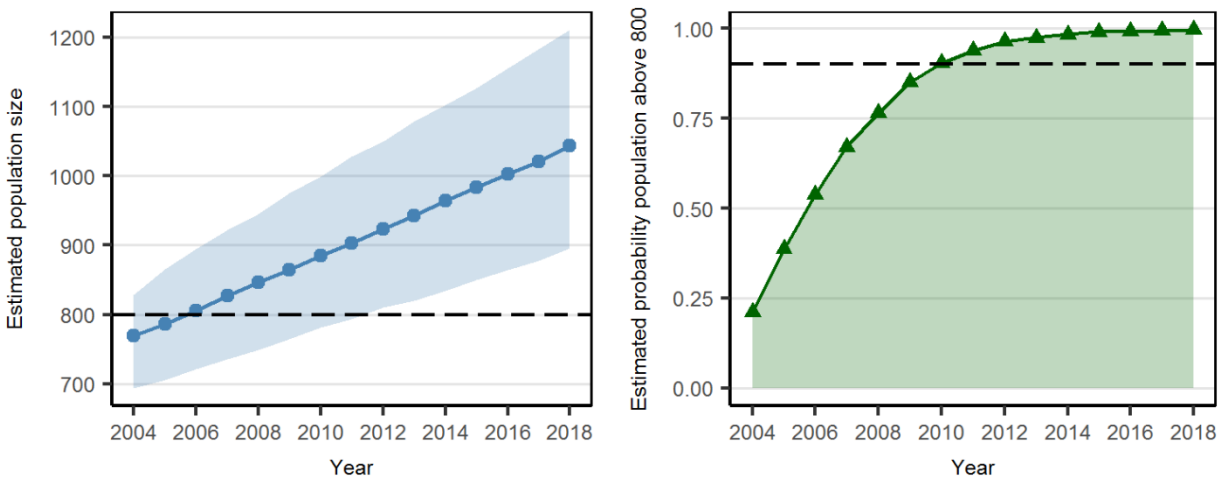

Figure 4. Estimated population size (median and 90th percentile; left) and estimated probability that the population was above 800 grizzly bears (right) during 2004–2018, based on current observed vital rates (Costello et al. 2016).

Adherence to Objective 2 will be evaluated by continued demographic monitoring, application of stochastic population modeling to track size and trend, and management of mortality of independent female and male grizzly bears. The six-year running averages for the annual survival rate of independent females and for the estimated number of TRU mortality for independent females and males within the DMA will be calculated and reported annually. Survival will be based on known-fate analysis of data collected from radio-marked bears during the current year plus the preceding five years, and will incorporate the time series of survival data from known-fate monitoring since 2004 (Appendix 3). The annual TRU mortality for each sex will include documented mortalities from all causes, including known and probable human-caused, natural, and undetermined causes. The number for each sex will then be augmented to account for unknown and unreported deaths, based on observed reporting rates obtained from the radio-marked sample (Appendix 3). Again, six-year running averages account for two breeding cycles and will make all three estimates less sensitive to sampling variance and annual variability. Discretionary mortality within the DMA will be curtailed until a management review is conducted if the six-year-average survival rate for independent females is below the six-year-average assigned threshold; or the six-year average number of TRU mortality for independent females or males is above the six-year average assigned threshold.

Female thresholds include defined, perpetual values (representing an unconditional minimum survival or maximum mortality rates, e.g., 0.90 survival) and calculated, short-term values (based on current population size and projection modeling, e.g., 0.91 or 0.92 survival). To ensure that Objective 2 is met, short-term thresholds may be more conservative than the defined thresholds. The male mortality limit includes only a defined, perpetual value representing an unconditional maximum mortality rate. By constraining the models to include maximum allowable mortality for males, the resulting female thresholds will be the most conservative values associated with meeting Objective 2. Thresholds will be established annually or for multi-year management periods up to six years as described in Appendix 3.

To illustrate the annual assessment of thresholds, we developed thresholds for a hypothetical six-year management period starting in 2013 followed by a hypothetical five-year management period starting in 2019 (Table 3, Figure 5). Thresholds for the first management period were developed by simulating population growth using current estimates of vital rates to year 2012 and then projecting another 25 years to predict effects of changing female and male independent bear survival. Under this scenario, and assuming selection of a six-year management period, the lowest possible threshold for independent female survival would be 0.93, the highest possible threshold for the number of independent female mortalities would be 22, and the highest possible threshold for the number of independent male mortalities would be 28. Thresholds for the second period were developed by simulating population growth using current estimates of vital rates to model year 2018 and then projecting another 25 years. Under this scenario, and assuming selection of a five-year management period, the lowest possible threshold for independent female survival would be 0.92, the highest possible threshold for the number of independent female mortalities would be 27, and the highest possible threshold for the number of independent male mortalities would be 31. For assessment of thresholds in a given year, six-year running averages were then computed for thresholds to account for the transition between management periods. For example, although

the period-assigned threshold for female survival changed from 0.93 to 0.92 in 2019, that new value of 0.92 would not be immediately applied in 2019. Instead, the period-assigned thresholds for the years 2014–2019 would be averaged to obtain a threshold of 0.93 for 2019. This is most appropriate, because it is meant to be compared to observed parameters that are also averaged across the years 2014–2019.

Survival of independent females has been monitored and reported previously in Mace and others (Mace et al. 2012, Costello et al. 2016). Costello et al. (2016) reported a mean annual survival rate of 0.95 for all independent females during 2004–2013 and found no evidence for change in the annual rate during the period. Here, we report six-year-average survival rates for the years 2013–2017 and compare them to the hypothetical thresholds that might have been developed in 2013 (Table 3, Figure 5). Estimated numbers of TRU mortality for independent females and males within the DMA have also been calculated and reported previously (Costello et al. 2016, Costello and Roberts 2016, 2017, 2018). Here, we report six-year-average numbers of female and male TRU mortality for the years 2013–2017 (Table 3, Figure 5).

Within the DMA, thresholds for numbers of TRU mortality for independent bears will include all forms of human-caused mortality, including hunting should that occur. As described in Montana's Management Plan for Grizzly Bears in Western Montana, the State of Montana's grizzly bear management program may use hunting as one tool among many in promoting the long-term conservation of grizzly bears. Any proposed regulated public hunt must therefore be evaluated in the context of the entire bear management program (including relevant mortality thresholds) and its efforts to promote tolerance and continued recovery of this species. This Conservation Strategy does not directly address hunting. Should hunting be considered as a viable option for grizzly bear management and conservation in the NCDE, MFWP would be required to undergo a public process involving the Montana Fish and Wildlife Commission and interested stakeholders. Any type of hunting is prohibited within GNP. Hunting within the BIR and FIR would involve decisions by their respective Tribal Councils and will follow this Conservation Strategy and applicable management plans.

Upon delisting, the population managers (MFWP, GNP, Blackfeet and CS&KT) would work collaboratively to ensure mortality thresholds described in this chapter are not exceeded. This may include development of a Memorandum of Agreement that specifies a process for jointly evaluating and tracking management removals each year and a process for allocating hunting mortality among the population managing agencies such that those thresholds are not exceeded.

Objective 3: Monitor demographic and genetic connectivity among populations

- Estimate spatial distribution of the NCDE grizzly bear population biennially.
- Identify the population of origin for individuals sampled inside and outside of the DMA to detect movements of individuals to and from other populations or recovery areas.

The current distribution of the NCDE grizzly bear population, inside and outside of the DMA, will be calculated and reported biennially, by applying zonal analysis and ordinary kriging to 7km × 7km cells with verified grizzly bear locations during the last 10 years (Bjornlie et al. 2014). Verified locations will be collected from: GPS transmitters; VHF telemetry flights; capture and mortality locations; grizzly bear-human conflict sites; observations (sightings or tracks) or remote camera photos confirmed by agency personnel; and opportunistic samples of grizzly bear hair, blood, scat, or tissue confirmed by DNA analysis. DNA samples obtained at these sites will be analyzed for population of origin to document movement of individuals to and from other populations or recovery areas.

Distribution of the NCDE population was calculated and reported previously using the method described above, but involved an 11-year period of 2004–2014 (Costello et al. 2016). Estimated population distribution during 2007–2016 (Figure 6) indicates the range was approximately 21,600 mi^2 (approximately 56,000 km^2) and includes areas outside of the DMA, especially on the eastern and southern boundary. Total area represents an increase of about 1.4% since 2014.

Within the NCDE, a large number of DNA samples have been collected and analyzed as part of the trend monitoring program and through non-invasive sampling (e.g., Kendall et al. 2009). Large samples have also been collected within the GYE and the CYE. As of 2016, no evidence of immigration into the NCDE from the GYE or emigration from the NCDE into the GYE has been observed. Distinguishing genetic differences between the NCDE and CYE populations is more problematic, because of the purposeful translocation (see Glossary) of NCDE bears into the Cabinet Mountains for population augmentation. However, Kendall et al. (2016) reported one male of probable NCDE origin within the Yaak Mountains, and one male of known Yaak origin within the NCDE. The latter male made multiple temporary forays to the Whitefish Range in the NCDE where he likely fathered four offspring with two NCDE females. Kasworm et al. (2016) subsequently reported that another adult male killed in the Cabinet Mountains originated from the NCDE. Parentage analysis for grizzly bears captured in the Cabinet Mountains indicate ancestry from only native individuals, individuals from the Selkirk Mountains, or individuals from the NCDE involved in augmentations (Kendall et al. 2015).

Table 3. Example of assignment and evaluation of annual thresholds for two hypothetical management periods beginning in 2013, including observed parameters for the years 2013–2017.

			Period thresholds involved in 6-year running average										
Parameter	Period	Period year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Female survival	2013–2018	1	0.93	0.93	0.93	0.93	0.93	0.93					
		2		0.93	0.93	0.93	0.93	0.93	0.93				
		3			0.93	0.93	0.93	0.93	0.93	0.93			
		4				0.93	0.93	0.93	0.93	0.93	0.93		
		5					0.93	0.93	0.93	0.93	0.93	0.93	
		6						0.93	0.93	0.93	0.93	0.93	0.93
	2019–2023	1							0.92	0.92	0.92	0.92	0.92
		2								0.92	0.92	0.92	0.92
		3									0.92	0.92	0.92
		4										0.92	0.92
		5											0.92
6-year-average threshold			0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92
6-year-average observed			0.95	0.95	0.96	0.95	0.95						
At or above threshold			Yes	Yes	Yes	Yes	Yes						
Female TRU	2013–2018	1	22	22	22	22	22	22					
		2		22	22	22	22	22	22				
		3			22	22	22	22	22	22			
		4				22	22	22	22	22	22		
		5					22	22	22	22	22	22	
		6						22	22	22	22	22	22
	2019–2023	1							27	27	27	27	27
		2								27	27	27	27
		3									27	27	27
		4										27	27
		5											26
6-year-average threshold			22	22	22	22	22	22	23	24	25	25	26
6-year-average observed			10	15	15	16	15						
At or below threshold			Yes	Yes	Yes	Yes	Yes						
Male TRU	2013–2018	1	28	28	28	28	28	28					
		2		28	28	28	28	28	28				
		3			28	28	28	28	28	28			
		4				28	28	28	28	28	28		
		5					28	28	28	28	28	28	
		6						28	28	28	28	28	28
	2019–2023	1							31	31	31	31	31
		2								31	31	31	31
		3									31	31	31
		4										31	31
		5											
6-year-average threshold			28	28	28	28	28	28	29	29	30	30	31
6-year-average observed			16	16	17	16	19						
At or below threshold			Yes	Yes	Yes	Yes	Yes						

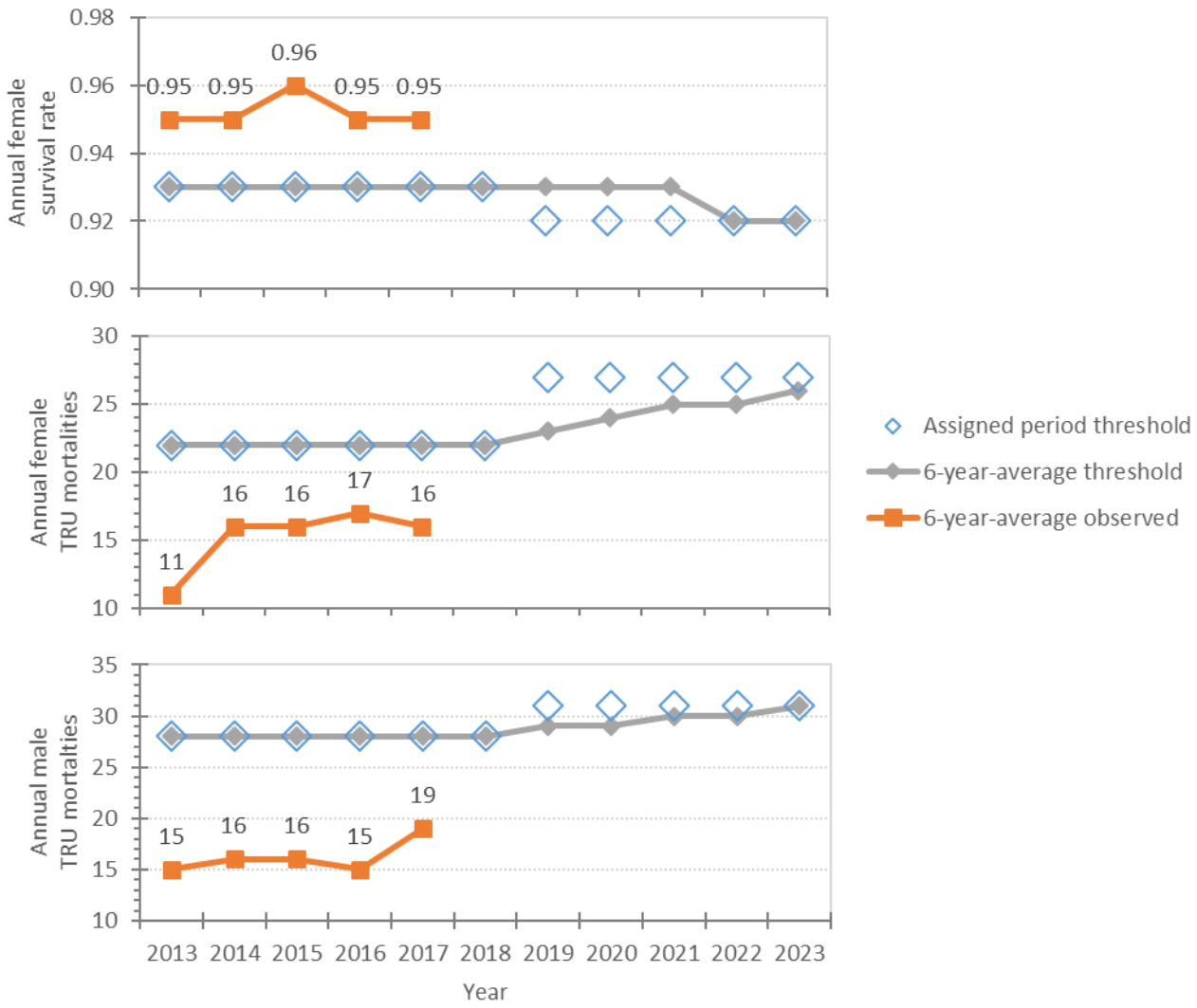

Figure 5. Example of assignment and evaluation of annual thresholds for two hypothetical management periods beginning in 2013, including observed parameters for the years 2013–2017.

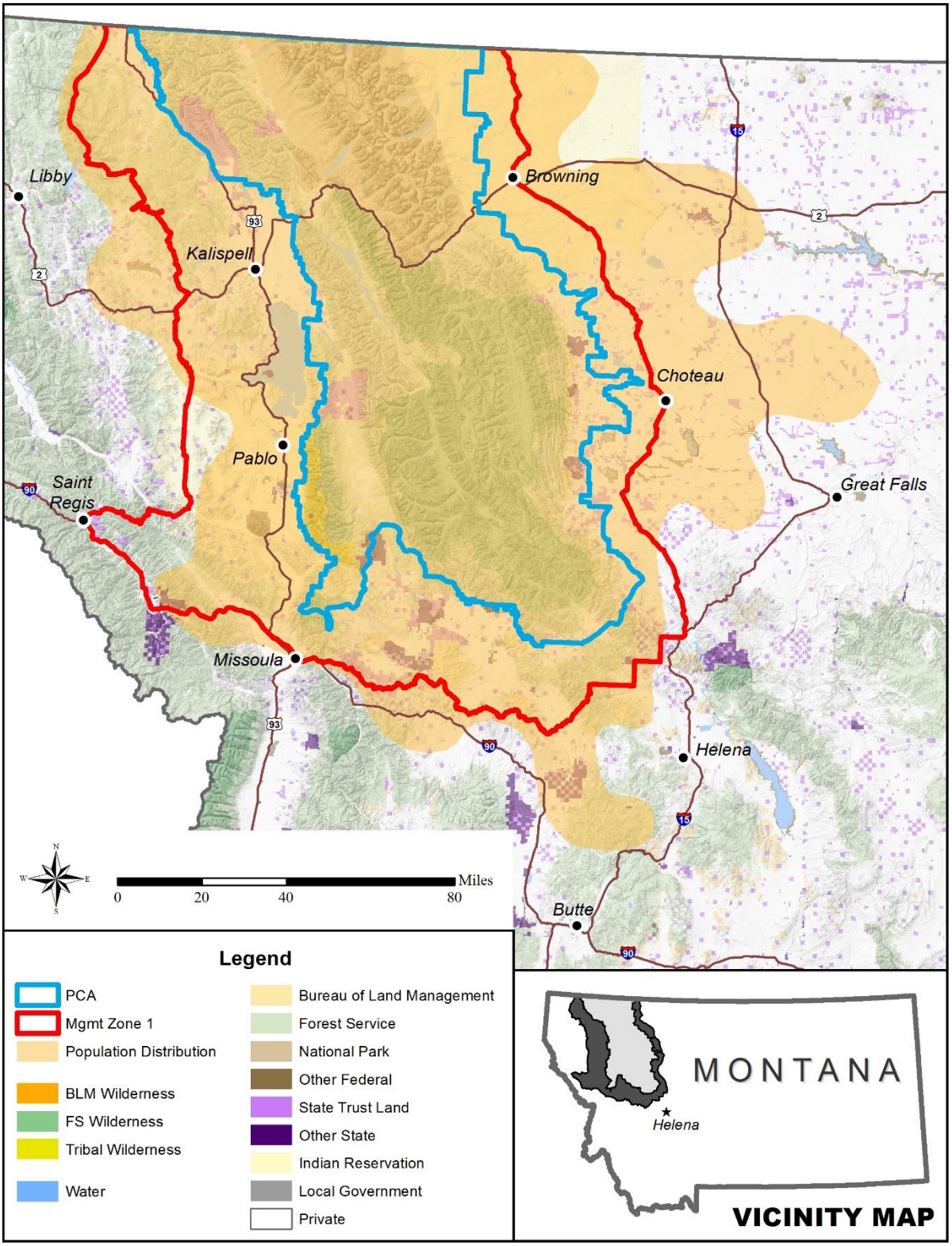

Figure 6. Estimated distribution of grizzly bears, 2007–2016.

CHAPTER 3: HABITAT MANAGEMENT AND MONITORING

The NCDE grizzly bear population is the largest in the lower-48 States. As of 2017, the population was estimated to be more than 1,000 grizzly bears (MFWP unpublished data). Grizzly bears are well distributed throughout the PCA. Grizzly bears also occur within an area surrounding and approximately double the size of the PCA (Costello et al. 2016).

The goal for habitat management in this Conservation Strategy is to provide reasonable assurance that habitat on Federal, State and Tribal lands will continue to be managed in a manner that supports a stable to increasing grizzly bear population in the NCDE. Based on its large population size and increasing trend, the NCDE population also appears to be capable of serving as a source population for other ecosystems in the lower-48 States. Therefore, this Conservation Strategy is also designed to support demographic connectivity with the small grizzly bear population in the CYE and a potential future population in the BE, and to allow for genetic connectivity to the GYE.

Habitat Objectives for Each Management Zone

As described in Chapter 1, this Conservation Strategy identifies the PCA, Zone 1 including DCAs, Zone 2, and Zone 3, and describes the goals for grizzly bear management in each area. As shown in Figure 2, each management zone is a mosaic of land ownerships, with different types of resource management that reflect the mission and mandates of each agency or Tribal government.

The most rigorous habitat protections will apply to the PCA, to achieve the goal of continual occupancy by a source population of grizzly bears. Habitat conditions that are compatible with long-term population stability will be maintained. Habitat management in the PCA will be focused on secure core (see Glossary) and motorized route density, developed recreation sites, vegetation management, livestock grazing, and mineral and energy development. Attractant storage rules will be in place on Federal, State and Tribal lands in the PCA.

Zone 1 surrounds the PCA. Here, habitat protections will focus on managing open motorized route densities at or below levels as specified in current land use or travel plans because these are known to have been compatible with a stable to increasing grizzly bear population. Attractant storage rules would be implemented on Federal, Tribal, and most State lands. On the northwest and southwest corners of Zone 1, there are two DCAs that are intended to support female occupancy and eventual dispersal to the CYE and BE. In the Salish and Ninemile DCAs, habitat protections will focus on not increasing motorized route (see Glossary) miles or density and managing current roadless areas as stepping stones to other ecosystems.

Zone 2 will be managed to provide the opportunity for grizzly bears to move between the NCDE and the GYE. Management direction that is consistent with the goal of genetic connectivity will

be continued on Federal lands. Attractant storage rules would be implemented on most Federal and State lands.

The emphasis in Zone 3 will be on prevention and response to human-grizzly bear conflicts. Existing land management direction has not precluded grizzly bears from occurring in Zone 3. To date, any grizzly bear found in Zone 3 originated from the NCDE, and this will likely remain the case. Zone 3 does not lead bears directly to another grizzly bear ecosystem. There is no need for habitat protections specifically developed for grizzly bears on Federal, State or Tribal lands in Zone 3 in order to support recovery of the NCDE population. The geographic extent of Zone 3 will be determined in the USFWS' Final rule delisting grizzly bears in the NCDE.

Summary of Land Management and Land Management Plans

Land ownership for each zone is shown in Table 4. As described in Chapter 6, management of Federal, Tribal, and State lands are guided by each of their respective management or conservation plans.

Forest plans provide an integrated set of management direction, including goals, desired conditions, standards, guidelines, and management area allocations, to guide resource management programs on each administrative unit of the NFS. Forest plans are revised periodically and may be amended at any time, and are prepared in compliance with the National Environmental Policy Act (NEPA) process, which requires significant public involvement. Forest plans for each of the NFs within the NCDE are available online at:

- Flathead NF — https://www.fs.usda.gov/main/flathead/landmanagement/planning
- Kootenai NF — https://www.fs.usda.gov/main/kootenai/landmanagement/planning
- Helena-Lewis and Clark NF — https://www.fs.usda.gov/main/hlcnf/landmanagement/planning
- Lolo NF — https://www.fs.usda.gov/main/lolo/landmanagement/planning

BLM resource management plans serve as a blueprint for land allocations and management strategies on these public lands. Resource Management Plans are prepared in compliance with the NEPA process, which requires significant public involvement. A summary of management direction relevant to grizzly bears for the Butte, Lewistown, and Missoula Field Offices is provided in Appendix 11.

Habitat management on the FIR is directed by the CS&KT's Forest Management Plan. The plan is authorized by the Tribal Council and the Bureau of Indian Affairs (BIA), and is in effect until 2030.

Management of forested grizzly bear habitat on BIR lands is implemented through the Blackfeet Nation's Forest Management Plan, as authorized by the Tribal Business Council and the BIA. This plan is in effect until 2023.

On DNRC lands, management actions are carried out under the direction of the State Board of Land Commissioners, which consists of elected officials. In 2011, DNRC entered into a Habitat Conservation Plan (HCP) with USFWS for State trust lands in western Montana to clarify obligations under the ESA and to provide long-term certainty for their timber management program. The HCP is in effect until 2061 and is available online at http://dnrc.mt.gov/HCP/Documents.asp.

The NCDE is characterized by large acreage of Wilderness Areas, Inventoried Roadless Areas (IRA), and other lands that have a management classification that restricts road construction, motorized use, livestock allotments, timber harvest, and/or hardrock mining or oil and gas development. Nearly 68% of all lands inside the PCA are considered "protected lands" because of their status as Congressionally-designated Wilderness Areas (30%) or other areas that restrict motorized use during the non-denning season (see Glossary). Altogether, approximately 8,900 mi^2 (21,100 km^2) of lands within the PCA, Zone 1, and Zone 2 are considered "protected lands" in ways that benefit grizzly bears (i.e., some restrictions on motorized access and/or new road construction) (Table 4, Figure 7).

Congressionally-designated Wilderness Areas are part of the National Wilderness Preservation System that was established by the Wilderness Act of 1964 (16 U.S.C. 1131–1136). The Wilderness Act provides protections from road construction, permanent human habitation, increases in developed recreation sites, new livestock allotments, new mining claims, and new oil and gas leases. There is no motorized use allowed in Wilderness Areas and these areas will not experience decreases in habitat security. While the Wilderness Act allows livestock allotments existing before the passage of the Wilderness Act and mining claims established before January 1, 1984, to persist within Wilderness Areas, no new grazing permits or mining claims are allowed. If pre-existing mining or oil and gas claims are pursued, the plans of operation are subject to Wilderness Act restrictions on road construction, permanent human habitation, and other development.

In addition to designated Wilderness Areas, thousands of acres have been designated as Wilderness Study Areas or identified as recommended wilderness. Although lacking permanent wilderness protection, these areas are managed by Federal agencies or Tribal governments to maintain their wilderness character. Activities such as timber harvest, mining, and oil and gas development are much less likely to occur in these areas, and wheeled and motorized recreation activities tend to be limited or non-existent.

Other areas with motorized use restrictions include IRA, the Conservation Management Area established by the Rocky Mountain Front Heritage Act of 2014, Tribal Roadless Areas, Tribal Primitive Areas, and some National Recreation Areas. All of these classifications contain

restrictions to varying degrees on motorized use, new road construction, and timber harvest. The 2001 Roadless Areas Conservation Rule generally prohibits road construction, road re-construction, and some types of timber harvest in IRA on NFS lands (66 FR 3244–3273, January 12, 2001). Restrictions on road building make activities such as timber harvest, mining and oil and gas production much less likely to occur. The FIR Forest Management Plan, in effect until 2030, designated several roadless and primitive areas that are unavailable to forest management activities completely or only allow helicopter timber harvest.

Food and Attractants in the PCA, Zone 1, and Zone 2

As discussed in Chapter 1, this Conservation Strategy aims to manage mortality of grizzly bears at sustainable levels. Anthropogenic food, garbage, and other attractants associated with resource management activities increase the risk of grizzly bear mortality. Requiring proper storage of food and attractants has been demonstrated to be an effective tool to promote public safety and to reduce grizzly bear mortality risk. In the PCA, Zone 1 including the DCAs, and Zone 2, food and attractant storage rules will be in place on Federal, Tribal, and most State lands (see http://igbconline.org/food-storage-regulations-2/ for current regulations). Refer to Chapter 4 for more information.

Clover can attract bears into areas where their presence is undesirable. To prevent this, clover should not be included in seed mixes to be used along roads or in other areas frequented by people.

Objective for Seed Mixes on Federal Lands in the PCA and Zone 1

- Within the PCA and Zone 1 (including the DCAs), clover should not be used in seed mixes (e.g., for erosion control or mine reclamation). Native seed mixes or those that are less palatable to grizzly bears should be used so that seeded areas do not become an attractant.

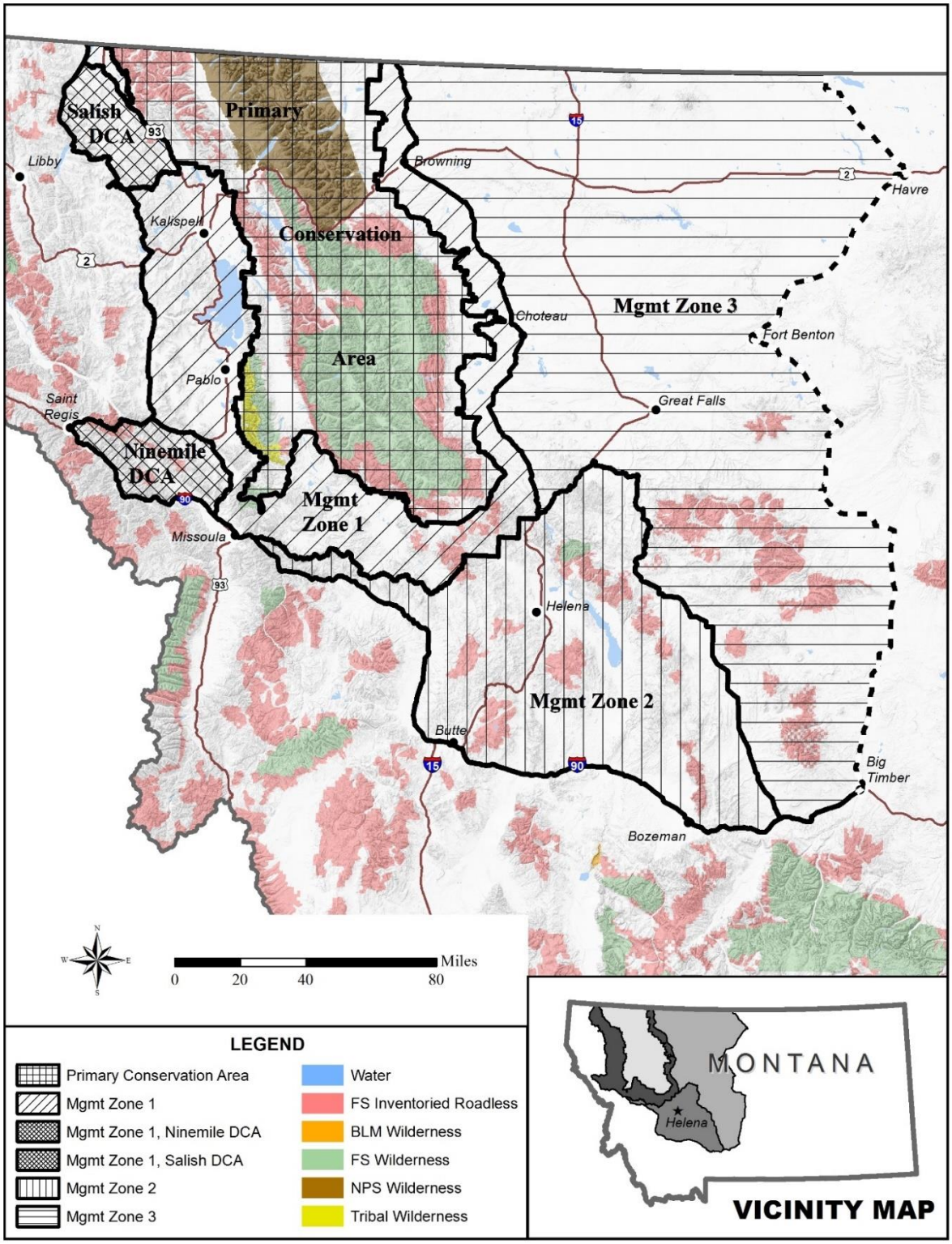

Figure 7. Map of "protected areas" in the NCDE PCA and Management Zones. The geographic extent of Zone 3 will be determined in the USFWS' Final Rule delisting grizzly bears in the NCDE.

Table 4. Land management within the NCDE PCA and Management Zones.

	PCA mi² (km²)	% of PCA	Zone 1 mi² (km²)	% of Zone 1	Zone 2 mi² (km²)	% of Zone 2
USFS						
Flathead NF	3,336 (8,639)		361 (935)			
Helena-Lewis and Clark NF	1,500 (3,885)		233 (605)		1,003 (2,597)	
Kootenai NF	185 (480)		442 (1,144)			
Lolo NF	420 (1,088)		644 (1,667)		< 1 (< 1)	
Beaverhead-Deerlodge NF					654 (1,694)	
Custer-Gallatin NF					139 (361)	
USFS Total	**5,441 (14,092)**	**61**	**1,680 (4,351)**	**22**	**1,797 (4,655)**	**25**
Glacier NP	**3,979 (1,536)**	**17**				
BLM	**141 (105)**	**< 1**	**173 (448)**	**2**	**419 (1,085)**	**6**
USFWS	**3 9**	**< 1**	**46 (119)**	**1**	**3 (7)**	**< 1**
Other Federal	**1 3**	**< 1**	**12 (31)**	**< 1**	**22 (57)**	**< 1**
BIR	**524 (1,357)**	**6**	**620 (1,605)**	**8**		
FIR	**231 (598)**	**3**	**1,374 (3,559)**	**18**		
DNRC	**352 (912)**	**4**	**451 (1,169)**	**6**	**328 (850)**	**5**
MFWP	**157 (146)**	**1**	**94 (243)**	**1**	**88 (227)**	**1**
Other State	**1 (3)**	**< 1**	**33 (86)**	**< 1**	**7 (19)**	**< 1**
County/City/Local Government	**< 1 (< 1)**	**< 1**	**3 (9)**	**< 1**	**12 (32)**	**< 1**
Private	**639 (1,655)**	**7**	**2,765 (7,160)**	**37**	**4,526 (11,723)**	**62**
Water	**101 (262)**	**1**	**263 (680)**	**3**	**76 (198)**	**1**
Total Area	**8.926 (23,118)**		**7,514 (19,460)**		**7.280 (18,854)**	
Protected Areas						
Total	**5,949 (15,407)**	**67**	**289 (748)**	**4**	**750 (1,944)**	**10**
Wilderness	4,312 (11,168)	48	25 (64)	< 1	44 (115)	1
Inventoried Roadless Areas	1,582 (4,098)	18	231 (597)	3	673 (1,743)	9

Habitat Management in the Primary Conservation Area

The PCA encompasses more than 8,926 mi^2 (23,119 km^2). About 61% of the PCA is managed by the USFS within the Flathead, Kootenai, Helena-Lewis and Clark, and Lolo National Forests; 17% is managed by GNP; 7% is privately owned or managed; and the remaining lands are managed by other agencies including Montana DNRC, the Blackfeet Nation on the BIR, the CS&KT on the FIR, MFWP, the BLM, and the USFWS (Table 4).

Based on the best available science (reviewed in Chapter 1), this Conservation Strategy focuses habitat management on the following key habitat features and human activities in the NCDE: (1) secure core and the density of open and total motorized routes, (2) developed recreation sites, (3) livestock allotments, (4) vegetation management, and (5) oil and gas and/or hardrock mining activities. These features were selected for consideration because of their potential to impact habitat availability and/or increase the risk of grizzly bear mortality within the NCDE.

As described in the Grizzly Bear Recovery Plan (USFWS 1993), BMUs and BMU subunits are used for habitat evaluation and population monitoring. A BMU is an area large enough to meet the yearlong habitat needs of both male and female grizzly bears, while BMU subunits represent the approximate size of a female grizzly bear's annual home range. The NCDE Recovery Zone was divided into 23 BMUs and 126 BMU subunits (Figure 3). This Conservation Strategy will continue to use the BMUs and BMU subunits as a tool for managing and monitoring certain habitat conditions and management activities within the PCA.

Rationale for the Habitat Baseline in the PCA

The general approach of this Conservation Strategy is to maintain the habitat conditions that existed during the period when the NCDE grizzly bear population was stable to increasing. A key assumption is that the measured levels of selected conditions/management activities (e.g. secure core, OMRD and total motorized route density (TMRD, see Glossary), developed recreation sites, and livestock allotments) that existed in 2011 did not prevent the growth of the NCDE grizzly bear population and can continue at the same levels.

Previous research has shown that secure core and motorized access density can strongly influence grizzly bear population growth through effects on habitat use and mortality rates (Mace et al. 1996, Mace et al. 1999, McLellan et al. 1999). From 2004–2011, the estimated growth rate for the NCDE grizzly bear population was approximately 2–3% annually, with more than 95% certainty that the population did not decline (Mace et al. 2012, Costello et al. 2016). During the same period (2004–2011) when the grizzly bear population was increasing, motorized route density declined and across the PAC secure core increased by at least 69 mi^2. For example, on the Flathead NF, the amount of core habitat (IGBC 1998) increased by approximately 155 mi^2 (400 km^2) from 1995 to 2004 and by another 65 mi^2 (170 km^2) from 2004 to 2011 (Ake 2018, pers. comm.). Thus, conditions relative to motorized access were the most favorable for grizzly bears at the end of this time period. The levels of the other management activities (developed recreation sites, livestock

allotments, vegetation management, and mining and oil and gas development) did not change much over the same period. Therefore, we chose to use habitat condition as of December 31, 2011 as a reasonable and conservative baseline that is expected to support a robust, stable to increasing grizzly bear population.

Future adjustments to the baseline values (Appendix 4) can be made if needed under specified circumstances. For example, adjustments may be necessary to reflect improved data, changes in land ownership, and motorized access changes that were evaluated and found to be acceptable through the ESA section 7 consultation process with USFWS while grizzly bears were listed as threatened.

We recognize that the five selected habitat conditions and management activities (secure core and motorized route density, developed recreation sites, livestock allotments, vegetation management, and mining and oil and gas development) do not capture all the environmental factors that can influence grizzly bear population growth. Many of the environmental, social, and economic factors influencing grizzly bear population status are outside the control of land management agencies, but we do have jurisdiction over these five important factors and can manage them in a manner that does not negatively affect the grizzly bear population. We acknowledge that there is uncertainty as to whether the habitat management direction will be sufficient in the face of future ecological challenges such as private land development and climate change. For this reason, regular monitoring of habitat conditions on Federal, State and Tribal lands, as well as development such as residential subdivision on private lands, will be conducted and evaluated over time. Furthermore, changes in multiple demographic rates will be monitored, not simply population size, as recommended by Doak (1995). The population and habitat monitoring data will be compiled per the established schedules to assure that the desired results are being achieved, and that appropriate management adjustments are identified and recommended if needed (Chapter 5).

Secure Core and Motorized Access Management on Federal Lands in the PCA

The negative effects of human access via roads on grizzly bears through displacement and mortality, and the importance of secure core to the survival and reproductive success of female grizzly bears have been well documented (McLellan and Shackleton 1988, Kasworm and Manley 1990, Mace et al. 1996, Mace and Waller 1997a, Mace and Waller 1998, Schwartz et al. 2010, Boulanger and Stenhouse 2014). The IGBC chartered a Task Force to evaluate State and Federal procedures for analyzing the effects of motorized access management on grizzly bears. The Task Force recommended that for each recovery zone, IGBC should determine acceptable levels of: (1) open motorized route densities (OMRD, see Glossary); (2) total motorized route densities (TMRD, see Glossary); and (3) core habitat areas (IGBC 1998). These levels were to be based on habitat use patterns for female grizzly bears monitored in that recovery zone, other research results, and social or other management considerations (IGBC 1998). OMRD is reported as the percentage of each BMU subunit that has more than 1 mi/mi^2 of open routes and TMRD is reported as the percentage of each BMU subunit that has more than 2 mi/mi^2 of total routes using a moving

window GIS analysis procedure (e.g., the Bunker Creek subunit has 12% with OMRD greater than 1 mi/mi^2 and 4% with TMRD greater than 2 mi/mi^2). At that time, core habitat areas were defined to include those areas more than 0.31 miles (500 meters) from open or gated wheeled motorized access routes and high-intensity-use non-motorized trails, and at least 3.91 mi^2 (10.12 km^2) in size, expressed as a percentage of the BMU subunit that meets this definition (e.g., 86% of the Bunker Creek subunit).

In accordance with the IGBC Task Force recommendations, the NFs west of the Continental Divide in the NCDE have been managing most BMU subunits (where at least 75 percent of the land is in national forest) with an objective to maintain less than 19 percent with OMRD greater than 1 mi/mi2 and less than 19 percent with TMRD greater than 2 mi/mi2 and to provide at least 68% as core habitat areas. The direction that now applies to all BMU subunits, including those where the National Forests comprise less than 75% of the lands, has been no net loss of core habitat areas and no net increase in OMRD or TMRD.

This Conservation Strategy incorporates some modifications to the previous definitions, and changed the term "core habitat area" to "secure core" to avoid confusion. Secure core is different by no longer deducting a buffered area around high-intensity-use non-motorized trails. In addition, Plum Creek Timber Company (now Weyerhaeuser Company) lands and routes are now considered private. Using a computerized GIS analysis process, Federal, State, Tribal, and private roads are considered by buffering them 0.31 miles (500 meters) when identifying secure core, but only Federal lands are included when calculating the percent secure core in the BMU subunit. Additionally, private roads are not included in calculation of OMRD and TMRD. Appendix 4 documents the baseline values using the Conservation Strategy's definitions for the percent secure core, OMRD greater than 1 mi/mi^2 and TMRD greater than 2 mi/mi^2 in each BMU subunit.

On Federal lands, the baseline levels of secure core, OMRD, and TMRD will be maintained in each BMU subunit. Limited temporary increases in TMRD and OMRD and temporary decreases in secure core will be allowed, if needed to allow project activities to continue up to the same level when the population was stable to increasing. The rationale for allowing temporary changes is that such changes were evaluated and allowed on Federal lands through the ESA section 7 consultation process with USFWS while the grizzly bear was listed as threatened. Between 2003 and 2010, six projects on USFS lands were developed that included either temporary increases in OMRD or TMRD or effects on secure core. Through the planning and ESA Section 7 consultation processes, these projects were allowed to proceed through temporary modification of the existing management direction. Five of the projects occurred on the Flathead NF and one on the Lolo NF, affecting 18 BMU subunits. The types of projects included timber salvage, timber harvest, and road management. During the life of these six Federal projects, in affected subunits the OMRD temporarily increased an average of 5.4%, TMRD temporarily increased an average of 2.9%, and secure core fluctuated by 2%. The projects occurred during the period when the NCDE grizzly bear population was estimated to be increasing (Kendall et al. 2009, Mace et al. 2012, Costello et al. 2016, USGS unpublished data). It should also be noted that the amount of area that could be affected by future temporary increases in OMRD and TMRD and/or temporary decreases in secure core is substantially limited by the large percentage of lands that are in protected areas. The

proportion of secure core where road access is allowable ranges from 2% of the secure core on the Helena-Lewis & Clark NF to 9% of the secure core on the Flathead NF. Therefore, we expect that this allowance for temporary increases/decreases will be compatible with the goal of maintaining the grizzly bear population in the NCDE.

Motorized Access Objectives on Federal Lands in the PCA

- On NPS, NFS, and BLM lands, there will be no net decrease in the percentage of secure core within each BMU subunit from the baseline (Appendix 3), unless decreases are temporary to accommodate projects, or would be allowable under the Application Rules provided below.
- On NPS, NF, and BLM lands, there will be no net increase in the percentage of OMRD or TMRD within each BMU subunit from the baseline (Appendix 3), unless increases are temporary to accommodate projects, or would be allowable under the Application Rules.
- On NF and BLM lands, a restricted road located outside of secure core may be temporarily opened for public motorized use to allow authorized uses (such as firewood gathering), provided the period of use does not exceed 30 consecutive days during one non-denning season and occurs outside of black bear hunting seasons and any potential grizzly bear hunting season.
- On NF and BLM lands, the baseline for OMRD and TMRD may be temporarily exceeded and secure core may be temporarily reduced to accommodate projects if the 10-year running averages for these parameters in each BMU subunit do not exceed the following limits (Table 5):
    - 5% temporary increase in OMRD baseline plus 5%
    - 3% temporary increase in TMRD baseline plus 3%
    - 2% temporary decrease for secure core (secure core baseline minus 2%)
- On NF and BLM lands, projects will be designed to meet the following conditions:
    - Secure core and motorized route densities should be restored within one year after completion of the project (i.e., when the road is no longer being used for project implementation beyond administrative use (see Glossary) levels).
    - Projects will be planned so that they do not exceed five years in duration (with the exception of gravel pits). If extensions are necessary beyond five years, the reasons must be documented in writing and reviewed by the NCDE Coordinating Committee to recommend appropriate additional mitigation, if needed.
    - If a project cannot occur within the allowable levels of administrative use (six trips/week OR a 30-day window) on restricted routes, the temporary limits on increases of OMRD and TMRD and decrease of secure core will apply. If the project can occur completely within administrative use levels, the project will not count toward the temporary allowable increase/decrease because it does not meet the definition of a “project” as defined in the Application Rules (below).

Table 5. Hypothetical example of how temporary changes in OMRD, TMRD, and secure core would be implemented for a project.

Part (A) shows the baseline values in a BMU subunit for OMRD, TMRD, and secure core from previous years and anticipated increases during the project (i.e., years 11–14).

Part (B) uses the data from Part (A) to show the 10-year running averages for OMRD, TMRD, and secure core before, during, and after project completion, demonstrating that these 10-year running averages do not violate the Application Rules for temporary changes in motorized access. It should be noted that in this hypothetical example, another project in this subunit would not be possible until year 24, unless that project did not require any changes in values for OMRD, TMRD, or secure core.

(A)

	BASELINE Value	Allowed Value for Project	yr 1	yr 2	yr 3	yr 4	yr 5	yr 6	yr 7	yr 8	yr 9	yr 10	project yr 11	project yr 12	project yr 13	project yr 14	yr 15	yr 16	yr 17
OMRD	19	24	19	19	19	19	19	19	19	19	19	19	31	31	31	31	19	19	19
TMRD	19	22	19	19	19	19	19	19	19	19	19	19	22	22	22	22	19	19	19
Secure Core	69	67	69	69	69	69	69	69	69	69	69	69	63	63	63	63	69	69	69

(B)

	BEFORE	DURING				AFTER		
	yr 1-10	yr 2-11	yr 3-12	yr 4-13	yr 5-14	yr 6-15	yr 7-16	yr 8-17
OMRD	19	20	21	23	24	24	24	24
TMRD	19	19	20	20	20	20	20	20
Secure Core	69	69	68	67	67	67	67	67

To assist in evaluation and monitoring of temporary changes in OMRD, TMRD, and secure core, automated GIS programs and spreadsheets are available (see Appendix 5).

Application Rules for Motorized Access on Federal Lands

Application Rules provide guidance for how the motorized route objectives will be implemented within the PCA. See Appendix 5 for further details and explanation about the definitions, conventions and methods to be used for analyzing and monitoring motorized route density and secure core.

- A project subject to the motorized access objectives is a temporary activity requiring construction of new or temporary roads, reconstructing or opening a restricted road (if such use exceeds administrative use levels), or recurring helicopter flights at low elevations (<500m) during the non-denning season.

- On NF and BLM lands, administrative use is not included in baseline calculations and is not included in calculations of net increases in OMRD or TMRD or decreases in secure core if the use level does not exceed either six trips (three round trips) per week OR one 30-day unlimited use period during the non-denning season (April 1–November 30 west of the Continental Divide and April 16–November 30 east of the Divide).
- A project may avoid reducing secure core by providing replacement secure core of equal size in the same BMU subunit. The replacement habitat must either be in place before project initiation or be provided concurrently with project development as an integral part of the project plan.
- Permanent changes in OMRD, TMRD, or secure core may occur due to improved data, unforeseen circumstances, natural events, or other reasonable considerations. Such changes will adjust the baseline values but will not be considered a violation of the motorized access management habitat objectives and will not require mitigation responses. Acceptable changes that may adjust baseline values include the following:
    - updated/improved data on a motorized route resulting in changed calculations without actual change on the ground;
    - technology or GIS projections changed, resulting in changed calculations without actual change on the ground (e.g., a switch from NAD27 to NAD83);
    - a road closure is moved a short distance to a better location (e.g., to the nearest intersection or turnout) to allow a turn-around providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
    - land with or without motorized routes is exchanged, acquired, purchased, or sold, resulting in a changed calculation;
    - a change in a motorized route is necessary to comply with Federal laws (e.g., Americans with Disabilities Act);
    - a change in a motorized route is necessary to address human–grizzly bear conflicts, human safety concerns, or resource damage concerns; or
    - an adjacent, non-Federal landowner made changes to their motorized access management that resulted in a decrease in the percentage of secure core or an increase in motorized route densities on adjacent Federal lands.
- Events such as wildfires, insect or disease-killed trees, flooding, avalanches, and mudslides may require emergency response actions. Motorized use of otherwise restricted roads would be allowed in such circumstances. Any responses to these unforeseen events would, however, be considered when proposing other projects in the affected BMU subunits.

Legacy Lands and Cooperative Management in the Swan Valley

The Swan Valley Grizzly Bear Conservation Agreement was developed in 1997 to coordinate timber harvest activities and associated road management across the multiple-use lands managed by the USFS, DNRC, and Plum Creek Timber Company. The Conservation Agreement recognized

that additional coordination was needed across the multiple land ownerships and road jurisdictions in the Swan Valley in order to conserve the grizzly bear. The Conservation Agreement provided guidance such as OMRD caps in all BMU subunits, management of subunits under a three-year active rotation schedule followed by a minimum of three years' rest, restricting activities in identified linkage areas during the spring period, and maintaining visual screening (see Glossary) along open forest roads.

The Montana Legacy Project was a cooperative effort of the Nature Conservancy, The Trust for Public Land, Plum Creek Timber Company, and multiple State and Federal partners throughout western Montana to facilitate the purchase and transfer of over 485 mi^2 (1,257 km^2) of private Plum Creek Timber Company lands into mostly public ownership. Although the Montana Legacy Project was not specifically designed to conserve grizzly bear habitat, it benefitted grizzly bears by increasing and consolidating public lands. Any lands sold to private owners have safeguards (e.g., conservation agreements) attached to them so that the integrity of wildlife habitat is maintained. Thus, the possibility of private land development on these lands in the Swan Valley has been largely eliminated, removing what had been a potential threat to the grizzly bear population.

As a result of completion of the land transfers, the remaining parties that are bound to the Swan Valley Grizzly Bear Conservation Agreement are the USFS, DNRC, and USFWS. In the foreseeable future, we anticipate that the Swan Valley Conservation Agreement will no longer be needed and will be dissolved. DNRC would then manage their lands in the Swan Valley in accordance with their HCP (DNRC, 2011). The USFS would manage in accordance with the forest plans, applying the same management direction to NFS lands in the Swan Valley as elsewhere in the PCA.

Motorized Access Objectives on Tribal Lands in the PCA

Blackfeet Indian Reservation: On the 273 mi^2 (708 km^2) of forested lands within the BIR managed under the Blackfeet Nation Forest Management Plan, no net increase in overall road density levels will be allowed. As a signatory to this Conservation Strategy, the Blackfeet Nation is committing to monitor and maintain records of motorized routes on all of their lands and coordinate with other agencies to report and update these data biennially.

Flathead Indian Reservation: Within the PCA, 91% of FIR lands are within the Mission Mountains Tribal Wilderness Area (143 mi^2, 370 km^2) or the South Fork Jocko Primitive Area (70 mi^2, 181 km^2), both of which are unavailable to commercial forest activities. In the Mission Mountains Tribal Wilderness, there will be no permanent increases in open or total road densities and there will be no permanent decreases in secure core. In the South Fork Jocko Primitive Area, there will be no net increase in open roads.

On the remaining 12 mi^2 (31 km^2) managed by the CS&KT in the PCA, habitat management is directed by the Forest Management Plan, as authorized by the Tribal Council and the BIA. On these lands, the following motorized access management direction applies:

- Open road densities shall not exceed 4 mi/mi^2;
- Total road miles shall remain at or below what existed in 1999;
- Total road densities will be reduced by removing 15% of road spurs in currently roaded areas over the life of the plan (2000–2030);
- Designated roads in timber sale areas will be closed after the harvest is complete.

As a signatory to this Conservation Strategy, the CS&KT is committing to monitor and maintain records of motorized routes on all of their lands and coordinate with other agencies to report and update these data biennially.

Motorized Access Objectives on DNRC Lands in the PCA

DNRC will manage motorized access on the 259 mi^2 (671 km^2) of their forested lands within the PCA according to their HCP. DNRC lands within the PCA occur in either large blocks of State forest or small, isolated parcels surrounded by other land ownerships.

On all lands within the PCA, DNRC will:

- minimize construction of new open roads, particularly in riparian areas, wetlands, and avalanche chutes;
- inspect and repair all primary road closure devices annually;
- suspend motorized activities within 0.6 mi (1 km) of a known, occupied den site; and
- during the spring period, prohibit commercial activities and minimize motorized activities on restricted roads associated with low-intensity forest management activities.

On large blocks of DNRC land within the PCA on the Stillwater, Coal Creek, and Swan River State Forests (205 mi^2, 530 km^2 combined), DNRC will manage motorized access according to their HCP and approved transportation plans, which remain in effect until 2061. These transportation plans cap the total miles of open and restricted road that can be constructed or re-opened for forest management activities over this time period. On the Swan River State Forest, there could be 70 miles (113 km) of permanent new roads constructed, none of which would be open to the public for motorized use. There would be minimal net increase in linear open road miles in the Swan River State Forest. Another 41.4 miles (66.1 km) of existing open roads would become seasonally restricted to commercial forest management activities during the spring season (April 1 – June 15) to provide grizzly bear security during this season. On the Stillwater and Coal Creek State Forests, 19.3 more miles (31.1 more km) of permanent road could be constructed and there will be a 15% reduction in the miles of roads that are open year-round (reduced from 125.3

miles to 107 miles (201.7 km to 172.2 km)). The HCP also identifies seven security zones on 34 mi^2 (89 km^2) of these State Forests where limits on commercial forest management activities during the non-denning season would consistently be in place (DNRC 2011 as amended in 2018). On the 34 mi^2 (89 km^2) of security zones identified on the Stillwater and Coal Creek State Forests, no new permanent roads will be constructed.

On isolated parcels of DNRC lands inside the PCA, DNRC will not exceed baseline values for linear miles of open road at the administrative unit level.

As a signatory to this Conservation Strategy, the DNRC is committing to monitoring and maintaining records of motorized routes on all of their lands and coordinating with other agencies to report and update these data biennially.

Monitoring of Motorized Access and Secure Core in the PCA

Percent secure core, OMRD greater than 1 mi/mi2 and TMRD greater than 2 mi/mi2 within each BMU subunit will be monitored using each individual land management agency's Geographic Information System (GIS) database of motorized access routes. The respective land management agencies will be responsible for maintaining their motorized routes GIS database. The data for OMRD, TMRD, and secure core will be compiled and analyzed, including comparison to the baseline, in odd-numbered years beginning in 2011. The results will be available the year thereafter in the Monitoring Team's annual report.

Developed Recreation Site Management on Federal Lands in the PCA

Developed recreation sites refer to sites or facilities with features that are intended to accommodate public use and recreation. Developed recreation sites are generally associated with frequent and/or prolonged human use that may result in increased bear attractants and grizzly bear mortality risk.

In most cases, developed recreation sites that support overnight use pose higher risks to bears than day-use sites since people spend more time, usually cook or eat meals, and produce more garbage while at these areas. Examples of developed recreation sites that are designed and managed for overnight use include campgrounds, lodges, rental cabins, and summer homes. Measures that have been demonstrated to be effective in controlling human food and attractants, thereby reducing the risk of human-grizzly bear conflicts, include the presence of campground hosts and installation of bear resistant containers.

In contrast to developed recreation sites, dispersed recreation sites rarely have permanent constructed features. Examples include many car camping sites along public roads, user-established camping areas accessible only by non-motorized means, and outfitter camps. Recreation use is often intermittent or temporary and there is limited presence of agency personnel at dispersed sites. Proper handling of food and attractants and other measures to prevent food

conditioning of bears and human-grizzly bear conflicts will continue to be required at dispersed recreation sites.

Habituation of bears is less likely to occur at dispersed recreation sites than at developed recreation sites. In GNP, conflicts and grizzly bear mortalities have been rare and related almost exclusively to campgrounds and other developed human-use areas (White et al. 1999). In the Swan Mountains, Mace and Waller (1996) reported there were no historic or recent records of grizzly bear-human conflict with recreationists in their study area. Because of the generally lower risk and the lack of history of human-grizzly bear conflicts at dispersed recreation sites in the NCDE, the objectives in this Conservation Strategy are applicable to developed recreation sites, and not dispersed sites. If new information reveals that dispersed recreation sites are having a greater impact on grizzly bears or if human-grizzly bear conflicts increase at these sites, concerns would be addressed site-specifically or the Conservation Strategy may be adjusted through the monitoring and evaluation process described in Chapter 5.

Sites or facilities constructed for use primarily by government employees to facilitate the administration and management of public lands are referred to as administrative sites (see Glossary). Examples include headquarters, ranger stations, dwellings, warehouses, guard stations, and park entrances. Federal, State, county, and municipal administrative sites are not subject to the limits on developed recreation sites, because agencies have direct control over the employees using these areas and are able to minimize the presence of attractants and grizzly bear mortality risk. Nevertheless, increases in the number of administrative sites on Federal lands should be minimized and any proposed increases should be evaluated site-specifically.

The general approach of the Conservation Strategy is to maintain the baseline number and capacity (see Glossary) of developed recreation sites on Federal lands that are designed and managed for overnight public use during the non-denning season. An allowance is made for a limited increase of one per decade per BMU, because that is consistent with the rate of increase that was allowed through ESA Section 7 consultation during the time when the grizzly bear population was stable to increasing. Such increases allowed managers to actively respond to resource damage, safety, and attractant concerns, and to respond to increasing public demand for recreation facilities.

Developed Recreation Site Objectives on Federal Lands

- Limit the number and capacity of new developed recreation sites on Federal lands in the PCA that are designed and managed for overnight use by the public during the non-denning season to one new site per decade per BMU, or one increase in the overnight capacity at one site per decade per BMU above the baseline.
- New or re-authorized recreation permits associated with developed recreation will include a clause providing for modification, cancellation, suspension, or temporary cessation of activities if needed to resolve a human-grizzly bear conflict situation.

- Facilities within the PCA that provide for day use by the public at developed recreation sites, or any increases in the number of day-use developed recreation sites above the baseline during the non-denning season, should include one or more measures to reduce the risk of human-grizzly bear conflicts.

Application Rules for Developed Recreation Sites on Federal Lands

- If changes are proposed that increase, expand, or change use of developed recreation sites beyond the baseline year in the PCA (Appendix 4), they will be analyzed by the agency proposing the change, and the potential detrimental and positive impacts documented through project evaluation or assessment. Any increases should be accompanied by measures aimed at reducing the risk of human-grizzly bear conflicts.
- A change in the number or capacity of developed recreation sites may be offset by an equivalent reduction at another site(s) elsewhere in the same BMU; doing so would not count as an increase. Any of the following means could be used for such an offset within in the same BMU: (1) equal reduction in capacity at another site; (2) closure of a developed recreation site(s); or (3) consolidation and/or elimination of dispersed camping, when and where it can be enforced effectively and it is reasonably assured that new dispersed sites will not develop nearby.
- Measures to reduce the risk of human-grizzly bear conflicts will be in place before completion of a new or a change to an existing developed recreation site, or included as an integral component of the design, including required funding. One or more of the following measures should be considered:
    - increased information and education;
    - increased conflict prevention resources (e.g., improved sanitation, backcountry food-hanging poles, etc.); or
    - increased law enforcement and patrols.
- If land managers reduce the number or capacity of developed recreation sites below the baseline, these reductions may be used at a future date to mitigate equivalent impacts of an increase, expansion, or change of use in developed recreation sites within that BMU.
- Capacity at campgrounds will be measured as the number of overnight campsites. Capacity at overnight sites other than campgrounds will be measured as the number of rooms, cabins, or bunkhouses, depending on the type of overnight site.
- Maintenance to existing developed recreation sites is allowed.
- Changes to the baseline values for the number and capacity of developed recreation sites may occur due to a variety of circumstances listed below. Such changes could permanently increase the number or capacity of developed recreation sites but would not count against the limit of one increase per decade per BMU. Examples of allowed changes include, but are not limited to, the following:

  - the agency acquired better information or updated/improved information in its database(s);
  - the agency exchanged, acquired, bought, or sold land which contained developed recreation sites;
  - a change was necessary to comply with Federal laws (e.g., Americans With Disabilities Act);
  - a modification of an existing developed recreation site was necessary to reduce resource damage, environmental impacts, or the potential for human-grizzly bear conflicts; or
  - the agency modified an existing developed recreation site to enhance human safety.
- Sites with day use only and administrative sites are not subject to limit of one increase per decade, but increases are to be minimized and accompanied by measures aimed at reducing the risk of human-grizzly bear conflicts.

Monitoring of Developed Recreation Sites in the PCA

Developed recreation sites will be tracked in each land management agency's existing GIS databases and reported in six broad categories: (1) recreational residences; (2) campgrounds; (3) other sites with overnight use; (4) trailheads; (5) other day-use-only sites; and (6) administrative sites. Appendix 4 displays the number of developed recreation sites in the PCA in these six categories.

Developed recreation sites available for human use only during the denning season are not subject to the limitations but the number of such sites will be tracked. Changes in the number and/or capacity of developed recreation sites designed and managed for overnight use and required mitigation measures associated with developed recreation sites on Federal lands will be tracked and maintained in a database to facilitate coordination across the multiple Federal jurisdictions in the PCA (four NFs, GNP, and BLM). Monitoring data will be compiled, analyzed, and compared to the baseline every two years, in the even-numbered years. The results will be included in the Monitoring Team's annual report the year thereafter.

Livestock Allotments in the PCA

As described in Chapter 1, impacts to grizzly bears from livestock operations potentially include direct mortality from control actions as a result of livestock depredation, learned use of livestock-related attractants, displacement due to livestock or related management activities, or direct competition for preferred forage species. Grizzly bears typically coexist with larger livestock (cattle and horses) without preying on them. However, many more conflicts have occurred with small livestock such as sheep, goats, and chickens. Beehives also can attract and be damaged by bears.

The general approach of this Conservation Strategy is to not increase the number of cattle and domestic sheep allotments or the number of animal unit (see Glossary) months of domestic sheep above the baseline level, which is based on 2011 conditions. Federal livestock grazing permits, allotment management plans, and annual operating plans will include provisions to reduce the risk of conflicts and to protect key grizzly bear food production areas.

There is no evidence of past conflicts between grizzly bears and horse/mule allotments due to attractants, depredation, or forage competition (USDA USFS 2014). Therefore, there are no limitations on these types of allotments in this Conservation Strategy.

Table 6. Active [1] cattle and/or sheep grazing allotments in the PCA baseline.

Land Manager	No. of Allotments	Type	AUMs [2]	Additional Info
Flathead NF	3	Cattle	320	
Helena-Lewis and Clark NF	24	Cattle	9857	2 additional allotments are currently inactive – AUMs not included
Helena-Lewis and Clark NF	1	Sheep	133	
Lolo NF	1	Cattle	30	
Kootenai NF	1	Cattle	373	2 additional allotments are currently inactive – AUMs not included
Glacier NP	0	n/a	n/a	GNP does not permit commercial livestock grazing allotments within Park boundaries
BLM	23	Cattle	1942	
DNRC	128	Predominantly cattle	17,147	97.4 mi^2 (252.3 km^2) in grazing leases/licenses
MFWP	5	Cattle	2884	34.9 mi^2 (90.5 km^2) in grazing leases
FIR		Cattle or horses		2.7 mi^2 (6.9 km^2) in agricultural (grazing or farming) leases
BIR				BIR is fully allotted; numbers of allotments and AUMs not available

[1] An active grazing allotment is one that is in use. A grazing permit in inactive status indicates that all permitted uses have expired, or have been cancelled, or waived.

[2] AUM's (Animal Unit Months) are calculated by multiplying the permitted number of sheep or cow/calf pairs times the months of permitted use.

Objectives for Livestock Allotments on Federal, State, and Tribal Lands in the PCA

Objectives for Federal and FIR lands:

- The term "range unit" is used when referencing FIR lands. There will be no increases in the number of cattle allotments on federal lands, or CSKT range units on Tribal lands, from the baseline.
- Allotment management plans and annual operating instructions should specify any needed measures to protect key grizzly bear food production areas (e.g., wet meadows, riparian areas) from conflicting and competing use by livestock, based on site-specific analysis.

Objectives for Federal, State, and FIR lands:

- There will be no increases in the number of sheep allotments or in permitted sheep AUMs above the baseline (Table 6).
- Existing sheep allotments/CSKT range units will be monitored and evaluated, and should be phased out as the opportunity arises with willing permittees.
- New permits for use of small livestock (such as sheep, goats, and llamas) for purposes such as weed control may occur but will follow existing Federal, State, or Tribal permitting processes. Such permits will stipulate that if the small livestock are subject to depredation by grizzly bears, consideration will be given to removing the small livestock from the area. The permits will also stipulate that any grizzly bear(s) depredating on these small livestock will not be removed unless additional circumstances indicate removal is warranted (Chapter 4).
- If depredations by grizzly bears occur, the appropriate response action to the grizzly bear causing the depredation will be determined and taken as described in Chapter 4.
- Permits for existing livestock allotments/CSKT range units will include requirements to reduce the risk of conflicts (such as requirements to store bear attractants in a bear-resistant manner, report livestock carcasses within 24 hours of discovery, and work with the appropriate agencies to properly dispose of a carcass).
- Boneyards (see Glossary) will not be established on Federal lands in the PCA. Any boneyards established on State or FIR lands in the PCA will be located in areas that will minimize the risk of habituating grizzly bears to human presence.
- Grazing permits will include clauses allowing for cancellation, suspension, or temporary cessation of activities if needed to resolve a grizzly conflict situation.

Application Rules for Livestock Grazing on Federal and FIR Lands

- Reissuance of permits for vacant cattle allotments/ CSKT range units may increase the number of permitted cattle, but the total number of allotments would remain the same as the indicated baseline.

- Combining or dividing existing allotments/CSKT range units would be allowed as long as it does not result in grazing allotments/CSKT range units in currently unallotted lands.
- A sheep grazing permit in non-use status (see Glossary) would not be allowed to increase allowable animal unit months beyond what was previously permitted prior to being in non-use when it is returned to use.
- Where chronic conflicts occur on cattle allotments/CSKT range units inside the PCA, and an opportunity exists with a willing permittee, the permitting agency may consider phasing out cattle grazing or moving the cattle to a vacant allotment where there is less likelihood of conflict.
- Increases in allotment numbers in the PCA that result from land acquisitions or exchanges will be added into the baseline rather than being counted as deviations from the baseline.

Objectives for Livestock Grazing on BIR Lands

- All lands inside the PCA on the BIR are currently allotted for livestock grazing. There will be no increase in the number of permitted grazing allotments within the PCA on the BIR.
- One or more Bear Management Specialists on the BIR will continue to work with livestock producers to minimize and manage livestock-grizzly bear conflicts.
- Existing sheep allotments will be monitored, evaluated, and phased out if the opportunity arises with willing permittees.
- All provisions in the BIR attractant storage order (Blackfeet Fish and Wildlife Code Chapter 3, Section 17), including management of livestock carcasses, will be adhered to by grazing permittees, apiary permit holders, and their agents.

Monitoring of Livestock Grazing in the PCA

The numbers of commercial livestock (cattle and sheep) grazing allotments and numbers of sheep AUMs within the PCA will be monitored and reported every two years by the permitting agencies. The number of livestock-grizzly bear conflicts on Federal lands within the PCA will also be compiled and reported every two years. The data will be compiled in even-numbered years and included in the Monitoring Team's annual report the year thereafter.

Vegetation Management in the PCA

Grizzly bears in the NCDE thrive in landscapes with a mix of different vegetation types and successional stages, but generally prefer to forage in areas with some type of hiding cover (see Glossary) nearby, particularly when foraging during the daylight hours (Aune and Kasworm 1989, Waller and Mace 1997). Vegetation management alters the amount and arrangement of cover and forage on the landscape. A desirable vegetation mosaic can be created, for example, by retaining cover adjacent to natural or created openings and riparian areas. Tree removal for fuels reduction or timber harvest and prescribed burning can result in localized increases in bear foods by

stimulating the growth of grasses, forbs, and berry-producing shrubs (Zager et al. 1983, Kerns et al. 2004). Vegetation management may also be designed to benefit grizzly bear habitat by controlling undesirable invasive species, improving riparian management, or discouraging livestock grazing in important food production areas.

However, if not implemented properly, vegetation management can negatively affect grizzly bears by: (1) removing cover, (2) disturbing or displacing bears from habitat during project activities, (3) increasing human-grizzly bear conflicts or mortalities as a result of unsecured attractants, and (4) increasing mortality risk or displacement due to construction of new roads into previously roadless areas and/or increased vehicular use on existing restricted roads, especially if roads remain open to the public after vegetation management is complete. Changes in the distribution, quantity, and quality of cover are not necessarily detrimental to grizzly bears as long as various projects occurring on multiple jurisdictions at any given time are coordinated on a BMU or subunit scale to ensure that grizzly bear needs are addressed. Although there are known impacts to individual bears from timber management activities, these impacts are typically temporary and have been managed acceptably using the IGBC Guidelines in place since 1986 (USDA USFS. 1986a).

This Conservation Strategy encourages vegetation management projects that are designed to: enhance forage production, except in areas that are frequented by people such as campgrounds; retain or develop cover adjacent to forest openings and highway crossing areas; protect important habitats such as avalanche chutes, riparian areas, and berry-producing shrubs; and minimize the impacts of motorized access.

Vegetation Management Objectives on National Forest System Lands in the PCA

- Design vegetation management prescriptions and activities to avoid detrimental effects on the grizzly bear population and to include one or more measures to protect, maintain, increase, and/or improve grizzly bear 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 human-grizzly bear conflicts.
- Vegetation and fuels management activities that will have detrimental impacts on the grizzly bear population or their habitat, as determined in a project specific environmental analysis, will not be permitted.
- Vegetation and fuels management activities should include measures to reduce the risk of disturbance to grizzly bears (e.g., restrict activities in spring bear habitat during the spring period, provide areas with low levels of human disturbance adjacent to areas with high levels of disturbance), as determined by a site-specific analysis. Winter logging is preferred. Logging operations during the non-denning season should be restricted in time and space to reduce significant disruptions of normal or expected grizzly activities. However, forest management activities such as pre-commercial thinning, burning, weed

spraying, and road stabilization and erosion control may need to be completed during the spring time period in order to meet 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 the use of closed roads).

- Where vegetation management occurs in forested areas, there will be a mosaic of successional stages to provide for grizzly bear habitat needs.
- Where present, cover should be maintained along meadows and other open feeding sites, riparian areas, past harvest units that do not yet provide hiding cover, known grizzly bear travel corridors, and identified highway crossing areas, based on site-specific analysis. Un-thinned strips or patches should be retained within harvest units and pre-commercial thinning units if needed for cover adjacent to open roads, as determined by a site-specific analysis.
- Roads used for project implementation must comply with the motorized access objectives described elsewhere in this Conservation Strategy.
- Include a clause in timber sale contracts providing for cancellation or temporary cessation of activities if needed to resolve a human-grizzly bear conflict situation.
- Prior to beginning work, all contractors, operators and their employees should be informed of safe procedures for working and recreating in grizzly country.
- If contractors, operators, or their employees request to establish a work camp on public Federal lands other than public campgrounds, a site evaluation should be prepared and written authorization should be provided before the campsite is established.

Vegetation Management on DNRC Lands in the PCA

The DNRC will manage grizzly bear habitat within and outside the PCA according to their HCP (DNRC 2011 as amended in 2018). For non-HCP lands, current administrative rules for forest management activities would apply, which would offer similar protections for grizzly bears. The DNRC HCP specifically establishes the following habitat management direction for timber harvest relevant to grizzly bears:

- Consideration of grizzly bears during planning and environmental review on all forest management-related projects occurring on covered lands, and shall incorporate mitigation measures to minimize impacts to grizzly bears or their habitat to the extent possible;
- Development of site-specific mitigation measures to minimize the impacts to important grizzly bear habitat elements (berry fields, avalanche chutes, riparian areas, wetlands, whitebark pine stands, and feeding/congregation areas);
- Retention of visual cover for grizzly bears in riparian and wetland areas by maintaining a 50 ft (15.2 m) no-harvest buffer, and through additional measures restricting removal of trees within defined Riparian Management Zones;
- Retention of up to 100 ft (30.5 m) of vegetation between open roads and clearcut or seed tree harvest units to provide visual screening;

- Design of regeneration harvest units to have no points in them that are greater than 600 ft (183 m) to visual screening cover;
- Restriction of commercial forest management activities during the spring period (April 1–June 15) in spring habitat (lands <5,200 ft (<1,585 m)) elevation in the Swan State Forest; (<4,900 ft (<1,494 m)) elevation on scattered parcels; areas associated with roads possessing restricted status during the spring period on the Stillwater State Forest);
- Prohibition of pre-commercial thinning and heavy equipment slash treatments during the spring period in spring habitat.

Vegetation Management on Tribal Lands in the PCA

Blackfeet Indian Reservation: Of the 2,384 mi^2 (6,174 km^2) of lands within the BIR, there are 273 mi^2 (708 km^2) of forested lands with management directed by the Blackfeet Nation Forest Management Plan. This plan is in effect until 2023 and establishes the following habitat management direction for timber harvest relevant to grizzly bears:

- Timber harvesting activities will be limited to single drainages when possible;
- Timber harvesting will be concentrated in one or two forest management units per year instead of being spread across the landscape;
- No timber harvest or road construction will occur between April 1 and June 15 annually, allowing grizzly bears secure access to spring foraging habitat;
- Dense cover will be maintained adjacent to main roads;
- All streams will be protected with Streamside Management Zones 100 feet (30.5 meters) in width on both sides of the stream with restrictions on how much vegetative cover and timber may be removed;
- All workers on timber projects are prohibited from carrying firearms on or near the sale area;
- All workers on timber projects are required to follow the attractant storage regulations (Blackfeet Fish and Wildlife Code Chapter 3, Section 17).

Flathead Indian Reservation: On the FIR, management of their 719 mi^2 (1,859 km^2) of forested lands is directed by the Forest Management Plan, as authorized by the Tribal Council and the BIA. This Plan establishes the following habitat management direction relevant to grizzly bears:

- 36% (26 mi^2, 673 km^2) of these forested lands are unavailable to timber harvest;
- 12% (89.1 mi^2, 231 km^2) contain restrictions on the locations and methods of harvest that may occur;
- Hiding cover along major highways near identified crossing areas (e.g., Evaro, and the Ravalli Corridor) will be retained and managed to provide movement opportunities and promote population expansion along the western edges of the NCDE;

- Adjacent drainages must remain undisturbed during the duration of a timber sale and for two years afterwards;
- Designated roads in timber sale areas will be closed after the harvest is complete.

Hardrock Mining and Mineral Development in the PCA

Forty-seven percent (about 4,200 mi^2, about 10,900 km^2) of the PCA is unavailable to new mining claims due to their status as Congressionally-designated Wilderness Areas, National Parks (i.e., GNP), or other special designations (see Figures 7 and 8). Public Law 109-432 made additional lands outside of designated Wilderness Areas on the Rocky Mountain Ranger District of the Helena-Lewis and Clark NF, some areas of the Flathead NF, and BLM lands along the Rocky Mountain Front unavailable to future location and entry under the General Mining Act of 1872. While this law prohibited the establishment of new claims, it did not eliminate claims that existed at the time the law was passed. However, there are no Plans of Operation or Notices of Intent to explore or operate any commercial mines inside the PCA on NF or BLM lands, except for the Cotter Mine on the Helena NF. There is some copper and silver exploration occurring at this mine, but activity is low and mitigation measures to protect grizzly bears were included in the plans of operation.

This Conservation Strategy ensures that appropriate mitigation measures will continue to be implemented in any future plans of operation inside the PCA. Mortality risk to grizzly bears from mineral development on Federal and DNRC lands will be largely mitigated through the motorized access objectives described earlier in this chapter and food/attractant storage requirements, but additional mitigation measures that are project specific will also be implemented.

Coordination of mining activities in grizzly bear habitat will occur during review and approval of a site-specific plan of operations under 36 CFR 228A for locatable mineral activities on NF lands, and under 43 CFR 3809 for locatable mineral activities on BLM-managed lands. Operating procedures, reclamation plans, or other mitigating measures necessary to meet the guidelines will be incorporated into the plan of operation, or could become agency-imposed operating conditions, provided such measures were consistent with the rights provided for under applicable mining laws. All exploration, development, production, mitigation measures, reclamation, and closure activities for locatable minerals on Federal, State, and private lands are also under the regulatory permitting authority of the Montana Department of Environmental Quality (DEQ). The agencies work cooperatively in the administration and management of mining operations. Mitigation measures may not conflict with the regulatory permitting authority of the DEQ.

Objectives for Hardrock Mining and Mineral Development on Federal and State Lands in the PCA and Zone 1

The intent is to avoid, minimize, and mitigate environmental impacts to grizzly bears and their habitat from mining activities occurring on Federal (as authorized under the Mining Law of 1872) and State lands, subject to valid existing rights. The potential effects to grizzly bears and bear habitat and necessary mitigation measures will be determined at the site-specific level by the authorizing or permitting agency. For projects with the potential to significantly negatively affect

grizzly bears or their habitat, operating plans, notices, and permits will include a mitigation plan with measures to protect grizzly bears and minimize detrimental impacts to them during and after operations. Operators are required to comply with the mitigation plan through the agencies' approval of the Operating Plan. Performance of operating and reclamation measures and site-specific mitigation measures used to protect grizzly bears or bear habitat will be enforced through the respective DEQ and Federal surface management regulations.

- New plans of operation and permits for mineral activities will include measures to reasonably mitigate potential impacts to grizzly bears or their habitat from the following:
    - Land surface and vegetation disturbance;
    - Water table alterations that affect bear foods;
    - Construction, operation, and reclamation of mine-related facilities such as impoundments, rights of way, roads, pipelines, canals, transmission lines, or other structures.
- For hardrock mining and mineral projects with the potential to significantly affect grizzly bears or their habitat, operating plans will include the following mitigation measures regarding habitat:
    - Ground-disturbing activities in identified spring bear habitat will be avoided between April 1 and June 30. If timing restrictions are not practicable, appropriate measures will be taken to reasonably mitigate negative impacts of mineral activity to grizzly bears.
    - Reasonable and appropriate measures regarding the maintenance, rehabilitation, restoration, or mitigation of functioning aquatic systems and riparian zones will be implemented.
    - Reclamation and revegetation of roads and other areas disturbed from mineral activities will be completed as soon as practicable by the operator.
- For hardrock mining and mineral projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include the following measures regarding motorized access:
    - New roads constructed for mineral exploration and/or development will be single-purpose roads only and will be closed to public use not associated with mineral activities.
    - On Federal lands inside the PCA, new roads or closed roads that are reopened for mineral exploration will be consistent with this Conservation Strategy's motorized access objectives, subject to valid existing rights.
    - On State lands only, roads constructed for mineral operations may be retained by the land management agency for use associated with other concurrent or future activities (such as timber sales or rights-of-ways). However, impacts associated with all uses of the road(s) must be analyzed in a MEPA environmental review, and impacts to grizzly bears minimized to the extent practicable.

- A traffic management plan will be developed as part of any proposed activity to identify when and how mine roads will be used, maintained, and monitored, if required, and how roads will be closed after mineral activities have ended.
- Speed limits will be adopted on motorized routes if needed to prevent or reduce collisions with grizzly bears.

- For hardrock mining and mineral projects with the potential to significantly affect grizzly bears or their habitat, the following tiered measures will be considered to mitigate impacts to grizzly bear habitat. Beginning at Step 1, any subsequent steps would be implemented only if the prior steps are not possible or achievable.
    1. The operator should reclaim the affected area back to suitable bear habitat that has similar or improved characteristics and qualities as the original suitable habitat (such as the same native vegetation).
    2. If Step 1 is not attainable, operators should either acquire a perpetual conservation easement (or easements) or purchase comparable or better replacement grizzly bear habitat in the PCA. Acquisition of habitat within connectivity corridors could also be considered for mitigation. Location of these habitats will be approved by the land management agency in close coordination with MFWP, and the easement/deeds will be transferred to the appropriate Federal or State agency or private conservation organization.
    3. If Steps 1 or 2 are not achievable, the next option is to consider offsetting negative effects to bears and grizzly bear habitat with other appropriate types of actions. This could involve radio telemetry monitoring of grizzly bear movements in the affected area that would support understanding of future conservation (in coordination with MFWP), other grizzly bear research (with MFWP involvement), funding a bear management specialist or enforcement officer, or other appropriate actions as needed to develop site-specific mitigation.
- Hardrock mining and mineral projects will include food storage/handling and garbage disposal measures and will incorporate any existing food storage measures for human occupancy. Proper handling of food and attractants is the sole responsibility of the operator. Compliance with these requirements will be evaluated during site inspections conducted by the authorizing agencies. The number and type of inspections as well as the mechanism for inspections will be identified through the planning process (MEPA or NEPA). In addition to measures included in the food/wildlife attractant storage special order(s), new permits and plans of operations will include the following measures regarding grizzly bear attractants:
    - Bear resistant food storage and garbage containers will be used at mine sites and at any campgrounds or dispersed sites where mining-related human occupancy is anticipated.
    - Garbage will be removed in a timely manner.

    - Road kills will be removed daily to a designated location determined in close coordination with and permitted by MFWP.
    - No feeding of any wildlife will be allowed.
    - Locations of work camps shall be approved in advance of operations.
- For hardrock mining and mineral projects with the potential to significantly affect grizzly bears or their habitat, the mitigation plan will include the following measures regarding human-bear conflict:
    - Firearms will be discouraged on site during operations except for security personnel and other designated persons. Carrying of bear spray will be recommended to the operator.
    - The operator should require employees to attend training related to living near and working in grizzly bear habitat prior to starting work and on an annual basis thereafter.

Monitoring of Minerals Activities in the PCA and Zone 1

For operations where it is determined there is potential for significant impacts ("significance" as determined through environmental review and permitting) to the grizzly bear population or its habitat, a monitoring plan will be developed by the operator with approval by the DEQ or Federal regulatory permitting agency, and in close coordination with MFWP for the life of the mineral activity. The monitoring plan will outline how changes in habitat and/or disturbance to bears will be monitored and mitigations (e.g., monitoring of reclamation measures) will be identified and funded.

Oil and Gas Development in the PCA

While land management plans identify large areas that are, or are not, considered "suitable" for oil and gas production, site-specific environmental analyses and mitigation measures occur at the project level. The environmental analysis involves two separate NEPA (or MEPA on State lands) processes. A NEPA process (or MEPA) is initiated when the decision is made to offer certain lands for leasing. Leasable minerals include, but are not limited to, oil and gas. Stipulations that would be required in order for leases to meet the requirements of land and resource management plans, or to meet other policy or regulation, are identified when the decision is made to offer lands for lease. These stipulations remain with the lease even if it is sold, and would be placed on any leases issued for that area in the future. A second, site-specific NEPA analysis is completed if, and when, a lease holder submits an application for a permit to drill. At this point, site-specific mitigation measures are incorporated to address any environmental concerns associated with the surface use plan of operations. These mitigation measures may be incorporated as additional lease stipulations or as conditions of approval for the surface use plan. Until this application for a permit to drill is submitted, no exploration or development can occur.

In 1997, the entire Rocky Mountain Ranger District of the Helena-Lewis and Clark NF was made unavailable for future leasing; the pre-existing leases in the Badger-Two Medicine portion of the Rocky Mountain Ranger District were canceled by the U.S. Secretary of Interior in 2016. In 2006, lands outside of designated Wilderness Areas on the Rocky Mountain Ranger District, some areas of the Flathead NF, and BLM 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 Public Law 109-432, the Tax Relief and Health Care Act of 2006 (Figure 5). 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. While Public Law 109-432 prohibited the establishment of new leases, it did not eliminate leases that existed at the time the law was passed.

As of 2012, there were 247 oil and gas leases in the PCA and another 140 in Zone 1. Most of those leases in both the PCA and Zone 1 are on USFS lands. Nineteen leases on the Helena NF and 16 leases on the Lewis and Clark NF have been terminated and most of the remainder are currently suspended, pending forestwide leasing analyses. Regional priorities for initiating the NEPA/MEPA process for these leases are based on available funding for analysis, public demand for action, and/or applications for permits to drill on existing leases.

Nine lease holders have submitted Applications for Permit to Drill (APDs) to the BLM on leases in the PCA, one of which is on private lands. There have been 11 APDs submitted in Zone 1, three of which are on USFS lands. The APDs include surface use plans of operation, which will require evaluation and analysis in compliance with NEPA. No action is currently being taken on these APDs pending decisions on funding and work priorities.

Stipulations included in existing leases would not be changed without agreement by lease holders, nor can additional stipulations be added to existing leases. Additional mitigations that may be needed to address environmental concerns, land and resource management plan requirements, or other policy or regulation would be included as conditions of approval of surface use plans of operation when permits to drill are issued. The majority of existing leases already contain stipulations that address maintaining grizzly bear security through such things as limits on timing or location of specific activities. When or if APDs are submitted on existing leases, the motorized access objectives described in this document for the PCA would apply, unless specific language in a lease superseded that requirement.

There have been several proposals before the Canadian government for large-scale industrial coal and gas developments in the upper North Fork Flathead River basin in British Columbia directly north of and upstream from GNP and the Flathead NF. On February 18, 2010, the B.C. Premier announced that mining, oil, gas, and coal development were no longer permissible land uses in the Canadian portion of the North Fork Flathead River (British Columbia Office of the Premier 2010).

The intent of this Conservation Strategy is to avoid, minimize and mitigate environmental impacts to grizzly bears and their habitat from mining activities occurring on Federal (as authorized under

the Federal Offshore Oil and Gas Leasing Reform Act of 1987) and State lands, subject to valid existing rights. Forty-seven percent (4,231 mi2 of 8,926 mi2) of PCA lands are unavailable to oil and gas leasing due to their status as Federally designated Wilderness Areas, National Park, (i.e., GNP), or other special designations (Figures 7 and 8). For operations where it is determined there is potential for significant impacts ("significance" as determined through environmental review and regulatory permitting) to the grizzly bear population or its habitat, the following objectives will apply to any future permits to drill issued on the Lolo NF, Flathead NF, Helena-Lewis and Clark NF, and Kootenai NF and on BLM and DNRC managed lands in the PCA and Zone 1. The Blackfeet Nation is working directly with the BIA and the USFWS to create a management plan and mitigation package for oil and gas development on BIR lands.

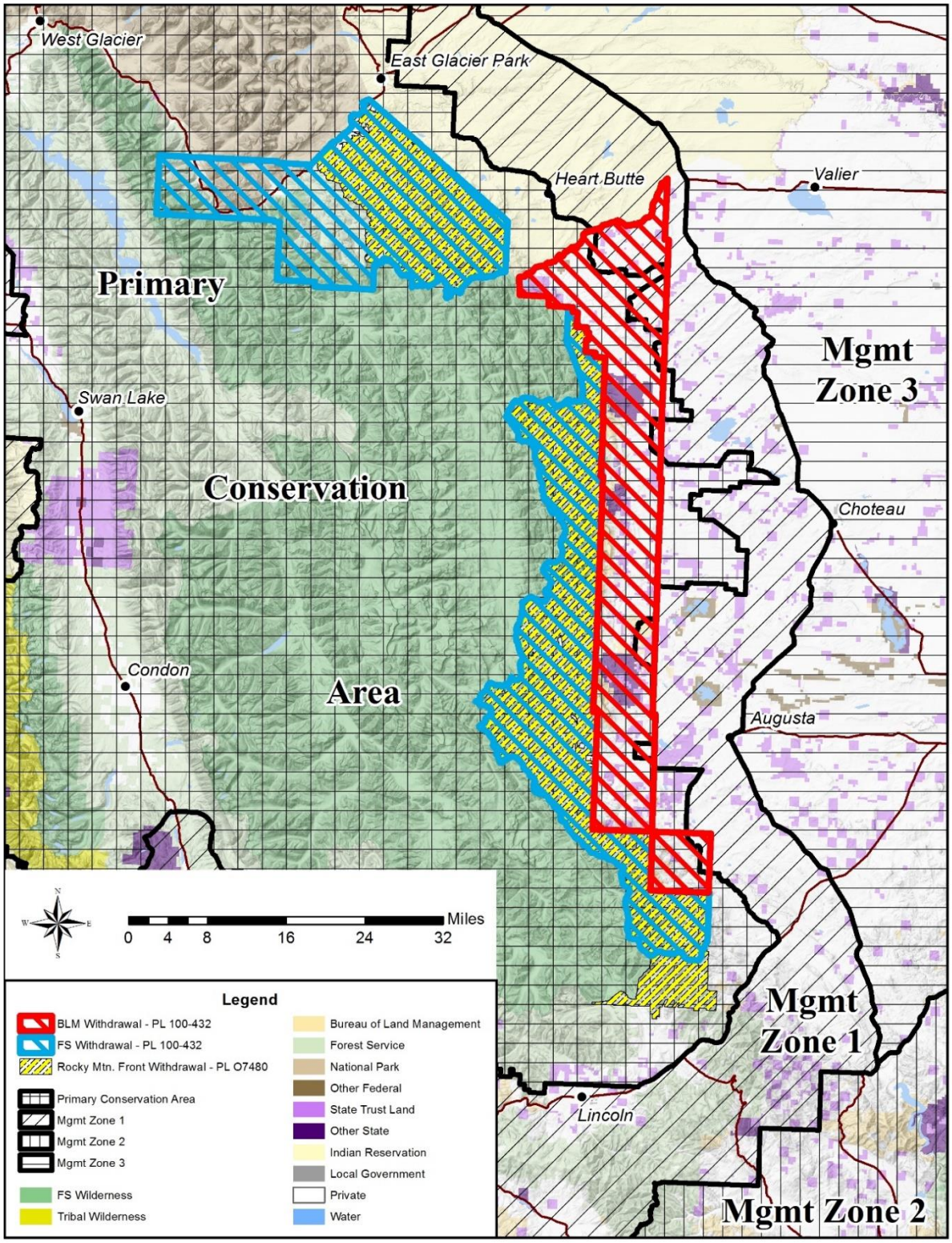

Figure 8. Rocky Mountain Front Mineral Withdrawal Area, where no new energy leases or mineral claims may be made on USFS or BLM managed lands.

Objectives for Oil and Gas Development on BLM Land

On lands or oil and gas mineral estates managed by the BLM in the PCA, no new leases will be permitted in the Rocky Mountain Front Mineral Withdrawal Area (Public Law 109-432) (Figure 8). For new leases outside of this Mineral Withdrawal Area, no surface occupancy (NSO, see Glossary) will be allowed in the PCA or Zone 1. Motorized access objectives described previously in this Chapter will apply for the PCA. Exceptions could be granted if no detrimental impacts to grizzly bears are determined through an environmental analysis. Additionally, the stipulation for no surface occupancy could be modified if the authorized officer, in consultation with MFWP, determines the area is no longer important to grizzly bears.

Objectives for Oil and Gas Development on National Forest System Land

- Stipulations already included in existing leases on National Forest System (NFS) lands in the PCA will not be changed, nor will additional stipulations be added to existing leases without the lease holder's agreement.
- New mineral leases in the PCA will include a no surface occupancy stipulation.
- Any permits for seismic activity or drilling will include a clause providing for modification or temporary cessation of activities if needed to resolve a human-grizzly bear conflict.
- If activities within the PCA and Zone 1 have the potential to adversely affect grizzly bears or their habitat as determined by a site-specific analysis, new permits, plans of operation, and/or leases will include the following mitigation measures, stipulations, or surface use objectives regarding grizzly bear habitat:
    - Ground-disturbing activities in identified grizzly bear spring habitat (as identified in a site-specific analysis) will be avoided between April 1 and June 30. If timing restrictions are not practicable, other measures will be taken to reasonably mitigate negative impacts to grizzly bears.
    - Seismic activity in identified grizzly bear denning habitat (as identified in a site-specific analysis) will be avoided during the denning season. If timing restrictions are not practicable, other measures will be taken to reasonably mitigate negative impacts to grizzly bears.
    - Cumulative impacts of multiple, concurrent seismic and/or drilling operations will be limited by timing restrictions. If timing restrictions are not practicable, other reasonable and appropriate measures will be taken to mitigate negative impacts to grizzly bears.
    - Reasonable and appropriate measures regarding the maintenance, rehabilitation, restoration, or mitigation of functioning aquatic systems and riparian areas will identify how reclamation will occur, plant species to be used in reclamation, a timeframe of when reclamation will be completed, and monitoring objectives.
    - Reclamation and revegetation of areas disturbed from oil and gas activities will be completed as soon as practicable by the operator.

- If oil and gas activities within the PCA and Zone 1 have the potential to adversely affect grizzly bears or their habitat as determined by a site-specific analysis, new permits and/or leases will include the following mitigation measures regarding motorized access:
  - Motorized access objectives for the PCA described previously in this Chapter will apply to new leases.
  - Public motorized use that is not associated with leasable minerals activities will be prohibited on routes constructed for exploration and/or development.
  - A traffic management plan will be developed as part of the proposed activity to identify when and how motorized routes will be used, maintained, and monitored (if required) and how motorized routes will be managed after activities have ended.
  - Helicopter use associated with seismic activity, exploration, drilling, or development will follow an approved plan using objectives identified in the Application Rules below.
  - Speed limits will be adopted on motorized routes if needed to prevent or reduce collisions with grizzly bears.
- In addition to measures included in the food/wildlife attractant storage special order(s), new plans of operation, permits and/or leases for mineral activities in the PCA and Zone 1 will include the following measures:
  - Bear resistant food storage and garbage containers will be used at development sites and at any campgrounds or dispersed sites where exploration or production-related human occupancy is anticipated.
  - Garbage will be removed in a timely manner.
  - Road kills will be removed daily to a designated location determined in close coordination with MFWP.
  - Feeding of wildlife will not be allowed.
  - Locations of work camps will be approved in advance of operations. Food storage requirements will be strictly adhered to in any work camps.

USFS Application Rules for Oil and Gas in the PCA and Zone 1

Helicopter use plans should include:

- Avoid establishing recurring helicopter use, especially in spring habitats or other known important grizzly bear habitats or use areas.
- Avoid establishing landing zones, especially in spring habitats or other known important grizzly bear habitats or use areas. If a landing zone is deemed necessary for safe implementation of the seismic or surface use plan or permit to drill, the landing zone should be constructed only in an area that has had site-specific analysis and approval.
- Minerals contractors and lessees should require employees to attend training related to safely living and working in grizzly bear habitat prior to starting work and on an annual basis thereafter.

- Carrying of bear spray should be recommended to lessees and operators to reduce the risk of human-grizzly bear conflicts.
- Wherever possible, use the best available noise-reduction technology on all equipment and motorized vehicles to reduce potential disturbance or displacement of grizzly bears.
- Where present, maintain wildlife cover at regular intervals along motorized routes, seismic corridors, and pipelines constructed for leasable energy activities.
- Available resources at existing gravel pits should be used before constructing new pits to reduce the risk of grizzly bear disturbance or displacement.

Objectives for Oil and Gas Development on DNRC Land

On all trust lands managed by DNRC in the PCA, Montana Oil and Gas Stipulations will apply and measures related to grizzly bears and their habitat (from BLM 1987:10, Appendix 11) would be incorporated into mitigation plans.

Monitoring of Oil and Gas Activities on Federal Lands in the PCA and Zone 1

Where it is determined there is potential for significant impacts ("significance" as determined through environmental review and permitting) to the grizzly bear population or its habitat, a monitoring plan will be developed in close coordination with MFWP for the life of the lease activity. The monitoring plan will outline how changes in habitat and/or disturbance to bears will be monitored and mitigations will be identified and funded. The monitoring plan will identify objectives for habitat parameters to determine if research of local grizzly bears (i.e., capturing and radio-collaring bears) is warranted and to what extent monitoring should be conducted.

Monitoring of Habitat Conditions over Time in the PCA

The Conservation Strategy focuses habitat management on features that influence grizzly bear displacement and mortality risk (i.e., secure core and motorized access; developed recreation sites; livestock allotments/CSKT range units; vegetation management; and oil, gas, and mining activities). Assessment, monitoring, and management of ecological aspects of habitat quality is far more difficult. Grizzly bears are dietary and habitat generalists, a characteristic that allows them to occupy the largest and most diverse global distribution of any bear species (Schwartz et al. 2003b, Van Daele et al. 2012). This ecological plasticity is evident even within the NCDE, where grizzly bears occupy and utilize a large number of forest, woodland, alpine, and grassland communities, each of with a unique set of available foods. Because of this wide dietary and habitat breadth, it is infeasible to quantify overall habitat productivity, or maintain on-the-ground monitoring of availability and use of the many individual bear foods. Instead, measures of grizzly bear body condition have been monitored as indirect indicators of habitat quality. In conjunction with the monitoring of body condition, stable isotope analyses of aggregate dietary composition

have also been conducted (Teisberg et al. 2015). Over time, monitoring of the relationships among body condition, assimilated diet, and characteristics of individual bears (sex, age, reproductive status, management history) will provide us with an opportunity to detect changes possibly associated with changes in habitat productivity. Further, continued monitoring of body condition will assist in understanding possible changes in food availability as climate change continues. Although some annual variation in these parameters is expected due to natural fluctuations in productivity and availability of foods, long-term changes in habitat quality and food productivity should be evident in these data. Future monitoring will incorporate new techniques and knowledge as these become available.

- Body condition: Habitat productivity and gross availability of high-quality foods can be measured indirectly by assessing the physiological condition of animals, through measurements of body mass, body size, and body fat. Bioelectrical impedance analysis methods allow for direct estimation of fat content of captured grizzly bears (Farley and Robbins 1994, Hilderbrand et al. 1998). Ratios of lean body mass to fat mass vary by individual characteristics (e.g., sex, age class, reproductive status) and from spring to fall, depending on available foods. Monitoring body condition indices among our sample of captured bears allow us to detect changes over time and space. Among adult females, fall estimates of body fat provide some inference as to whether individuals meet the physiological requirements for producing cubs (Robbins et al. 2012).
- Stable isotope analysis: With sufficient sample sizes, it is possible to use observed ratios of stable isotopes in food items to infer information about assimilated diets (i.e., that which is digested and metabolically used) of grizzly bears (Robbins et al. 2004). Ratios of naturally occurring nitrogen, sulfur, and carbon isotopes allow us to estimate the relative dietary proportions of food groups incorporated via digestion and metabolism. As an example, ratios of 15N to 14N (δ15N) become higher with increasing trophic level, allowing distinction between a plant-based, animal-based, or mixed diet. Within an animal, metabolically active tissues (e.g., hair, blood components) incorporate material that reflects the isotopic ratio of the items ingested during the time of growth. Hence, ratios of hair provide a catalogue of the assimilated diet during its growth period (approximately summer to fall). Further, hairs can be segmented by length to assess changes in ingestion during the time of growth. In comparison, the turnover rate of blood components allows for shorter-term estimates of assimilated diet; ratios from blood plasma reflect the 1–2 weeks of digested diet prior to collection, while red blood cells reflect the recent 2–3 months of diet.

Private Land Development in the PCA

Federal land management and State wildlife agencies do not have management authority over private lands and these agencies do not have the ability to mitigate for private land development through management actions on their lands. As private lands are developed, State, Federal, and Tribal agencies will work together with counties or other organizations to explore options that address impacts from private land development such as increased outreach efforts, proper storage of potential bear attractants, and providing for habitat connectivity. To this end, MFWP completed its “Fish and Wildlife Recommendations for Subdivision Development: A Working Document” in

2012 (available online at http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/buildingWithWildlife/subdivisionRecommendations/). We will encourage private land owners, counties and agencies to cite and use these recommendations when developing and reviewing subdivision applications and regulations. MFWP also developed a GIS planning tool for developers and counties to use that identifies "crucial areas" for wildlife connectivity. This GIS tool provides an easy-to-use and understandable way to plan for development and conserve land by including wildlife considerations from the beginning stages of planning and letting developers know in advance where to expect greater expense and potential mitigation costs (Available online at http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html).

We will utilize information available from non-governmental sources, such as universities, Headwaters Economics, and Land Trusts, to keep abreast of significant changes or trends in land ownership and land uses occurring within the NCDE. This information may prove useful in supplementing or interpreting monitoring data on the NCDE grizzly bear population and its habitat.

MFWP, CS&KT, and the Blackfeet Nation will continue their efforts to limit human-grizzly bear conflicts on private lands inside and outside the PCA to keep human-caused grizzly bear mortality within sustainable levels. Upon request, MFWP and Federal agencies will continue to assist private non-profits and other entities to categorize and prioritize potential lands suitable for permanent conservation such as land exchanges, acquisitions, and conservation easements.

Human-caused mortality related to private land conflicts will be monitored and must be controlled to meet the population/demographic objectives in this Conservation Strategy. As in the past, MFWP will continue to monitor and report annual human-caused mortality related to private land conflicts throughout the NCDE ecosystem (PCA and Zones 1, 2, and 3). Additionally, all bear-related conflicts in the DMA will be reported annually. The entities responding to conflicts (MFWP, GNP, Blackfeet Nation, and CS&KT) will provide their raw data about conflicts to MFWP who will compile and report them annually. This information will be used to assess the efficacy of conflict reduction efforts and identify areas where conflicts are concentrated so preventative outreach can be directed there (Chapter 4.)

Habitat Management in Zone 1 and the Demographic Connectivity Areas

In this section, we describe habitat management in Zone 1 and in the DCAs (Figure 2). The primary land management entities responsible for habitat management in Zone 1 are the USFS, the BLM, DNRC, the Blackfeet Nation on the BIR, and the CS&KT on the FIR. Collectively, these entities manage 57% of the 4,298 mi^2 (11,132 km^2) in Zone 1 (Table 4). Within Zone 1, another 37% of lands are privately managed. Approximately 3.8% of lands inside Zone 1 are considered protected lands because of their status as Congressionally designated Wilderness Areas or other non-motorized areas (Table 4, Figure 7).

Within the PCA, the moving window analysis method (see Glossary) is used to quantify OMRD and TMRD in each BMU subunit, and objectives for OMRD, TMRD and secure core are set at a level appropriate to the PCA's function as a population source area. However, Zone 1 and the DCAs are characterized by a larger proportion of private land, where road information is incomplete or unavailable. This makes use of the moving window analysis method infeasible. Grizzly bears are also expected to occur at lower densities in Zone 1 and the DCAs than in the PCA.

Therefore, the objectives for motorized routes in Zone 1 and the DCAs will use linear miles or density of motorized routes/roads. Boulanger and Stenhouse (2014) and Lamb et al. (2018) quantified the effects of linear densities of roads on the survival and population density of grizzly bears in Alberta. Information such as this can be used to assess existing conditions to assure that the objectives for Zone 1 and the DCAs will be met.

Because we know baseline levels of open motorized routes on Federal and State lands in Zone 1 have not precluded an increasing grizzly bear population, including an expansion of reproductive female bear distribution in Zone 1, our approach is to maintain these conditions on the landscape. By signing this Conservation Strategy, the USFS and BLM have committed to maintaining or establishing limits on motorized access routes that are compatible with a stable to increasing grizzly bear population in the NCDE. Changes to land management plans through future revisions will be guided by the agreements reached in this Conservation Strategy and will be consistent with this intent.

Standards and guidelines in current BLM management plans are summarized in Appendix 11.

DNRC has developed specific measures to guide habitat management on non-HCP trust lands in portions of Zone 1 and Zone 2 (Appendix 10).

Objectives for Zone 1 on Federal and State Lands

Habitat management in Zone 1 is focused primarily on managing motorized access. On USFS and BLM lands, routes open for public motorized use during the non-denning season will be managed in accordance with land management plans and consistent with the intent of this Conservation Strategy. Similarly, on DNRC lands, the HCP will provide conservation measures on 197 mi^2 (511 km^2) of forested trust lands (Appendix 10) and additional draft measures will be implemented on other trust lands not covered by the HCP.

Livestock grazing, hardrock mining, and oil and gas development are also discussed because of the potential risk of grizzly bear mortality associated with these activities.

Motorized Access in Zone 1 on Federal and State Lands

BLM: Efforts to consolidate public lands, conservation easements with willing landowners, and other efforts to improve provide habitat connectivity and facilitate the movement of wildlife are encouraged. There will be no net increase in the linear miles or density of roads that are open for public motorized use during the non-denning season in Zone 1.

USFS: Efforts to consolidate public lands, conservation easements with willing landowners, and other efforts to improve provide habitat connectivity and facilitate the movement of wildlife are encouraged. There will be no net increase in the linear miles or density of roads that are open for public motorized use during the non-denning season in Zone 1.

DNRC: The HCP regulates motorized access management on (226 mi^2 (586 km^2) of State land in Zone 1. On these lands, DNRC has agreed to minimize construction of new open roads and prohibit commercial forest activities during the spring period (April 1–June 15) in identified spring habitat, and to suspend any motorized forest management activity within 0.6 mi (1.0 k) of an active den site until May 31 or earlier if DNRC can confirm the bear has left the den site vicinity. On the remaining 266 mi^2 (688 km^2) of other lands managed by DNRC in Zone 1, grizzly bears would be considered a sensitive species and administrative rules for management activities would be in place that would provide protective measures including minimization of new open motorized access routes.

Livestock Allotments/Grazing in Zone 1

BLM: No new sheep allotments will be allowed in Zone 1. Additionally, no new livestock allotments of any kind will be created in Zone 1 with some minor exceptions for cows if new lands are acquired that previously allowed livestock grazing.

USFS:

- No net increase in the number of active sheep allotments or in permitted sheep Animal Unit Months will be allowed above the baseline.
- Permits will require reporting of livestock carcasses within 24 hours of discovery, which will be followed by proper disposal. Boneyards are prohibited on NF lands.
- New and reauthorized grazing permits and annual operating instructions will incorporate requirements to reduce the risk of human-grizzly bear conflicts, and will include a clause providing for modification, cancellation, suspension, or temporary cessation of activities if needed to resolve a human-grizzly bear conflict situation.
- Temporary permits for grazing by small livestock for purposes such as controlling exotic weeds, or for trailing small livestock across NF lands, will be managed so as to not result in an increase in small livestock-bear conflicts.

DNRC: On HCP lands in Zone 1, DNRC will discourage small livestock allotments and will allow them only if an adequate mitigation plan is developed and implemented. On all lands within Zone 1, grazing leases and licenses issued will require the following language:

- Relocate livestock carcasses in areas with high risk of bringing grizzly bears into conflict with humans within 24 hours of discovery to minimize risk of human-grizzly bear conflicts. Lessee shall cooperate with DNRC managers and MFWP bear management specialists as necessary to address prompt removal of problem livestock carcasses.
- Bone yards that would promote habituation and frequent use by grizzly bears are prohibited.

Hardrock Mining in Zone 1

On lands managed by the USFS, BLM, and DNRC in Zone 1, habitat protections for mining projects are identical to those found in the PCA. Please see the Hardrock Mining and Mineral Development in the PCA section earlier in this chapter.

Oil and Gas Development in Zone 1

On all lands managed by the USFS and BLM in Zone 1 and all trust lands managed by DNRC in Zone 1, the mitigation measures for oil and gas will be identical to those described for the PCA earlier in this chapter.

Objectives for Demographic Connectivity Areas (DCAs) on Federal, State, and Tribal Lands

Outside of the PCA on the western side of Zone 1, two DCAs have been identified: the Salish DCA and the Ninemile DCA (Figure 2). In these areas, habitat protections will focus on limiting linear miles of open road and maintaining current IRAs as stepping stones to other ecosystems. Although current levels of open road miles are relatively high in the DCAs as compared to the PCA, we know from radio-collared bears that conditions have been adequate to support female occupancy, including females with offspring.

Salish Demographic Connectivity Area

Within the Salish DCA, 79.2% of lands (1,117 mi^2), are managed by the USFS.

Kootenai NF: 431 mi^2 (1,118 km^2) are managed by the Kootenai NF in accordance with its forest plan (USFS 2015).

- There is one IRA (2 mi^2, 5 km^2) on the Kootenai NF in the Salish DCA. This IRA will be managed according to forest plan direction.

- The Salish DCA overlaps almost entirely with the Tobacco Bears Outside the Recovery Zone (BORZ) polygon. The Forest Plan does not allow increases in permanent linear miles of open or total roads or motorized trails within BORZ polygons, with listed exceptions.
- The remaining USFS acres within the Kootenai NF portion of the Salish DCA that are outside the BORZ will be managed according to Kootenai NF plan management direction.

Flathead NF: 150 mi^2 (387 km^2) of the DCA are managed by the Flathead NF in accordance with its forest plan (USFS 1986).

- There is one IRA (8.5 mi^2 (22 km^2) on the Flathead NF in the Salish DCA. This IRA will be managed according to Forest Plan direction.
- Open motorized routes will be maintained at levels that are known to have been compatible with a stable to increasing grizzly bear population in the NCDE. There will be no net increase above the baseline in linear density of roads and trails open for public motorized use during the non-denning season on NFS lands within this DCA, with certain exceptions such as for administrative use, to reflect changes in land ownership, to comply with other Federal laws if necessary, and to address resource damage or human safety concerns. Temporary roads and trails (defined in FSM 7505) are not included in this limitation. There will be no restrictions on motorized use of roads that is determined necessary for emergency operations.

<u>Ninemile Demographic Connectivity Area</u>

Within the Ninemile DCA, 79% of lands (1,650mi^2) are managed by the USFS and the CS&KT.

Lolo NF: 399 mi^2 (1,034 km^2) managed by the Lolo NF in accordance with its forest plan (USFS 1986).

- Within the Ninemile DCA, 20.4% of NFS lands are in IRAs. These IRAs will be managed according to Forest Plan direction. Four IRAs are located within the Ninemile DCA:
    - Reservation Divide (26 mi^2, 68 km^2)
    - Stark Mountain (20 mi^2, 51 km^2)
    - North Siegel (14 mi^2, 37 km^2)
    - South Siegel – South Cutoff (21 mi^2, 54 km^2)
- There will be no net increase above the baseline in density of roads and trails open for public motorized use during the non-denning season on NFS lands within this DCA, with certain exceptions such as for administrative use, to reflect changes in land ownership, to comply with other Federal laws if necessary, and to address resource damage or human safety concerns. Temporary roads and trails (defined in FSM 7505) are not included in this limitation.

- There will be no restrictions on motorized use of roads that are determined necessary for emergency operations or that are authorized by contract, permit, lease or other written authorization.

Flathead Indian Reservation: 240 mi^2 (621 km^2) of the Ninemile DCA are managed by the CS&KT, in accordance with the Forest Management Plan.

- Tribally identified wilderness and roadless areas comprise 17% of Tribal lands within the Ninemile DCA. In general, these areas will be retained in their current, non-motorized condition. These include:
    - Tribally designated wilderness area: Sleeping Woman (Ninemile Divide) (26 mi^2, 67 km^2)
    - Tribally designated roadless area unavailable to logging or motorized use: Ravalli/Valley (Hewolf) Complex (12 mi^2, 32 km^2). Burgess (3 mi^2, 7 km^2) is available to helicopter logging.
- Open road densities shall not exceed 4 mi/mi^2.
- Total road miles shall remain at or below what existed in 1999.
- Hiding cover adjacent to Highway 93 at Evaro and the Ravalli Corridor will be retained and managed to provide movement corridors between ecosystems.
- Designated roads in timber sale areas will be closed after the harvest is complete.

Habitat Management in Zone 2

Zone 2 will be managed to provide the opportunity for grizzly bears, particularly males, to move between the NCDE and the GYE. The primary objective is dispersal by male bears, yet occupancy by female bears could also occur. In Zone 2, habitat management direction compatible with the goal of providing for genetic connectivity will be maintained. In addition, proper storage of food/attractants will be required on Federal lands in Zone 2. Existing public land management direction has not precluded grizzly bears from occurring in this area, even though it is predominantly privately owned (62%; Table 4). BLM and USFS land management plans contain direction to benefit other species or resource values that benefit grizzly bears that could occur there. Measures in the DNRC HCP pertaining to food storage, retention of riparian cover, and minimization of open roads in riparian areas will apply to most forested DNRC lands in Zone 2. These and additional measures for DNRC lands in Zone 2 that require food storage and livestock carcass disposal clauses in future permits, leases, licenses, and operating plans are summarized in Appendix 10.

Habitat Management Not Needed in Zone 3

In contrast to Zones 1 and 2, Zone 3 does not provide habitat linking other grizzly bear ecosystems. Grizzly bears currently occupy Zone 3 (adjacent to Zone 1), and their numbers are expected to

increase, but this may be incompatible with human presence because these areas lack forest cover, land ownership is mostly private, and agricultural uses predominate.

There is no need for habitat protections specifically developed for grizzly bears on Federal and State lands in Zone 3 in order to support recovery of the NCDE population. Existing land management direction has not precluded grizzly bears from occurring in Zone 3.

In Zone 3, grizzly bears will be managed primarily through conflict response. Grizzly bears will not be captured and removed just because they occur in Zone 3, nor will they be captured and removed from Zone 3 unless there are conflicts that can only be resolved by capture and relocation or removal of the offending bear.

As discussed previously in this document, although Zone 3 is currently depicted in Figure 2, the geographic extent of Zone 3 will be determined in the USFWS' Final rule delisting grizzly bears in the NCDE.

CHAPTER 4: CONFLICT PREVENTION, RESPONSE, AND MANAGEMENT

Human-grizzly bear conflicts are incidents in which bears either do or attempt to: injure or kill people; damage property; kill or injure livestock; damage beehives; obtain anthropogenic foods and other attractants; or damage agricultural crops. Most human-grizzly bear conflicts are the result of grizzly bears attempting to gain access to human-related attractants such as garbage, human foods, livestock or pet foods, hunter-harvested deer or elk carcasses, maintained orchards, compost piles, bird feeders, or vegetable gardens in areas of human presence. Although aggression towards people is uncommon, grizzly bears may occasionally injure or kill people when displaying natural defensive behavior or when they have become food-conditioned. Some grizzly bear habitat near residences is important for population persistence; however, instances where one or more grizzly bears frequent areas near people and subsequently cause complaints may be considered a conflict. A management grizzly bear (see Glossary) is an identified individual that is involved in a conflict where some level of management action is undertaken (see "Management Bear Direction and Conflict Response" section).

In some areas of the NCDE, human-grizzly bear conflicts have increased as the frequency of human-grizzly bear encounters has gone up. This is a result of an increasing and expanding grizzly bear population in combination with increasing numbers and distribution of people living and recreating in grizzly bear habitat. This Conservation Strategy takes language directly from the Grizzly Bear Management Plan for Western Montana (Dood et al. 2006), which addresses conflict management in the NCDE. Considering the many people who live, work, and recreate in the region, it is significant to note that levels of conflicts and grizzly bear mortalities since 2004 have not precluded an increasing grizzly bear population. Underlying attitudes toward grizzly bears are highly variable and relate to issues such as resident and recreationist safety concerns and economic impacts on local businesses and agricultural producers. Local support for grizzly bears on the landscape decreases if conflicts are not handled in an effective and timely manner. Conversely, human support towards grizzly bears may improve when local people are provided with adequate information (Johnansson et al. 2017).

The objective of conflict management is to maximize human safety and minimize property losses while maintaining a viable population of grizzly bears (Dood et al. 2006). This approach of balancing human needs with grizzly bear population considerations builds acceptance and tolerance for grizzly bear conservation. For this approach to be effective, State, Tribal, and Federal agencies must respond to conflicts rapidly. When human-grizzly bear conflicts are not adequately addressed, there can be negative consequences for the individual grizzly bear and the people

involved, and support for grizzly bear management and conservation in the NCDE can be undermined.

Grizzly bear conflict management will emphasize a quick response by management authorities, removing the source of the conflict when possible, and using non-lethal solutions. Depending on the circumstances of the conflict, appropriate responses may include:

- Proactively removing or securing attractants;
- Public education and outreach;
- Discouraging the grizzly bear from visiting the site using non-lethal methods (e.g. aversive conditioning);
- Reactively or preemptively capturing and translocating a grizzly bear to a new area, and/or;
- Removing the grizzly bear from the wild, including lethal control.

Signatories to this Conservation Strategy will work to minimize the number of grizzly bears removed from the population due to conflict situations. Inside the PCA and Zone 1, the response to human-grizzly bear conflicts and how individual grizzly bears will be managed will be based on this Conservation Strategy (see "Management Bear Direction and Conflict Response" section in this chapter). In Zones 2 and 3, the response and status of grizzly bears involved in a conflict will be based on relevant State, Federal, or Tribal grizzly bear management plans.

The best ways to minimize conflicts are through prevention efforts including education and outreach, food/attractant storage rules on public lands, securing or removing attractants, and a variety of non-lethal methods that may be used directly by the public. In cases where Tribal, Federal, or State management authorities determine minimizing the sources of conflicts is ineffective or inadequate to address the specific circumstances of the conflict, translocation or removal of the management grizzly bear may be warranted and will be consistent with this Conservation Strategy. Conflict prevention efforts will continue in areas currently occupied by grizzly bears and will be initiated in locations that are anticipated to have grizzly bears in the future as the population expands further.

Education and Outreach

Successful grizzly bear conservation includes more than providing habitat on the landscape; people must accept the grizzly bear as a cohabitant of the land. Tolerance can be maintained when the public has confidence in management agencies to respond quickly and appropriately to human-grizzly bear conflicts and the public is equipped with the knowledge to understand and avoid human-grizzly bear conflicts. Education and outreach efforts are an essential component in building and maintaining this human tolerance of grizzly bears. Other management strategies

outlined in this Conservation Strategy are unlikely to succeed without useful, coordinated, adaptable outreach programs. Focused outreach messages must be communicated frequently and consistently, with emphasis on the following: hunting safely in grizzly bear country, keeping private property (including livestock and domestic pets) bear resistant, appropriate food storage when camping or living in grizzly bear country, hiking and camping safely in grizzly country, being able to tell the difference between black bears and grizzly bears, recognizing high-risk situations regarding grizzly bear habitat, knowing grizzly bear biology and behavior, the tourism revenue and cultural benefits of grizzly bears, and the efficacy and proper use of bear spray, electric fencing, and other non-injurious deterrence techniques.

Messages for all outreach efforts will be based on grizzly bear biology and behavior. Custom messages targeted at specific audiences (e.g., hunters, hikers, recreationists, homeowners, livestock operators, rural communities, commercial entities, loggers, miners, resort operators, outfitters, etc.) have been identified and increase the efficiency of education and outreach efforts.

The following outreach actions in current and future grizzly range are ongoing and will be continued by various entities:

- Outreach programs to local schools, businesses and community organizations;
- Lessons on human safety and conflict prevention while hunting in grizzly bear habitat presented to pertinent hunter education classes;
- Online and in-person training to assist hunters with identification of black versus grizzly bears. MFWP implemented mandatory bear identification training for hunters purchasing black bear licenses in 2002;
- Promotion of the safe and effective use of bear spray, including training and education;
- News releases and media (TV, radio and newspaper) messages, including information about helpful websites;
- Agency and partner-produced radio spots and Public Service Announcements;
- Web pages (on agency and Tribal websites) that are devoted to living and recreating in grizzly bear country;
- Dynamic websites dedicated to reducing human-grizzly bear conflicts by disseminating information on current grizzly bear activity and how to keep neighborhood bear attractants minimized;
- Use of available tools, such as the “Bears and Bees” video to teach beekeepers about how to avoid conflicts with bears;
- Information and workshops on electric fencing to keep bears out of orchards, garbage, grain storage, chicken coops, bee yards and other potential attractants;
- Meetings with homeowner groups and local communities about keeping bears out of garbage through bear-resistant garbage containers and electric fences;
- Day-to-day public contacts and preventative work by agency and partner personnel;
- Messages sent through online social networks (e.g., Facebook, Twitter, etc.);
- Meetings, presentations, and signs to proactively inform people about grizzly bear activity and to reduce the potential for conflicts;

- Various grizzly bear safety brochures available at agency and partner offices, distributed by field personnel and given out at presentations;
- "Hunters Know Your Bears" and "Food Storage" signs posted at campgrounds, trailheads, popular hunting areas, fishing access sites, etc., as needed;
- Education and training of permanent and seasonal agency personnel;
- Securing, transportation, and disposal of hunter harvested carcasses.

Information and Education (I&E) Team

To ensure the consistency of messages presented across the multiple jurisdictions in this ecosystem, the NCDE's existing I&E subcommittee, composed of State, Tribal, and Federal agency staff members and information and education professionals, will continue to coordinate outreach efforts in the NCDE. This team will identify and prioritize needed outreach efforts in the NCDE, ensure consistency and accuracy of information, facilitate partnerships with private land owners and non-profit organizations, identify and target specific audiences, identify and implement useful, new communication techniques, and adapt messages in response to public concerns. Chapter 5 contains details about the members of the I&E Team.

Attractant Storage Rules & Regulations

Securing potential attractants is the single most effective way to prevent grizzly bears from becoming food conditioned and displaying subsequent unacceptable aggressive behavior. It is effective in limiting human-caused grizzly bear mortality, human-grizzly bear encounters, and other human-grizzly bear conflicts. These actions have been ongoing and will continue under this Conservation Strategy. A map of current food storage orders can be found on the IGBC website at http://igbconline.org/food-storage-regulations-2/.

Federal Lands

USFS: The USFS has implemented and monitors compliance with food storage orders that require people using grizzly bear habitat to store food and other attractants properly on public lands so that bears cannot access them. Forest-wide food/attractant storage orders are in place on the Flathead NF, Lolo NF, Kootenai NF, and Beaverhead-Deerlodge NF. On the Custer-Gallatin NF, food/attractant storage orders are in place within managed lands in Zone 2. On the Helena-Lewis and Clark NF, food/attractant storage orders are in place on the Lincoln Ranger District (PCA and Zone 1) and on the Rocky Mountain Ranger District (PCA). The Helena-Lewis and Clark NF is in the process of developing and implementing a food/attractant storage order that will apply to the entire NLC, including portions in Zone 3.

Existing and future food storage orders on USFS lands are governed by direction of 36 CFR 261.50 and address: (1) human, pet, and livestock food, toiletries, beverages, and garbage; (2) wildlife and domestic animal carcasses; (3) burnable attractants; and (4) reporting the death and location of livestock to a USFS official. Approved means and methods for the above are included in the special orders. Bear resistant food storage facilities are provided at some recreation sites.

> *Enforcement: Violations of these prohibitions are punishable by a fine of not more than $5,000 for an individual or $10,000 for an organization or imprisonment for not more than six months (16 U.S. C 551 and 18 U.S. C. 3559 and 3571).*

GNP: GNP enforces a food storage order governed by direction of 36 CFR 2.10 (d) that prohibits anyone from leaving food or garbage unattended or stored improperly where it could attract or otherwise be available to wildlife.

> *Enforcement: In general, citations are issued whenever there are violations of 36 CFR 2.10 (d) observed and the items left out would attract and provide a food reward to a bear or other wildlife. This includes such items as coolers containing food and/or beverages, packaged or cooked food, cooking equipment/utensils with food on them, and beverage containers with beverages in them. Campground managers remove any unsecured food or food coolers which may attract wildlife and provide a food reward. Only commissioned law enforcement officers may issue violation notices. In all cases it must be determined that the visitor(s) are, or have been, made aware of the food storage regulations prior to issuing a citation. If in doubt, a written warning is issued. Penalties for violations of 36 CFR 2.10 range from $50–$250 per violation.*

USFWS: One National Wildlife Refuge exists in the PCA (Swan River) and another exists in Zone 1 (National Bison Range complex) of the NCDE. Other refuge lands and Waterfowl Production Areas (WPA) occur in Zone 1 in the Blackfoot Valley Conservation Area, the Rocky Mountain Front Conservation Area and Flathead Valley area. All refuge lands are day-use only with no overnight camping allowed except for Arod Lakes WPA; visitors generally park, hunt, and recreate. All sites provide only parking areas and no garbage containers. Use of refuge lands operates under the pack-in/pack-out policy, which has been adequate for preventing grizzly bears from accessing human sources of food at day-use sites. To date, no conflicts with grizzly or black bears have been reported at any of these sites. Administrative and housing facilities are limited, and all attractants are stored in a bear-resistant manner.

> *Enforcement: Failure to comply with the pack-in/pack-out food and attractant policy results in violation of 50 CFR 27.94: Disposal of Waste - The littering, disposing, or dumping in any manner of garbage, refuse, sewage, sludge, earth, rocks or other debris on*

any national wildlife refuge except at points or locations designated by the refuge manager, or the draining or dumping of oil, acids, pesticide wastes, poisons, or any other types of chemicals wastes in, or otherwise polluting any waters, water holes, streams, or other areas within any national wildlife refuge is prohibited.

BLM: The BLM has drafted a food storage order for all BLM managed lands in the PCA, Zone 1, and Zone 2. Modeled after the food storage orders on USFS lands in the NCDE, it addresses: human, pet, and livestock food, and garbage; other attractants; safe storage techniques; and wildlife carcasses. Currently, the proposed language for this food storage order includes some exceptions for specific campgrounds and developed recreation sites in Zone 2 but employs an adaptive management approach stating that if conflicts occurred at these sites, food storage orders would be implemented.

Enforcement: Failure to comply with food storage orders of special use permits result in the cancellation of the permit or denial of future permits. Contracts can be cancelled for failure to follow food storage orders. A Supplementary Rule will be pursued such that violations of any food storage regulations, except for provisions of 43 CFR 8365.1-7, would be punishable by a fine not to exceed $1,000 and/or imprisonment not to exceed 12 months (43 CFR 8364.1, 8365.1-6, 8360.07, and 18 USC 3559 and 3571 and FLPMA Section 303, 43 USC 1733).

State Lands

MFWP: The MFWP manages anthropogenic bear attractants on State-owned Wildlife Management Areas (WMAs), Fishing Access Sites, and State Parks through mandatory food storage requirements, pack in/pack out policies, and/or bear resistant containers. Attractant management varies by habitat, season, and grizzly bear activity. All WMAs in the PCA, Zone 1, and most in Zone 2 have mandatory food storage orders, including the Aunt Molly, Blackfoot-Clearwater, Kootenai Woods, Marshall Creek, Nevada Lake, Sun River, Ear Mountain, Spotted Dog, Marias River, and Blackleaf WMAs. MFWP also employs an adaptive management approach stating that if conflicts occur at these sites, food storage orders would be implemented on WMA lands without existing food storage orders. Similarly, Fishing Access Sites require that users pack out all garbage. At most State Parks within the NCDE, bear-resistant garbage bins are provided (Dood et al. 2006). Informational signs of other lands such as those enrolled in the Block Management Access program is encouraged to notify users of potential grizzly bear presence.

Enforcement: ARM 12.8.201 and 12.8.210 control the dumping, pollution or littering of lands or waters under the control, administration and jurisdiction of MFWP. The

maximum penalty for a violation is $135. These rules are enforced by official Department staff such as wardens and park management staff.

DNRC: The DNRC relies on its HCP for forest management activities as the primary component of this Conservation Strategy for grizzly bears in the PCA and Zone 1 (DNRC HCP 2010). The HCP requires all DNRC personnel and contractors who conduct forest management activities or camp in the HCP area to store all human food, pet food, livestock feed, garbage and other attractants in a bear-resistant manner (Appendix 10). Burnable attractants (such as food leftovers or bacon grease) shall not be buried, discarded, or burned in an open campfire. Additionally, inside the PCA, Zone 1, and Zone 2, all Trust Land Management Division (TLMD) lease and license agreements that permit uses and/or activities that may involve the use or presence of bear attractants (e.g., leases/licenses for cabin and home sites, grazing, outfitting, group use licenses for camping, picnicking etc.) shall contain applicable clauses requiring unnatural bear foods and attractants to be contained and/or managed in a bear-resistant manner.

Enforcement: Violations of these orders are punishable by lease or license cancellation and a civil penalty of up to $1,000 for each day of violation. Pursuant to Montana Code Annotated § 77-1-804(8). In determining the amount of civil penalty, Administrative Rule 36.25.157 requires that DNRC consider the following factors: (1) number of previous violations, (2) severity of the infractions, and (3) whether the violation was intentional or unintentional.

Tribal Lands

BIR: The Blackfeet Nation implements and monitors compliance with attractant storage regulations in areas normally occupied by grizzly bears. This includes nearly all public BIR lands in the PCA and most public BIR lands in Zone 1. Blackfeet Fish and Wildlife Code Chapter 3, Section 17 requires all residents and visitors in "normally occupied" grizzly bear habitat to store food, garbage, livestock food, gut piles, big game carcasses and livestock carcasses in a bear-resistant manner. Chapter 3, Section 17 also applies to timber harvest activities within the BIR. Purchasers, all employees, contractors and subcontractors must store trash in bear-resistant containers, remove trash daily, and refrain from feeding wildlife.

Enforcement: The penalty for violating this section shall be $100 per violation per day. The penalty for commercial food businesses violating food or garbage storage regulations shall be $500 per violation per day. Regulations are enforceable by Tribal wardens and Tribal police.

FIR: The CS&KT implemented food storage regulations for campers and backcountry users on March 1, 2011. These regulations require that "all food, garbage, pet items or any attractants that may provide a reward to wildlife, must be stored in a bear resistant manner."

> *Enforcement: These regulations are enforceable by Tribal wardens and Tribal police. Fines for violations will range from $50 to $100.*

Other Lands

On private lands in Montana, Montana Code Annotated § 87-6-216 prohibits the feeding of certain wildlife including grizzly bears. A person may not provide supplemental feed attractants to animals by purposely or knowingly attracting any ungulates, bears, or mountain lions with supplemental feed attractants. A person who is engaged in the recreational feeding of birds is not subject to civil or criminal liability under this section unless, after having received a previous warning by the department, the person continues to feed birds in a manner that attracts ungulates or bears and that may contribute to the transmission of disease or constitute a threat to public safety. Some large private land and/or easement owners have included food storage requirements (e.g. The Nature Conservancy).

> *Enforcement: MCA 87-6-216 is enforced by official MFWP employees with enforcement authority. The maximum penalty for a violation is $135.*

Additional Sanitation Efforts

A technical working group coordinated by MFWP submitted recommendations to the Montana Department of Commerce Community Technical Assistance Program regarding a State-wide "rule set" for future subdivisions (http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/buildingWithWildlife/subdivisionRecommendations/documents.html). These recommendations provide guidance to minimize the adverse impacts of subdivision development on wildlife and wildlife habitat. To minimize human-grizzly bear conflicts, MFWP recommended that if the proposed subdivision is located in an area of high or potentially high human-grizzly bear conflict in the opinion of the local MFWP biologist, the subdivision developer is required to provide adequate facilities for contained bear-resistant garbage collection.

Many counties and communities have improved their landfills and garbage collection systems to reduce or prevent conflicts with grizzly bears. Landfills have been made bear resistant with chain link or electric fence perimeters. Timing of garbage collection has been adjusted in some areas to limit the availability of attractants to grizzly bears. Several private garbage disposal companies within the NCDE have replaced old dumpsters and cans with bear resistant containers in problem areas. Multiple non-government organizations as well as Federal, State and Tribal entities

participate in grant programs that provide bear resistant containers to counties or other municipalities.

Apart from garbage, agency personnel also work with private landowners to improve sanitation and attractant storage to prevent grizzly bear conflicts. Efforts to bolster storage of other attractants include but are not limited to: bear-resistant grain bin doors, bear-resistant livestock feed storage, apple collection, and electric fencing, which is described in more detail below. Carcass removal and the elimination or redistribution of private land boneyards has also reduced grizzly bear conflicts. The Blackfoot Valley and Pondera/Teton counties currently have a voluntary program that removes dead livestock from the landscape. In other instances, landowners or agency personnel simply move dead livestock away from people and their herds to prevent conflicts.

Non-lethal Conflict Prevention Tools and Techniques

Beyond education and proper attractant storage, grizzly bear conflict prevention requires a growing suite of tools and techniques that are used by the public, agency personnel, or both. Over the past few decades considerable effort has been directed toward the development of non-lethal techniques for preventing conflicts entirely or responding to them once they have occurred. State, Tribal, and Federal bear management plans, including this Conservation Strategy, emphasize non-lethal techniques to prevent conflicts from occurring. Subsequently, these deterrence techniques prevent conflicts and reduce the number of bears translocated or removed from the population.

Many non-lethal grizzly bear deterrence and conflict prevention tools are easily used by the public. Homeowners, recreationists, and agricultural operators will be encouraged through assistance programs and cost-share funding to use or implement bear conflict prevention methods; however, human safety needs to be paramount. During an encounter, bear spray is a safe and effective way to stop a threatening or attacking grizzly bear. For bear deterrence on private property the public may use certain non-injurious tools and techniques as directed by agency personnel, for example landowners may responsibly drive off grizzly bears using vehicles if the bear doesn't sustain injury. Electric fencing is an incredibly effective tool to exclude grizzly bears when properly maintained and monitored. Electric fencing can prevent grizzly bears from accessing potential attractants such as chicken coops, pig pens, calving or lambing corrals, orchards, bee yards, compost piles, gardens, hunter-killed carcasses, boneyards, and any anthropogenic attractant a grizzly bear should not be able to access. MFWP, Federal, and Tribal personnel work extensively with the public and non-profit organizations to make electric fencing as cheap and effective as possible for citizens. This is accomplished through cost-share programs, loaner kits for short-term attractants, demonstrations at local community events and farm and ranch stores, and a comprehensive guide produced by MFWP on "Bears and Electric Fencing" available online at http://fwp.mt.gov/fwpDoc.html?id=48893.

In addition to the prevention tools that the public may use, agency personnel that are specially trained to respond to grizzly bear conflicts may employ additional methods to manage grizzly bear conflicts. Community phone and Internet call trees are a useful preventative tool that helps residents become aware of grizzly bears in the area. Beyond call trees, the best available technologies and science will be used in the NCDE to aversively condition grizzly bears and minimize human-grizzly bear conflict when appropriate. Agency personnel and their assignees will aversively condition grizzly bears to humans with the goal of reducing habituation by using cracker shells, paintball markers, electronic scare devices, plastic slugs, propane noise makers, trained bear dogs, and other tools. It is recognized that aversive conditioning techniques are most successful on grizzly bears that have less experience with people and have not accessed anthropogenic foods.

Management Bear Direction and Conflict Response

Management grizzly bears are individuals involved in a human-grizzly bear conflict that results in an agency management response action. Examples of management grizzly bears include, but are not limited to, grizzly bears that have become food-conditioned (Hopkins et al. 2010), that attempt or do injure/kill livestock or pets, damage property, or display unacceptable aggression. Management bear classification depends on multiple factors; therefore, such status is determined on a case-by-case basis by management authorities. Some grizzly bears involved in conflicts that are resolved through preventive measures (i.e., removing or securing the human-related attractant) are not considered management grizzly bears. Conversely, some attractants are not feasible to secure (e.g. 400 mi^2 of Flathead Lake cherry orchards; thousands of square miles of wheat, barley, corn, and other crops). Such agricultural situations often attract multiple species of wildlife due to quality and quantity of forage. In unsecurable agricultural situations the producer assumes some responsibility for crop damage, which occurs with many other wildlife species in Montana. However, management authorities recognize excessive impacts to producer livelihoods should be minimized. As such, management authorities will continue to respond to crop and livestock damage conflicts from grizzly bears and will seek solutions to minimize agricultural loss.

The management grizzly bear direction in this chapter of the Conservation Strategy applies to the PCA and Zone 1 only. For Zone 2 and Zone 3, relevant State, Federal, and Tribal plans guide decisions about management grizzly bears and conflict response. However, grizzly bears in Zones 2 and 3 will not be captured and removed just because they are present. Across management zones, State, Federal, and Tribal authorities make decisions regarding the appropriate management response within their respective jurisdictions. If the decision made by one of these management authorities is to translocate a grizzly bear, interagency agreements apply, and communication and coordination will occur. All translocated management grizzly bears may be marked with microchips, ear tags, lip tattoos, radio tracking device, or any combination of such. The authority

to manage and respond to human-grizzly bear conflicts is based upon existing State, Federal, and Tribal laws and regulations, as detailed in Chapter 6.

Within the PCA and Zone 1, decisions about management grizzly bears will consider the following:

- State, Federal, and Tribal management agencies will retain personnel specifically trained to rapidly respond to grizzly bear conflicts, perform public education, provide assistance with proactive actions to minimize availability of attractants, and assist with grizzly bear translocations and removals.
- Location, cause of incident, severity of incident, history of the grizzly bear, health/age/sex of the grizzly bear, behavior, individual identification certainty, and the level of prevention efforts will be considered in any decision about a management grizzly bear (Dood et al. 2006).
- Removal of management grizzly bears will be carefully considered and consistent with mortality limits for the NCDE as described in Chapter 2 of this Conservation Strategy.
- Any decision to translocate or remove a management grizzly bear will have documented reasons.
- Action in all management grizzly bear situations will emphasize removal of the human cause of the conflict when possible, and education to prevent future conflicts.
- Grizzly bears may be preemptively moved when they are in areas where they are likely to come into conflict with people (e.g. human settlements) if aversive conditioning and/or minimizing or removing attractant sources is not feasible or has failed.
- Federal, State, and Tribal wildlife agencies, in coordination with the appropriate land management agencies, will determine sites for translocations. State, Tribal, and Federal agencies will agree upon a translocation site before the translocation occurs. Federal, State, and Tribal wildlife managers will coordinate with local land managers on all translocations.
- To facilitate informed decisions about management grizzly bears on adjacent jurisdictions, Federal, State, and Tribal management authorities will communicate with each other to understand the origin and conflict history of any marked grizzly bear that is captured in a conflict situation within their respective jurisdictions, as appropriate. Statewide conflict databases will be maintained annually to promote efficient identification of marked grizzly bears and previous history.

Grizzly Bear Removals

Captured grizzly bears identified for removal may be given to public research institutions or accredited public/non-profit zoological parks for appropriate non-release educational or scientific purposes as per State and Federal regulations. Grizzly bears not suitable for release, research, or educational purposes will be euthanized by management authorities, as described in appropriate agency management plans. Depending on the circumstances of the conflict and subsequent

removal decision, orphaned cubs of euthanized female grizzly bears may be left in the wild, taken to the MFWP rehab facility in Helena, Montana for re-release to the wild, or removed from the population (see MFWP Policy on Intake, Rehabilitation, and Disposition of Injured and Orphaned Wildlife, August 2013).

Monitoring Protocol

MFWP will compile and report human-grizzly bear conflicts in all Management Zones across all jurisdictions. All reported conflicts and subsequent response actions, if any, will be documented and summarized annually. This reporting system will provide managers with a way to identify and compare trends in the frequency, location, cause, land ownership, and type of conflict so that conflict prevention efforts can be prioritized and directed at areas and user-groups more effectively.

CHAPTER 5: IMPLEMENTATION AND EVALUATION

Upon implementation of this Conservation Strategy, the NCDE Coordinating Committee will replace the current NCDE Subcommittee. The Coordinating Committee will provide oversight, coordinate and evaluate implementation of this Conservation Strategy, promote the exchange of data and information about the NCDE grizzly bear population among agencies and the public, and make recommendations to the management agencies regarding implementation of this Conservation Strategy. The Coordinating Committee will inform the IGBC about the NCDE grizzly bear population. The Coordinating Committee members will make decisions on recommendations to agencies. This Coordinating Committee does not supersede the authority of the management agencies beyond the specific actions agreed to as signatories to this Conservation Strategy. Upon delisting, decisions will be based on each agency's management plan.

NCDE Coordinating Committee Membership, Roles, and Responsibilities

NCDE Coordinating Committee membership will consist of representatives from the following entities:

Federal:

- NPS: GNP (one member)
- USFS: Beaverhead-Deerlodge NF, Custer-Gallatin NF, Flathead NF, Helena-Lewis & Clark NF, Kootenai NF, and Lolo NF (two members total for the six NFs)
- BLM: Butte, Lewistown, and Missoula Field Offices (one member total for the three Field Offices)
- Wildlife Services (one member)

State of Montana:

- MFWP (two members)
- DNRC (one member)

- County representative appointed by the Montana Association of Counties (one member)

Tribes:

- Blackfeet Nation (one member)
- CS&KT (one member)

Additional entities will serve in an advisory capacity:

- USFWS(Grizzly Bear Recovery Coordinator)
- USGS

NCDE Coordinating Committee roles include:

- Establish a charter to include meeting rules, committee procedures, and chairperson election rules, including how the group comes to consensus on areas of disagreement.
- Ensure commitments to the Conservation Strategy are being met through regular monitoring and reporting, and address deviations to those commitments.
- Seek funding to further the conservation of the NCDE grizzly bear by implementing this Conservation Strategy.
- Communicate with the public about management decisions and monitoring reports.
- Appoint members to the NCDE Monitoring Team and I&E Team.
- Appoint, as needed, science teams, work groups, task forces, or other subcommittees to analyze or make recommendations regarding specific grizzly bear management issues.

Primary NCDE Coordinating Committee Activities Include:

- Coordinate information sharing and implementation of this Conservation Strategy across the Federal, State, and Tribal agencies within the NCDE.
- Ensure that population and habitat data are collected and reported, as agreed to in this Conservation Strategy, and evaluated to assess current status of the grizzly bear population and adherence with Conservation Strategy commitments.
- Ensure monitoring reports are made publicly available.
- Make recommendations for revisions or amendments to the Conservation Strategy.
- The committee will make decisions about committee representation in the event of land management jurisdictional changes within the NCDE, or as deemed necessary.
- Identify management, research, and financial needs and prioritize these to successfully implement the Conservation Strategy.

- In specific circumstances if management agencies are proposing to deviate from the Conservation Strategy, or if requested by a Coordinating Committee member, and with concurrence of the Coordinating Committee, the Coordinating Committee shall consider providing a Position Statement about the benefits or impacts to the grizzly bear population. The Charter will define the process for the Coordinating Committee to develop Position Statements.

NCDE Coordinating Committee Operating Procedures

Within 30 days of a USFWS Final Rule delisting the NCDE grizzly bear population, the signatories to this Conservation Strategy would name their agency representatives to the Coordinating Committee. This Committee does not supersede the authority of its member agencies.

The person serving as chairperson of the NCDE Subcommittee, if and when a Final Rule changing status is published, would call the first meeting of the Coordinating Committee.

- At the first meeting, the Coordinating Committee would elect a chairperson. Chairpersons would be elected at intervals determined by the members of the Coordinating Committee, as stated in the charter.
- The Coordinating Committee would meet at least one time each year, with additional meetings as needed and agreed to by a majority of the Committee. Public notification of these meetings would be made by the chairperson or her/his representative. The details on locations and times of meetings and other business issues associated with the functioning of the Coordinating Committee would be determined at the first meeting.
- The Coordinating Committee Chair would be responsible for meeting logistics and meeting expenses. Expenses for Coordinating Committee members would be paid by their respective agencies.
- The signatory agencies would support the participation of their representatives.

Revising this Conservation Strategy

After the Conservation Strategy has been adopted, every five years the Coordinating Committee will evaluate the regulatory mechanisms, interagency cooperation, population and habitat management and monitoring, and other provisions of this Conservation Strategy and will revise this Conservation Strategy as appropriate to ensure conservation of the grizzly bear in the NCDE.

Beyond the five-year evaluation process, this Conservation Strategy's objectives may only be changed through a clear demonstration of need based on biological data, the best available science, and/or new techniques, per the decision framework outlined in the Charter. Other changes may be made due to unforeseen circumstances with a majority approval by the Coordinating Committee.

Changes to objectives will be subject to public review and comment, must be in writing, and must be approved by the Coordinating Committee. Ultimately, any such changes would be guided by and consistent with the agreements reached in this Conservation Strategy and its overall goal to maintain a recovered grizzly bear population in the NCDE and conserve its habitat.

NCDE Coordinating Committee – Implementation Structure

The NCDE Monitoring Team

In order to understand the status of grizzly bears throughout the NCDE and formulate appropriate management strategies and decisions, there is a need for centralized responsibility to collect, manage, analyze, and distribute science-based information on grizzly bear trend, distribution, survival, mortality, conflicts, and habitat conditions. To meet this need, an NCDE Monitoring Team will be established to provide annual monitoring data to the Coordinating Committee as well as the USFWS (as required by Section 4(g)(1) of the ESA for a minimum of five years after delisting any species). The NCDE Monitoring Team would consist of scientists representing GNP, USFS, BLM, USFWS, MFWP, DNRC, the Blackfeet Nation, and the CS&KT. Other scientists can be added to the Monitoring Team with the agreement of the Coordinating Committee. An MFWP and a USFS representative will serve as co-chairs of the Monitoring Team and will call meetings as needed. Signatory agencies will support the participation of their representatives.

Agencies and Tribes responsible for monitoring major population and habitat parameters are listed in Appendix 12.

MFWP will oversee population monitoring, following procedures set forth in Chapter 2. MFWP will house, manage, and share the grizzly bear population database within the structure defined by the Monitoring Team. MFWP will prepare an annual report on demographic objectives and monitoring with staff support from participating agencies. This annual monitoring report will provide information about demographic monitoring efforts, mortality management, human-grizzly bear conflicts and conflict response efforts.

The land management agencies (i.e., the USFS, BLM, or GNP) will house the maintained spatial GIS data to support analysis of habitat monitoring as set forth in Chapter 3. These databases and GIS layers will be available to all participating agencies for analyzing impacts from proposed projects.

The Monitoring Team will also produce an annual report on habitat objectives and monitoring results for habitat parameters on the schedules described in Chapter 3.

To adequately assess habitat conditions, adherence to the habitat standards, and report on the habitat monitoring items identified in this Conservation Strategy, the use and intensive maintenance of GIS databases are required. A coordinated approach to database maintenance and management is necessary for ongoing success. Members of the Monitoring Team will include identified biologists and GIS specialists from the signatory agencies. All participating agencies would commit to seeking and sharing funding responsibilities for a GIS database manager position.

As detailed in the monitoring sections of this Conservation Strategy, the NCDE Monitoring Team will:

- Coordinate grizzly bear data collection and analysis;
- Prepare annual monitoring reports with staff support from relevant agencies;
- Present monitoring results and analysis to the Coordinating Committee annually;
- Provide technical support to agencies and Tribes responsible for the immediate and long-term management of grizzly bears in the NCDE to assist with project impact analyses;[1]
- Coordinate updates and maintenance of the motorized access, developed sites, and livestock allotments databases;
- Document and report any changes in motorized access route density, levels of secure core habitat, developed sites and their capacity, livestock allotments, and permitted sheep numbers biennially, according to the monitoring schedules described in Chapter 3 of this Conservation Strategy;
- Ensure that all cooperators have the tools and training to evaluate motorized access route density and secure core habitat for projects;
- Evaluate the need for updating or changing the methods used to evaluate habitat and demographic parameters and make recommendations to the Coordinating Committee on such changes, as necessary;
- Set and maintain definitions, values, formats and procedures for collecting and updating habitat data and assessment models; and
- Ensure that there is an effort to look for and monitor for grizzly bear females with young in each of the BMUs every 6 years.

The Information and Education Team

Successful maintenance of a recovered NCDE grizzly bear population requires joint understanding of issues, sharing of knowledge (including new science and results of monitoring), and open communication among agencies, Tribes, elected officials, non-governmental organizations, and the public. Members of the I&E Team will be appointed by the Coordinating Committee and will

[1] The NCDE Monitoring Team is not responsible for completing impact analyses for projects proposed by any agency; such analyses are the responsibility of the agency making the proposal unless otherwise negotiated.

include information and education specialists from signatory agencies. The Coordinating Committee will appoint an I&E Team chair.

The goals of the I&E Team are:

- Increase understanding of grizzly bears and their habitat;
- Increase public support for and compliance with agency management actions to maintain a secure NCDE grizzly bear population;
- Increase public knowledge about how to prevent encounters and conflicts;
- Increase public knowledge about human safety and the effectiveness and proper use of bear spray;
- Utilize all possible technology and media resources to help decrease human-grizzly bear conflicts while still maintaining maximum access to natural resources for humans and grizzly bears;
- Foster information sharing to ensure maximum resource, policy, and scientific informational exchange among agencies, Tribes, elected officials, interest groups, local residents, and the public;
- Provide for meaningful public involvement through a variety of methods to inform the public about agency decisions relating to grizzly bear habitat and population management activities and other management actions that may affect local residents, landowners, and other users; and
- Establish working relationships based on trust and work with communities on landscape level conflict reduction projects.

Evaluation and Consequences Related to Monitoring Results

Management Review

The evaluation of the effectiveness of grizzly bear conservation measures detailed in this Conservation Strategy will be an ongoing process shared by all members of the Coordinating Committee and based on the results presented in the Monitoring Team's annual reports. If there are deviations from any of the population or habitat objectives stipulated in this Conservation Strategy, a Management Review will be completed by a team of scientists appointed by the members of the Coordinating Committee.

A Management Review examines management of habitat, populations, or efforts of participating agencies and Tribes to complete their required monitoring. The purposes of a Management Review are:

- To identify the reasons why particular demographic, habitat, or funding objectives were not achieved;

- To assess whether a deviation from demographic, habitat, or funding objectives constituted a biological concern to the grizzly bear population in the NCDE;
- To provide management recommendations to correct deviations from habitat or population objectives, or to offset funding shortfalls;
- To consider departures by one or more agencies or Tribes from the monitoring effort required under this Conservation Strategy and to develop plans to ensure that monitoring efforts be maintained as per the standards in this document; and/or
- To consider and establish a scientific basis for changes/adaptations in management due to changed conditions in the ecosystem.

A Management Review will be triggered by any of the following thresholds:

- Failure to meet any of the demographic objectives for survival, distribution, or mortality limits in any one year, as specified in Chapter 2;
- Failure to meet any of the habitat objectives for motorized route densities or secure core habitat, as specified in Chapter 3;
- Failure to meet the objectives for developed recreation sites or livestock allotments, as specified in Chapter 3; or
- Failure by a participating agency to provide adequate habitat or population data from their jurisdiction to meaningfully assess adherence to the habitat or demographic objectives in this Conservation Strategy.

Management Reviews would normally be undertaken after the annual summary of monitoring information presented to the Coordinating Committee and in response to identified deviations from thresholds listed above. Any Coordinating Committee member can request that a Management Review be initiated. That request would be a topic for discussion by the Coordinating Committee and the review would be initiated based on their decision. The Charter will detail the decision process for initiating a member-requested Management Review. The Management Review process would be completed within six months of initiation and the resulting written report presented to the Coordinating Committee.

Individual agencies on the Coordinating Committee will respond to the Management Review with proposed actions that address the deviations from the population or habitat objectives, if warranted and if possible.

U.S. Fish and Wildlife Service Status Review

Section 4(g) (1) of the ESA requires the USFWS to monitor all delisted and recovered species for at least five years. The post-delisting monitoring plan is detailed in the delisting rule. The primary purpose of this requirement is to ensure that the recovered species does not warrant protections

under the ESA. If data indicated that protective status under the ESA should be reinstated, the USFWS will initiate a Status Review. A Status Review would evaluate the factors affecting the population and result in a finding that summarizes the status of the population and recommends listing or not. Members of the public may also submit a petition to the USFWS at any time. Upon receipt of such a petition that contains sufficient scientific information to demonstrate that the request to relist is warranted, the USFWS would perform a Status Review.

CHAPTER 6: REGULATORY AND CONSERVATION FRAMEWORK

The management of grizzly bears and the habitats they require for survival are dependent upon the laws, regulations, agreements, and management plans of the State, Tribal, and Federal agencies in the NCDE. This chapter documents existing regulatory mechanisms that will be effective in maintaining a recovered grizzly bear population in the absence of ESA protections. These laws, regulations, and agreements provide the legal basis for coordinating management, controlling mortality, providing secure habitats, managing human-grizzly bear conflicts, establishing hunting regulations, managing motorized access, managing livestock grazing, regulating oil and gas development, mitigating large scale mining operations, maintaining education and outreach programs to prevent conflicts, and monitoring populations and habitats.

The NF and BLM Resource Management Plans, the GNP Superintendent's Compendium, the DNRC HCP, Tribal Management Plans, Montana Code Annotated (MCA), and Administrative Rules of Montana (ARM) are regulatory mechanisms that are legally enforceable. These dictate how grizzly bear population and habitat management will occur, and, in doing so, they serve to ensure against excessive grizzly bear mortality by minimizing human-caused mortality risk. The signatories of this Conservation Strategy have reviewed their existing management plans and have or will incorporate the population and habitat conservation measures described in this Conservation Strategy into their respective management plans as needed.

Federal Laws

Glacier National Park Enabling Act, 16 U.S.C. § 161 et seq**.** An Act of Congress on May 11, 1910 established GNP a public park for the benefit and enjoyment of the people and for the preservation of the park in a State of nature and for the care and protection of the fish and game within its boundaries. GNP comprises 17% of the NCDE's PCA for grizzly bears.

What it means to grizzly bears: In an act that pre-dates the creation of the NPS, Congress created GNP in recognition of the unique scenic and natural values of the area. The Act directed the Secretary of Interior to promulgate such rules and regulations necessary to preserve these values for future generations. The Act clearly states that the park will be maintained in a natural state with its wildlife protected. GNP continues to work to fulfill this directive by implementing rigorous protection programs, as is evident by maintenance of a large population of grizzly bears for decades.

National Park Service Organic Act, 1916. The NPS...shall promote and regulate the use...by such means as... to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner...as will leave them unimpaired for future generations. 16 U.S.C. §1

What it means to grizzly bears: This Act created a NPS to administer National Parks. In this Act, Congress specifically directs the Park Service to conserve natural values and to prevent their impairment. Modern interpretations of the act assume that principles of ecosystem management will be applied. Such principles require the maintenance of fully functional ecological systems of which large predators like grizzly bears are integral components. This interpretation precludes the NPS from engaging in any activity that would result in the loss or substantial diminishment of any native species in a National Park, including grizzly bears.

The Wilderness Act, 1964, 16 U.S.C. 1131- 1136. The USFS and NPS both manage lands designated as wilderness areas under the Wilderness Act of 1964 (16 U.S.C. 1131– 1136). Within these areas, the Wilderness Act states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircraft; (4) there can be no other form of mechanical transport; and (5) no structure or installation may be built. Where the use of aircraft or motorboats have already become established, these uses may be permitted to continue (e.g., Shafer Meadows airstrip). The Wilderness Act allows livestock allotments existing before the passage of the Wilderness Act or if specified in the legislation creating new wilderness areas, and mining claims staked before January 1, 1984, to persist within Wilderness Areas. No new mining claims can be issued, but new grazing permits can be issued on allotments that were in place before the Wilderness Act was signed. If preexisting mining claims are pursued, the plans of operation are subject to Wilderness Act restrictions on road construction, permanent human habitation, and developed sites.

What it means to grizzly bears: Over 48% (4,312 mi^2, 11,168 km^2) of grizzly bear habitat inside the PCA is within Federal and Tribal Designated Wilderness Areas. As such, a large

proportion of existing grizzly bear habitat is protected from direct loss or degradation by the prohibitions of the Wilderness Act. These Wilderness Areas are considered long-term secure habitat because they do not allow motorized access and are protected from new road construction, site developments, new livestock allotments, mining claims, and energy development by Federal legislation.

Lacey Act, 1900, 16 U.S.C. § 3371 et seq. This Act makes it illegal to import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken or possessed in violation of any law, treaty or regulation of the United States or in violation of any Indian Tribal law; and to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any State or in violation of any foreign law. 18 U.S.C. §§42-43.

What it means to grizzly bears: The primary focus of the Lacey Act is the prohibition of interstate and international trafficking in protected wildlife. In the absence of ESA protection, other State, Federal, and Tribal laws remain that endeavor to protect grizzly bears or regulate hunting of the bears. Therefore, the species would continue to be protected by provisions specified under the Lacey Act because it is tied to the wildlife-related laws of Montana, Canada, and Tribal entities. Violators of the Lacey Act can face civil fines up to $10,000, forfeiture of wildlife and equipment, and criminal penalties up to five years' incarceration and maximum fines of $250,000 for individuals and $500,000 for organizations. There have been several instances of convictions in North America due to violations of the Lacey Act with regard to grizzly bears. These violations included illegal purchase of live bears, selling bear gall bladders, improper tagging of harvested bears, and illegal killing of bears. The Lacey Act will continue to apply to individuals or parties involved in such activities regardless of the status of grizzly bears under the ESA.

Fish and Wildlife Coordination Act, 1934, 16 U.S.C. §661-666c. This Act relates to wildlife associated with water resource development. This Act also authorizes that lands and waters may be acquired by Federal construction agencies for wildlife conservation to mitigate water projects in order to preserve and assure for the public benefit the wildlife potential of the particular water project area.

What it means to grizzly bears: The Fish and Wildlife Coordination Act requires that fish and wildlife conservation be given equal consideration with other aspects of water resource development. Consultation with USFWS is required if any modification of a stream or other water body is proposed by an agency under a Federal permit or license. In the absence of ESA protection, potential impacts to grizzly bears from a proposed project would still need to be evaluated. This Act also authorizes the preparation of plans to protect wildlife

resources in the event that a water resource development project is undertaken. For example, mitigation plans for hydroelectric projects within the range of the grizzly bear must consider potential impacts to the species and recommend mitigation measures. If any water resource development projects are proposed that have the potential to impact grizzly bears in the area, those impacts must be addressed.

National Wildlife Refuge Administration Act 1966 and 1997 Refuge Improvement Act. 16 U.S.C. §668dd et seq. The charter for the refuge system establishes a clear statutory goal of conservation, defined in ecological terms. The USFWS is directed by statutory mission to sustain, restore and enhance healthy populations of fish, wildlife, and plants on system lands. The USFWS may not permit uses to occur where they are incompatible with the conservation purpose of the system and economic uses must contribute to attaining the conservation mission. Statutes require the USFWS to maintain "biological integrity, diversity, and environmental health" on the refuges.

What it means to grizzly bears: The mission of the refuge system is conservation, defined as being for animals, plants, and their habitats. This is in contrast to the more complex multiple-use, sustained yield missions that also seek to provide commodities extracted from other public lands. Further, by statute, the USFWS may not permit uses to occur where they are incompatible with conservation of wildlife and their habitat. These laws provide strong protections for grizzly bears and their habitat where they occur on refuge lands. In the PCA and Zone 1, the refuge system includes 34.5 mi^2 (89.5 km^2) of land.

Sikes Act, 1960, 16 U.S.C. §670g. The Sikes Act of 1960 directs the Secretary of Defense, in cooperation with the USFWS and State fish and wildlife agencies, to carry out a program for the conservation and rehabilitation of natural resources on military installations. The Sikes Act allows for the sustainable, multipurpose use of natural resources subject to military security and safety requirements. An amendment to the Act in 1974 (P.L. 93-452) authorized the Secretaries of Interior and Agriculture, in coordination with the States, to plan, develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish, and game on certain public lands, including those administered by the USFS and BLM. Such programs shall include, but not be limited to, habitat improvement projects, related activities, and adequate protection for species considered endangered or threatened.

What it means to grizzly bears: The Sikes Act requires the Department of Defense to develop and implement integrated natural resource management plans for U.S. military installations. Plans must consider fish, wildlife, and habitat needs; and are prepared in cooperation with the USFWS and State wildlife agencies. In the absence of ESA protection for the grizzly bear, requirements under the Sikes Act would still need to be met. The

nearest major installations are Malmstrom Air Force Base in Great Falls, Montana and Fairchild Base near Spokane, Washington. Smaller facilities include Fort Missoula near Missoula, Montana and Fort William Henry Harrison near Helena, Montana. Resource plans for these installations that may have impacts on grizzly bears have been and will continue to be reviewed under the Sikes Act, post-delisting.

Multiple Use Sustained Yield Act, 1960, 16 U.S.C. §§528-531. It is the policy of the Congress that the NFs are established and shall be administered for outdoor recreation, range, timber, watershed and wildlife and fish purposes. As used in this Act, "Multiple Use" means the management of all the various resources of the NFs so that they are utilized in the combination that will best meet the needs of the American people. It requires NFs to make the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. It allows for some land to be used for less than all of its resources while institutionalizing coordinated management of the various resources, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources. It also allows management for multiple uses that may not necessarily provide the greatest dollar return or the greatest unit output.

What it means to grizzly bears: This means that while grizzly bear habitat will be managed according to the intent of this Conservation Strategy, the USFS must also balance the needs of grizzly bears with a combination of other, sometimes competing, land uses. The Multiple Use Sustained Yield Act applies to lands managed by the USFS, or approximately 60.9% (6,000 mi^2) of the PCA within the NCDE.

National Environmental Policy Act, 1970, 42 U.S.C. §§ 4321-4370(f) (NEPA). NEPA applies to Federal agencies and requires those agencies to consider the environmental impacts of its decisions before taking Federal actions. It requires agencies to take a “hard look” at the projected environmental impacts of a proposed action. The twin goals of NEPA are to provide for informed decision-making about the environmental effects of proposed actions and to make known those impacts to the public so that their views may be expressed. NEPA is a procedural statute. It does not dictate a result. Agencies must consider a range of alternatives to a proposed project, each with different levels of impacts. In addition to public review, NEPA requires Federal agencies to coordinate or consult with each other prior to making decisions.

What it means to grizzly bears: NEPA ensures that any project occurring on Federally managed lands, requiring Federal permits or involving expenditures of Federal funds will involve analysis and disclosure of potential environmental impacts. It uses a multidisciplinary approach to consider environmental effects in Federal government

agency decision making. It applies to a wide range of land use actions, including most land use plan revisions and amendments. It ensures that impacts to wildlife, including grizzly bears, from activities proposed on NF or other Federal lands will be analyzed in advance. It also ensures that decisions will be subject to some level of public review.

Endangered Species Act, 1973, 16 U.S.C. § 1531-1599. (ESA) The ESA requires the Secretary of the Interior to list species that are either endangered or threatened with extinction. The listing determination is based on the analysis of five factors. If one or more of those criteria are met, it qualifies for listing as threatened or endangered. Listed species receive legal protection against "taking," which includes harassment, harm, hunting, killing and significant habitat modification or degradation. A major goal of the ESA is to recover endangered or threatened species to the point they can be removed from the list. In order to delist a species, the USFWS must review those same five factors to determine whether any one of them continues to threaten or endanger a species. Thus, the USFWS must find that: (a) the species' habitat or range is not threatened with destruction, modification or curtailment; (b) the species is not being over utilized for commercial, recreational, scientific or educational purposes; (c) disease and predation are not significant problems; (d) there are adequate regulatory mechanisms in place; and (e) there are no significant other natural or manmade factors affecting the continued existence of the species. The USFWS must monitor recovered species for not less than five years after the species is delisted and no longer protected under the ESA. Both listing and delisting decisions must be based solely on the best available scientific and commercial information regarding a species' status, without reference to economic or other factors. The ESA authorizes a landowner to develop an HCP to minimize and mitigate, to the maximum extent practicable, any impact to threatened and endangered species while conducting lawful activities on their lands. An HCP may continue to apply even after a species is delisted. The USFWS has the authority to issue emergency regulations any time there is a significant risk to the well-being of an animal. Emergency rules may take effect immediately upon publication in the Federal Register. The emergency rule must explain in detail the reasons why such a regulation is necessary. The USFWS must withdraw the rule if it determines it is no longer necessary, based on the best scientific and commercial data available.

What it means to grizzly bears: The ESA governs the process for listing and delisting. If grizzly bears are removed from the Federal List of Threatened and Endangered Wildlife (i.e., "delisted"), the USFWS will continue to monitor the status of grizzly bears in the NCDE. Any HCP developed while grizzly bears were listed remains in effect for the life of the Plan, regardless of listed status. The USFWS must respond to any petitions for re-listing received and maintains the authority to emergency re-list at any other time if conditions warrant.

National Forest Management Act (NFMA) of 1976, 16 U.S.C. § 1600, et seq. NFMA requires that a national renewable resource program be developed, and that integrated land management plans be developed with public participation for each unit of the NFS. Among other requirements, the plans must 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.

> *What it means to grizzly bears*: This directs the USFS to create legally binding Land Management Plans that provide direction for management of wildlife habitats which may include regulating human activities (i.e., motorized route densities, developed sites, livestock allotments) on the NFs. NF lands comprise approximately 61% (5,441 mi^2, 14,092 km^2) of the PCA within the NCDE. Incorporating management direction from the Conservation Strategy into Forest Plans ensures that the USFS must comply with standards and guidelines for managing grizzly bear habitat. Doing so ensures the existence of a regulatory mechanism to prevent the need for re-listing the bear.

Federal Land Policy and Management Act (FLPMA) of 1976. BLM lands will be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values...that will provide food and habitat for fish and wildlife and domestic animals, and that will provide for outdoor recreation and human occupancy and use. FLPMA is also the law that gives the BLM authority to designate "Wilderness Study Areas" on their lands and manage these areas "in a manner so as not to impair the suitability of such areas for preservation as wilderness." Similar to the Wilderness Act of 1964, FLPMA allows "the continuation of existing mining and grazing uses and mineral leasing" which were in existence on or before October 21, 1976. 43 U.S.C. §§ 1701-1777.

> *What it means to grizzly bears:* Grizzly bears are a natural resource that fall under the FLPMA's umbrella of management guidelines which decrees that the resources required by grizzly bears, and other species, will be provided for through appropriate management and with consideration for other land assets. The BLM will manage the natural elements that are necessary for grizzly bears and other wildlife.

Fish and Wildlife Improvement Act, 1978, 16 U.S.C. § 742(a). This law authorizes the Secretaries of the Interior and Commerce to establish, conduct, and assist with national training programs for State fish and wildlife law enforcement personnel. It also authorized funding for research and development of new or improved methods to support fish and wildlife law enforcement. The law provides authority to the Secretaries to enter into law enforcement cooperative agreements with State or other Federal agencies, and authorizes the disposal of abandoned or forfeited items under the fish, wildlife, and plant jurisdictions of these Secretaries. It strengthens the law enforcement operational capability of the USFWS by authorizing the disbursement and use of funds to facilitate various types of investigative efforts. It expanded the use of fines, penalties and forfeiture funds

received under the ESA and the Lacey Act to include the costs of shipping, storing and disposing of items. It specifically prohibits the sale of items whose sale is banned under other laws.

> *What it means to grizzly bears:* Law enforcement cooperative agreements between Federal agencies, Montana and the Tribes will assist in efforts to control illegal activities directed at grizzly bears.

The National Parks Omnibus Management Act of 1998, 16 U.S.C. § 5901, et seq. This Act requires the Secretary of Interior to improve management, protection, interpretation and research of NPS resources. It also requires the Secretary to develop comprehensive training for NPS employees. It identifies the need to enhance management and protection of national park resources by providing clear authority and direction for the conduct of scientific study in the National Park system and to use the information gathered for management purposes.

> *What it means to grizzly bears*: This law provides further support for GNP to use scientific research to monitor and manage grizzly bears within their boundaries.

Tax Relief and Health Care Act of 2006, PL 109-432. This law permanently withdrew lands on the Lewis and Clark NF and some areas of the Flathead NF from any future leasing under the mining and mineral leasing laws. While this law prohibited the establishment of new leases, it did not eliminate leases that existed at the time the law was passed.

> *What it means to grizzly bears*: This law means that nearly all USFS and BLM lands in the NCDE with a high potential for oil and gas development are legally unavailable to such development (Chapter 3, Figure 3).

National Indian Forest Resource Management Act, 1990, 25 U.S.C, Ch. 33. This Federal law requires a forest management plan for Tribal forest lands to describe the manner in which policies of the Tribes and Secretary will be applied. It requires the silviculture plan to support the objectives of beneficial landowners and be based on the principle of sustained yield. It requires the approval of the Secretary of the Interior.

> *What it means to grizzly bears*: Similar to NFMA for the USFS, this law provides authority for Tribes to create management plans to regulate human activities such as livestock grazing (on forested lands) and road construction.

Clean Water Act (1970), Safe Drinking Water Act (1974), Clean Air Act (1972), and Resource Conservation and Recovery Act (1976)

What it means to grizzly bears: Together, these environmental laws provide tangential benefits to grizzly bears by assuring minimum levels of environmental quality are maintained.

Federal Regulations

Roadless Areas Conservation Rule, 2001. The stated purpose of the 2001 Roadless Areas Conservation Rule is to provide lasting protection to IRAs on NFS lands. The rule generally prohibits road construction, road re-construction, and some types of timber harvest in IRAs (66 FR 3244-3273, January 12, 2001).

What it means to grizzly bears: The Roadless Areas Conservation Rule effectively ensures that IRAs will be maintained in their current state in terms of road access. This means these areas will continue to serve as secure areas for grizzly bears away from constant or prolonged human presence.

25 CFR 162.1 to .623. This Federal regulation describes the authorities, policies, and procedures governing the granting of leases on Tribal reservations.

What it means to grizzly bears: It affects grizzly bear conservation by providing for the regulation of the location and duration of leases of grazing units on land that contains grizzly bears and bear habitat.

25 CFR 166.1. This Federal regulation describes the authorities, policies, and procedures the BIA uses to approve, grant, and administer permits for grazing livestock on Tribal land, individually-owned Tribal land, or government land on Tribal reservations.

What it means to grizzly bears: It affects grizzly bear conservation by regulating livestock grazing on land that contains grizzly bears and bear habitat.

36 CFR 1.2 (d). The regulations contained in 36 CFR parts 2–5, part 7, and part 13 of this section shall not be construed to prohibit administrative activities conducted by the NPS, or its agents, in accordance with approved general management and resource management plans, or in emergency operations involving threats to life, property, or park resources.

What it means to grizzly bears: Allows the NPS to manage grizzly bears and conduct research and management activities that would otherwise be prohibited.

36 CFR 1.5 (a)(1). Gives NPS Superintendents the authority to establish for all or a portion of a park area a reasonable schedule of visiting hours, impose public use limits, or close all or a portion of a park area to all public use or to a specific use or activity in order to protect natural resources or provide for human safety.

> *What it means to grizzly bears*: Gives park superintendents the authority to limit specific activities, or human use of areas important to grizzly bears to prevent conflicts. 36 CFR 1.3 provides penalties for violations.

36 CFR 1.5 (a)(2). Gives NPS Superintendents the authority to designate areas for a specific use or activity, or impose conditions or restrictions on a use or activity.

> *What it means to grizzly bears*: Allows superintendents to prohibit or restrict park uses that threaten grizzly bear security or other values, with penalties for violations.

36 CFR 1.7(b). NPS Superintendents shall publish in writing all designations, closures, permit requirements and other restrictions imposed under discretionary authority.

> *What it means to grizzly bears*: This is the 'Superintendents Compendium' and is a legal record of GNP committing to management of grizzly bears by this Conservation Strategy.

36 CFR 2.2(a)(1). Prohibits the unauthorized taking of wildlife in National Parks.

> *What it means to grizzly bears*: It protects grizzly bears by making it a Federal offense to kill them inside a National Park.

36 CFR 2.2(a)(2). Prohibits the feeding, touching, teasing, frightening, or intentional disturbing of wildlife in National Parks.

> *What it means to grizzly bears*: This regulation is an effective way to minimize human-caused grizzly bear mortalities by making it illegal to contribute to their habituation or food-conditioning inside National Parks. This ultimately prevents conflicts and minimizes potential management removals.

36 CFR 2.10 (d). Gives NPS Superintendents authority to designate all or a portion of a park area where food, lawfully taken fish or wildlife, garbage and equipment used to cook or store food must be kept to avoid bear/human conflicts. This restriction does not apply to food that is being transported, consumed, or prepared for consumption.

> *What it means to grizzly bears*: This regulation provides National Parks the authority to implement and enforce food storage regulations. This important conflict prevention tool is widely applied throughout bear habitat and is strictly enforced.

36 CFR 219. Sets out the planning requirements for developing, amending, and revising land management plans for units of the National Forest System (NFS). A land management plan must provide for social, economic, and ecological sustainability within USFS authority and consistent with the inherent capability of the plan area. The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area. In addition, to provide for diversity, the plan must provide the ecological conditions necessary to contribute to the recovery of Federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area. A species of conservation concern is a species, other than Federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.

> *What it means to grizzly bears*: This regulation requires the USFS to provide for ecological integrity and diversity should result in ecological conditions that will sustain the grizzly bear and its habitat. After delisting, the forest planning process will include an evaluation of grizzly bears to determine if designation as a species of conservation concern is warranted.

36 CFR 261.50 (a) and (b). This regulation gives NF Supervisors the authority to issue orders which close or restrict the use of described areas, or of any forest development road or trail within the area over which he has jurisdiction.

> *What it means to grizzly bears*: This authority is used to close areas to minimize human-grizzly bear conflicts and to issue food storage, carcass storage and camping requirements.

36 CFR 261.53 (a) and (e). States that when provided for in an order authorized under 36 CFR 261.50 (a) and (b) it is prohibited to go into or be upon any area which is closed for the protection of: (a) threatened, endangered, rare, unique, or vanishing species of plants, animals, birds or fish or; (b) for public health or safety.

> *What it means to grizzly bears*: This regulation provides the USFS with the authority to restrict human activities and entrance at specific times and/or locations to protect grizzly bears and provide for public safety, if it is deemed necessary.

36 CFR 261.58 (e) and (s) and (cc). States that when provided for in an order authorized under 36 CFR 261.50 (a) and (b) the following are prohibited. (a) Camping; (s) Possessing, storing, or transporting any bird, fish, or other animal or parts thereof as specified in the order; (cc) Possessing or storing any food or refuse, as specified in the order.

> *What it means to grizzly bears*: This regulation provides for restricting certain human activities to minimize human-grizzly bear conflicts and provides for visitor safety.

Tribal Laws, Rules, and Ordinances

Blackfeet Indian Reservation

Tribal Ordinance 40(B) – Timber Use Policy Statement with attached Timber Product Law. The Policy Statement is the driving document regulating the harvest of forest products on the Tribal reservation. The Product Law specifies the enforcement procedures and penalties for failing to comply with Tribal regulations.

> *What it means to grizzly bears*: This Ordinance provides Tribal authorities the authority to enforce conditions in their Forest Management Plans regarding road densities, food storage, and other provisions associated with individual projects. Ultimately, this reduces the potential for grizzly bear-human conflicts and therefore, human-caused grizzly bear mortality.

Constitution and By-Laws For the Blackfeet Tribe of the Blackfeet Indian Reservation of Montana, Article VI Section 1(p). This section of the Blackfeet Nation's constitution grants the Blackfeet Tribal Business Council the power to promulgate rules and regulations governing hunting, fishing, and trapping on the BIR.

> *What it means to grizzly bears*: It is significant to grizzly bear conservation because it gives the Blackfeet Tribal Business Council the authority to govern hunting of grizzly bears

on the BIR. The constitution is enforced by the Blackfeet Tribe and recognized and approved by the Secretary of Interior.

Fish and Game Rules to Govern Fishing, Hunting, and Trapping on the Blackfeet Indian Reservation. This document describes how all wildlife on the BIR, are owned and managed by the Blackfeet Nation. It describes the authority of the Blackfeet Nation to manage wildlife and habitat on the reservation. It contains regulations regarding food storage. It describes penalties and enforcement procedures. It is enforced by Blackfeet Tribal Game Wardens.

What it means to grizzly bears: It applies to grizzly bear conservation by providing the legal basis to regulate and enforce the take of grizzly bears on the reservation and implementing a food storage order.

Flathead Indian Reservation

Tribal Ordinance 44D – Tribal Hunting and Fishing Conservation Ordinances

What it means to grizzly bears: For members: Hunts for religious, cultural or spiritual purposes that are otherwise prohibited by regulation may be engaged in if approved by the appropriate Tribal Culture Committee and/or the Tribal Council. The following species of game animals are closed to hunting and taking within the exterior boundaries of the Reservation: grizzly bear, pronghorn antelope, mountain lion. For non-members, all big game are closed to hunting or taking.

Montana State Laws (MCSa) and Administrative Rules (ARMs)

(For exact language of specific law or administrative rules, see statutes)

MCA § 87-1-217 – Policy for management of large predators. In managing large predators, such as bears, the primary goals of MFWP are to protect humans, livestock, and pets; preserve and enhance the safety of the public during outdoor recreational and livelihood activities; and preserve citizens' opportunities to hunt large game species. The department seeks consultation and coordination with county commissioners and Tribal governments in areas that have identifiable populations of large predators.

What it means to grizzly bears: This rule provides for local government involvement in large-scale decision making relative to MFWP management of predators. Local support and tolerance of grizzly bears is critical to long term grizzly bear conservation.

MCA § 87-1-301 – Powers of the Montana Fish and Wildlife Commission. The Commission administers the day-to-day activities of MFWP under the executive branch with specific statutory duties and the commission sets fish and wildlife regulations, approves property acquisitions, and approves certain rules and activities of the Department as provided by statute.

> *What it means to grizzly bears:* Allows MFWP to manage grizzly bears as part of the suite of wildlife within the State with the goal of species protection and preservation.

MCA § 87-1-303 – Rules for use of lands and waters. The Montana Fish and Wildlife Commission may adopt and enforce rules governing uses of lands that are acquired or held under easement by the commission or lands that it operates under agreement with or in conjunction with a Federal or State agency or private owner; adopt and enforce rules governing recreational uses of all public fishing reservoirs, public lakes, rivers, and streams that are legally accessible to the public or on reservoirs and lakes that it operates under agreement with or in conjunction with a Federal or State agency or private owner. These rules must be adopted in the interest of public health, public safety, public welfare, and protection of property and public resources in regulating hunting, fishing, trapping, picnicking, camping, sanitation, and use of firearms.

> *What it means to grizzly bears:* Provides authority to the Commission to set mandatory food storage orders on State owned and/or managed lands in the interest of public safety, public welfare and protection of property.

MCA § 87-1-304 – Fixing of seasons and bag and possession limits. Subject to the provisions of 87-5-302, the Montana Fish and Wildlife Commission may fix seasons, bag limits, possession limits, and season limits, including the opening, closing, shortening or lengthening seasons on any species of game, bird, fish, or furbearing animal as defined by 87-2-101. The Commission may also declare a closed season on any species of game, fish, game birds, or fur-bearing animals threatened with undue depletion from any cause. The Commission may close any area or district of any stream, public lake, or public water or portions thereof to hunting, trapping, or fishing for limited periods of time when necessary to protect a recently stocked area, district, water, spawning waters, spawn-taking waters, or spawn-taking stations or to prevent the undue depletion of fish, game, fur-bearing animals, game birds, and nongame birds. The Commission may open the area or district upon consent of a majority of the property owners affected. The commission may authorize the director to open or close any special season upon 12 hours' notice to the public.

> *What it means to grizzly bears:* This law provides authority to the Montana Fish and Wildlife Commission to set rules and regulations for grizzly bear hunting. The Commission has the authority to: fix, open, close, lengthen, or shorten hunting seasons; declare hunting arms specifications; set possession and bag limits; set tagging and license requirements; set shooting hours; open special areas, and issue special licenses to manage grizzly bears through sport harvest. The Commission process requires opportunity for public involvement.

MCA § Section 87-5-301 – Grizzly bear: findings/policy. The Legislature finds that: (a) grizzly bears are a recovered population and thrive under responsive cooperative management; (b) grizzly bear conservation is best served under State management and the local, State, Tribal, and Federal partnerships that fostered recovery; and (c) successful conflict management is key to maintaining public support for conservation of the grizzly bear. It is the policy of the State of Montana to: (a) manage the grizzly bear as a species in need of management to avoid conflicts with humans and livestock; and (b) use proactive management to control grizzly bear distribution and prevent conflicts, including trapping and lethal measures.

> *What it means to grizzly bears:* Allows State management of grizzly bears as a classified species. Grizzly bears are currently dually classified in Montana as a game animal with no defined harvest season and as a "species in need of management." A "species in need of management" classification implies the species is either in need of intense conservation or population management.

MCA § Section 87-5-302 – Commission regulations on grizzly bears. The Montana Fish and Wildlife Commission has the authority to regulate the hunting of grizzly bears including establishing requirements: for the tagging of carcasses, skulls, and hides; for transportation, exportation, and importation. The Commission shall establish hunting season quotas for grizzly bears that will prevent the population of grizzly bears from decreasing below sustainable levels and with the intent to meet population objectives for elk, deer, and antelope. The provisions of this subsection do not affect the restriction provided in 87-2-702 that limits a person to the taking of only one grizzly bear in Montana per license.

> *What it means to grizzly bears*: This law provides authority to the Commission to set rules and regulations for tagging, transportation, exportation, and importation of legally harvested grizzly bears and ensures that any hunting seasons set by the Commission will not contribute to the grizzly bear population decreasing below sustainable levels.

MCA § Section 87-2-101 – Definitions. "Game animals" means deer, elk, moose, antelope, caribou, mountain sheep, mountain goat, mountain lion, bear, and wild buffalo.

> *What it means to grizzly bears:* Classifying grizzly bears as a game animal in Montana gives the Montana Fish and Wildlife Commission the authority to implement a hunting season. Classification as a game animal also makes it illegal for private citizens to kill a grizzly bear without a license and outside the seasons set by the Commission. In other words, status as a game animal prevents unregulated take by citizens.

MCA § 87-6-202 – Unlawful possession, shipping, or transportation of game fish, bird, game animal, or fur-bearing animal. A person may not possess, ship, or transport all or part of any game fish, bird, game animal, or fur-bearing animal that was unlawfully killed, captured, or taken, whether killed, captured, or taken in Montana or outside of Montana.

> *What it means to grizzly bears:* This law makes it illegal to possess any unlawfully obtained part of a grizzly bear.

MCA § 87-6-206 – Unlawful sale of game fish, bird, game animal, or fur-bearing animal. A person may not purposely or knowingly sell, purchase, or exchange all or part of any game fish, bird, game animal, or fur-bearing animal.

> *What it means to grizzly bears:* This law makes it illegal to sell any unlawfully obtained part of a grizzly bear.

MCA § 87-6-106 – Lawful taking to protect livestock or person**.** This law states that a citizen may kill a grizzly bear if it is "…attacking, killing, or threatening to kill a person." However, for purposes of protecting livestock, a person may not kill or attempt to kill a grizzly bear unless the grizzly bear is in the act of attacking or killing livestock." A person who takes wildlife based on this law shall notify the MFWP within 72 hours and shall surrender or arrange to surrender the wildlife to MFWP.

> *What it means to grizzly bears:* By making a distinction between grizzly bears and other wildlife which may kill livestock, the State of Montana has provided additional protection to grizzly bears. It makes this type of killing only allowed under extremely rare circumstances. Additionally, if a person kills a grizzly bear based on this law, there must be injured or dead livestock associated with it.

MCA § 87-6-216 – Unlawful supplemental feeding. A person may not provide supplemental feed attractants to game animals by purposely or knowingly attracting any cloven-hoofed ungulates, bears, or mountain lions with supplemental feed attractants; after having received a previous warning, negligently failing to properly store supplemental feed attractants and allowing any cloven-hoofed ungulates, bears, or mountain lions access to the supplemental feed attractants; or purposely or knowingly providing supplemental feed attractants in a manner that results in an artificial concentration of game animals that may potentially contribute to the transmission of disease or constitute a threat to public safety.

> *What it means to grizzly bears:* This law provides MFWP with a legal framework within which to regulate attractant storage on private lands. It means that MFWP has a legal basis to require landowners to store attractants in a way bears cannot access them.

MCA § 87-2-702 – Restrictions on special licenses: availability of bear and mountain lion licenses. A person who has killed or taken any game animal, except a deer, an elk, or an antelope, during the current license year is not permitted to receive a special license under this chapter to hunt or kill a second game animal of the same species. The Montana Fish and Wildlife Commission may require applicants for special permits authorized by this chapter to obtain a valid big game license for that species for the current year prior to applying for a special permit. Through 87-2-702, the Commission may issue one grizzly bear license each year through a competitive auction or lottery. The Commission shall promulgate rules for the use of the license and conduct of the auction or lottery. A wildlife conservation organization may be authorized to conduct the license auction or lottery, in which case the authorized organization may retain up to 10% of the proceeds of the sale to cover reasonable auction or lottery expenses. All proceeds remaining from the auction or lottery, whether conducted by the commission or as otherwise authorized by the Commission, must be used by the department for the management of grizzly bears.

> *What it means to grizzly bears:* Hunting harvest is limited by rules set forth by the legislature and the Commission. If the Commission were to authorize a hunting season, hunters are restricted to one grizzly bear taken in Montana during their lifetime per MCA 87-2-702, whether it is taken by a license issued under 87-2-701 or through an auction tag taken under MCA 87-2-814.

MCA § Title 75, Chapter 1 – Montana Environmental Policy Act. Establishes policy of the State of Montana to use all practicable means and measures to create and maintain conditions under which man and nature can coexist in productive harmony.

> *What it means to grizzly bears*: This policy, similar to NEPA, is procedural in nature and assures that any project proposed by the State of Montana in grizzly bear habitat will consider, in detail, the impacts to grizzly bears. It establishes the requirement for the State of Montana to consider the environmental effects of each project and allow public input.

MCA § Title 77, Chapter 1 – Administration of State Lands. Directs the State Board of Land Commissioners to manage State lands to support education and for the attainment of other worthy objectives helpful to the well-being of the people of Montana. It further directs the board to manage State lands under the multiple use management concept to ensure they are utilized in that combination best meeting the needs of the people and the beneficiaries of the trust; and harmonious and coordinated management of the various resources.

> *What it means to grizzly bears*: This law means that lands managed by DNRC must be economically viable while balancing the needs of grizzly bears.

Administrative Rule of Montana (ARM) 12.9.103 – Grizzly Bear Policy. The Montana Fish and Wildlife Commission has management authority for the grizzly bear, a resident wildlife species,

and is dedicated to the preservation of grizzly bear populations within the State of Montana. To promote the preservation of the grizzly bear in its native habitat, the commission establishes policy guidelines for the MFWP action when dealing with grizzly bear. The department shall work to perpetuate and manage grizzly bear in suitable habitats of this State for the welfare of the bear and the enjoyment of the people of Montana and the nation. It is recognized by the commission that research on the habitat requirements and population characteristics of the grizzly bear is essential for the welfare of the species. MFWP research programs and proposals directed at defining those habitat requirements are encouraged and supported. The Commission recognizes its responsibility to consider and provide for recreational opportunities as part of a grizzly bear management program. These opportunities shall include legal hunting, recreational experiences, aesthetics of natural ecosystems, and other uses consistent with the overall welfare of the species. The department should consider the variability of values between individuals, groups, organizations, and agencies when management programs for various grizzly bear populations are developed. Hunting is considered the most desirable method of balancing grizzly bear numbers with their available habitat, minimizing depredations against private property within or adjacent to grizzly bear habitat, and minimizing grizzly bear attacks on humans. The department shall consult with appropriate Federal agencies and comply with applicable Federal rules and regulations in implementation of this policy. (History: Sec.87 1 301MCA, IMP, 87 1 201, 87 1 301 MCA, Eff. 12/31/72, AMD, 1977 MAR p.257, Eff. 8/26/77.)

> *What it means to grizzly bears:* This policy guides decision making for grizzly bear conservation and management within the State of Montana with an overall goal to promote the preservation of the grizzly bear. It requires coordination with appropriate Tribal, Federal, State, and private entities and advocates protecting grizzly bear habitat.

Administrative Rule of Montana (DNRC) (ARM) 36.11.433 – Grizzly bear management on other western Montana lands. When conducting forest management activities on scattered lands administered by the Stillwater unit, Kalispell unit, Missoula unit and Clearwater unit, within the NCDE, and in Plains and Libby unit lands within the CYE, the department shall adhere to the following:

- Design projects to result in no permanent net increase of open road density on parcels that exceed an open road density of one mile per square mile using simple linear calculations. This shall apply only during the non-denning period. Temporary increases are permissible for up to two consecutive operating seasons. The department shall make efforts to reduce total road density when compatible with other agency goals and objectives.
- Retain cover that provides visual screening adjacent to open roads to the extent practicable.
- Maintain hiding cover where available along all riparian zones.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating.

Administrative Rule of Montana (DNRC) (ARM) 36.11.434 – Grizzly Bear Management on Eastern Montana lands. On Bozeman unit lands within the GYE, and Helena unit and Conrad unit lands within the NCDE, the department shall determine appropriate methods to comply with the ESA, 16 U.S.C. Sections 1531 through 1544 and 77-5-116, MCA, on a project level basis. Factors to consider shall include, but not be limited to:

- cover retention;
- duration of activity;
- seasonal restrictions;
- hiding cover near riparian zones;
- food storage (where applicable); and
- road density.

What it means to grizzly bears: This policy requires that considerations and protective measures be incorporated into all forest management activities conducted on State trust lands in the areas specified. Affected lands occur in portions of the PCA, Zone 1 and Zone 2. These requirements supplement those contained in DNRC's HCP and would be required for all applicable DNRC lands not covered under that agreement.

Montana Constitution. Article IX Environment and Natural Resources, Section 1 Protection and Improvement. The State and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations.

What it means to grizzly bears: This Section provides tangential benefits to grizzly bears by assuring a minimal level of environmental quality on State lands and projects.

Montana Constitution. Article X, Section 2. Public school fund. The public school fund of the State shall consist of:

1. Proceeds from the school lands which have been or may hereafter be granted by the United States;
2. Lands granted in lieu thereof;
3. Lands given or granted by any person or corporation under any law or grant of the United States;
4. All other grants of land or money made from the United States for general educational purposes or without special purpose;
5. All interests in estates that escheat to the State;
6. All unclaimed shares and dividends of any corporation incorporated in the State;
7. All other grants, gifts, devises or bequests made to the State for general educational purposes.

What it means to grizzly bears: This Section describes what lands belong to the State of Montana for management under Article X, Section 11 of the Constitution and the laws and administrative rules adopted there under.

Montana Constitution. Article X, Section 11. Public land trust, disposition. All lands of the State that have been or may be granted by Congress, or acquired by gift or grant or devise from any person or corporation, shall be public lands of the State. They shall be held in trust for the people, to be disposed of as hereafter provided, for the respective purposes for which they have been or may be granted, donated or devised.

What it means to grizzly bears: This Section requires that all State lands are held in trust and that full market payment must be made for any disposition of those lands. Thus, these considerations have the potential to influence land management policies of DNRC that may influence grizzly bears.

Federal Plans and Guidelines

In addition to Federal and State laws and regulations, the following plans and guidelines provide both direction and guidance for grizzly bear population and/or habitat management.

National Park Service

GNP released the Bear Management Plan and Bear Management Guidelines in May 2010 as guidance documents for managing grizzly bears. Sections in the Guidelines cover informing visitors and employees, preventive management actions, special bear management areas, preparing for management actions, and follow-up and evaluation of management actions.

NPS 77, Natural Resource Management Guidelines, May 16, 1991. Guides NPSmanagers to perpetuate and prevent from harm (through human actions) wildlife populations as part of the natural ecosystems of parks.

Final Environmental Impact Statement, Grizzly Bear Management Program, Glacier National Park, July 1983

- Identifies sanitation procedures designed to ensure that human foods and attractants are kept secured from bears. Garbage and other unnatural food attractants will be eliminated before control actions are required. The solid waste handling program will encompass use of trash containers of bear-resistant design, careful and frequent garbage pickup to prevent overflow and overnight accumulations.
- The Superintendent authorizes and approves the GNP Grizzly Bear Management Program that outlines the park's Bear Management Area Program. The Bear Management Area

Program restricts recreational activity in areas with seasonal concentrations of grizzly bears. The goals of these restrictions include: (1) minimize bear/people interactions that may lead to habituation of bears to people (habituation can result in bears being removed from the population for human safety); (2) prevent human caused displacement of bears from prime food sources; and (3) decrease the risk of bear-caused human injury in areas with high levels of bear activity.

- Outlines Park bear monitoring program.
- Outlines Park bear research goals and objectives.
- Leaves open the possibility for supplemental feeding of grizzly bears, if deemed necessary.
- Identifies as an objective that public awareness of exposing bears to unnatural food sources may lead to human injury, or to the bears' destruction, or both. Requires an active information program be directed at both visitors and employees to inform them of policies and goals of bear management, and the reasons for these. Provides guidelines for the distribution of bear safety warning information through entrance stations, signs, visitor contacts, and literature.

U.S. Forest Service

If and when the NCDE grizzly bear population is delisted under the ESA, NFs in or adjacent to the NCDE that are under the 1982 planning regulations would assess whether classification of the grizzly bear as a Sensitive Species is warranted for those NFs that have not yet identified Species of Conservation Concern per the 2012 planning regulations. If so, on those NFs, grizzly bears and their habitats would be managed as Sensitive Species on NFS lands in accordance with USFS Manual 2670 (specifically 2670.22, 2670.32, and 2676.1 2676.17e). For NFs in the NCDE that have amended or revised their forest plans under the 2012 planning rule, the USFS would consider the grizzly bear as a potential Species of Conservation Concern, as required by USFS Handbook 1909.12 chapter 10 section 12.52(d)(2)(b). In addition, NFs would continue to follow direction established in existing land management plans until amended or revised.

Existing land management plans in the NCDE are:

- Beaverhead-Deerlodge NF Land and Resource Management Plan (2009, with amendment)
- Custer NF Plan (1986 with amendments) (currently under revision)
- Flathead NF (1986 with amendments) (currently under revision)
- Gallatin NF Plan (1987 with amendments) (currently under revision)
- Helena NF Plan (1986, with amendments) (currently under amendment and revision)
- Kootenai National Forest Land Management Plan (2015) (currently under amendment)
- Lewis and Clark NF Plan (1986, with amendments) (currently under amendment and revision)
- Lolo NF Plan (1986, with amendments) (currently under amendment)

The Swan Valley Grizzly Bear Conservation Agreement is not a plan but is a collaborative document that was developed in 1997 to coordinate management of multiple use lands now largely managed by the USFS and the DNRC. Chapter 3 addresses more detailed information about how lands in the Swan Valley will be managed in the foreseeable future.

Bureau of Land Management

If a change of status for the NCDE grizzly bear population under the ESA takes place, the BLM will classify the grizzly bear as a sensitive species in the NCDE area. Currently, the Butte Field Office, Lewistown Field Office, and Missoula Field Office Resource Management Plans contain extensive guidelines that directly benefit grizzly bears and/or their habitat. While many of these are summarized in Chapter 3, detailed descriptions are provided in Appendix 11.

State Plans and Guidelines

MFWP Grizzly Bear Management Plan for Western Montana. In 2006, MFWP released a management plan and final programmatic Environmental Impact Statement (EIS) for grizzly bear management in 17 counties in western Montana that include the entire NCDE PCA, Zone 1, and Zone 2. The plan focuses on grizzly bear management in the NCDE, CYE, and BE, as well as intervening areas. The goal of this management plan is, "To manage for a recovered grizzly bear population in western Montana and to provide for a continuing expansion of that population into areas that are biologically suitable and socially acceptable. This should allow MFWP to achieve and maintain population levels that support managing the bear as a game animal along with other species of native wildlife and provide some regulated hunting when and where appropriate." The plan identifies management objectives, describes grizzly bear biology, provides strategies for reducing and responding to grizzly bear/human conflicts, and discusses both habitat and population monitoring needs.

DNRC State Forest Land Management Plan. The DNRC State Forest Land Management Plan was signed in May 1996 and provides specific resource management standards that apply to all forested State trust lands in Montana. The plan contains specific standards that emphasize management of vegetation to promote biodiversity, and it includes habitat protection measures for endangered, threatened, and sensitive species. The resource management standards were codified in Forest Management Administrative Rules in September 2003.

DNRC Habitat Conservation Plan for Forested State Trust Lands. In 2011, DNRC entered into a HCP with the USFWS, which provides conservation measures and requirements for forest management activities on most of its forested State lands throughout western Montana, including lands occupied by grizzly bears in the NCDE (DNRC 2011). The HCP guides management of activities on 984 mi^2 (2,549 km^2) in western Montana. Of these lands, approximately 259 mi^2 (671 km^2) occur within the NCDE PCA, and an additional 143 mi^2 (370 km^2) of occupied habitat occur outside the PCA (DNRC 2011). The DNRC developed their HCP and habitat mitigation measures to address the needs of several listed species, including the grizzly bear. This HCP provides additional outreach focused on avoiding bear encounters and storing food properly, minimizes roads in key bear habitats (avalanche chutes and riparian areas), and suspends motorized activities within 0.6 mi (1 km) of a den site (DNRC 2011). Also within the PCA, access management restrictions and cover retention requirements apply, and new grazing allotments for small livestock (i.e., sheep or goats) are prohibited. Additionally, in areas outside of PCA, new open road construction would be minimized, vegetative cover would be retained, there would be spring restrictions on forest management activities, and restrictions on livestock grazing to minimize bear/livestock conflicts would be incorporated into grazing permits (DNRC 2011). The HCP is in effect until 2061 and will guide management of grizzly bear habitat across forested State trust lands in western Montana during that time (DNRC 2011, USFWS 2011) (http://dnrc.mt.gov/HCP/Documents.asp).

Tribal Management Plans

Bear Management Plan and Guidelines for Bear Management on the Blackfeet Reservation. Pending adoption by the Blackfeet Tribal Business Council, this document describes the policies, goals, and methods for implementing bear management activities on the BIR. It describes how the Blackfeet Nation will manage livestock depredations and other human-grizzly bear conflicts, what conflict preventative measures will be used, procedures for handling bears, and bear habitat protection measures. This document affects grizzly bear conservation because it directs the way grizzly bears are managed on the BIR. The Blackfeet Fish and Wildlife Department implements this plan.

Blackfeet Forest Management Plan, 2008. This document guides forest management activities on the BIR from 2009 to 2023. It is required by Federal regulation and addresses timber harvesting, forest protection, forest development, and the organization of the forestry department. It describes special considerations for grizzly bear habitat in forest management activities. The plan is implemented by the Blackfeet Tribe with final oversight by the BIA. It applies to grizzly bear conservation because it guides timber management, which affects the quality and quantity of grizzly bear habitat and how bears use it.

Flathead Indian Reservation Grizzly Bear Management Plan, 1981. A resolution by the FIR Tribal Council gave the plan its authority. It covers the Tribal Fish and Game Conservation Department, Wildland Recreation Department, and BIA Wildlife Branch. The overall goal is, "to secure and/or maintain a viable, self-sustaining population (of grizzly bears) in critical habitat occupied in the Mission Mountains." It includes subgoals of managing the population for a "stable or slightly increasing" trend; maintaining sufficient grizzly bear habitat to support a "viable bear population;" minimizing human-bear competition; and managing "natural resources to minimize adverse effects and maximize benefits for grizzly bears while meeting the natural resource needs of the Confederated Tribes." The FIR Grizzly Bear Management Plan will be revised to incorporate this Conservation Strategy once it is finalized.

Flathead Indian Reservation Forest Management Plan, 2000 (with amendments). This plan, as authorized by the FIR Tribal Council and the BIA, is in effect from 2000 to 2030. It "…emphasizes restoration of the forest over the economic returns it could provide" by identifying timber harvest standards and providing legal descriptions and designations of roadless and wilderness areas where timber harvest and road construction is limited or not allowed. It also identifies areas where hiding cover should be maintained to facilitate movement across roads and restricts total road miles to levels at or below that number existing in 1999. The FIR Forest Management Plan is currently being revised and will incorporate elements of this Conservation Strategy relevant to forest management.

GLOSSARY OF TERMS

adaptive management – a model for conservation that uses and incorporates information from ongoing monitoring and research to direct appropriate management actions. Specifically, it is the integration of program design, management, and monitoring to systematically test assumptions in order to adapt management measures accordingly.

administrative sites – locations or facilities established for use primarily by government employees to facilitate management of public lands. Examples include headquarters, ranger stations, dwellings, warehouses, guard stations, and Park entrances.

administrative use – a general term for authorized agency activity. Specifically, in the portion of the NCDE mapped as the primary conservation area for grizzly bears, administrative use is defined as motorized use by agency personnel or others authorized by agency officials to perform specified duties, of roads that are closed to public motorized use.

animal unit – is a standard unit used in calculating the relative grazing impact of different kinds of classes of livestock. One animal unit is defined as a 1000 lb beef cow with or without a nursing calf, with a daily dry matter forage requirement of 26 lb.

animal unit month – the amount of forage needed by an animal unit grazing for one month

anthropogenic food – foods or attractants having a human origin

attractants – anything that attracts a bear to a site

aversive conditioning – a learning process in which deterrents (e.g., rubber bullets, bean bags, cracker shells, dogs, etc.) are continually and consistently administered to a bear to reduce the frequency of an undesirable behavior

baseline – the baseline for the NCDE is defined as conditions as of December 31, 2011, as modified by changes in numbers that were evaluated and found to be acceptable through the Endangered Species Act Section 7 consultation with USFWS while the grizzly bear

was listed as Threatened. The baseline can also be updated to reflect changes allowed under the application rules, such as those caused by ownership changes or improved data.

bear management subunit – an area of a bear management unit, in the portion of the NCDE for grizzly bears mapped as the primary conservation area, representing the approximate size of an average annual female grizzly bear home range (e.g., 31-68 mi^2 (Mace and Roberts 2012)).

bear management unit – an area about 400 mi^2, in the portion of the NCDE for grizzly bears mapped as the primary conservation area, that meets yearlong habitat and population monitoring needs of both male and female grizzly bears.

boneyard – a site that is used for disposing of multiple animal carcasses.

capacity (of developed recreation sites within the NCDE primary conservation area) – the number of sites available in a campground; or the number of rooms available for lodging (as a commercial rental); or the number of cabins, bunkhouses or recreation residences available for overnight use (managed under a special use permit).

cover – the elements of the environment used by an animal for hiding, security, shelter, and access to foods. Cover varies depending upon the species or the time of year and may include a variety of vegetation types as well as topography. The amount and quality of cover needed depends on the animal's size, mobility, and reluctance or willingness to venture into relatively open areas.

demographic connectivity area (DCA) – an area in zone 1 intended to allow grizzly bear occupancy and potential dispersal beyond the NCDE to other recovery areas.

denning season – the typical time period during winter months in which most grizzly bears are hibernating in dens

dependent bear – an individual under the care of its mother, usually referring to a cub or yearling. Bears typically separate from their mother at age 2, therefore 2-year-old bears may be described as dependent during the spring and independent for the remainder of the year.

food conditioned – a bear that has learned to associate people, human activities, human-use areas, or food storage receptacles with anthropogenic foods

grazing allotment – a designated area of land that is available for livestock grazing and is represented on a map. A grazing allotment can include National Forest Service (NFS) and non-NFS lands. Permits are issued for the use of allotments or portions of allotments. The term "range unit" is used when referencing Flathead Indian Reservation lands. Allotments may be:

• active: Livestock grazing allotments that are in use, including pack and saddle stock allotments.

• closed: Areas having suitable livestock range that have been closed to livestock grazing by administrative decision or action.

• combined: An allotment that has been combined into another allotment and therefore, no longer exists as an independent allotment.

• vacant: An allotment that does not have a current grazing permit issued. (USFS Manual 2205)

grazing permit in non-use status – a grazing permit that is not being used. Non-use of a term grazing permit, in whole or in part, must be approved by a Forest Supervisor and is allowed for permittee convenience, resource protection or development, or range research (USFS Manual 2231.7).

grazing permit in inactive status – all permitted uses have expired, been cancelled, or been waived.

habituated bear – a bear that shows little to no overt reaction to people (Herrero et al. 2005) as a result of being repeatedly exposed to anthropogenic stimuli without substantial consequence

human-grizzly bear conflict – an interaction between a grizzly bear and human in which bears either do, or attempt to, damage property, kill or injure livestock, damage beehives, injure people, or obtain anthropogenic foods or attractants or agricultural crops.

hyperphagia – Increase in appetite and consumption of food during the fall associated with the need to gain adequate fat reserves for hibernation

independent bear – an individual that is greater than or equal to 2 years old and no longer under the care of its mother. This age class will include adults of reproductive age and subadults that are no reproductively mature.

management grizzly bear – any grizzly bear involved in a grizzly bear-human conflict that results in an agency management response action.

management removal – lethal or non-lethal removal of a bear from the population by or at the direction of management personnel

motorized route – a road or trail that is designated for motorized use by the management agency

moving window analysis – a geographic information system software procedure that quantifies the density of roads and trails by incrementally moving a template across a digital map.

no surface occupancy (NSO) – a fluid mineral leasing stipulation that prohibits use or occupancy of the land surface in order to protect identified resource values. Lessees may develop the oil and gas or geothermal resources under the area restricted by this stipulation through use of directional drilling from sites outside the no surface occupancy area.

non-denning season – the time period from early spring to late fall when grizzly bears typically are not hibernating. Used for motorized access analyses, the season is April 1 through November 30 on the west side of the Continental Divide, and April 16 through November 30 on the east side of the Divide.

occupancy unit – one of the defined areas used to document presence of females with offspring within Zone 1, including the two DCAs and other units demarcated by political boundaries (i.e., State/Tribal boundaries and MFWP regional boundaries).

open motorized route density – a moving window analysis calculation that applies to the primary conservation area portion of the NCDE and includes Federal, State, and Tribal roads and motorized trails that are open to wheeled motor vehicle use by the public for any part of the non-denning season. See also moving window analysis.

primary conservation area – an area to be managed as a source area for the grizzly bear population. See page 37 for map.

recreation site – a defined, public recreation area. There are two categories for recreation sites: dispersed and developed.

• Developed recreation sites have agency improvements made out of manmade materials that are intended to provide for public recreation. Examples include, but are not limited to: ski areas, campgrounds, sites with cabins, huts, lodges, recreation residences, visitor centers, and trailheads.

• Dispersed recreation sites have minimal to no agency improvements made out of manmade materials. Dispersed sites may include outfitter camps or other primitive camping spots along a road, trail, water body, or at a road closure.

recovered population – a population that is able to survive on its own in the wild over the long-term.

regulatory mechanism – a requirement that is legally binding or enforceable and that has specific protective stipulations or standards.

road – a motor vehicle route more than 50 inches wide, unless identified and managed as a trail.

• decommissioned: The stabilization and restoration of an unneeded road to a more natural state. Decommissioned roads do not count towards Total Motorized Route Density (TMRD) as long as they meet the definition of impassable.

• impassable: A road that has been treated in such a manner that the road is blocked and there is little resource risk if road maintenance is not performed on a regular basis (self-

maintaining). These roads are not counted in the Total Motorized Route Density (TMRD) as long as the road (generally the first 50 to 300 feet) has been treated to make it inaccessible to wheeled motorized vehicles during the non-denning season. Roads may become impassable as a result of a variety of means, including but not limited to one or more of the following: natural vegetation growth, road entrance obliteration, scarified ground, fallen trees, boulders, culvert or bridge removal, etc. Impassable roads may remain on the inventoried road system if use of the road is anticipated at some point in the future.

• temporary: A road necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road and that is not included in a forest transportation atlas (36 CFR 212.1). In the NCDE primary conservation area, temporary roads will meet the definition of impassable when no longer needed for the project.

running average – a method for computing the average of a stream of numbers for a specified period. For example, a six-year running average computes the mean for the values in the current year plus the previous five years. A running average is commonly used with time series data to smooth out short-term fluctuations and highlight longer-term trends or cycles.

secure core – an area of the NCDE primary conservation area more than 0.31 miles (500 meters) from a route open to wheeled motorized use during the grizzly bear non-denning season, or a gated route, and that is greater than or equal to 2,500 acres (3.91 mi^2 (10.12 km^2) in size. Roads restricted with physical barriers (not by gates or signs only), decommissioned roads, impassable roads, temporary roads, over-the-snow motorized routes/areas, and non-motorized trails are allowed within secure core, unless otherwise restricted (e.g., by other national forest plan direction).

total motorized route density – a moving window analysis calculation that applies to the primary conservation area portion of the NCDE and includes Federal, State, and Tribal roads and motorized trails that do not meet the definition of an impassable route. See also moving window analysis.

Total reported and unreported mortalities (TRU mortality) – an estimate of the total number of mortalities of independent bears within the DMA, by sex, representing the sum of documented management removals, documented radio-marked deaths, and an estimate of other reported and unreported mortality calculated using the Cherry et al. (2002) method based on reported mortalities (excluding management removals and radio-marked removals) and the reporting rate observed among radio-marked bears.

translocation – the capture and transport of a bear from the site of capture to a different location for release

unacceptable aggression – bear behavior that includes active predation on humans, approaching humans or human use areas in an aggressive way; aggressive behavior when the bear is unprovoked by self-defense, defense of young, defense of foods, or in a surprise encounter

visual screening – vegetation and topography providing visual obstruction capable of hiding a grizzly bear from view

LITERATURE CITED

Anderson, C. R., Jr., M. A. Ternent, and D. S. Moody. 2002. Grizzly bear-cattle interactions on two grazing allotments in northwest Wyoming. Ursus 13:247-256.

Aune, K., and W. Kasworm. 1989. Final report East Front grizzly studies. Montana Department of Fish, Wildlife, and Parks, Helena, Montana, USA.

Aune, K. E., R. D. Mace, and D. W. Carney. 1994. The reproductive biology of female grizzly bears in the Northern Continental Divide Ecosystem with supplemental data from the Yellowstone Ecosystem. International Conference on Bear Research and Management 9:451-458.

Bartlein, P. J., C. Whitlock, and S. L. Shafer. 1997. Future climate in the Yellowstone National Park region and its potential impact on vegetation. Conservation Biology 11:782-792.

Bentz, B. J., J. Regniere, C. J. Fettig, E. M. Hansen, J. L. Hayes, J. A. Hicke, R. G. Kelsey, J. F. Negron, and S. J. Seybold. 2010. Climate change and bark beetles in the western United States and Canada: direct and indirect effects. Bioscience 60:602-613.

Blackfeet Nation. 2008. Blackfeet forest management plan, 2009-2023. Blackfeet Nation, Browning, Montana, USA.

Blanchard, B. M. and R. R. Knight. 1991. Movements of Yellowstone grizzly bears. Biological Conservation 58:41-67.

Blanchard, B. and R. R. Knight. 1996. Effects of wildfire on grizzly bear movements and food habits. Pages 117-122 in J.M. Greenlee, editor. The ecological implications of fire in Greater Yellowstone. Proceedings of the 2nd biennial conference on the Greater Yellowstone Ecosystem. 1993. Yellowstone National Park, Wyoming. International Association of Wildland Fire. Fairfield, Washington.

BLM. 1987. Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program, management guidelines for selected species. BLM-MT PT-87-003-4111. Bureau of Land Management, Lewistown District. 71 pp.

Boulanger, J., & Stenhouse, G. B. (2014). The impact of roads on the demography of grizzly bears in Alberta. PLoS ONE, 9(12), 22.

Boyce, M. S., B. M. Blanchard, R. R. Knight, and C. Servheen. 2001. Population viability for grizzly bears: a critical review. International Association for Bear Research and Management Monograph Series Number 4.

British Columbia Office of the Premier. 2010. British Columbia and Montana partner on environment and clean energy. News release, February 18, 2010.

Cayan, D. R., S. A. Kammerdiener, M. D. Dettinger, J. M. Caprio, and D. H. Peterson. 2001. Changes in the onset of spring in the western United States. Bulletin of the American Meteorological Society 82:399-415.

Chapman, J. A., J. I. Romer, and J. Stark. 1955. Ladybird beetles and army cutworm adults as food for grizzly bears in Montana. Ecology 36:156-158.

Confederated Salish and Kootenai Tribes. 2000. Flathead Indian Reservation forest management plan. Pablo, Montana, USA.

Costello, C. M., R. D. Mace, and L. Roberts. 2016. Grizzly bear demographics in the Northern Continental Divide Ecosystem, Montana: research results (2004–2014) and suggested techniques for management of mortality. Montana Department of Fish, Wildlife and Parks. Helena. 121 pp.

Costello, C. M., R. D. Mace, and L. Roberts. 2016. Grizzly bear demographics in the Northern Continental Divide Ecosystem, Montana: research results (2004–2014) and suggested techniques for management of mortality. Montana Department of Fish, Wildlife and Parks. Helena.

Costello, C. M., and L. L. Roberts. 2016. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2015. Montana Fish, Wildlife & Parks, 490 N. Meridian Road. Kalispell.

Costello, C. M., and L. L. Roberts. 2017. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2016. Montana Fish, Wildlife & Parks, 490 N. Meridian Road. Kalispell.

Costello, C. M., and L. L. Roberts. 2018. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2017. Montana Fish, Wildlife & Parks, 490 N. Meridian Road. Kalispell.

Craighead, F. C., Jr., and J. J. Craighead. 1972. Grizzly bear prehibernation and denning activities as determined by radiotracking. Wildlife Monographs 32:1-35.

Craighead, J. J., and J. A. Mitchell. 1982. Grizzly bear. Pages 515-556 in Wild mammals of North America: biology, management, and economics. The Johns Hopkins University Press, Baltimore, Maryland, USA.

Craighead, J. J., J. S. Sumner, and G. B. Scaggs. 1982. A definitive system for analysis of grizzly bear habitat and other wilderness resources. Monograph No. 1. Wildlife-Wildlands Institute, University of Montana Foundation, Missoula, Montana, USA.

Craighead, L., D. Paetkau, H.V. Reynolds, E.R. Vyse, and C. Strobeck. 1995. Microsatellite analysis of paternity and reproduction in arctic grizzly bears. The Journal of Heredity 86(4):255-261.

DNRC. 2011. Habitat Conservation Plan for Forested State Trust Lands (amended 2018). Montana Department of Natural Resources and Conservation. Forest Management Bureau, Missoula, Montana, USA. September 2010. http://dnrc.mt.gov/divisions/trust/forest-management/hcp

Doak, D.F. 1995. Source-sink models and the problem of habitat degradation: general models and applications to the Yellowstone grizzly. Conservation Biology 9:1370-1379.

Dood, A. R., S. J. Atkinson, and V. J. Boccadori. 2006. Grizzly bear management plan for western Montana: Final programmatic environmental impact statement 2006-2016. Montana Department of Fish, Wildlife and Parks, Helena, Montana, USA.

Duffy, P. B., R. W. Arritt, J. Coquard, W. Gutowski, J. Han, J. Iorio, J. Kim, L.-R. Leung, J. Roads, and E. Zeledon. 2006. Simulations of present and future climates in the western United States with four nested regional climate models. Journal of Climate 19:873-895.

Fagre, D. B., D. L. Peterson, and A. E. Hessl. 2003. Taking the pulse of mountains: Ecosystem responses to climatic variability. Climatic Change 59:263-282.

Farley, S.D., and C.T. Robbins. 1994. Development of two methods to estimate body composition of bears. Canadian Journal of Zoology 72:220–226.

Felicetti, L. A., C. C. Schwartz, R. O. Rye, K. A. Gunther, J. G. Crock, M. A. Haroldson, L. Waits, and C. T. Robbins. 2004. Use of naturally occurring mercury to determine the importance of cutthroat trout to Yellowstone grizzly bears. Canadian Journal of Zoology 82:493-501.

Felicetti, L. A., C. C. Schwartz, R. O. Rye, M. A. Haroldson, K. A. Gunther, D. L. Phillips, and C. T. Robbins. 2003. Use of sulfur and nitrogen stable isotopes to determine the importance of whitebark pine nuts to Yellowstone grizzly bears. Canadian Journal of Zoology 81:763-770.

Forman, R. T., and L. E. Alexander. 1998. Roads and their ecological effects. Annual Review of Ecology and Systematics 29:207-231.

Gallatin National Forest. 2006. Gallatin National Forest travel management plan – Record of decision and Final Environmental Impact Statement. Gallatin National Forest, Bozeman, MT, USA.

Graves, T., and V. Reams, editors. 2001. Record of the snowmobile effects on wildlife: Monitoring protocols workshop. April 10-12, 2001, Denver, CO, USA.

Graves, T. A. 2002. Spatial and temporal response of grizzly bears to recreational use on trails. Thesis. University of Montana, Missoula.

Gunther, K. A., M. A. Haroldson, K. Frey, S. L. Cain, J. Copeland, and C. C. Schwartz. 2004. Grizzly bear-human conflicts in the Greater Yellowstone ecosystem, 1992-2000. Ursus 15:10-22.

Hamer, D., and S. Herrero. 1987. Grizzly bear food and habitat in the front ranges of Banff National Park, Alberta. International Conference on Bear Research and Management 7:199-213.

Harding, L., and J. A. Nagy. 1980. Responses of grizzly bears to hydrocarbon exploration on Richards Island, Northwest Territories, Canada. Pages 277-280 in Bears: their Biology and Management. Proceedings of the 4th International Conference on Bear Research and Management, Kalispell, Montana, USA.

Haroldson, M. A., M. A. Ternent, K. A. Gunther, and C. C. Schwartz. 2002. Grizzly bear denning chronology and movements in the greater Yellowstone ecosystem. Ursus 13:29-37.

Hegg, S. J., K. Murphy, and D. Bjornlie. 2010. Grizzly bears and snowmobile use: a summary of monitoring a grizzly den on Togwotee Pass. Yellowstone Science 18:23-28.

Herrero, S., T. Smith, T.D. DeBruyn, K. Gunther, and C.A. Matt. 2005. Brown bear habituation to people—safety, risks, and benefits. Wildlife Society Bulletin, 33: 362-373.

Hewitt, D.G., and C.T. Robbins. 1996. Grizzly bear food habitat from fecal analysis. Wildlife Society Bulletin 24:547–550.

Hilderbrand, G.V., S.D. Farley, C.T. Robbins, T.A. Hanley, K. Titus, and C. Servheen. 1996. Use of stable isotopes to determine diets of living and extinct bears. Canadian Journal of Zoology 74:2080-2088.

Hilderbrand, G. V., C. C. Schwartz, C. T. Robbins, M. E. Jacoby, T. A. Hanley, S. M. Arthur, and C. Servheen. 1999. The importance of meat, particularly salmon, to body size, population

productivity, and conservation of North American brown bears. Canadian Journal of Zoology 77:132-138.

Hilderbrand, G., S. Farley, and C. Robbins. 1998. Predicting body condition of bears via two field methods. Journal of Wildlife Management 62(1):406-409.

Hopkins III, J.B., S. Herrero, R.T. Shideler, K.A. Gunther, C.C. Schwartz, and S.T. Kalinowski. 2010. A proposed lexicon of terms and concepts for human–bear management in North America. Ursus, 21: 154-168.

Interagency Grizzly Bear Committee. 1986. Interagency grizzly bear guidelines. Missoula, Montana, USA. 100pp.

Interagency Grizzly Bear Committee. 1994. Interagency grizzly bear committee taskforce report: grizzly bear/motorized access management. Missoula, Montana, USA.

Interagency Grizzly Bear Committee. 1998. Interagency Grizzly Bear Committee Taskforce Report: Grizzly bear/motorized access management. Missoula, Montana, USA.

Interagency Grizzly Bear Committee. 2001. Support for the concept of linkage zones, signed memo.

Jacoby, M. E., G. V. Hilderbrand, C. Servheen, C. C. Schwartz, S. M. Arthur, T. A. Hanley, C. T. Robbins, and R. Michener. 1999. Trophic relations of brown and black bears in several western North American ecosystems. Journal of Wildlife Management 63:921-929.

Johnson, C. J., M. S. Boyce, C. C. Schwartz, and M. A. Haroldson. 2004. Modeling survival: application of the Andersen-Gill model to Yellowstone grizzly bears. Journal of Wildlife Management 68:966-978.

Johnson, H.E., D.L. Lewis, T.L. Verzuh, C.F. Wallace, R.M. Much, L.K. Willmarth, and S.W. Breck. 2018. Human development and climate affect hibernation in a large carnivore with implications for human-carnivore conflicts. Journal of Applied Ecology 55:663–672.

Jonkel, C. 1980. Grizzly bears and livestock. Western Wildlands 6:11-14.

Jonkel, J. J. 1993. A manual for handling bears for managers and researchers. U.S. Fish and Wildlife Service, Missoula, Montana, USA.

Jope, K. L. 1985. Implications of grizzly bear habituation to hikers. Wildlife Society Bulletin 13:32-37.

Joyce, L.A., M. Talbert, D. Sharp, and J. Stevenson. 2018. Historical and projected climate in the Northern Rockies Region. Pages 17–23 in J.E. Halofsky, D.L. Peterson, eds. Climate change in the rocky mountain ecosystems. Advances in Global Change Research 63. doi: 10.1007/978-3-319-56928-4_2.

Judd, S. L., R. R. Knight, and B. M. Blanchard. 1986. Denning of grizzly bears in the Yellowstone National Park area. Pages 111-117 in Bears: their biology and management. Proceedings of the 6th International Conference on Bear Research and Management, Grand Canyon, Arizona, USA.

Kamath, P. L., M. A. Haroldson, G. Luikart, D. Paetkau, C. Whitman, and F. T. van Manen. (2015). Multiple estimates of effective population size for monitoring a long-lived vertebrate: An application to Yellowstone grizzly bears. Molecular Ecology 24(22), 5507-5521.

Kasworm, W. F., and T. L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. International Conference on Bear Research and Management 8:79-84.

Kendall, K. C. 1986. Grizzly and black bear feeding ecology in Glacier National Park, Montana. Progress Report 1982-1985. USDI National Park Service, Glacier National Park, Montana, USA.

Kendall, K. C., A. C. Macleod, K. L. Boyd, J. Boulanger, J. A. Royle, W. F. Kasworm, D. Paetkau, M. F. Proctor, K. Annis, and T. A. Graves. 2016. Density, distribution, and genetics structure of grizzly bears in the Cabinet-Yaak Ecosystem. Journal of Wildlife Management 80: 314-331.

Kendall, K. C., A. C. MacLeod, K. L. Boyd, J. Boulanger, J. A. Royle, W. F. Kasworm, D. Paetkau, M. F. Proctor, K. Annis, and T. A. Graves. 2016. Density, distribution, and genetic structure of grizzly bears in the Cabinet-Yaak Ecosystem. Journal of Wildlife Management 80(2):314–331.

Kendall, K. C., and S. F. Arno. 1990. Whitebark pine – an important but endangered wildlife resource. Pages 264-273 in W. C. Schmidt and K. J. McDonald, compilers. Proceedings–Symposium on whitebark pine ecosystems: ecology and management of a high-mountain resource. USDA Forest Service, Intermountain Research Station, General Technical Report INT-270, Ogden, Utah, USA.

Kendall, K. C., and R. E. Keane. 2001. Whitebark pine decline: infection, mortality, and population trends. Pages 221-242 in D. F. Tomback, S. F. Arno, and R. E. Keane, editors. Whitebark pine communities: ecology and restoration. Island Press, Washington, D.C., USA.

Kendall, K. C., J. B. Stetz, J. Boulanger, A. C. Macleod, D. Paetkau, and G. C. White. 2009. Demography and genetic structure of a recovering grizzly bear population. Journal of Wildlife Management 73:3-17.

Kendall, K. C., J. B. Stetz, D. A. Roon, L. P. Waits, J. B. Boulanger, and D. Paetkau. 2008. Grizzly bear density in Glacier National Park, Montana. Journal of Wildlife Management 72:1693-1705.

Kerns, B. K., S. J. Alexander, and J. D. Bailey. 2004. Huckleberry abundance, stand conditions, and use in Western Oregon: Evaluating the role of forest management. Economic Botany 58:668-678.

Klaver, R. W., J. J. Claar, D. B. Rockwell, H. R. Mays, and C. F. Acevedo. 1986. Grizzly bears, insects, and people: Bear management in the McDonald Peak region, Montana. Pages 204-211 in G.P. Contreras and K.E. Evans, compilers. Proceedings—grizzly bear habitat symposium. U.S. Forest Service General Technical Report INT-207.

Knight, R. R., B. M. Blanchard, and L. L. Eberhardt. 1988. Mortality patterns and populations sinks for Yellowstone grizzly bears, 1973-1985. Wildlife Society Bulletin 16:121-125.

Lamb, C.T., G. Mowat, A. Reid, L. Smit, M. Proctor, B.N. McLellan, S.E. Nielsen, and S. Boutin. 2018. Effects of habitat quality and access management on the density of a recovering grizzly bear population. Journal of Applied Ecology 2018:1-12.

LeFranc, M. N., Jr., M. B. Moss, K. A. Patnode, and W. C. Sugg III, editors. 1987. Grizzly bear compendium. The National Wildlife Federation, Washington, D.C., USA.

Lindenmayer, D. B., and J. Fischer. 2006. Habitat fragmentation and landscape change: an ecological and conservation synthesis. Island Press, Washington, D.C., USA.

Leung, L. R., Y. Qian, X. Bian, W. M. Washington, J. Han, and J. O. Roads. 2004. Mid century ensemble regional climate change scenarios for the western United States. Climatic Change 62:75-113.

Linnell, J. D. C., J. E. Swenson, R. Andersen, and B. Barnes. 2000. How vulnerable are denning bears to disturbance? Wildlife Society Bulletin 28:400-413.

Mace, R. D., D. W. Carney, T. Chilton-Radandt, S. A. Courville, M. A. Haroldson, R. B. Harris, J. Jonkel, B. McLellan, M. Madel, T. L. Manley, C. C. Schwartz, C. Servheen, G. Stenhouse, J. S. Waller, E. Wenum. 2012. Grizzly bear population vital rates and trend in the Northern Continental Divide Ecosystem, Montana. Journal of Wildlife Management 76:119-128.

Mace, R. D and C. J. Jonkel. 1986. Local food habits of the grizzly bear in Montana. International Conference on Bear Research and Management 6:105-110.

Mace, R. D., S. Minta, T. Manley, and K. Aune. 1994. Estimating grizzly bear population size using camera sightings. Wildlife Society Bulletin 22:74-83.

Mace, R. D. and L. Roberts. 2011. Northern continental divide ecosystem grizzly bear monitoring team annual report, 2009-2010. Montana Fish Wildlife and Parks, Kalispell, Montana, USA.

Mace, R. D. and J. S. Waller. 1996. Grizzly bear distribution and human conflicts in Jewel Basin Hiking Area, Swan Mountains, Montana. Wildlife Society Bulletin 24:461-467.

Mace, R. D. and J. S. Waller. 1997a. Final report: grizzly bear ecology in the Swan Mountains, Montana. Montana Fish, Wildlife & Parks, Helena, Montana, USA.

Mace, R. D. and J.S. Waller. 1997b. Spatial and temporal interaction of male and female grizzly bears in northwestern Montana. Journal of Wildlife Management 61:39-52.

Mace, R. D. and J. S. Waller. 1998. Demography and population trend of grizzly bears in the Swan Mountains, Montana. Conservation Biology, Vol. 12, No. 5 (Oct., 1998), pp. 1005-1016.

Mace, R. D., J. S. Waller,T. L. Manley, K. Ake, and W. T. Wittinger. 1999. Landscape evaluation of grizzly bear habitat in western Montana. Conservation Biology 13:367-377.

Mace, R. D., J. S. Waller, T. L. Manley, L. J. Lyon, and H. Zuuring. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, Montana. Journal of Applied Ecology 33:1395-1404.

Mace, R. D., J. S. Waller, T. M. Manley, K. Ake, and W. T. Wittinger. 1999. Lanscape evaluation of grizzly bear habitat in western Montana. Conservation Biology 13:367–377.

Mace, R. 2005. Interagency population monitoring plan for grizzly bears in the Northern Continental Divide Ecosystem, Montana. Montana Fish, Wildlife and Parks, Kalispell.

Madel, M. 2009. Rocky Mountain Front grizzly bear management programs: 2008 annual report. Montana Fish, Wildlife & Parks, Region four, Great Falls.

Martinka, C. J. and K. C. Kendall. 1986. Grizzly bear habitat research in Glacier National Park, Montana. Pages 19-23 in Proceedings of the Grizzly Bear Habitat Symposium, USDA Forest Service General Technical Report INT-207.

Mattson, D. J. 1990. Human impacts on bear habitat use. Pages 33-56 in Bears: their biology and management. Proceedings of the 8th International Conference on Bear Research and Management, Victoria, British Columbia, Canada.

Mattson, D. J. 2000. Causes and consequences of dietary differences among Yellowstone grizzly bears (Ursus arctos). Ph. D. Dissertation, University of Idaho, Moscow, USA.

Mattson, D. J., B. M. Blanchard, and R. R. Knight. 1991a. Food habits of Yellowstone grizzly bears, 1977-1987. Canadian Journal of Zoology 69:1619-1629.

Mattson, D.J., B.M. Blanchard, and R.R. Knight. 1992. Yellowstone grizzly bear mortality, human habituation, and whitebark pine seed crops. Journal of Wildlife Management 56:432-442.

Mattson, D. J., C. M. Gillin, S. A. Benson, and R. R. Knight. 1991b. Bear use of alpine insect aggregations in the Yellowstone ecosystem. Canadian Journal of Zoology 69:2430-2435.

Mattson, D. J., S. Herrero, R. G. Wright, and C. M. Pease. 1996. Science and management of Rocky Mountain grizzly bears. Conservation Biology 10:1013-1025.

Mattson, D. J., and R. R. Knight. 1991. Effects of access on human-caused mortality of Yellowstone grizzly bears. Interagency Grizzly Bear Study Team Report, Bozeman, Montana, USA.

Mattson, D. J., R. R. Knight, and B. M. Blanchard. 1987. The effects of developments and primary roads on grizzly bear habitat use in Yellowstone National Park, Wyoming. Pages 259-273 in Bears: their biology and management. Proceedings of the 7th International Conference on Bear Research and Management, Williamsburg, Virginia, USA.

Mattson, D. J., and T. Merrill. 2002. Extirpations of grizzly bears in the contiguous United States, 1850-2000. Conservation Biology 16:1123-1136.

McLellan, B. N. 1989. Dynamics of a grizzly bear population during a period of industrial resource extraction. II. Mortality rates and causes of death. Canadian Journal of Zoology 67:1861-1864.

McLellan, B. N. 1994. Density-dependent population regulation of brown bears. Pages 15-24 in M. Taylor, editor. Density-dependent population regulation of black, brown, and polar bears. 8th International Conference on Bear Research and Management, monograph series number 3.

McLellan, B. N., and F. W. Hovey. 1995. The diet of grizzly bears in the Flathead River drainage of southeastern British Columbia. Canadian Journal of Zoology 73:704-712.

McLellan, B. N., and F. W. Hovey. 2001. Natal dispersal of grizzly bears. Canadian Journal of Zoology 79:838-844.

McLellan, B. N., F. W. Hovey, R. D. Mace, J. G. Woods, D. W. Carney, M. L. Gibeau, W. L. Wakkinen, and W. F. Kasworm. 1999. Rates and causes of grizzly bear mortality in the interior mountains of British Columbia, Alberta, Montana, Washington, and Idaho. Journal of Wildlife Management 63:911-920.

McLellan, B., Hovey, F., Mace, R., Woods, J., Carney, D., Gibeau, M., Kasworm, W. (1999). Rates and causes of grizzly bear mortality in the Interior Mountains of British Columbia, Alberta, Montana, Washington, and Idaho. Journal of Wildlife Management, 63(3), 911-920.

McLellan, B. N., and D. M. Shackleton. 1988. Grizzly bears and resource-extraction industries: effects of roads on behaviour, habitat use and demography. Journal of Applied Ecology 25:451-460.

McLellan, B. N., and D. M. Shackleton. 1989. Grizzly bears and resource-extraction industries: habitat displacement in response to seismic exploration, timber harvesting and road maintenance. Journal of Applied Ecology 26:371-380.

McWethy, D. B., S. T. Gray, P. E. Higuera, J. S. Litell, G. T. Pederson, A. J. Ray, and C. Whitlock. 2010. Climate and terrestrial ecosystem change in the U.S. Rocky Mountains and Upper Columbia Basin: Historical and future perspectives for natural resource management. U.S. Department of the Interior, National Park Service Natural Resource Report NPS/GRYN/NRR–2010/260, Fort Collins, Colorado, USA.

Mikle, N., T.A. Graves, R. Kovach, K.C. Kendall, and A.C. Macleod. 2016. Demographic mechanisms underpinning genetic assimilation of remnant groups of a large carnivore. Proceedings of Royal Society B 283:20161467.

Miller, C. R., and L. P. Waits. 2003. The history of effective population size and genetic diversity in the Yellowstone grizzly (Ursus arctos): Implications for conservation. Proceedings of the National Academy of Sciences 100:4334-4339.

Mills, L. S. 2007. Conservation of wildlife populations: Demography, genetics, and management. Blackwell Publishing, Malden, Massachusetts, USA.

Montana Department of Natural Resources and Conservation (DNRC). 2010. Final Environmental Impact Statement for the Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Kalispell, Montana, USA.

Montana Fish, Wildlife & Parks (MFWP). 2002. Grizzly bear management plan for southwestern Montana 2002-2012. Helena, Montana, USA.

Montana Fish, Wildlife & Parks (MFWP). 2005. Montana comprehensive fish and wildlife conservation strategy. Helena, Montana, USA.

Montana Fish, Wildlife & Parks. 2012. Fish and Wildlife Recommendations for Subdivision Development in Montana: A Working Document. Montana Fish, Wildlife & Parks, Helena, Montana. 174 pp.

Morehouse, A.T., T.A. Graves, N. Mikle, and M.S. Boyce. 2018. Nature vs. nurture: Evidence for social learning of conflict behavior in grizzly bears. PLoS ONE 11:e0165425. Doi:10.1371/journal.pone.0165425.

Mowat, G., and D. C. Heard. 2006. Major components of grizzly bear diet across North America. Canadian Journal of Zoology 84:473-489.

Munro, R. H. M., S. E. Nielsen, M. H. Price, G. B. Stenhouse, and M. S. Boyce. 2006. Seasonal and diel patterns of grizzly bear diet and activity in west-central Alberta. Journal of Mammalogy 87:1112-1121.

Nitschke, C. R., and J. L. Innes. 2008. Climatic change and fire potential in south-central British Columbia, Canada. Global Change Biology 14:841-855.

Nowak, R. M., and J. L. Paradiso. 1983. Walker's Mammals of the World, 4th edition. The Johns Hopkins University Press, Baltimore, Maryland, USA.

Orme, M. L., and R. G. Williams. 1986. Coordinating livestock and timber management with the grizzly bear in situation 1 habitat, Targhee National Forest. Pages 195-203 in G.P. Contreras and K.E. Evans, compilers. Proceedings—grizzly bear habitat symposium. U.S. Forest Service General Technical Report INT-207.

Peck, C. P, F. T. van Manen, C. M. Costello, M. A. Haroldson, L. A. Landenburger, L. L. Roberts, D. D. Bjornlie, and R. D. Mace. 2017. Potential paths for male-mediated gene flow to and from an isolated grizzly bear population. Ecosphere 8(10):e01969. 10/1002.ecs2/1969.

Peck, C. P., F. T. van Manen, C. M. Costello, M. A. Haroldson, L. A. Landenburger, L. L. Roberts, D. D. Bjornlie, and R. D. Mace. 2017. Potential paths for male-mediated gene flow to and from an isolated grizzly bear population. Ecosphere 8:e01969.

Pederson, G. T., S. T. Gray, T. Ault, W. Marsh, D. B. Fagre, A. G. Bunn, C. A. Woodhouse, and L. J. Graumlich. 2011. Climatic controls on the snowmelt hydrology of the northern Rocky Mountains. Journal of Climate 24:1666-1687.

Pierson J. C., T. A. Graves, S. C. Banks, K. C. Kendall, and D. B. Lindenmayer. Relationship between effective and demographic population size in continuously distributed populations. Evol. Appl. 2018; 00:1–14. https://doi.org/10.1111/eva.12636

Pigeon, K.E., S.D. Côté, and G. Stenhouse. 2016a. Assessing den selection and den characteristics of grizzly bears. The Journal of Wildlife Management 80:884–893.

Pigeon, K.E., G. Stenhouse, and S.D. Côté. 2016b. Drivers of hibernation: linking food and weather to denning behaviour of grizzly bears. Behavioral Ecology and Sociobiology 70:1745–1754.

Proctor, M. F., B. N. McLellan, C. Strobeck, and R. M. R. Barclay. 2004. Gender-specific dispersal distances of grizzly bears estimated by genetic analysis. Canadian Journal of Zoology 1108-1118.

Proctor, M. F., B. N. McLellan, C. Strobeck, and R. M. R. Barclay. 2005. Genetic analysis reveals demographic fragmentation of grizzly bears yielding vulnerably small populations. Proceedings of the Royal Society, London 272:2409-2416.

Proctor, M. F., D. Paetkau, B. N. McLellan, G. B. Stenhouse, K. C. Kendall, R. D. Mace, W. F. Kasworm, C. Servheen, C. L. Lausen, M. L. Gibeau, W. L. Wakkinen, M. A. Haroldson, G. Mowat, C. D. Apps, L. M. Ciarniello, R. M. R. Barclay, M. S. Boyce, C. C. Swartz, C. Strobeck. 2012. Population fragmentation and inter-ecosystem movements of grizzly bears in western Canada and the northern United States. Wildlife Monographs 180:1-46.

Reynolds, P.E., H.V. Reynolds, and E.H. Follmann. 1986. Responses of grizzly bears to seismic surveys in northern Alaska. Pages 169-175 in Bears: their biology and management. Proceedings of the 6th International Conference on Bear Research and Management, Grand Canyon, AZ, USA.

Robbins, C.T., J.K. Fortin, K.D. Rode, S.D. Farley, L.A. Shipley, and L.A. Felicetti. 2007. Optimizing protein intake as a foraging strategy to maximize mass gain in an omnivore. Oikos 116:1675–1682.

Robbins, C. T., M. Ben-David, J. K. Fortin, and O. L. Nelson. 2012. Maternal condition determines birth date and growth of newborn bear cubs. Journal of Mammalogy 93:540–546.

Robbins, C. T., C. C. Schwartz, and L. A. Felicetti. 2004. Nutritional ecology of ursids: a review of newer methods and management implications. Ursus 15:161-171.

Roberts, D.R., S.E. Nielsen, and G.B. Stenhouse. 2014. Idiosyncratic responses of grizzly bear habitat to climate change based on projected food resource changes. Ecological Applications 24:1144–1154

Rode, K. D., and C. T. Robbins. 2000. Why bears consume mixed diets during fruit abundance. Canadian Journal of Zoology 78:1640-1645.

Rodriguez, C., J. Naves, A. Fernandez-Gil, J. R. Obeso, and M. Delibes. 2007. Long-term trends in food habits of relict brown bear population in northern Spain: the influence of climate and local factors. Environmental Conservation 34:36-44.

Schallenberger, A., and C.J. Jonkel. 1980. Rocky Mountain east front grizzly studies, 1979. Annual report. Border Grizzly Project Special Report No. 39. Border Grizzly Project, Missoula, Montana, USA.

Schoen, J. W., L. R. Beier, J. W. Lentfer, and L. J. Johnson. 1987. Denning ecology of brown bears on Admiralty and Chichagof Islands. Pages 293-304 in Bears: their biology and management. Proceedings of the 7th International Conference on Bear Research and Management, Williamsburg, Virginia, USA.

Schwartz, C. C., M. A. Haroldson, and S. Cherry. 2006. Reproductive performance of grizzly bears in the Greater Yellowstone Ecosystem, 1983-2002. Pages 18-24 in C. C. Schwartz, M. A. Harolson, G. C. White, R. B. Harris, S. Cherry, K. A. Keating, D. Moody, and C. Servheen, eds. Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem. Wildlife Monographs 161.

Schwartz, C. C., M. A. Haroldson, and G. C. White. 2010. Hazards affecting grizzly bear survival in the Greater Yellowstone Ecosystem. Journal of Wildlife Management 74:654-667.

Schwartz, C. C., K. A. Keating, H. V. Reynolds, III, V. G. Barnes, Jr., R. A. Sellers, J. E. Swenson, S. D. Miller, B. N. McLellan, J. Keay, R. McCann, M. Gibeau, W. F. Wakkinen, R. D. Mace, W. Kasworm, R. Smith, and S. Herrero. 2003a. Reproductive maturation and senescence in the female brown bear. Ursus 14:109-119.

Schwartz, C. C., S. D. Miller, and M. A. Haroldson. 2003b. Grizzly/brown bear. Pages 556 586 in G. Feldhamer, B. Thompson, and J. Chapman, editors. Wild mammals of North America: biology, management, and conservation. Johns Hopkins University Press, Baltimore, Maryland, USA.

Scott, J. M., D. D. Goble, J. A. Wiens, D. S. Wilcove, M. Bean, and T. Male. 2005. Recovery of imperiled species under the Endangered Species Act: the need for a new approach. Frontiers in Ecology and the Environment 3:383-389.

Servheen, C. 1981. Grizzly bear ecology and management in the Mission Mountains, Montana. Ph. D. dissertation. University of Montana, Missoula, Montana, USA.

Servheen, C. 1983. Grizzly bear food habits, movements, and habitat selection in the Mission Mountains, Montana. Journal of Wildlife Management 47:1026-1035.

Servheen, C. 2010. Email from Chris Servheen, U.S. Fish and Wildlife Service Grizzly Bear Recovery Coordinator to Rebecca Shoemaker, U.S. Fish and Wildlife Service Research Assistant.

Servheen, C., and M. Cross. 2010. Climate change impacts on grizzly bears and wolverines in the northern U.S. and transboundary Rockies: Strategies for conservation. Report on a workshop held September 13-15, 2010, in Fernie, British Columbia, Canada.

Servheen, C., M. Haroldson, K. Gunther, K. Barber, M. Brucino, M. Cherry, B. DeBolt, K. Frey, L. Hanauska-Brown, G. Losinski, C. Schwartz, and B. Summerfield. 2004. Yellowstone mortality and conflicts reduction report. Presented to the Yellowstone Ecosystem Subcommittee April 7, 2004.

Shaffer, S. C. 1971. Some ecological relationships of grizzly bears and black bears of the Apgar Mountains in Glacier National Park, Montana. M. S. thesis, University of Montana, Missoula, Montana, USA.

Stenhouse, G., J. Dugas, J. Boulanger, D. Hobson and H. Purves. 2003. Grizzly bear cumulative effects analysis model review for the Regional Carnivore Management Group. Unpubl. Report. 33 pp.

Stewart, I. T., D. R. Cayan, and M. D. Dettinger. 2004. Changes in snowmelt runoff timing in western North America under a 'business as usual' climate change scenario. Climatic Change 62:217-232.

Stringham, S. F. 1990. Grizzly bear reproductive rate relative to body size. Pages 433-443 in Bears: their biology and management. Proceedings of the 8th International Conference on Bear Research and Management, Victoria, British Columbia, Canada.

Sumner, J. and J.J. Craighead. 1973. Grizzly bear habitat survey in the Scapegoat Wilderness, Montana. Montana Cooperative Wildlife Research Unit, Missoula, Montana, USA.]

Swenson, J. E., F. Sandegren, S. Brunberg, and P. Wabakken. 1997. Winter den abandonment by brown bears, Ursus arctos: causes and consequences. Wildlife Biology 3:35-38.

Teisberg, J.E., M.J. Madel, R.D. Mace, C.W. Servheen, and C.T. Robbins. 2015. Diet composition and body condition of Northern Continental Divide grizzly bears. Final Report.

USDA Forest Service. 1986a. Interagency grizzly bear guidelines. United States Forest Service, Washington, D.C., USA.

USDA Forest Service. 1986a. Helena National Forest Plan. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5352772.pdf.

USDA Forest Service. 1986b. Lewis and Clark National Forest Plan. Retrieved from https://www.fs.usda.gov/detail/lcnf/landmanagement/?cid=stelprdb5409100.

USDA Forest Service. 1986c. The Lolo National Forest Plan. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd477025.pdf.

USDA Forest Service. 2015. Land management plan, 2015 revision, Kootenai National Forest. Retrieved from https://www.fs.usda.gov/main/kootenai/landmanagement/planning, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3826663.pdf.

USDA Forest Service. 1986d. Flathead National Forest Plan. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5357688.pdf

USDA Forest Service. 2014. Biological Assessment for terrestrial wildlife species, Bob Marshall Wilderness outfitter and guide reissuance, Flathead, Lewis and Clark, Helena, and Lolo National Forests, including Appendix B. 45 pp.

USDA Forest Service. 2017. Final Environmental Impact Statement for the Flathead National Forest Revised Forest Plan and Forest Plan Amendments to Incorporate Habitat Management Direction for the Northern Continental Divide Ecosystem Grizzly Bear Population on the Helena-Lewis and Clark, Kootenai, and Lolo National Forests. Retrieved at https://www.fs.usda.gov/detailfull/flathead/home/?cid=stelprdb5422786&width=full

U. S. Fish and Wildlife Service. 1993. Grizzly bear recovery plan. Missoula, Montana, USA.

U. S. Fish and Wildlife Service. 1997. Biological opinion on amendment 19 to the Flathead National Forest plan. U. S. Fish and Wildlife Service, Montana Field Office, Helena, Montana, USA.

U.S. Fish and Wildlife Service. 2002. Biological Opinion on greater Yellowstone ecosystem snowmobile use consultation. Helena, MT, USA.

U. S. Fish and Wildlife Service. 2007. Final conservation strategy for the grizzly bear in the Greater Yellowstone Area. Interagency Conservation Strategy Team.

U.S. Fish and Wildlife Service. 2011. Record of Decision. Proposed Issuance of a Permit to Montana Department of Natural Resources Conservation, Authorizing Incidental Take of Endangered and Threatened Species on Forested Trust Lands in Western Montana. Kalispell, Montana, USA.

Van Daele, L. J., V. G. Jr Barnes, and J. L. Belant. 2012. Ecological flexibility of brown bears on Kodiak Island, Alaska. Ursus 23:21–29.

Van Daele, L. J., V. G. Barnes, and R. B. Smith. 1990. Denning characteristics of brown bears on Kodiak Island, Alaska. Pages 257-267 in Bears: their biology and management. Proceedings of the 8th International Conference on Bear Research and Management, Victoria, British Columbia, Canada.

Waller, J. S. 2005. Movements and habitat-use of grizzly bears along U. S. Highway 2 in northwestern Montana 1998-2001. Ph. D. dissertation. University of Montana, Missoula, Montana, USA.

Waller, J. S. and R. D. Mace. 1997. Grizzly bear habitat selection in the Swan Mountains, Montana. Journal of Wildlife Management 61:1032-1039.

Waller, J., and C. Servheen. 2005. Effects of Transportation Infrastructure on Grizzly Bears in Northwestern Montana. Journal of Wildlife Management 69(3):985-1000.

Walters, C. J. and C. S. Holling. 1990. Large-scale management experiments and learning by doing. Ecology 71:2060-2068.

Walther, G.-R. 2003. Plants in a warmer world. Perspectives in Plant Ecology, Evolution and Systematics 6:169-185.

Walther, G.-R., S. Berger, and M. T. Sykes. 2005. An ecological 'footprint' of climate change. Proceedings of the Royal Society B 272:1427-1432.

Walther, G.-R., E. Post, P. Convey, A. Menzel, C. Parmesan, T. J. C. Beebee, J.-M. Fromentin, O. Hoegh-Guldberg, and F. Bairlein. 2002. Ecological responses to recent climate change. Nature 416:389-395.

Waser, P. M., and W. T. Jones. 1983. Natal philopatry among solitary mammals. Quarterly Review of Biology 58:355-390.

White, D., Jr., K. C. Kendall, and H. D. Piction. 1998. Grizzly bear feeding activity at alpine army cutworm moth aggregation sites in northwest Montana. Canadian Journal of Zoology 76:221-227.

White, D., Jr., K. C. Kendall, and H. D. Picton. 1999. Potential energetic effects of mountain climbers on foraging grizzly bears. Wildlife Society Bulletin 27:146-151.

White, K.S., D.P. Gregovich, and T. Levi. 2018. Projecting the future of an alpine ungulate under climate change scenarios. Global Change Biology 24:1136–1149.

Whitlock, C., W. Cross, B. Maxwell, N. Silverman, and A.A. Wade. 2017. 2017 Montana climate assessment. Bozeman and Missoula MT: Montana State University and University of Montana, Montana Institute on Ecosystems. Doi:10.15788/m2ww8w.

Woods, J. G., D. Paetkau, D. Lewis, B. N. McLellan, M. Proctor, and C. Strobeck. 1999. Genetic tagging of free-ranging black and brown bears. Wildlife Society Bulletin 27:616-627.

Woodroffe, R. 2000. Predators and people: using human densities to interpret declines in large carnivores. Animal Conservation 3:165-173.

Zager, P., C. Jonkel, and J. Habeck. 1983. Logging and wildfire influence on grizzly bear habitat in northwestern Montana. Pages 124-132 in Bears: their biology and management. Proceedings of the 5th International Conference on Bear Research and Management, Madison, Wisconsin, USA.

LIST OF APPENDICES

Appendix 1 Response to Comments……172

Appendix 2 Methods to estimate vital rates and numbers of reported/unreported mortalities within the DMA……...235

Appendix 3 Procedure for calculating survival and mortality thresholds for demographic objective 2……237

Appendix 4 Habitat Baseline- Motorized Access in Each Bear Management Subunit……...248

Appendix 5 Habitat Baseline- Developed recreation sites in Each Bear Management Unit.....262

Appendix 6 Protocol Paper for Motorized Access Analyses Application Rule……..264

Appendix 7 Comparison Between 2011 NCDE Conservation Strategy Secure Core Levels and Security CORE Levels in Each Bear Management Subunit……284

Appendix 8 Detailed Summary of Current BLM Management Plan Direction Relevant to Grizzly Bears in the PCA, Management Zone 1, and 2 for the Butte, Lewiston, and Missoula Field Offices……..290

Appendix 9 Summary of Protective Measures in the DNRC Habitat Conservation Plan Outside of the PCA……..297

Appendix 10 Detailed Summary of DNRC Habitat Management Developed for Grizzly Bears in the PCA, Zone 1, and Zone 2……..300

Appendix 11 Bureau of Land Management Draft Habitat Standards for Management Zone 1……...318

Appendix 12 Lead Agencies and Tribes Responsible for Monitoring Population and Habitat Parameters under this Conservation Strategy……..326

APPENDIX 1

Response to Comments

Public Comments Draft NCDE Conservation Strategy (8/2013)
Conservation Strategy Response to Public Comments (2018)

Public Comments Organized by Topics:

Processes, Language, Regulatory and General Comments for Conservation Strategy and Delisting……...173

Habitat, Land Use, Development and Motorized Access/Travel……181

DNRC……..201

Private Lands……...207

Climate Change ……...208

Population, Mortality, Conflict and Bear Biology (Methodology)…….208

Post Delisting Management…….219

Monitoring……...223

Connectivity…….227

Economic…….231

Hunting……232

Processes, Language, Regulatory and General Comments for Conservation Strategy and Delisting

1. **Public Comment:** The SVCA should be introduced in Chapter 1.

   Response: *We added an introduction to the SVCA in Chapter 1, as suggested.*

2. **Public Comment:** Concerned/Disagreed about the overall approach to gb management described in the Strategy. FWS should develop a CS for the entire lower-48 States and should not delist any individual population until an interconnected metapopulation with 2,500–3,000 individuals (or even 5,000) is documented. This would correspond to a minimum effective population size of at least 500, as recommended by Soule 1980; Forman and Godron 1986. SVC cited Allendorf et al. 1991, Allendorf and Ryman 2010, Reed et al. 2003, and Bader 2000 to support this assertion that effective population size must be larger.

   Response: *Delisting requirements are under the purview of the USFWS. This Conservation Strategy is not a USFWS document but rather is a multi-agency document by the NCDE subcommittee and its purpose is to manage grizzly bears after they are delisted.*

3. **Public Comment:** By Court Order, the Service must develop HBRC for the NCDE, gather input from a workshop of independent scientists, and open them to a separate public process ***before*** finalizing the CS.

   Response: *The referenced court order does not require finalizing the Habitat-Based Recovery Criteria before the Conservation Strategy; the court order requires finalizing before a USFWS Final Rule. The USFWS held a workshop on the Habitat-Based Recovery Criteria in January 2018.*

4. **Public Comment:** Many commenters expressed their disapproval of delisting the grizzly bear in the NCDE. Others said grizzly bears are still at 2% of their original range, the same status as when listed under the ESA

   Response: *Delisting requirements are under the purview of the USFWS. This Conservation Strategy is not a USFWS document but rather is a multi-agency document by the NCDE subcommittee and its purpose is to manage grizzly bears after they are delisted.*

5. **Public Comment:** The Strategy should clearly layout the complete process for how it would be adopted and implemented, providing a "status" for each step: complete, require signing of MOU, and requiring formal incorporation through other processes.

   Response: *Chapter 1 indicates that agencies documented their commitment to implementing the Conservation Strategy by signing the MOU. Chapter 1 also includes a description of the regulatory framework surrounding the Conservation Strategy. The finalization, signing, and*

incorporation into other processes is complete and further steps are not necessary at this point. Chapter 5 outlines how revisions to the Conservation Strategy would occur.

6. **Public Comment:** Many commented that some of the language in the Conservation Strategy was too vague and weak (e.g., minimize, discourage, manage female survival generally >90).

   Response: *We reviewed and strengthened the language if needed, and believe that the commitments summarized here are strong and will maintain a healthy, recovered grizzly bear population.*

7. **Public Comment:** The MOU at the beginning should be revised to remove the last sentence, "This CS does not go into effect until all agencies have signed this document and the final rule delisting the NCDE grizzly population has been published in the FR." This commenter thought a "track record of implementation" before delisting is a better demonstration of "existing" regulatory mechanisms and consistent with the PECE policy about conservation strategies substituting for listing under the ESA, thereby increasing legal defensibility.

   Response: *While some parts of the Conservation Strategy, such as habitat management, are currently in effect, other parts of the Conservation Strategy, such as some management strategies in Chapters 2 and 4, would not be allowed in a listed population. Therefore, the Conservation Strategy cannot go into effect until the population is delisted from the ESA.*

8. **Public Comment:** There is somewhat of an inconsistency between Standard 2 as outlined on page 37 and Appendix 2, page 8. On page 37 units of measure are carried out to the 2nd decimal place, but to the 3rd decimal place on Page 8 of Appendix 2. I suggest you amend Appendix 2 and round to the 2nd decimal place for consistency. Carrying units of measure out to the third decimal place suggests an unrealistic level of certainty.

   Response: *We edited the document as suggested.*

9. **Public Comment:** As a listed species, bears found in Zone 2 receive section 7 consultation where they are "present." They would lose this upon delisting and the Strategy does nothing to offset this loss of a regulatory mechanism.

   Response: *It is correct that after delisting Section 7 consultation would no longer occur for grizzly bears in the PCA or Zones 1, 2, or 3. However, existing land management direction and associated regulatory mechanisms would continue to be applied in Zone 2, as committed to by the signatories to this Conservation Strategy and through existing statutory requirements.*

10. **Public Comment:** DCAs should extend all the way to other recovery zones instead of falling 5–30 miles short as the Ninemile DCA does with the CYE.

Response: *The Conservation Strategy delineated the DCAs to incorporate available public lands, particularly with existing roadless areas, that are adjacent to the PCA and appear to be capable of supporting female grizzly bears. The NCDE management zones are intended to encompass areas where any bears that are present are likely to have originated from the NCDE. After delisting of the NCDE population, any grizzly bears that are outside of the PCA or Zones 1, 2, and 3 would continue to have full protections under the ESA. Although the DCAs do not extend to the other recovery zones, they do extend to the boundary of Zone 1; therefore, bears that have moved outside of the DCAs towards other recovery zones to the west and southwest will still be protected as threatened under the ESA.*

11. **Public Comment:** We received many comments about the membership of the Coordinating Committee. The Coordinating Committee should include representatives from grizzly bear conservation organizations, land trusts, community-based groups, and other non-governmental organizations (NGOs), especially since this is not a decision-making body. These could be from groups that are not directly involved in grizzly bear litigation. Some suggested that local governing bodies be included as signatories.

    Response*: Involvement and input from NGOs is important. In addition to public involvement in meetings and agency and Tribal actions, the Conservation Strategy outlines specific ways these groups will be asked to participate on important habitat connectivity and sanitation/attractant mitigation working groups. These groups could provide help with outside resources, funding, projects enhancing habitat connectivity, and on-the-ground conflict mitigation; by maintaining and enhancing existing partnerships, work groups can help foster tolerance and maintain the spirit of conflict reduction into the future.*

12. **Public Comment:** Missoula County requests four county commissioners on the Coordinating Committee, each from a different geographic area.

    Response*: Counties often have specific roles and input on grizzly bear management issues. The Montana Association of Counties is asked to assist in appointing one member to serve on the Coordinating Committee. County representation and involvement can also be incorporated into the Conservation Strategy through a working-group process.*

13. **Public Comment:** The Blackfeet Tribe suggested it have two representatives on the Coordinating Committee, a wildlife biologist and either a Council member or the Director of Fish & Wildlife.

    Response*: Involving the BIA and bringing in more Tribal representation through the NCDE Coordinating Committee was discussed with current Tribal representatives. It was decided that further Tribal involvement could be incorporated through a working-group process.*

14. **Public Comment:** Some people questioned why the USGS would no longer be on the Coordinating Committee, especially considering the central role that agency plays in the GYE.

***Response**: The USGS does play an important role. The Conservation Strategy recognizes this and has been amended to include one member from the USGS serving in an advisory capacity. The USGS also had input during the draft and final phases of preparing the Conservation Strategy.*

15. **Public Comment**: There must be a mandatory Relisting Process in response to specific triggers, no just the promise of a review.

    ***Response**: Post-delisting monitoring requirements, relisting triggers and the status review process are under the purview of the USFWS and will be included in any proposed delisting rule, which will undergo public comment. We did not include in the final Conservation Strategy because this document is not a USFWS document but rather is a multi-agency document by the NCDE subcommittee.*

16. **Public Comment:** In DCAs, replace "will focus" with "shall limit" to make it legally prescriptive and binding. In the "Habitat" section of the hardrock mining section for the PCA (p. 72), the conditions that timing restrictions will occur when "practicable" makes this measure subjective and legally worthless.

    ***Response:** The term "will focus" was used in describing objectives for habitat protections. Individual DCA discussions provide reference to current management restriction that will continue. The language regarding hardrock mining in the Conservation Strategy actually states that appropriate measures will be taken if timing restrictions are not practicable. This allows the land management agency to identify other solutions that protect grizzly bears and meets the objective to "avoid, minimize and mitigate environmental impacts to grizzly bears" while still meeting agency obligations for mineral development. Further, each managing agency is committing to developing project level mitigation plans for grizzly bears.*

17. **Public Comment:** The Strategy should discuss the Policy for Evaluation of Conservation Efforts as it may be critical to successfully defending it in court.

    ***Response:** The Conservation Strategy provides discussion of the evaluation of conservation efforts in Chapter 5. As noted there, evaluation and effectiveness of grizzly bear conservation measures will be an ongoing process shared by all members of the NCDE Coordinating Committee. Each agency represented on the Coordinating Committee has policy directly or indirectly related to grizzly bear management. Specific agency policy references for evaluation of conservation efforts can be found in Chapter 6, which provides a list and summary descirption of agency direction.*

18. **Public Comment:** "The ESA and FWS define harm and take…to include significant displacement of bears, not just their deaths." (p. 24 of SVC comment).

Response: *In Chapter 3, we have added some discussion regarding the potential of certain human activities to result in habitat displacement.*

19. **Public Comment:** Some commenters were supportive of MCA 87-301 that directs MFWP to "use proactive management to control grizzly bear distribution and prevent conflicts, including trapping and lethal measures" while others were concerned with how this would be implemented without precluding connectivity.

    Response: *The Montana Fish and Wildlife Commission can consider these comments as part of their authority to set policy for wildlife management within Montana. The Commission processes are public and provide for public comment before decisions are made in most instances.*

20. **Public Comment:** Several comments criticized the Montana Fish and Wildlife Commission because it is a politically appointed board that makes decisions based largely on personal and public opinion, not science.

    Response: *The NCDE Subcommittee does not have authority to change State of Montana laws regarding the Commission. The Subcommittee includes scientists from multiple agencies with background working with and knowledge on grizzly bears and provide scientific assessment for agency managers. MFWP members on the Subcommittee provide this information to the Commission as part of the decision-making process.*

21. **Public Comment:** The Service determined in its own biological opinion (1995) that the Swan Valley Conservation Agreement was inadequate to achieve recovery. Furthermore, because we know the Swan Valley is a sink for grizzly bears, this proves the SVCA doesn't work.

    Response:

    - *The USFWS' 1995 opinion found that the implementation of the Swan Valley Grizzly Bear Conservation Agreement was not likely to jeopardize the continued existence of the NCDE grizzly bear population (SVGBCA BiOP pg. 40). The 1995 Opinion states that "Although the Service has reached a not likely to jeopardize conclusion on the entire NCDE population, there remains concern with habitat conditions in the Conservation Area. Information contained in the USFWS' 1995 Opinion was based on the best information available at that time, and much has been learned since then about grizzly bears, including published accounts of grizzly bear survival rates and positive population trajectory. Since 1995, open road densities in the Conservation Area subunits have surpassed the goal of having less than 33% open motorized access density.*

- *The Swan Valley is one relatively small portion of the NCDE and the grizzly bear population has continued to grow and expand its range since the Agreement was put in place in 1995.*
- *Between 2000 and 2015, 80% of the known grizzly bear mortalities in the Swan Valley occurred on either private land or by automobile collision on Highway 83. In response, cooperators undertook additional efforts to increase public information and awareness among residents, posted a reward to reduce the illegal killing of bears, and bolstered measures to reduce or secure bear attractants.*
- *Bears continue to occupy and live in the Swan Valley and connectivity between the Swan and Mission mountain ranges is being maintained.*
- *Land ownership has changed dramatically in the Swan Valley since 1995; the majority of Plum Creek corporate timberland has been transferred into public ownership.*
- *As detailed in Chapter 3, the USFS and DNRC will continue to emphasize habitat conservation for grizzly bears in the Swan Valley.*
- *No published research establishes the Swan Valley as a population-limiting sink for grizzly bears.*

22. **Public Comment:** "The Service's belief that long-term management plans will somehow protect bears when the DNRC's priority is maximizing profit, and the Blackfeet Tribal Council recently supported excessive amounts of oil and gas development in bear habitat, is unwarranted."

    Response: *We are unaware of any reference in the DNRC HCP that provides a reference for managing survival of female grizzly bears "generally greater than 90%." The DNRC HCP is a 50-year plan that was prepared to comply with Section 10(a)(1)(B) of the Federal ESA (16 United States Code [USC] 1531 et seq.) and the regulations that implement that section of the ESA. In February 2012, the USFWS issued an incidental take permit to DNRC for its Forest Management Program on forested trust lands. The Permit was the culmination of 10 years of coordination between the two agencies to develop an HCP; analyze its effects on the environment in a NEPA and MEPA EIS; comply with Sections 7 and 10 of the ESA; and issue a Record of Decision and Statement of Findings. The HCP provides a comprehensive suite of conservation commitments tailored to DNRC's forest management activities that minimize adverse effects to grizzly bears and four other species. In this process, the USFWS conducted a thorough analysis, completed a biological opinion, and concluded that implementation of the HCP would not impede recovery of grizzly bears or jeopardize the species, and that the HCP minimized and mitigated impacts of the covered activities to the maximum extent practicable. While DNRC's HCP is in place, State forest management rules require that the conservation commitments are implemented. Numerous measurable habitat caps and standards make up the conservation commitments contained in the HCP (e.g. open and restricted road amount caps in the Stillwater and Swan River State Forest transportation*

plans, seven established security zones in the Stillwater Block, and fixed subzones that require rest periods in the Swan, to name a few). References in the HCP in "the sole discretion of DNRC" primarily refer to DNRC's intent to implement various interagency strategies for bull trout and lands disposition and acquisition measures, which have legal relevance pertaining to DNRC's trust mandate for management of state trust lands. DNRC lands managed under the Conservation Strategy are subject to differing mandates than Federal lands, as well as differing requirements under the ESA. While commitments to conserve grizzly bears differ in a number of instances from those for Federal lands, they provide considerable conservation value on DNRC's working forest lands.

23. **Public Comment:** The laws, regulations, agreements, and management plans described in the Conservation Strategy must be binding and legally enforceable to be considered adequate.

    Response: *Laws and regulations are generally legally enforceable, unless specifically exempted within the legislation. Actions taken by Federal government agencies are legally enforceable through the Administrative Procedures Act (5 U.S.C. § 701 - 708). In the case of the NCDE Conservation Strategy, the Memorandum of Understanding signed among the governmental agencies is not a legal document. Rather, it is a document that outlines expected actions to be taken by the appropriate agency to protect grizzly bears within their legal requirements to do so.*

24. **Public Comment:** NF Plans are not legally enforceable.

    Response: *NF Plans and other USFS decisions are subject to judicial review under the Administrative Procedures Act (5 U.S.C. § 701 - 708).*

25. **Public Comment:** Due to uncertainty regarding future USFS policy, the Conservation Strategy should ensure that grizzly bears receive sensitive species status (or the equivalent thereof) on all eight NFs covered by the plan. Additionally, the Conservation Strategy should require project-level viability assessments regardless of what happens with USFS policy.

    Response: *The authority to designate Sensitive Species on USFS lands is delegated to the Regional Forester (RF). If/when the NCDE grizzly bear population is delisted, the RF can consider including them on the Sensitive Species list, similar to guidance for GYE grizzly bear population (Forest Service Manual 2676.14a, Oct. 6, 2017). Habitat management actions discussed in Chapter 3 of the Conservation Strategy are in the process of being incorporated in forest plans for the Flathead NF, Kootenai NF, Lolo NF and Helena-Lewis & Clark NF. Management on these forests will continue to follow plan protections for grizzly bear after delisting, providing grizzly bear habitat protections throughout western Montana into the future.*

Regarding viability, MFWP and the USFWS will continue to monitor population demographics following de-listing. Chapter 5 details the mechanisms that will be in place, should de-listing occur, that will provide continuity in cooperation among signatories. This structure will allow management agencies to exchange monitoring information necessary for project analysis.

26. **Public Comment:** DNRC is relying on adjacent Forest Service core area to provide grizzly bear security but the application rules exempt the USFS from this obligation;

    Response: *DNRC is not relying on adjacent or nearby core areas on NF lands. DNRC implements its commitments and compliance with Forest Management Rules independently of the USFS. DNRC's measures are intended to stand on their own and HCP implementation requires continuous oversight by the USFWS and annual monitoring. DNRC's conservation measures apply to their particular land base, differing ownership pattern, and differing mandate, and the commitments complement those on adjacent National Forest Lands. The USFWS permitted incidental take associated with DNRC's covered forest management activities under a 10-year HCP development and consultation process under Section 10(a)(1)(B) of the Federal ESA.*

    The DNRC grizzly bear conservation strategy contained in the HCP is considerably more comprehensive and constraining than earlier administrative State rules (ARMs) that were in place prior to the HCP and when the grizzly bear population was increasing.

27. **Public Comment:** As a listed species, bears found in Zone 2 receive section 7 consultation where they are "present." They would lose this upon delisting and the Strategy does nothing to offset this loss of a regulatory mechanism.

    Response: *The loss of ESA protection will be offset by mechanisms discussed in the Conservation Strategy. The Conservation Strategy details actions that government agencies and Tribes will take to protect grizzly bears should de-listing occur. Protections that are incorporated into agency rules or plan decisions will still be in force if grizzly bears are de-listed. In addition, Chapter 5 provides mechanisms that the agencies will use to coordinate grizzly bear management outside of the ESA. There are a number of examples of multi-agency coordination to manage wildlife species that are not reliant on the ESA.*

28. **Public Comment:** Badger 2Med Alliance suggested this revision to current language to increase legal defensibility: "Because amending or revising management plans will require an analysis under NEPA for some agencies and entities, the USFWS will not sign the CS until this NEPA process is complete and until the agencies agree to include specific language in their amended / revised management plans acknowledging that the habitat standards being

incorporated into those plans are legally binding and will be maintained in perpetuity." This language should be in USFS, BLM, GNP, & Tribal plans.

Response: *We revised the wording to make it clear that each signatory is committing to the objectives set forth in the Conservation Strategy and will follow their respective policies and procedures to incorporate the objectives if needed. The USFS has been developing an amendment to the Kootenai NF, Helena-Lewis and Clark NF, and Lolo NF plans and a revision of the Flathead forest plan through the NEPA process. The proposed management direction for grizzly bear habitat was informed by the draft NCDE Conservation Strategy and other new information. The Draft EIS was released in June 2016 for public review and comment, and the Final EIS and draft record of decisions (RODs) were completed in December 2017. The final RODs will be issued after resolution of objections is completed.*

Habitat, Land Use, Development and Motorized Access/Travel

29. **Public Comment:** Therefore, controlling human-caused mortality, monitoring both population and habitat parameters, and responding when necessary with adaptive management (Walters and Holling 1990). Comment: "I'm not sure how "adaptive management" as described by Walters and Holling can be a response"

Response: *We removed that paragraph because we felt that it was not very helpful to the discussion.*

30. **Public Comment** They reported there were no historic or recent records of grizzly bear/human conflict in their study area. Similarly, while grizzlies in GNP are displaced to some degree by non-motorized trails (Jope 1985; White et al. 1999), conflicts and grizzly bear mortalities there are extremely low and related almost exclusively to campgrounds and other human-use areas. Comment: "Displacement that leads to a reduction in habitat available (decrease in habitat effectiveness) if it had a population level effect would be more through reproductive rates and perhaps cub survival - not so much adult survival. But, of course, you're right that roads lead to dead bears."

Response: *No response necessary.*

31. **Public Comment:** Beaverhead Deerlodge and Helena National Forests must complete travel planning that is consistent with recovery goals.

Response: *Travel planning is conducted by the USFS in accordance with regulations at 36 CFR Part 212. Proposed designation and revision of roads, trails, and areas for motorized use, and for over snow motorized use, are prepared using the NEPA procedures. One of the required criteria for designation of roads, trails, and areas for motorized use is to consider the effects, with the objective of minimizing, harassment of wildlife and significant disruption*

of wildlife habitats. Travel planning completed to date on the Beaverhead-Deerlodge NF and Helena-Lewis and Clark NF has included ESA section 7 consultation with USFWS on Federally-listed species, including the grizzly bear. This Conservation Strategy will guide habitat management after delisting to assure that recovery of the NCDE population is maintained.

32. **Public Comment:** Many people want the habitat protections to be more restrictive in the PCA and asserted that motorized access standards on the Flathead NF must comply with Amendment 19 before delisting. They say the USFWS acknowledged this in the 2011 status review, saying that until all BMU subunits are in compliance with A19, threats to grizzlies will not have been substantially eliminated (p. 39). Others noted that 40 of 123 subunits were out of compliance in 2011. It is important to recognize that these numeric thresholds were taken directly from research conducted by Mace and others, who documented statistically significant bear displacement from habitats where human impacts exceeded these thresholds and that "such animals may not change this resultant avoidance behavior for long periods after road closures" (2006 Rock Creek B.O., Section A, p. 39).

Response: *The Conservation Strategy is designed to maintain key habitat conditions in the PCA that existed during the period when the grizzly bear population was known to be increasing. This is expected to sustain a stable to increasing bear population for the foreseeable future. The Conservation Strategy identifies habitat and population monitoring that will be ongoing, and establishes a process for regular evaluation of monitoring data and actions to be taken if the desired outcome is not being achieved.*

The Flathead NF enacted Amendment 19 in 1995, based largely on preliminary information from a study in the Swan Mountains (Mace and Manley 1993). The IGBC Task Force on Motorized Access recommended in 1994, with an update in 1998, that road densities and security core be managed with consideration to information specific to a given area as well as to the percentage of a BMU subunit in Federal ownership. The Flathead NF adopted specific, numeric objectives for open motorized route densities (OMRD) and total motorized route densities (TMRD) and security core for the BMU Subunits with more than 75 percent National Forest System lands, and a standard for no net increase in OMRD and TMRD and no net decrease in security core for all BMU subunits irrespective of land ownership. The other NFs in the NCDE did not adopt similar forest plan amendments. Subsequent to the adoption of Amendment 19 and the completion of the IGBC Task Force report, OMRD, TMRD and the percent security core have been evaluated on all NCDE forests through ESA Section 7 consultation, with consideration of the best available science regarding impacts of roads and other factors on grizzly bears. A number of studies since 1995 have provided information that supports the finding that motorized route densities may impact grizzly bears, with some variation depending on the area, type of road, traffic volume, and other factors.

Significant efforts made by the USFS over the past 20+ years have led to the majority of BMU subunits in the NCDE now meeting the Amendment 19 objectives. The NCDE grizzly bear

population has been monitored and results show that the number of bears now substantially exceeds the minimum population size goal stated in the Grizzly Bear Recovery Plan, the population is well distributed throughout the Recovery Zone, and the population has expanded its geographic distribution well beyond the Recovery Zone boundary (Kendall et al. 2009, Mace et al. 2012, Costello et al., 2016), even though not every BMU subunit meets the 19-19-68 percentage objective of Amendment 19.

33. **Public Comment:** Many thought the commitments to motorized access management on Blackfeet Indian Reservation, Flathead Indian Reservation, and/or Montana Department of Natural Resources and Conservation lands were inadequate for grizzlies. Some said these entities should set a clear threshold number for road densities and secure habitat, as is done on Federal lands. They noted "no net increase in overall road density levels" on the BIR does not address current road densities. Similarly, the FIR Forest Plan should lower their allowed open road densities of 4 mi/square mi and reduce total road densities by more than the 15% currently proposed and more than just road spurs, main roads too. Some asked if the FIR's limit of 4 mi/square mi for open roads actually allows an increase over current levels or 2011 levels.

Response: *Lands managed by the signatories to the Conservation Strategy on DNRC lands are subject to differing land uses and mandates, as well as differing requirements under the ESA. Regarding DNRC lands, conservation protections for grizzly bears within the PCA and zones 1 and 2 under the Conservation Strategy would be provided by the DNRC HCP, in cooperation with the USFWS. The 50-year HCP was prepared to comply with Section 10(a)(1)(B) of the ESA (16 United States Code [USC] 1531 et seq.) and the regulations that implement that section of the ESA. In February 2012, the USFWS issued an incidental take permit to DNRC for its Forest Management Program on forested trust lands. The Permit was the culmination of 10 years of coordination between the two agencies to develop an HCP, analyze its effects on the environment in a NEPA and MEPA EIS, comply with Sections 7 and 10 of the ESA, and issue a Record of Decision and Statement of Findings. The HCP provides a comprehensive suite of conservation commitments tailored to DNRC's forest management activities that minimize adverse effects to grizzly bears. In this process, the USFWS conducted a thorough analysis, completed a biological opinion, and concluded that implementation of the HCP would not impede recovery of grizzly bears or jeopardize the species and that the HCP minimized and mitigated impacts of the covered activities to the maximum extent practicable. While DNRC's HCP is in place, State forest management rules require that the conservation commitments are implemented.*

On the FIR, there will be no increases in open or total road densities and no decreases in secure core within the PCA, since the majority is within the Mission Mountain Tribal Wilderness, the Mission Mountain Wilderness Buffer, or the South Fork Jocko Primitive Area. In Zone 1, including the Ninemile Demographic Connectivity Area, of the 770 mi^2 of Tribal land, approximately 211 mi^2 are available for timber harvest. The Forest Management Plan

will guide habitat management on those acres. The Wildlife and Fisheries Programs manage approximately 31 mi^2 for wildlife and fish conservation where access is walk-in only.

Research and monitoring efforts indicate that the grizzly bear population is increasing on the BIR at the current road density levels. Therefore no net increase in overall road densities should be an adequate standard regardless of current road densities.

34. **Public Comment:** There were many general requests for more or better habitat protections outside the PCA in Zones 1, 2, and the demographic connectivity areas (DCAs) or in all occupied habitat. "Since virtually none of Zone 2 has any bear-based habitat standards, these provisions appear likely to result in a grizzly being excluded, moved, and killed rather than accommodated." These standards should be based on grizzly bear science instead of assuming elk based standards are adequate for grizzlies too.

    Response: *It has long been recognized that grizzly bears will occasionally move into and even reside permanently in areas outside recovery zones, and they are expected to do so in many areas. However, only bears living inside the Recovery Zone are considered crucial to recovery goals (USFWS, 1993, p. 18). Therefore this Conservation Strategy will apply the most stringent habitat protections to the PCA, which is the same boundary as the Recovery Zone. The goal of Zone 1 is continued occupancy by grizzly bears, and this area will be included in population monitoring. Existing habitat protections in Zone 1 have been compatible with an increasing population and will focus on managing motorized route densities. The goal in the DCAs is to support female grizzly bear occupancy and eventual dispersal to other ecosystems. Habitat protections in the DCAs include limiting miles of open road and maintaining current roadless areas. Providing for genetic connectivity through Zone 2 does not require the stringent habitat protections of the PCA, which is managed as a population source area. Both male and female grizzly bears are already known to occur in Zone 2 under current conditions. Because there seemed to have been some misunderstanding of the differing objectives for each management zone, the Conservation Strategy was reviewed and edited where needed to more clearly convey the planned approach and the rationale for habitat management in each management zone.*

    Besides being unnecessary to achieve the goal of recovery of the NCDE population, it is impractical to expect to provide the same level of habitat protections in Zone 1, the DCAs and Zone 2 as in the PCA. Federal lands make up nearly 79% of the PCA, but only about 25% of Zone 1 and about 30% of Zone 2. Existing Federal land management plan direction has been sufficient to enable bears to move through and occupy Zones 1 and 2. Existing protections provided by designations such as IRAs, as well as by current travel management plans, will remain in place and additional emphasis will be given to properly securing food and attractants in Zone 2.

35. **Public Comment:** The USFWS must explain why it thinks current conditions are adequate for grizzlies when it found in its 1995 Biological Opinion that A19 levels are necessary to avoid jeopardy to the NCDE population. Until Federal and State agencies fund and complete new, peer-reviewed and published research regarding motorized access thresholds that will support a grizzly bear population in the NCDE, the best available science is A19 standards.

Response: *Amendment 19 is a management strategy that is based on the best available science at the time. In the 23 years since the 1995 Biological Opinion was issued, a substantial body of new information, including peer-reviewed published research about the NCDE grizzly bear population, has become available. Both the status of the NCDE population and our understanding about grizzly bear responses to human activities and management have improved. The 2013 draft Conservation Strategy cited extensively to the literature (pages 136–148) and new information has been considered and incorporated into the final Conservation Strategy. The USFS recently completed Section 7 consultation with USFWS on the effects of incorporating grizzly bear habitat management direction that was informed by the draft NCDE Conservation Strategy into the forest plans. The 2017 Biological Opinions concluded that the forest plan amendments and the Flathead NF's revised forest plan are not likely to jeopardize the continued existence of the grizzly bear. USFWS further noted that several elements of the proposed action will be beneficial to the grizzly bear population. The 2017 Biological Opinions are available on the Flathead NF's website.*

36. **Public Comment:** "…the Conservation Strategy's commitment to freeze conditions at the 2011 baseline rings hollow, because no agency has any idea what those habitat levels were. This is particularly serious given the findings of Doak (1995) that there was an 8–13 year "lag time" between habitat decline and grizzly population decline."

Response: *Archived data are readily available for habitat conditions with respect to roads, developed recreation sites, and livestock allotments for numerous points in time including the 2011 baseline. The 2011 year reflected habitat conditions at the time the Conservation Strategy was being developed, and the grizzly bear population trend was increasing.*

Doak (1995) cautioned against relying exclusively on population census data, which might not detect the impacts of habitat degradation. For species such as grizzly bears, he suggested that changes in population densities in particular habitats or changes in specific demographic rates may be more effective measures of population status. The Conservation Strategy does not rely solely on population census monitoring. The habitat conditions listed above will be monitored in conjunction with individual body condition and population demographic rates on an ongoing basis.

37. **Public Comment:** "Basing recovery on population estimates and then assuming adequate habitat and security exist is not the same thing as firstly measuring recovery against promised and legally required habitat-based recovery criteria. It is instead arbitrary, capricious, and an abuse of agency discretion."

Response: The *USFWS is currently evaluating habitat-based recovery criteria to be appended to the Grizzly Bear Recovery Plan for the NCDE. On May 11, 2016, a notice was published 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, the USFWS conducted a workshop to hear oral presentations and also accepted written comments during July of 2016. The USFWS published a second Federal Register notice on December 12, 2017 announcing a second workshop and the opportunity to comment on the draft Recovery Plan Supplement: habitat-based recovery criteria for the NCDE grizzly bear population. A second workshop was held on January 3, 2018, and written comments on the draft Supplement to the Recovery Plan were accepted between December 12, 2017, and January 26, 2018. After reviewing public comment, USFWS will append the final habitat-based recovery criteria for the NCDE grizzly bear population to the Recovery Plan as a supplement. The habitat-based recovery criteria will help to guide recovery efforts.*

38. **Public Comment:** Population trend was also boosted as a result of compliance with ESA Sections 7 and 9, Amendment 19, and the guidance for Management Situation 1 on 3 million acres. These assurances would not continue following delisting.

Response: *The grizzly bear Recovery Plan specifically calls for development of a Conservation Strategy so that guidance is in place prior to delisting, to help assure that the population would remain healthy. The stated intent of the Conservation Strategy is to maintain a stable to increasing population post-delisting. As described in Chapter 3, this is to be accomplished in part by maintaining across the entire PCA the five habitat conditions (motorized route density and secure core, developed recreation sites, livestock allotments, vegetation management, and minerals and energy development) that have been shown through previous research to strongly influence grizzly bear population growth through effects on habitat use and mortality rates. We recognize that these five habitat conditions do not capture all the environmental factors that can influence population growth. We also acknowledge that there is uncertainty as to whether maintaining baseline habitat conditions will be sufficient in the face of future ecological challenges such as private land development and climate change. Monitoring of habitat conditions on Federal, State and Tribal lands will be conducted as described in Chapter 3. We will compile and evaluate the population and habitat monitoring data per the established schedule to assure that the desired population objectives are being achieved, and if needed, to recommend appropriate management adjustments as discussed in Chapter 5.*

39. **Public Comment:** Some supported the idea of keeping habitat levels at 2011 baseline, while others questioned the inherent assumptions that these conditions did indeed result in an increasing population and that they can be maintained.

Response: *In Chapter 1 of the Conservation Strategy, there is a section titled "Grizzly Bear Habitat Management" that documents the habitat features and management activities that have been demonstrated through research to influence grizzly bear habitat through habitat degradation or loss, displacement, and/or fragmentation, or to affect grizzly bear mortality risk. This information provided the basis for focusing the guidance for habitat management on public lands within the PCA on secure core, motorized route density, developed recreation sites, livestock grazing, vegetation management, and minerals and energy development. Monitoring of habitat conditions will be focused on these same habitat parameters, along with monitoring of the population. The Conservation Strategy embraces the concept of adaptive management, and recognizes that adjustments will be made if needed, based on the best available science and with public review and comment. See also the response to #41 below.*

40. **Public Comment:** Some thought the selection of 2011 as a baseline year was arbitrary and shortsighted. Maybe habitat conditions on public lands in 2011 were compatible with an increasing population but to assume this will always be the case when current trends of increasing private land development, traffic on roads, train traffic, recreationists on public lands, oil and gas development on the Rocky Mountain Front, and changes to habitat related to climate change are expected to continue is faulty logic. Regulating motorized use, developed sites, and livestock allotments on public lands is not enough to ensure grizzly bear survival into the future in light of climate change and human population growth. Concerns about increases in human use of public lands were echoed by the peer reviewers. Some suggested the Strategy include a clause to re-evaluate the adequacy of the 2011 baseline at a 5 or 10 year interval.

Response: *Additional explanation about the selection of 2011 as the baseline year was added to Chapter 3 of the Conservation Strategy. Briefly, the rationale was that the grizzly bear population was increasing between 2004 and 2011, and motorized route density in the NCDE was decreasing during the same period. The 2011 year was most practical as it reflected existing developed sites, road densities, and projects at the time the Conservation Strategy was being developed, and the grizzly bear population trend was increasing at a healthy level. Selecting the 2011 date also allowed the greatest number of years and data available at that time to be included, upon which to base population trend. Thus, habitat conditions with respect to motorized route density were the most favorable for grizzly bears at the end of this period when there was an increasing population trend. Therefore, 2011 was chosen as a reasonable and conservative baseline from which to maintain habitat conditions that would*

be likely to support a stable to increasing grizzly bear population. The Conservation Strategy acknowledges that there is some uncertainty as to whether maintaining baseline habitat conditions will be sufficient in the face of future habitat changes such as private land development and climate change. However, the omnivorous diet, large home range size, and behavioral flexibility of grizzly bears gives us reasonable confidence that this approach will be successful in sustaining the population. Habitat conditions on Federal, State and Tribal lands, as well as trends in private land development, will be monitored according to an established schedule (see Chapter 3). Population and habitat monitoring data also will be compiled and evaluated (see Chapter 2).

Regarding the suggestion to establish a regular timetable to evaluate the effectiveness of the Conservation Strategy, the process is discussed in Chapter 5. Briefly, the Coordinating Committee will establish a NCDE Monitoring Team upon delisting, with Habitat and Population monitoring working groups. Those working groups will generate and present regular monitoring reports to the Coordinating Committee. The monitoring teams will also evaluate the need for updating or changing the methods used to evaluate habitat and demographic parameters and make recommendations to the Coordinating Committee on such changes, as necessary. If there are deviations from any of the population or habitat objectives stipulated in this Conservation Strategy, a Management Review will be completed by a team of scientists appointed by the members of the Coordinating Committee. One of the purposes of the Management Review is to consider and establish a scientific basis for changes/adaptations in management due to changed conditions in the ecosystem.

41. **Public Comment:** Some commenters object to no longer considering non-motorized trails in calculations of secure core habitat. They claim their impacts are identical to open roads, that this approach is contrary to the current IGBC policy and Greater Yellowstone Ecosystem Conservation Strategy, and that the USFWS's claims of increased secure habitat due to this omission are disingenuous and misleading.

Response: *The definition of secure core blocks that are a minimum of 2,500 acres (3.9 mi^2) in size was based on research that evaluated road density but did not analyze high-intensity-use nonmotorized trails. The original recommendation to exclude areas within 0.31 mi (500 m) of high-intensity-use nonmotorized trails from secure core area calculations was based on the judgment of biologists and managers and several untested assumptions regarding the potential impacts of such trails on grizzly bears. No data were available on the actual use levels of nonmotorized trails, and the threshold for "high" use (20 parties or more per week) was not based on literature or empirical data.*

Multiple studies have documented displacement of individual grizzly bears from nonmotorized trails to varying degrees (Schallenberger and Jonkel 1980; Jope 1985; McLellan and Shackleton 1989; Kasworm and Manley 1990; Mace and Waller 1996; White et al. 1999). However, none of these studies documented increased mortality risk from foot or horse trails or population level impacts to grizzly bears. For example, while grizzlies in GNP are

displaced to some degree by nonmotorized trails (Jope 1985; White et al. 1999), conflicts and grizzly bear mortalities there are extremely infrequent and related almost exclusively to campgrounds and other human-use areas. Because of the difficulty in objectively defining and accurately identifying high-intensity-use trails, as well as the lack of data indicating that nonmotorized trail use results in disproportionate grizzly bear mortality or population declines, the decision was made to no longer include this in the definition for secure core. Removal of high-intensity-use nonmotorized trails does change the baseline value for secure core in some BMU subunits, but all future activities would be held to this new baseline level.

42. **Public Comment:** The Helena National Forest recently amended their road and cover standards. Are these changes consistent with the Strategy?

    Response: *As part of the initial proposal for the Blackfoot Travel Management Plan, forest plan standard 4a for Big Game Security would have been programmatically amended. However, in the 2017 Record of Decision, the NF Supervisor decided not to amend forest plan standard 4a at that time. The plan components for motorized route densities that are included in the NCDE Grizzly Bear Amendments are consistent with the Conservation Strategy.*

43. **Public Comment:** Allowing over-snow use "until research identifies a concern" is far too vague to be enforceable. It could not be part of a forest plan.

    Response: *In response to the comment, we agreed to remove this phrase from the Application Rule concerning motorized use in secure core. Elsewhere in the Conservation Strategy (especially in chapters 1 and 5) it is clearly stated that changes will be made when warranted by new scientific information.*

44. **Public Comment:** The commitment to no net increase above 2011 baseline values in linear miles of permanent open roads allowed on [the Ninemile] DCA appears to only limit "permanent" open roads. This means there are no limits on the number of temporary open roads. Temporary roads should have a time limit.

    Response: *The objective for the Ninemile DCA is no net increase in the density of roads and trails open for public motorized use during the non-denning season on National Forest System lands. Temporary roads are not subject to this requirement. The Conservation Strategy uses the term "temporary" roads in the sense that roads are opened for the specific objective of completing a project and are closed at its conclusion. We noted that the Glossary was lacking a definition of temporary roads, so that has been added. The definition clarifies that a temporary road is necessary for emergency operations or it is authorized by a contract, permit, lease, or other written authorization. This is in contrast to opening a road for other uses or for an unspecified timeframe. On Federal and DNRC lands, temporary roads must be made impassible to motorized vehicles upon completion of each project. The length of time*

that a temporary road may be used will be determined by the terms of the contract, permit, lease, or other authorization.

45. **Public Comment:** The USFS should commit to managing roadless areas in the PCA and Zone 1 in their current, non-motorized state, and eliminating any motorized use that is currently allowed. The Strategy should ensure that connectivity goals are incorporated into forest plans, in contrast to the 2011 draft plan for the Kootenai NF, which proposed to increase motorized access into areas that were previously non-motorized.

    Response: *IRAs on NF lands in Montana are managed in accordance with the 2001 Roadless Area Conservation Rule. The Record of Decision on the Kootenai NF revised forest plan was issued in 2015 and the plan contains this standard:*

    "*FW-STD-IRA-01. Within IRAs, outside of the State of Idaho, the 2001 Roadless Area Conservation Rule (36 CFR 294 Subpart B, published at 66 Fed Reg. 3244–3273) shall apply. IRAs are identified in a set of IRA maps, contained in the Forest Service Roadless Area Conservation, Volume 2, dated November 2000, which are held at the national headquarters office of the Forest Service, or any subsequent update or revisions of those maps (36 CFR 294.11). Maps of the IRAs are also found in appendix C of the Forest Plan FEIS."*

46. **Public Comment:** There should be more information or justification about the Swan Valley Grizzly Bear Conservation Agreement and why it's ok to treat these lands differently.

    Response: *The Swan Valley Grizzly Bear Conservation Agreement was developed in 1997 to coordinate timber harvest activities and associated road management across the multiple-use lands managed by Plum Creek Timber Company, the USFS, and DNRC. The Conservation Agreement recognized that additional coordination was necessary across the multiple land ownerships and road jurisdictions in the Swan Valley in order to conserve the grizzly bear and other Federally listed species and to minimize incidental take. See also the response to #48 below.*

47. **Public Comment:** The Swan Valley Grizzly Bear Conservation Agreement is not a regulatory mechanism by itself…it should be incorporated into any amendment the USFS makes.

    Response: *The Swan Valley Grizzly Bear Conservation Agreement was entered into by Plum Creek Timber Company, DNRC, USFS, and USFWS in 1995 to coordinate timber harvest activities and associated road management across the Swan Valley in a manner that would conserve grizzly bears. Subsequently, through the Montana Legacy Project, over 484 mi^2 of private Plum Creek Timber Company lands in the Swan Valley were purchased and*

transferred into mostly public ownership. If in the future the conservation agreement is not renewed, DNRC will manage their lands in the Swan Valley in accordance with their HCP (DNRC, 2011) and the Flathead NF will manage its lands in the Swan Valley in accordance with the forest plan. DNRC is required to adhere to the HCP under State rule and under requirements set forth in the incidental take permit, and the Flathead NF is required by the National Forest Management Act to follow their forest plan. These plans will provide the necessary regulatory mechanisms for grizzly bear conservation in the Swan Valley.

48. **Public Comment:** Despite the fact that the USFS now owns > 75% of many BMU subunits in the Swan Valley as a result of the Legacy Project, the Strategy does not require these subunits to comply with A19, only the less stringent Swan Valley Grizzly Bear Conservation Agreement that the USFWS itself said is inadequate to achieve recovery. The USFS (or other relevant landowner) should permanently re-vegetate former Plum Creek roads built since 1980 in to the Swan Range including Van Mountain, Scout Creek, Squeezer Creek, Lion Creek and Smith Creek.

    Response: *The management direction under forest plan Amendment 19 applied to 54 BMU subunits on the Flathead NF. Amendment 19 established a standard requiring no net increase in open motorized access density (OMRD) and total motorized access density (TMRD) and no net decrease in security core areas. For subunits with more than 75% NFS lands, it also established numeric objectives (often referred to as "19-19-68") to limit the percent of area with OMRD greater than 1 mile/mile^2 and the percent of area with TMRD greater than 2 miles/mile^2 to $\leq$19 percent, and to provide security core areas on 68% or more of the subunit. At the time when Amendment 19 was adopted, 14 BMU subunits had less than 75% NFS lands. The number of subunits subject to the Amendment 19 objectives has now changed from 40 to 47 because of land acquisitions including the Montana Legacy Project and a District Court decision related to the Glacier Loon and Buck Holland subunits (USDC-Missoula 2014).*

    The Conservation Strategy does not require the 19-19-68 objectives, but does continue to call for no net increase in OMRD and TMRD and no net decrease in secure core on Federal lands. Appendix 4 of the Conservation Strategy presents the baseline values for motorized access in each BMU subunit, and also provides the values as of the end of 2017.

    Between 1995 and 2016, about 730 miles of road have been decommissioned across the Flathead NF. The BMU subunits in the Swan Valley are likely to be of high priority for future road decommissioning to improve habitat for bull trout and grizzly bears or to meet other resource objectives.

49. **Public Comment:** Motorized access standards must be based on actual research regarding grizzly bear use throughout the ecosystem, not just in the Swan Valley.

Response: *The Conservation Strategy has considered all available research that is relevant to management of the grizzly bear population in the NCDE. This includes studies in the Swan Mountains, across all of the NCDE, in the GYE, and in the adjacent Canadian Rockies. The Conservation Strategy recommends that the moving window analysis method for calculating open and TMRD and secure core continue to be used within the PCA, in order to provide continuity in management and monitoring data for this source population.*

Recent research in Alberta has been able to relate grizzly bear occupancy, survival, and reproduction to average density of motorized routes, rather than using the moving windows method (Boulanger and Stenhouse 2014; Lamb et al. 2018). The Conservation Strategy recommends using this method outside the PCA (such as in the DCAs) to calculate motorized route density and to help quantify the potential effects of motorized routes on grizzly bears.

50. **Public Comment:** Some questioned why highways, county roads, and private roads are not counted against OMRD and TMRD (at least if they cross public lands)? If these increase, that will invalidate the basic assumption that the Conservation Strategy reflects conditions conducive to bears in 2011.

    Response: *The Federal agencies have no jurisdiction over highways, county roads, or private roads, and it is unrealistic to expect the agencies to be able to mitigate for high road densities that may exist on some other ownerships. The objectives for OMRD and TMRD were derived from the South Fork grizzly bear study area, which was predominantly (84%) NFS land (Mace and Manley 1993). Early attempts to extrapolate the same calculations to other portions of the NCDE that are characterized by less Wilderness and more intermingled ownerships revealed the problems associated with trying to account for roads on other ownerships. For example, data for roads on private lands were incomplete or lacking, and in some cases the information was considered proprietary. Through discussions with USFWS, it was agreed that private roads and lands would be excluded from OMRD and TMRD calculations. Additionally, highways and county and city roads will not be included in OMRD and TMRD calculations but will be buffered for secure core calculations.*

51. **Public Comment:** Numerous commenters criticized the Application Rules for motorized access route densities within the PCA as a loophole and a concession to industries. They note that by allowing mitigation habitat to be provided elsewhere, the USFWS is incorrectly assuming there will be no impacts to feeding, breeding, denning, and survival and that females will move to mitigation habitat, an assumption undermined by Allen et al. (2011), who found that female grizzlies continued to use more heavily roaded habitat of their historic home ranges even when there were large blocks of less roaded habitat nearby. Others questioned the analysis used to create the Application Rules because it was based on only 6 projects on 2 of the 5 forests within the NCDE. Furthermore, it selected large projects instead of a representative or random sample.

Response: *The allowance for temporary increases in TMRD and open motorized route density, and for temporary decreases in secure core is intended to accommodate project activities to occur at a level similar to what occurred during the same time period when the grizzly bear population was increasing. The application rule was based on the temporary changes that were allowed for six projects in the PCA that were implemented in consultation with USFWS. The rationale for allowing the temporary changes to OMRD, TMRD, and secure core is provided in Chapter 3.*

52. **Public Comment:** The USFWS should evaluate what the overall decline in secure core and net increase in road densities would be if there was a project in each of the BMU subunits available in the PCA for such a project (e.g., not in GNP or Wilderness Areas).

Response: *As part of the ESA Section 7 consultation between the USFS and USFWS on the Flathead NF's revised forest plan and the NCDE grizzly bear amendments, the USFS analyzed the percentage of secure core that could be affected by temporary reductions for projects. Because of the large amount of Wilderness Areas, IRAs, and other land allocations that restrict motorized use, only a very small fraction of the secure core could be affected: a maximum of 9% (approximately 287 mi^2) of the secure core on the Flathead National Forest, 1% (approximately 2.6 mi^2) on the Helena portion of the Helena-Lewis and Clark NF, 3% (approximately 34 mi^2) on the Lewis and Clark portion of the Helena-Lewis and Clark NF, 7% (approximately 8,400 acres) on the Kootenai NF, and 3% (approximately 14 mi^2) on the Lolo NF. Seventy-four of the 126 BMU subunits in the NCDE have lands that are not contained within a Wilderness Area or GNP. It is extremely unlikely that funding and other logistics could ever result in projects occurring simultaneously in all 74 of these BMU subunits.*

53. **Public Comment:** Replacement secure habitat should be of equal or greater habitat quality and in place for at least 10 years. Some went further to say mitigation should restore degraded areas that are currently developed and not used by grizzly bears to offset impacts associated with projects.

Response: *This comment is referring to one of the application rules, which would provide for mitigating the permanent loss of secure core. The application rule states that replacement secure core must be of equal size and similar quality (if possible) and function in the same BMU subunit. It is not possible in the Conservation Strategy to forecast the circumstances that might result in a permanent loss of secure core or the available mitigation opportunities, and therefore we have not added further conditions to the application rule. We believe any such mitigation is best formulated through project analysis.*

54. **Public Comment:** Due to illegal use of closed roads, when roads are closed (after project completion or to improve habitat), they should be obliterated, not just closed with a gate. At the very least, there should be some kind of compliance monitoring and enforcement.

    Response: *Federal agencies will continue to monitor and enforce compliance with its regulations, including those that restrict motorized use. Federal agencies also reinforce or otherwise improve closure devices when deemed necessary. On State trust lands, the DNRC HCP requires all primary access closures within the PCA to be checked annually, and repairs to any defective closures must be made within one operating season following their detection.*

55. **Public Comment:** There should be restrictions on buying and selling land. Disposal of Federal land should not be allowed and if lands are acquired, they should be improved and restored (e.g., remove developed sites, roads, etc.). Again, this is hugely important to offset other increases on private lands the agencies have no authority over.

    Response: *We acknowledge the concern about disposal of Federal lands in the PCA. However, this Conservation Strategy does not set agency land ownership policy. Land ownership adjustments (acquisition and conveyance) of NFS lands are guided by Department, Agency and Forest Plan strategic goals, conservation objectives and desired conditions. The USFS has been a partner in past land adjustments such as the Montana Legacy Project that consolidated land ownership in the Swan Valley portion of the PCA and protected lands from development such as residential subdivision. On State trust lands in the PCA, caps are in place under the DNRC HCP that would prevent the disposition of >15% of the covered land base to non-conservation-based entities to ensure that the integrity of the plan and commitments are retained over time.*

56. **Public Comment:** The five-year limit on projects should be absolute, without any exceptions. Further, there should not be any projects allowed in a BMU subunit for at least another 20 years after a project has ended.

    Response: *The Conservation Strategy recommends that individual projects should be designed so that implementation does not exceed five years. The maximum five-year duration was based on past experience administering projects such as timber sales in grizzly bear habitat. A five-year period allows for proper sequencing of activities such as pre-harvest weed treatment, erosion control practices on roads, timber harvest, post-harvest slash treatment, tree planting, and post-harvest road management. This appears to have been compatible with a stable to increasing grizzly bear population in the NCDE. It is not possible to make the five-year limitation absolute, because agency contracts must allow for the extension of contract term lengths under qualifying conditions. Wildfires or unusually wet weather also may cause a delay in completion of project activities.*

Available scientific information does not support the need for a "rest" period such as the 20 years suggested by the commenter. The concept of 10-year rest period was proposed by the IGBC's Task Force Report (1994 and 1998) at a time when management direction for secure core habitat was being formulated. The idea was to provide a time period without disturbance by motorized activities for a female grizzly bear to replace herself (roughly from the time a female bear is born to her first litter (six years) and then raising offspring to 2½ years old). Secure core is now in place across the NCDE and grizzly bear experts no longer believe that a rest period is needed to support recovery of the grizzly bear population.

57. **Public Comment:** For the exception to the motorized standards if a project is within administrative use levels (defined as either 6 trips (3 round trips) per week OR one 30-day unlimited use period during the non-denning season), there should be a hard number on the limit of trips per day for that 30-day window. It should not be unlimited.

    Response: *The six trips per week was based upon road counter data from the South Fork Grizzly Bear Study. It was not known if the use was on weekends only, occurred daily, or for one heavy short period of use. The six trips per week is the average of that data. The 30-day unlimited use period is an alternative that was developed to enable consideration of season of use and to help to avoid chronic disturbance to grizzly bears.*

58. **Public Comment**: Increases should not be allowed every 10 years without meeting the Application Rules. This will allow a continual erosion of habitat and increase conflict risk for grizzly bears at a time when other factors the USFWS has no control over (e.g., human population growth, private land development, and climate change) are also increasing. It is unclear how the developed site standard relates to the 2011 baseline and overall approach to maintain habitat conditions as they were in 2011. It is illogical and confusing to include "changes" in developed sites as the first bullet in the Application Rules for the "no changes to developed sites" standard. The Application Rules (and the standard itself) seem to allow for a steady increase in developed sites on public lands. How is this consistent with the approach of using 2011 as a baseline year? To compensate for this uncertainty, no increases in developed sites on public land should occur. Some thought this standard should be expanded to include public lands in all of Zone 1.

    Response: *The objectives and Application Rules for developed recreation sites have been revised to improve clarity.*

    There have been human-grizzly bear conflicts but no grizzly bear mortalities at developed recreation sites on Federal or State lands within the NCDE recovery area in recent decades. Most of the grizzly bears killed or removed by management agencies in the NCDE had been

involved in conflicts related to unsecured attractants such as garbage, bird feeders, pet/livestock feed, and human foods, with the vast majority of these situations occurring on private lands. Because there is not a strong pattern of grizzly bear mortalities associated with developed recreation sites in the NCDE, the Conservation Strategy Team did not propose to preclude any increases within the PCA. Furthermore, with ESA section 7 consultation with USFWS, the land management agencies have added new developed recreation sites during the period when the NCDE population was stable to increasing. Future increases in the number or capacity of developed recreation sites would be limited to one per BMU per decade, the same rate that occurred during the 2004–2011 period when the grizzly bear population was shown to be increasing. Habitat management in Zone 1 is focused primarily on constraining motorized access and limiting the risk of grizzly bear mortality, for example through proper handling and storage of food/attractants. To meet the purpose of Zone 1, it is not necessary to constrain developed recreation sites in Zone 1. The DMA encompasses both the PCA and Zone 1, ensuring that the number and sources of mortality will be tracked and can be addressed if future problems develop.

59. **Public Comment:** The Application Rules for developed sites are too lenient. They should include restrictions on the type of acceptable development allowed, mitigation actions required, and the frequency with which these "exchanges" can be made. Currently, a trailhead could be replaced with a campground with minimal mitigation steps.

    Response: *The section on Developed Recreation Sites, specifically the objectives and Application Rules, has been revised to better define and explain the intent for limiting and/or offsetting increases in the number and capacity of developed recreation sites on Federal lands. Contrary to the comment, a campground and a trailhead in most cases would not be considered to be equivalent, because the objective has been clarified to apply to developed recreation sites that are designed and managed for overnight use. Because of the wide variation in the type, scope, and scale of developed recreation sites, as well as the crucial importance of their location on the landscape, the Conservation Strategy is not prescriptive in the types of developments to be allowed or the mitigation measures to be required. Site-specific analysis and public involvement will occur when projects are proposed.*

60. **Public Comment:** The way the developed site standards are currently written does not conform to the latest USFS planning regulations. Standards can only restrict actions, not direct them.

    Response: *The USFS has developed forest plan management direction that was informed by the draft Conservation Strategy and also conforms to the agency's own policy and regulations. It is acceptable for signatories of the Conservation Strategy to make any necessary adjustments of the language to conform with their regulations and procedures.*

61. **Public Comment:** Currently, the Strategy says "because dispersed sites do not contain permanently constructed features, they will not be subject to this developed site standard." The Strategy goes on to say dispersed sites could be eliminated to allow for increases in other developed sites (e.g., campground). Either dispersed sites have impacts or they do not. Dispersed sites should be included in the developed site standard if the Application Rules allow consolidation or elimination of these sites to serve as mitigation. The Strategy should identify what metric(s) will be used to assess the value of closing a dispersed camping site for the creation of a developed site.

    Response: *The Conservation Strategy explains that dispersed sites are temporary in nature and have minimal to no site modifications. It is likely that grizzly bear mortality risk is lower at dispersed sites than at developed recreation sites where people spend more time, usually cook or eat meals, and produce more garbage while at these areas. The Application Rules state that consolidation or elimination of dispersed sites could be used to offset an increase in the number or capacity of developed recreation sites only when that would constitute an equivalent reduction in the same BMU.*

62. **Public Comment:** The Strategy should include prohibitions on all oil and gas development in secure core areas of the PCA. The USFS and BLM should commit to "no surface occupancy" in the PCA and Zone 1 on existing leases without an Application for Permit to Drill, not just future leases. The USFS and BLM should have standards prohibiting future oil and gas leases in the PCA and Zone 1 and should cancel all suspended leases (339 on the Flathead National Forest alone).

    Response: *The Federal agencies do not have the authority to change the terms of valid existing rights. Chapter 3 has been revised so that stipulations requiring no surface occupancy will be applied to new leases on National Forest System lands in the PCA.*

63. **Public Comment:** The Strategy should provide clear direction regarding oil and gas development on the BIR. The Blackfeet Nation should be required to complete a "cumulative-impact management plan that includes setbacks from the PCA and Zone 1; best management practices for any drilling that occurs; a rigorous reclamation plan; and a cumulative-impact mitigation package that actually benefits grizzly bears" as a prerequisite to delisting.

    Response: *As of March 2018, the Blackfeet Tribal Business Council is considering a draft plan to manage and mitigate effects of oil and gas exploration and development in or near grizzly bear habitat.*

64. **Public Comment:** What about oil and gas standards on MFWP lands at risk of development (e.g., Blackleaf)?

Response: *MFWP has many Wildlife Management Areas (WMAs) in and near the NCDE. As the grizzly bear's distribution continues to expand, bears may be found on additional WMAs. Lands managed by FWP, including WMAs, have a variety of subsurface mineral ownerships. Some are owned by MFWP or DNRC and others are privately owned. Exploration and development of these mineral resources would be subject to statutory regulations and negotiations to provide subsurface mineral owners the right to access their property while MFWP protects surface habitat and grizzly bears. One example that MFWP may require is a stipulation for exploration and development with "no surface occupancy."*

65. **Public Comment:** The exception for No Surface Occupancy on BLM lands for new leases in the PCA and Zone 1 is problematic. If an official can determine a specific area is unimportant for grizzly bears, doesn't this undermine the basic science supporting motorized access standards and bring them all into question?

Response: *Under the Conservation Strategy, surface occupancy and use would be prohibited on all BLM and split estate lands within the boundary of the grizzly bear PCA and Zone 1. Exemptions, modifications, and waivers would be considered on a case by case basis, and could be approved by the authorized officer and MFWP if the proposal will not negatively affect grizzly bears or grizzly bear habitat. Proposals that would likely affect grizzly bears and their habitat would not be approved. Any associated road construction for exceptions, modifications, and waivers would be managed on an OMRD of <1 mile/mile^2 on BLM lands. New roads would be temporarily constructed and reclaimed once they are no longer needed. As stated in the Oil and Gas Development section of Chapter 3, a determination by the authorized officer that the area is no longer important to grizzly bears must be made in consultation with MFWP.*

66. **Public Comment:** While funding grizzly bear research is identified as a mitigation measure for lost habitat due to hardrock mining activities, it is unclear how funding research would effectively mitigate habitat loss. It is much clearer how funding a bear management specialist or enforcement officer would.

Response: *The funding of research is not proposed as a mitigation measure, but rather is encouraged to provide location-specific information that will assist in formulating effective mitigation measures. As Chapter 3 explains, this could involve radio telemetry monitoring of grizzly bear movements in the affected area (in coordination with MFWP), other grizzly bear research (with MFWP involvement), funding a bear management specialist or enforcement officer or other appropriate actions as needed to develop site-specific mitigation. We believe this clearly conveys the intent.*

67. **Public Comment:** Maintaining hiding cover in identified areas where bears cross highways should be the norm throughout the NCDE, not just on the FIR.

    Response: *The Vegetation Management section was edited to more clearly describe where it is desirable to retain or develop cover, including identified highway crossing sites in the PCA.*

68. **Public Comment:** Some respondents were concerned about allowing public access to roads open exclusively for timber harvest, as described in the vegetation management section. They argue that firewood gathering would be particularly damaging to grizzly bears because it occurs during the fall, when bears are in hyperphagia and also occurs at a time when hunters with firearms are likely to use those roads. They also note that this allowance seems inconsistent with commitments elsewhere to make new roads associated with projects single purpose roads closed to the public.

    Response: *The motorized access section has been modified to clarify this issue of temporarily opening a restricted road for public uses such as firewood cutting. To minimize impacts to bears and other wildlife, such use would be limited to a period that does not exceed 30 consecutive days, must occur outside of the black bear hunting seasons and any potential future grizzly bear hunting season, and will not be permitted within secure core. This approach is consistent with current management practices on National Forest System lands in the NCDE.*

69. **Public Comment**: Motorized access management in the Salish DCA allows road densities much higher than what science tells us is consistent with grizzly survival in the long-term. Explain the conclusion that female grizzlies will "seek out and survive" areas with Open Road Densities of 3–5 mi/mi^2. This explanation should answer these questions as well:
    - What is meant by "documented?" How many were 1 time sightings/locations, and how many were observed multiple times?
    - How many of these females were transient, and how many were resident?
    - How many of the females lived in the Salish DCA for an entire non-denning season, or multiple seasons?
    - What was the survival rate for these females? …for their offspring?
    - How many of these 8 females are alive today and remain in the Salish DCA?

    Response: *Available scientific information that relates grizzly bear occupancy, survival, and reproduction to the density of motorized routes (for example, Boulanger and Stenhouse 2014) is considered in the Conservation Strategy. Demographic monitoring, described in Chapter 2, will continue to provide information about the occurrence and mortality rates of grizzly bears within the PCA and Zone 1, including the DCAs. The following is a summary of what is known about grizzly bears in the Salish DCA between 2001 and 2017. Seven female grizzlies*

(two adults and five offspring) were located primarily inside the Salish DCA by radiotelemetry monitoring. All seven of these were either captured or were dependent young of females captured within the Salish DCA, and were likely residents. Of these seven, two were female yearlings that were translocated outside the DCA where they remain, and five were last known alive but their collars were shed or failed (two adults, three yearlings of unknown sex).

Eleven female grizzly bears were resident at the eastern edge of the Salish DCA and were located occasionally inside the DCA. Of these 11, four are now dead, one lost contact and may be dead, and six were last known to be alive but have shed their collars.

Five female grizzly bears were transients that traveled within the Salish DCA after being translocated. Of these, one is still being monitored and four were last known alive but shed their collars.

No mortalities have been documented among female grizzlies primarily monitored within the Salish DCA, and no mortalities have been documented among their dependent offspring. Among all bears located within the DCA, survival rates are similar to bears in other areas, with lower survival among bears involved in human-grizzly bear conflicts. One of the eight females reported to use the Salish DCA as of the 2013 draft of the Conservation Strategy is believed to be alive today and still residing in the DCA. These bears are surviving with current levels of motorized access and other human uses.

Among radio-monitored bears, we have documented two denning events by an adult female with offspring and one denning event by a male within the Salish DCA.

70. **Public Comment:** Is there enough denning habitat in the DCAs for a female's home range to be entirely inside a DCA?

    Response: *One radio-marked female (with offspring) was observed to den twice within the Salish DCA and spend most of her active season in the area. It is only a single individual but indicates that there is sufficient denning habitat to allow for year-round occupation of this area.*

71. **Public Comment:** Many commenters expressed support for the construction of wildlife crossing structures, especially along Interstate 90 near the Ninemile DCA. Others requested a crossing structure across Highway 2 from the Salish DCA toward the Cabinet Mountains Wilderness, especially in light of the anticipated increase in traffic in this area once the Rock Creek and Libby mines are developed.

Response: *Thank you for your comments in support of wildlife crossing structures. The Conservation Strategy does not address individual sites. The signatories have been cooperating for many years to improve the permeability of highways to wildlife movement.*

DNRC

72. **Public Comment:** Some did not think the DNRC's HCP was adequate to support grizzly bears in the NCDE and noted the Conservation Strategy says its implementation is at the "sole discretion of the DNRC" and therefore cannot be considered a regulatory mechanism. Many commenters objected to vague, non-regulatory language in the HCP and said actual standards are minimal (e.g., minimize, discourage, manage female survival "generally > 90%). One commenter suggested "more specific management standards in the Strategy for DNRC" and one noted the habitat standards on DNRC lands are unclear. As currently written, standards can be violated, not met, or changed.

    Response: *We are unaware of any reference in the DNRC HCP that provides a reference for managing survival of female grizzly bears "generally greater than 90%." The DNRC HCP is a 50-year plan that was prepared to comply with Section 10(a)(1)(B) of the ESA (16 United States Code [USC] 1531 et seq.) and the regulations that implement that section of the ESA. In February 2012, the USFWS issued an incidental take permit to DNRC for its Forest Management Program on forested trust lands. The Permit was the culmination of 10 years of coordination between the two agencies to develop an HCP; analyze its effects on the environment in a NEPA and MEPA EIS; comply with Sections 7 and 10 of the ESA; and issue a Record of Decision and Statement of Findings. The HCP provides a comprehensive suite of conservation commitments tailored to DNRC's forest management activities that minimize adverse effects to grizzly bears and four other species. In this process, the USFWS conducted a thorough analysis, completed a biological opinion, and concluded that implementation of the HCP would not impede recovery of grizzly bears or jeopardize the species, and that the HCP minimized and mitigated impacts of the covered activities to the maximum extent practicable. While DNRC's HCP is in place, State forest management rules require that the conservation commitments are implemented. Numerous measurable habitat caps and standards make up the conservation commitments contained in the HCP (e.g. open and restricted road amount caps in the Stillwater and Swan River State Forest transportation plans, seven established security zones in the Stillwater Block, and fixed subzones that require rest periods in the Swan, to name a few). References in the HCP in "the sole discretion of DNRC" primarily refer to DNRC's intent to implement various interagency strategies for bull trout and lands disposition and acquisition measures which have legal relevance pertaining to DNRC's trust mandate for management of State trust lands. DNRC lands managed under the Conservation Strategy are subject to a differing mandates than Federal lands, as well as*

differing requirements under the ESA. While commitments to conserve grizzly bears differ in a number of instances from those for Federal lands, they provide considerable conservation value on DNRC's working forest lands.

73. **Public Comment:** The new roads constructed in the PCA on DNRC lands would violate the status quo assumption. All of these kinds of anticipated future changes permitted by the Strategy (like the allowance for 1 new developed site per BMU per 10 years) that would adversely affect grizzly bears should be evaluated and discussed in conjunction with the acceptance of that assumption.

    Response: *Construction of additional open roads on DNRC lands is prohibited under the HCP except under rare circumstances (e.g. providing access across DNRC lands to an adjacent private landowner). Amounts of restricted roads in the Stillwater block and Swan River State Forest are capped by established transportation plans, and restricted and open road amounts on scattered lands must be scrutinized whenever a project is conducted and reduced where possible. Road construction without limits would not be allowed on DNRC lands in the PCA. See response to #59 above for additional information pertaining to DNRC lands that the HCP.*

74. **Public Comment**: Many disapproved of the DNRC's HCP because it allows permanent reductions in secure core areas on the Stillwater State Forest. Other deficiencies in the DNRC HCP raised in public comments included:
    a. The rest period is not a surrogate for secure core because it has many loopholes to allow salvage logging and use of closed roads by DNRC;
    b. DNRC is allowed to maintain up to eight miles of temporary roads at any one time;
    c. DNRC is relying on adjacent USFS core area to provide grizzly bear security but the application rules exempt the USFS from this obligation;
    d. the HCP relies on adjacent Plum Creek lands having "efforts to avoid or minimize take" but Plum Creek does not have an HCP to ensure there are legal obligations to minimize take.
    e. It excludes more than 50,000 acres of State trust lands planned for transition and/or development;
    f. The exemptions to the 50 foot "no-cut buffers" around riparian zones have so many exceptions, they are rendered ineffective. The HCP allows for borrow pits in streamside management zones; roads in riparian management zones, wetland management zones, and avalanche chutes; cable logging corridors in riparian management zones; and multiple harvest entries and salvage logging in riparian management zones that allow up to 20% to be logged.
    g. It allows 1,100 miles of new road to be built and total road densities to increase from 3.1 mi/mi^2 to 4.7 mi/mi^2.
    h. There are no biological goals in the HCP or habitat criteria to ensure good bear habitat is always available.

i. The Strategy should specifically require the retention of 100 feet of vegetation between open roads and clear-cut or seed tree harvest units (Appendix 12, p. 100), not "up to 100 feet" as it currently says. Further, the USFWS should explain the biological basis for this seemingly narrow buffer (only 50 feet on each side).

Response: *DNRC entered into a settlement agreement in September 2015 that was associated with litigation involving secure core on the Stillwater State Forest. As a result of that agreement, seven security zones that total 34 mi^2 were established. No management can occur within these seven zones outside of the winter period and no new permanent roads may be constructed. This represents a slightly different management approach than the one considered originally in the Conservation Strategy. Revisions in the final strategy address incorporation of the Agreement. On the Swan River State Forest, five management subzones are established under the HCP that would require a minimum of six years of rest following any three-year window of management activity. This approach is very similar to requirements of the existing Swan Valley Grizzly Bear Conservation Agreement. Security core requirements were not required for DNRC or Plum Creek Timber Company under the Swan Valley Grizzly Bear Conservation Agreement, which has been implemented since 1995. The NCDE grizzly bear population has been increasing in numbers and distribution while the Swan Agreement has been in effect.*

Responses to individual points:

a. The rest period is not a surrogate for secure core because it has many loopholes to allow salvage logging and use of closed roads by DNRC.

On the Swan River State Forest some limited allowances can occur while a subzone is in rest for limited operating periods (such as salvage) to capture timber value before it is lost. While security core areas would not be maintained on the Swan River State Forest, by resting subzones from large-scale commercial forest management activities for six year periods substantial portions of the Swan landscape would experience considerably less mechanized disturbance than if the rest periods were not in place. This same approach has been applied in the Swan Valley since 1995.

b. DNRC is allowed to maintain up to 8 miles of temporary roads at any one time;

This stated requirement under the HCP applies to the DNRC Stillwater Block. This allowance for temporary roads was agreed to by DNRC and the USFWS to provide DNRC some additional limited access to their ownership in a manner that would not require additional permanent restricted roads. DNRC must continuously track their active temporary road segments as a part of the commitment and reclaim segments no longer needed immediately following project completion. Reclaimed roads must be rendered unusable by motorized vehicles.

c. DNRC is relying on adjacent USFS core area to provide grizzly bear security but the application rules exempt the USFS from this obligation;

DNRC is not relying on adjacent or nearby core areas on National Forest Lands. DNRC implements its commitments and compliance with Forest Management Rules independently of the USFS. DNRC's measures are intended to stand on their own and HCP implementation requires continuous oversight by the USFWS and annual monitoring. DNRC's conservation measures apply to their particular land base, differing ownership pattern, and differing mandate, and the commitments complement those on adjacent National Forest Lands. The USFWS permitted incidental take associated with DNRC's covered forest management activities under a 10-year HCP development and consultation process under Section 10(a)(1)(B) of the Federal Endangered Species Act.

The DNRC grizzly bear conservation strategy contained in the HCP is considerably more comprehensive and constraining than earlier administrative State rules (ARMs) that were in place prior to the HCP and when the grizzly bear population was increasing.

d. The HCP relies on adjacent Plum Creek lands having "efforts to avoid or minimize take" but Plum Creek does not have an HCP to ensure there are legal obligations to minimize take.

The DNRC HCP does not reference or rely on the actions, commitments or management approach of any other landowner in western Montana.

e. It excludes more than 50,000 acres (78 mi^2) of trust lands planned for transition and/or development;

In western Montana within the DNRC HCP Planning Area, decisions had to be made regarding the lands to include in the HCP. The total land area in western Montana excluded was 1,264,000 acres (1,975 mi^2). The majority of these acres were non-forested lands (719,000 acres, 1,123 mi^2), followed by lands in the DNRC Conrad Unit on the Rocky Mountain Front where many lands have recently burned where few roads or forest management opportunities are present (359,000 acres, 561 mi^2), and lands where HCP species habitat was not present (117,000 acres, 183 mi^2). A full listing of lands that were excluded from the HCP and why can be found on p. 1–14 of the DNRC HCP (Vol. 2, 2010). Without question the vast majority of DNRC lands with habitat significance for grizzly bears where conflicts with DNRC management activities are likely to occur, were included for management under the HCP. DNRC is currently in the process of adding an additional 81,000 acres (127 mi^2) to the HCP, and any lands removed from the HCP must comply

with predefined caps on acreages and locations relative to their sensitivity regarding grizzly bears and other covered species. Any disposition sensitive HCP lands would require notification of the USFWS and would follow a process that would allow conservation-based entities to have first right to purchase or exchange such lands under the DNRC HCP Transition Lands Strategy (DNRC HCP, Vol. 2, 2010, pp. 3–1 to 3–7).

f. The exemptions to the 50 foot "no-cut buffers" around riparian zones have so many exceptions, they are rendered ineffective.

The HCP allows for borrow pits in streamside management zones; roads in riparian management zones, wetland management zones, and avalanche chutes; cable logging corridors in riparian management zones; and multiple harvest entries and salvage logging in riparian management zones that allow up to 20% to be logged.

The exceptions to 50 no-harvest buffer contained in the HCP were fully analyzed in the 2010 HCP EIS. The results of this analysis including detailed modeling scenarios, indicate that the RMZ conservation strategies utilized in the HCP were effective in maintaining critical riparian functions. Under limited circumstances that must be tracked and reported, DNRC can address specific situations or circumstances within 50-foot no cut buffers that would include the effects of fire, insect and disease salvage, and the need to emulate natural disturbance through non-salvage related timber harvest. These circumstances would occur on an infrequent basis and ample forest vegetation (if present in non-burn scenarios) would be retained as cover for bears. Regarding borrow pits, under the HCP some site-specific minor levels of borrowing may occur in the Streamside Management Zone (SMZ) when necessary to construct, reconstruct, improve or maintain roads or stream crossings only. These situations are limited to borrowing of minor amounts of road fill material from the existing road right of way that is needed to construct, maintain or improve stream crossings. These would involve minimal excavation and be very short duration projects expected to have negligible adverse effects on grizzly bears. Road construction necessary to cross a stream is permitted under the HCP. However, the amount of road construction occurring in Forested Trust lands key grizzly bear recovery is greatly restricted by the transportation plans developed under the HCP for the Stillwater and Swan State Forest. Construction of open roads through avalanche chutes is prohibited under the HCP, and avalanche chutes must be avoided where possible in any project where they occur. The amount of harvest allowed within 50 feet of a stream under the HCP for cable logging systems is restricted to no more than 15% of any affected 50-foot buffer, and required to be spaced at 150-foot intervals, thus, in these situations cover for grizzly bears would be minimally affected. All harvest exceptions, including salvage and harvest designed to promote regeneration of shade intolerant tree species are limited to 20% of the RMZ acres in any given Aquatic Analysis unit. The 20% was a conservative estimate of the amount of

disturbance that we would expect at any given time in streamside riparian stands across a landscape considering historical conditions. Disturbance is an integral and natural component of riparian areas and studies conducted in this region have found that fires occurred with comparable frequency in both streamside riparian areas and uplands prior to the 1920s (Agee 1994, and Everett et al. 2003).

g. It allows 1,100 miles of new road to be built and total road densities to increase from 3.1 mi/mi^2 to 4.7 mi/mi^2.

The estimate of 1,100 miles of new road was the predicted amount of additional road DNRC was likely to need to access its covered land base for forest management. These roads would be constructed over the 50-year term of the Incidental Take Permit across 548,509 acres (857 mi^2) of DNRC lands. The average increase would equate to an increase of 1.3 miles of restricted road per square mile of DNRC lands over 50 years. A significant portion of this predicted increase in roads would occur outside of the PCA where open and restricted road amounts are strictly capped, and as such, they would pose less risk to grizzly bears.

h. There are no biological goals in the HCP or habitat criteria to ensure good bear habitat is always available.

The biological goals of the DNRC HCP for grizzly bears and other covered species may be found on p. 1–8 of the DNRC HCP (Vol. 2, 2010). Measurable road caps and other quantifiable grizzly bear commitments are implemented and monitored annually, which provide habitat assurances for the species over the next 45 years.

i. The Strategy should specifically require the retention of 100 feet of vegetation between open roads and clear-cut or seed tree harvest units, not "up to 100 feet" as it currently says. Further, the USFWS should explain the biological basis for this seemingly narrow buffer (only 50 feet on each side).

The "up to 100 feet" requirement recognizes that effective visual screening is typically provided by submerchantable trees and shrubs. In many places along open roads, effective visual screening cover can be provided by a narrow band of vegetation a few feet wide. Thus, the biological objective of effective screening can be accomplished by whatever buffer width is necessary on a site-specific basis to shield from view open areas associated with logging units along open roads.

Private Lands

75. **Public Comment:** Some felt the Conservation Strategy's treatment of private land development is cursory and fails to acknowledge that "inappropriate private land development is one of the greatest threats to the grizzlies' future viability." They requested more emphasis about the crucial role private land plays in grizzly bear connectivity. They suggested the Strategy contain commitments from member agencies to participate and encourage the conservation of strategically-located private lands. At the very least, the Strategy should indicate that the conservation of additional grizzly bear habitat would benefit grizzlies and identify this as a priority for the signatories. They believe funding of conservation easements is more likely to be directed towards conservation of grizzly bear habitat if the benefits of doing so are included in an official strategic plan.

    Response: *Chapter 1 contains a section on private land development that acknowledges the impacts that have occurred on private lands, and the substantial efforts that management agencies have devoted toward private landowner outreach. The signatories are committed to continuing those efforts. However, the Conservation Strategy is careful to point out that the habitat management recommendations in Chapter 3 are applicable to the Federal, State and Tribal lands under the jurisdiction of the signatories, and not to private lands. Members of the NCDE Coordinating Committee can participate in community-based efforts to secure conservation easements for important properties and to work with communities on landscape-level conflict reduction projects.*

76. **Public Comment:** The Conservation Strategy "details many ways that bears are being pushed to private land and forced to travel to the Yellowstone area for gene transfer and to the Selway-Bitterroot of Idaho to start a new bear population there." "The single best way to prevent conflicts with humans is to limit grizzly bear numbers and distribution."

    Response: *The Conservation Strategy focuses on conflict prevention in Zone 2 to manage for genetic connectivity to the GYE. Conflict prevention maximizes human safety and minimizes property losses while providing for genetic connectivity to the GYE through Zone 2. The grizzly bear was listed as a threatened species under the ESA in the lower-48 States in 1975. The 1993 Grizzly Bear Recovery Plan identifies the BE as one of six grizzly bear recovery zones where restoration of a population of grizzly bears is a goal. Chapter 4 describes the objective of addressing human-grizzly bear conflicts in a manner that will maximize human safety and minimize property losses while maintaining a viable population of grizzly bears.*

Climate

77. **Public Comment:** "Climate change presents a new and serious threat to key foods for the bears." The adverse effects of climate change on the survival of NCDE grizzly bears cannot be swept under the rug. Those effects must be taken into account in a serious manner in the NCDE Strategy.

    Response: *We strengthened the discussion about effects of climate change.*

78. **Public Comment:** According to a newspaper interview with Kate Kendall (Hungry Horse News, May 29, 2013), researchers simply "don't know what climate change will do to berry production." Some commenters asserted that berry production is "key to bear survival" in the NCDE.

    Response: *We strengthened the discussion about effects of climate change.*

Population, Mortality, Conflict and Bear Biology (Methodology)

79. **Public Comment:** The Service's claims of 11 movements across Hwy. 3 in Canada north of the NCDE (10 males and 1 female) in the last 30 years seems to suggest that the NCDE is already becoming an isolated population, especially in terms of demographic rescue.

    Response: *Measures of heterozygosity from the NCDE obtained between 1990 and 2004 are similar to those from undisturbed populations in Canada and Alaska, leading to the conclusion that the NCDE population has high genetic diversity and is well-connected to other populations.*

80. **Public Comment:** There should be a small section that details the current density of bears in GNP, Zone 1, and PCA to set up demographics standards (pull this info. from Appendix 2)

    Response: *The demographic objectives and thresholds are applied to all of the DMA, therefore we do not differentiate among GNP, the rest of the DMA, and Zone 1 when establishing thresholds or annually assessing the thresholds.*

81. **Public Comment:** Average age of first reproduction in the NCDE is 5.7 years old but can vary from 3–8 years of age (Costello et al. 2016). Comment: "But it was calculated incorrectly; as Mace et al. stated, there was insufficient data to follow Garshelis et al. 1998. So, it would be older than this."

    Response: *The analysis in Mace et al. (2012) did not use the Garshelis et al. (1998) method, but the analysis in Costello et al. 2016 does. Therefore, the new estimate is unbiased and should not be low.*

82. **Public Comment:** Mean litter size in the NCDE is 2.1 with a range from one to four cubs (Mace and Waller 1997b). Comment: "Beware, the "mortality-adjusted" litter size calculations that Rick used may be incorrect. If cubs in single cub litters (or small litters) are more apt to be lost than cubs from larger litters (Schwartz et al,. 2006, Zedrosser et al. 2009) then then the actual litter size at birth may be SMALLER not larger than the litters when first seen in the spring, but the interbirth intervals or age at first litters would be shorter. You can't adjust one without affecting the others. That is why it is better to just use these parameters when first seen which also will be wrong for that parameter but not for estimating lambda."

Response: *All of our calculations are designed to estimate reproductive output as of early spring (roughly the time of den emergence when we have the opportunity to observe females), not reproductive output as of the time of birth. If we fail to detect litters that were completely lost before the first observation, that error is explicitly accounted for in our estimation of proportion of females with cubs from transition probabilities. This transition probability is contingent on us knowing the status of a females in the previous year, so it is not informed by bears that might be captured in the current year. On the other hand, litter size is documented both from radio-marked females observed immediately after den emergence and from newly captured bears, therefore it is necessary to adjust for later captures. We believe these methods maximize our samples sizes, while reducing bias. For the analysis in Costello et la. (2016), the adjustment only increased the mean estimated litter size from 2.0 to 2.1, therefore the effect of the adjustment is minimal.*

83. **Public Comment:** "Can an adult female survival rate realistically be 95%. I know we (me too) get these numbers from time to time but are they realistic? For example, if we collar 10, 5-year-old females and we track them all for 20 years and none die but at 24 years of age they all die, then we have a 95% survival rate. I know its not the only factor causing an unrealistically high survival rate but I worry that collared bears, and in particular GPS collared bears (because they are big and obvious) are not killed by people as frequently as non-collared bears. I KNOW this is true in some cases as people have collared bears specifically to protect them (females that live in farm land) and have had people tell us that they didn't shoot the bear because of the big GPS collar."

Response: *Yes, we think a 95% survival rate among independent bears is entirely realistic. Grizzly bears are a k-selected species, characterized by high adult survival rates, long reproductive intervals, and lower juvenile survival. Using this rate in stochastic population modeling provides estimates of population growth that are modest and entirely realistic for grizzly bears. In addition, the 2–3% growth rate we estimate for the NCDE appears consistent with population expansion, numbers of estimated total mortalities, etc. We cannot completely discount the form of radio-telemetry bias the reviewer describes, but we do not suspect it results in any sizable positive bias in our estimated survival rate. We typically use brown collars that are not easily observed. We do not affix any eartags to research-captured bears, although they are typically affixed to management-captured bears. We document a wide variety of causes of death, and many of them are unlikely to be affected by the presence of a collar/eartags (e.g., natural, vehicle, train). The reviewer suggests that the presence of a collar or tags might increase survival probability, but it could just as easily be argued that*

their presence might increase the chance that a person might report a bear for causing conflict (knowing it was previously captured), which may reduce its survival probability.

84. **Public Comment:** Referring to the 15 capture related mortalities in Table 1. Comment: "This seems pretty high unless >2000 bears have been captured. I'm sure you have had reviews of this and know what is going wrong."

Response: *During 1998–2017, there were 15 capture-related mortalities. This included two dependent offspring orphaned when their mother died. During 2004–2017 (i.e., years for which we have complete data on number of captures), we had 12 capture-related mortalities among 1,022 captures (including those two orphaned offspring), therefore 1.1% of captures resulted in a mortality. This value is not very different from the rate suggested by the reviewer of about 0.8% (i.e., 15 of 2,000 captures). We take bear safety very seriously and make every attempt to reduce injuries and/or mortalities associated with capture operations. Note that more than half of these mortalities occurred in situations where bear managers were responding to conflict situations, when and where conditions for capture are sometimes problematic.*

85. **Public Comment:** The Service must manage for an increasing population trajectory for the NCDE to function as a source population. Even with current levels of growth, connectivity has not been documented for males or females. Furthermore, the 3% annual increase in population size from 2004–2009 seems to indicate this population is not yet at carrying capacity, so why would we expect managing for zero population growth would promote connectivity? Defenders suggests an 8% mortality limit. Badger Two Medicine Alliance suggested a 7% mortality limit for females and 15% for males, like in the GYA.

Response: *Since the draft Conservation Strategy was prepared, the NCDE grizzly bear population has continued to expand, therefore the potential for achieving connectivity is higher than in 2013. The approach to the demographic objectives has been revised. It now has a mortality threshold of 15% for males. We have tied mortality thresholds overall to support an estimated probability of at least 90% that the population within the DMA remains above 800 bears. This more conservative approach will likely result in a larger population size. We have also added occupancy thresholds for reproductive females in the DCA to help support connectivity.*

86. **Public Comment:** More/better population protections in the PCA. Some individuals feel the population criteria and mortality standards, like the habitat criteria should apply only to the PCA; others took the opposite view and feel the population criteria should extend to the DCAs and Zone 1, 2, and 3, or in all occupied habitat. They argue that mortalities in these areas still affect survival rates and trend of the overall NCDE population they came from.

Response: *The approach to the demographic objectives has been revised. We have tied mortality thresholds to support an estimated probability of at least 90% that the population within the DMA remains above 800 bears within the DMA, which includes the DCAs. Substantial modeling with population sizes proposed for the DMA support that focusing on a core of at least 800 individuals will lead to long term persistence of the population. The population and habitat management outlined in the draft and revised Conservation Strategy are based on our assumption that the DMA is large enough to support a self-sustaining population of grizzly bears, and this assumption is supported by our monitoring data. The DMA is comprised of the PCA, where the most conservative habitat protections apply, and Zone 1, which is a buffer area. Therefore, we believe it is most appropriate to apply the thresholds within this core area.*

87. **Public Comment:** The objective to maintain a recovered grizzly population that is sufficient to maintain a healthy population is circular and should be re-phrased.

Response: *This has been revised.*

88. **Public Comment:** One commenter suggests we refer to the demographic standards as "criteria" since they are not standards in the same way that term is defined and used for habitat. They are not "legally binding" in the same sense as standards are. This distinction should be better explained.

Response: *We have revised the chapter and now refer to demographic "objectives" and some of these have specific relevant "thresholds."*

89. **Public Comment:** The term "discretionary mortality" should be defined. Are management actions considered discretionary?

Response: *Discretionary mortality has been defined agency-sanctioned mortalities excluding those necessary for protecting human safety.*

90. **Public Comment:** The criterion for hunting should be with the other criteria, not by itself.

Response: *There is no objectives or threshold specifically for hunting or for the lands on which hunting may occur. Hunting mortalities will be counted against the DMA independent bear mortality thresholds, therefore any proposal for harvest will be informed and limited by the thresholds.*

91. **Public Comment:** The standards for maintaining female survival at or above 0.90 and implementing mortality standards are confusing, vague, and overly complex. Some asked why the survival criterion is so complicated if any of the thresholds trigger the same response: curtailment of discretionary mortality while a review is completed. This could probably be a 1 sentence standard. Also, some questioned the triggers themselves, saying they could not find a biological justification or link between these survival rates and time periods. Others said it is unclear if there is a mortality limit inside GNP and how those bear mortalities that are close to the park or within the park will be counted against demographic and mortality standards. It is also unclear whether mortality limits apply to the BIR and FIR.

Response: *In writing both versions of the Conservation Strategy, we attempted to be concise, while also thoroughly describing the methods and triggers for a management review. The process may seem confusing and complex, but we would argue that it is not vague. The intention is to maintain a recovered population, and thus to avoid triggering a management review, therefore the thresholds must be applicable to changing conditions over time. In the current version, the population modeling which will be used to inform the thresholds will be continually updated to incorporate the most current vital rates, making the thresholds both biologically justified and timely. The thresholds apply to the population within the DMA, irrespective of jurisdiction and the agreements in this Conservation Strategy represent a commitment to manage the population with explicit inter-agency agreement.*

92. **Public Comment:** The Strategy's mortality limits would allow twice as many adult females to die than currently.

Response: *The mortality limits are intended to be limits for mortality, not targets. The mortality thresholds will likely be higher than the current numbers of estimated mortalities within the DMA. The current numbers of mortalities are associated with a growing population. As the population grows, more female mortalities will be expected and permitted. At all times, thresholds for the number of mortalities will be set to support an estimated probability of at least 90% that the population within the DMA remains above 800 bears. Given the commitment to incorporate all forms of uncertainty in the population modeling, this necessitates maintaining an actual population size that is likely closer to 1,000 bears.*

93. **Public Comment:** The Strategy should do more to address illegal malicious killings (i.e., poaching) since this is the second largest source of human-caused mortality in the NCDE.

Response: *Malicious killings are a significant source of mortality and efforts to apprehend and prosecute poachers will continue after delisting. Education and outreach efforts will continue to help reduce conflicts. These mortalities, when known, do count against the total mortality limits.*

94. **Public Comment:** Some commenters requested that the distribution criterion be revised to include the following conditions: (1) that no 2 adjacent BMUs be unoccupied by reproductive females, and (2) Mandatory bear occupancy in the Mission Mountains.

Response: *These criteria from the Recovery Plan were developed at a time when the grizzly bear population density was far lower and when it was more confined to the center of the Recovery Zone. With the current population size and distribution, we do not feel that these specifics are needed any longer. In addition, in the revised Conservation Strategy, we have expanded the occupancy threshold to include units within Zone 1, thus requiring occupancy in areas even more peripheral than the Mission Mountains.*

95. **Public Comment:** FWS must further explain its assertion that allowing 20% of the male portion of the population to be killed will not affect population trend, especially since the Study Team determined 15% was a sustainable mortality rate for independent males in the GYA.

Response: *Analyses in Costello et al. (2016) demonstrated that independent male survival rates did influence population trend, although changes in independent female survival had a much greater effect. Costello et al. (2016) found that independent male survival rates of 0.80 were sustainable, however these rates resulted in more skewed female-to-male sex ratios and a decreased representation of adult males in the population. They suggested that male survival rates of 0.85 were most likely to result in population stability or growth and adult female-to-male sex ratios similar to current conditions. For these reasons, we revised the threshold to 15% for independent males.*

96. **Public Comment:** Numerous commenters are concerned about the high uncertainty around setting mortality limits using trend estimates to project population size from a 2004 value for size and relative density. There is no discussion or acknowledgement that projections of population size using the 2004 value become increasingly imprecise as time goes on. One solution is for the Strategy to commit to periodic, independent estimates of population size. An alternative solution would be to implement more conservative mortality limits.

Response: *We acknowledge that the projections of population size become increasingly imprecise over time. We have revised our approach to setting the demographic thresholds. We have tied mortality thresholds to support an estimated probability of at least 90% that the population within the DMA remains above 800 bears within the DMA. This builds uncertainty into the thresholds and results in more conservative mortality limits in the event that no periodic estimates of population size are conducted. In addition, we are currently*

investigating the use of an integrated population model, which would directly involve the mortality data, potentially reducing this tendency for the uncertainty to increase over time.

97. **Public Comment:** Because of the uncertainty surrounding estimates of trend and population size and grizzly bears have very low reproductive rates, the Strategy should manage for female survival more than 90%. For instance, if we know current survival rates are 95%, shouldn't we keep them there since this has translated into a slightly increasing population? Defenders recommended 8% female mortality limits while other groups requested 7% limits instead of the current 10% proposed.

    Response: *Costello et al. (2016) revised the vital rate estimates that were used for the analyses by Harris in the draft Conservation Strategy. The revised vital rate estimates involved a larger sample of bears and were therefore more precise and presumably more accurate. These values led to a somewhat lower estimated annual growth rate. Costello et al. (2016) reported that independent female survival rates ≥0.93 were most likely to lead to population stability or growth, assuming current estimates of reproductive parameters and a modest decrease in male survival. The independent female survival threshold in the revised Strategy requires a minimum of 90% at all times, but also requires higher survival rates when needed to support an estimated probability of at least 90% that the population is above 800 bears. In the near future, female survival rates of 92% or 93% and female mortality thresholds of 7% or 8% will likely be needed. Threshold of 90% survival and 10% mortality will only be possible at higher estimated population sizes.*

98. **Public Comment:** The Service should consult a statistician about using 6 year running averages of the most recent data instead of all data to estimate trend. While one may increase precision, it could also mask a more recent trend.

    Response: *A six-year running average for survival estimates balances desires to have shorter term estimates with desires to limit deployment of radio collars on grizzlies. The Conservation Strategy relies not only on survival estimates, but also has objectives for limiting human-caused mortality, and evaluating the distribution of reproductive females, both of which will be reported annually.*

99. **Public Comment:** The goal to manage for a stable to increasing population is inconsistent with the demographic guideline to maintain at least 800 animals because this would represent a 20% decline in the current population. Further, the goal to maintain 800 animals is inconsistent with claims that the NCDE will be a source population for other grizzly recovery zones since the Strategy proposes to reduce population size by 20% and relax mortality thresholds.

Response: *The criteria in the conservation strategy represents levels necessary to ensure long term persistence. They are not population objectives. As stated previously the revised population goal does not call for reduction in the population size from its current size.*

100. **Public Comment:** The goal to maintain 800 animals is inconsistent with claims that the NCDE will be a source population for other grizzly recovery zones since the Strategy proposes to reduce population size by 20% and relax mortality thresholds. (as this pertains to the Molloy ruling on wolves.

Response: *The criteria in the Conservation Strategy represents levels necessary to ensure long term persistence. They are not population objectives. As stated previously, the revised population goal does not call for reduction in the population size from its current size.*

101. **Public Comment:** GNP must have a mortality limit.

Response: *Mortality thresholds are for the entire DMA, and include mortalities in GNP.*

102. **Public Comment:** There must be a mortality limit for dependent young. These cohorts can be important too, as demonstrated in the GYA.

Response: *The survival of dependent young is important to the persistence of the grizzly bear population, and we monitor it annually and look for changes over time. Dependent bear survival rates are an integral part of our population modeling. However, the majority of dependent bear mortalities are likely from natural causes and are definitely not documented. To illustrate, between 2004 and 2017, we documented an average of 6.9 dependent bear mortalities within the DMA per year. Based on our vital rates and population modeling, a rough estimate of the number of dependent young within the population ranged from approximately 327 in 2004 to 442 in 2017. These numbers suggest that we document roughly 4% cub mortality and 4% yearling mortality. In contrast, our estimated mortality rates from monitoring presence of cubs and yearlings with their mothers is 45% for cubs and 36% for yearlings. In other words, roughly 91% of estimated cub mortalities and 89% estimated yearling mortalities are not documented. These realities would make it difficult to establish a dependent bear mortality limit that has any kind of biological meaning. In contrast, we selected independent female survival and numbers of independent female and male mortalities as the parameters for thresholds because we believe these thresholds allow us to monitor and limit the very factors that we can influence through management, and female survival is the factor that will ultimately influence population trajectory. Through elasticity analyses for the GYE grizzly bear population, Harris et al. (2006) reported that "a unit change in independent*

survival produced over 8 times as much unit change in lambda as the same proportional unit change in the other parameters (like dependent bear survival)."

103. **Public Comment:** DCAs should have a goal of zero human-caused mortality.

Response: *Our Conservation Strategy is to limit human-caused mortality to values less than thresholds, and the thresholds are applied to the DMA. It is not realistic that zero mortalities would occur in any particular area, even in GNP.*

104. **Public Comment:** Some respondents requested that the livestock allotment standards be extended to all of Zone 1 on USFS lands (the same as for Zone 1 BLM lands) or all of occupied habitat. Others thought the Strategy should limit the number of Animal Unit Months for cattle as well as for sheep.

Response: *The objective for Zone 1 is to minimize grizzly bear mortality, and we agree that it is appropriate for management direction that is aimed at reducing the risk of mortality to be extended to Zone 1. The livestock section of Chapter 3 was modified to extend the objectives that are aimed at reducing the risk of mortality to Zone 1 on National Forest System lands.*

Chapter 1 of the Conservation Strategy explains that significantly higher rates of conflicts with grizzly bears are well documented for sheep and other small livestock, as compared to cattle. It is for this reason that Animal Unit Months are limited for sheep but not for cattle.

105. **Public Comment:** There should be no action taken against grizzly bears depredating livestock on public lands.

Response: *Chapter 4 states that the emphasis of conflict management will be quick response by management authorities, removal of the source of the conflict where possible, and the use of non-lethal solutions. As outlined in Chapter 4, the circumstances need to be evaluated on a case-by-case basis to determine the appropriate response. All signatories are committed to reducing the risk of conflicts between grizzly bears and livestock on lands covered under the Conservation Strategy. On State trust lands, if small livestock such as sheep are lost in the PCA or Zone 1, the lessee shall assume any cost of losses associated with grizzly bears and the bear will typically not be removed unless management authorities judge that the particular circumstances warrant removal and document those circumstances (e.g., the behavior resulted in a human fatality, the bear had a prior conflict history, etc.).*

106. **Public Comment:** The terms vacant, active, and inactive should be clearly defined and used consistently. Is vacant the same thing as inactive?

Response: *Our use of these terms and definitions have been reviewed, clarified where needed, and added to the Glossary. In the context of grazing allotment management, the term vacant indicates an allotment that does not have a current grazing permit issued, while inactive indicates that all permitted uses have expired, been cancelled, or waived.*

107. **Public Comment:** If lethal removal is the result of specific landowners, they should be punished.

Response: *We currently have a Montana statute that makes it illegal to feed ungulates, mountain lions, and bears. Additionally, MFWP does have laws pertaining to feeding of game animals (see Chapter 6); therefore, once grizzly bears are classified as such, deliberate feeding will become prosecutable. Food storage orders are in place for public land, thus people may be cited for unsecured attractants in these areas. Private lands would fall under the jurisdiction of county and municipal authorities to implement food storage orders. Also, bear removals are not always the direct result of landowner actions. Finally, the NCDE Conservation Strategy team does not have the authority to implement the suggested legal action.*

108. **Public Comment:** FWS has failed to consider research by Mattson (2001) that grizzly mortality is driven by frequency of human contact, and the lethality of that contact. It is almost certain that the frequency of human contact will increase…this will result in increased grizzly mortalities.

Response: *Mortality limits are accounted for in our Demographics Section of the Conservation Strategy. Additionally, we are monitoring mortality closely and if mortality limits are violated then a status review will occur, and appropriate action will be taken. Our conservation strategy team comprising of over 50 natural resource professionals from Tribal, State, and Federal agencies have considered research by Mattson (2001), however, focusing on just one piece of literature fails to account for the broader dataset. For example, visitation in GNP has been steadily increasing and is now at over 3 million visitors annually, yet grizzly mortality has not increased simultaneously. Further, bear managers, biologists and wardens, and personnel from other Tribal, State and Federal agencies, continue to work diligently with communities, ranching districts, livestock associations, conservation groups and State and governmental agencies to increase grizzly bear tolerance and conflict prevention. Under the spirit of the Conservation Strategy, a variety of working groups are contributing toward proactive efforts, acquiring funding and prioritizing an array of "Bear Smart/Bear Wise" community-driven projects across the conservation area. Certain communities have had success. For example, over the last 15 years, the Blackfoot Valley and the North Fork of the Flathead Valley have seen a reduction of bear conflicts and mortalities, in great part due to*

the involvement of landowner-led conflict reduction efforts. Similar approaches are being launched across the State.

109. **Public Comment:** Some questioned the assertion that nuisance bear management benefits bears by "…minimizing illegal killing of bears" (p. 15) and ask what literature the Service has to support this statement?

Response: *Data on illegal killing is very hard to gather since such acts are usually not discussed publicly. When bear managers respond to a conflict call it does reduce the chances that a landowner will take matters into their own hands which may result in illegally killing a bear. In the collective experience of our bear managers we strongly support the notion that bear management leads to a reduction of both conflicts and illegal killings.*

110. **Public Comment:** A local non-governmental organization stated, "We support the nuisance bear guidelines and standards."

Response*: Recognize local support for reducing conflict.*

111. **Public Comment:** All responses to conflict should have associated paperwork to: (1) justify the action; (2) identify the benefit; (3) identify the most efficient response action; (4) identify the most humane response action; (5) evaluate the response; and (6) modify the protocol if warranted.

Response: *Please read the monitoring protocol section in Chapter 5, which specifically addresses the concern from this public comment. Data is already being collected on management responses to human-grizzly conflicts and such record keeping will always occur. It is almost impossible to prescribe specific actions to certain human-grizzly bear conflicts because each incident is highly situational depending on; location, cause of incident, severity of incident, history of the bear, health/age/sex of the bear, behavior, individual identification certainty and level of prevention efforts. Therefore, managers need flexibility in conflict response to properly protect people and bears. Managers always strive for the most humane response action and our conservation strategy clearly states this with "Action of in all management bear situations will emphasize removal of the human cause of the conflict, when possible, and management and education actions to prevent future conflicts." Additionally, the conservation strategy states, "The emphasis of grizzly bear conflict management will be quick response by management authorities, removal of the source of the conflict where possible, and the use of non-lethal solutions. Depending on the circumstances of the conflict, appropriate responses may include: removing or securing attractants, public education and outreach, discouraging the bear from visiting the site using non-lethal methods (e.g., aversive*

conditioning), reactively or preemptively capturing and relocating a management bear to a new area…"

112. **Public Comment:** Some questioned MFWP's "reactive" approach to FSOs (waiting for a problem to occur) should be replaced by binding attractant storage rules for all users of DNRC lands and Montana State Parks. At the very least, this should be done inside the PCA.

Response: *MFWP does have food storage requirements on State lands and provides bear resistant garbage containers in and outside of the PCA. DNRC lands in the PCA also operate under a NCP, which addresses food storage. Currently, all WMAs in the PCA and Zone 1 have food storage orders. Also, many WMAs in Zone 2 already have food storage orders. A map of current food storage orders can be found on the IGBC website at* http://igbconline.org/food-storage-regulations-2/.

113. **Public Comment:** Some requested that cities and towns in the PCA, DCAs, and Zone 1 require bear-resistant garbage cans as the only refuse option.

Response: *Bear-resistant garbage receptacle requirements would be ideal for the PCA, DCAs, and Zone 1, however, that requirement is beyond the authority of our conservation strategy. Bear managers are continually working with local governments and sanitation companies to implement food storage orders and bear resistant garbage receptacles, yet this process takes a significant amount of time.*

Post Delisting Management

114. **Public Comment:** Badger 2Med Alliance suggested this revision to current language to increase legal defensibility: "Because amending or revising management plans will require an analysis under NEPA for some agencies and entities, the USFWS will not sign the CS until this NEPA process is complete and until the agencies agree to include specific language in their amended / revised management plans acknowledging that the habitat standards being incorporated into those plans are legally binding and will be maintained in perpetuity." This language should be in USFS, BLM, GNP, & Tribal plans.

Response*: The USFS has been developing an amendment to the Kootenai NF, Helena-Lewis and Clark NF, and Lolo NF plans and a revision of the Flathead NF plan through the NEPA process. The proposed management direction for grizzly bear habitat was informed by the draft NCDE Conservation Strategy and other new information. The Draft EIS was released in June 2016 for public review and comment, and the Final EIS and draft record of decisions (RODs) were completed in December 2017. The final RODs will be issued after resolution of objections is completed.*

115. **Public Comment:** Add "in perpetuity" for effective date back in or "until it can be demonstrated that the CS is not necessary."

Response: *The expectation is that the Conservation Strategy, once finalized, would remain in effect beyond recovery, delisting, and the five-year monitoring period required by the ESA. We recognize that the grizzly bear is a conservation-reliant species and that habitat protections are expected to remain in place. The agencies are committed to be responsive to the needs of the grizzly bear through adaptive management actions based on the results of detailed annual population and habitat monitoring.*

116. **Public Comment:** A long-term, reliable funding source must be in place for the Strategy to be considered adequate. Mortality and population monitoring, conflict reduction, habitat monitoring, outreach and education may not be completed to the extent necessary to ensure a thriving grizzly population. Some recommended that all dollars from grizzly hunting tags go to grizzly bear research and conservation.

Response: *The Conservation Strategy reflects the agencies' and Tribes' commitment to future management and monitoring of grizzly bears. The agencies and Tribes have been funding and performing the majority of grizzly bear recovery, management, monitoring, and enforcement efforts within their jurisdictions for decades. There is not a reasonable basis to believe the agencies will not adequately fund grizzly bear management of a delisted population. By signing the Conservation Strategy, participating agencies have committed to implementing the protective features that are within their discretion and authority, and to secure adequate funding for implementation. Furthermore, adequate funding would be demonstrated by achieving the commitments outlined in the Strategy.*

117. **Public Comment:** Many commenters were adamant that management should never be given to the State of Montana and we need only look at wolves to see why. They say Montana will increase hunting quotas to decrease population size, eventually leading to extinction.

Response: T*he mortality thresholds and demographic parameters contained in Chapter 2 will ensure that the population remains well above recovery levels. Those mortality thresholds become increasingly restrictive as the population declines such that the population will always remain above 800 bears in Zone 1 and cannot be extirpated. If hunting is eventually allowed, hunting mortality will be another form of mortality against which the mortality thresholds apply.*

118. **Public Comment:** Why is the Service managing for 2011 habitat conditions but 2006 population size goals? The Strategy's minimum mandatory population size should be at least 944 bears, 2011 levels.

Response: *The population size management goal in the previous draft was 800 bears. The revised population goal is to maintain an estimated probability of at least 90% that the population is above 800 bears. Given our current levels of uncertainty, this necessitates maintaining an estimated population size that is closer to 1,000 bears. This estimated population size was first achieved in 2016, more recently than the timing for the 2011 habitat conditions.*

119. **Public Comment:** Many people question the scientific basis behind claims of population growth, size, and recovery and are particularly concerned with how the population trend and size was interpreted. Some said the observed increase in bears in peripheral areas could be driven by expanding home ranges to account for inadequate resources instead of actual population growth. Other claim the Fish and Wildlife Service has, in contradiction to the Friedman decision, mistakenly used the population data as unequivocal evidence that the grizzly bear has recovered. Still others requested that "independent, outside and credentialed authorities" be allowed to review and evaluate the population dynamics and risks in the NCDE.

Response: *Population modeling using observed vital rates to estimate population size and trend are well established norms in wildlife biology, and it is our primary method for evaluating population trend. The draft Conservation Strategy cited deterministic population modeling. The revised Conservation Strategy cites stochastic modeling, which evaluates the population trend based on thousands of trajectories that might be possible given the observed vital rates and their uncertainties. The result of positive growth from these analyses are then supported by observed geographic expansion of the population and an increasing trend in number of documented independent bear mortalities which mirrors the population growth (coupled with no evidence of a decrease in survival). We also find no evidence if increasing home range size and, in fact, have evidence that home range size decreases with higher bear density. Bears continue to display healthy body condition, providing no suggestion of inadequate resources. The weight of evidence is in favor of population growth and expansion.*

120. **Public Comment:** In a similar vein, many commenters noted, "…the CS claims to "know" there was a "stable to increasing population" in 2011, while one of its own researchers, Dr. Richard Harris notes in Appendix P: that, '…consequently, yearly population size of NCDE grizzly bears remains unknown." Harris also notes that "available data do not allow this to be asserted with the conventional level of statistical certainty," as evidenced by the large confidence intervals for lambda (0.928–1.102).

Response: *We do not claim to "know" but have strong evidence of population growth between 2004 and 2011. This evidence comes both from the original analyses cited or included in the*

draft Conservation Strategy, the analyses in Costello et al. (2016) which included additional data even from the 2004–2011 period, and our most current analyses which included data up to 2017. The full statement by Dr. Richard Harris was, "Although a precise estimate of total population size has been published, there is, at present, no protocol in place for updating this estimate; consequently, yearly population size of NCDE grizzly bears remains unknown." In the revised Conservation Strategy, we provide a protocol for updating the population estimate using stochastic population modeling. We recognize that our annual population estimate is informed by numerous parameters that each have uncertainty, and that the uncertainty of our resulting population estimates increases with time. Nonetheless, by incorporating all of that uncertainty into our population model and examining the full range of possible population trajectories, we concluded that the population increased during 2004 and 2011 from the following information: (1) The median estimate of population size in 2011 among 5,000 possible trajectories is 903 bears, substantially larger than the estimated population size of 765 bears in 2004; and (2) 98% of the 5,000 trajectories resulted in an estimated population size of >765 bears by 2011, thus growth. Furthermore, our set of possible trajectories fully exemplify the uncertainty associated with lambda, which is the mean rate of increase from one year to the next. Although the vast majority of trajectories resulted in a population increase from 2004 to 2011, decreases from one year to the next were quite common within the time series. The vast majority of the 5,000 trajectories included at least one year of annual decline and 59% of trajectories included multiple years (2–5) of annual decline within the time series. Therefore, our results are entirely consistent with population growth over the multi-year period, and a lambda estimate with a confidence interval that straddles 1.0.

121. **Public Comment:** Why is there no demographic criterion for lambda? The Service should at least explain why this is biologically justified. If the Study Team had only been monitoring female survival in the GYA, they would not have detected any changes in recent years but we know the population has stabilized.

Response: *We derive estimates of lambda from our vital rates and population modeling (as they do in the GYE). We selected independent female survival and numbers of independent female and male mortalities as the parameters for thresholds because: (1) we collect data for these parameters each year and can calculate and report the estimates annually; (2) we believe these thresholds allow us to monitor and limit the very factors that we can influence through management; and (3) female survival is the factor that will ultimately influence lambda. Through elasticity analyses for the GYE grizzly bear population, Harris et al. (2006) reported that "a unit change in independent survival produced over 8 times as much unit change in lambda as the same proportional unit change in the other parameters." Additionally, lambda is a mean value estimated over time. Rather than focus our population objective directly on lambda, we selected to focus our objective in the Conservation Strategy revision on maintaining an estimated probability of at least 90% that the population is above 800 bears. This choice allowed us to fully incorporate uncertainty into our management decisions and focus on the lower bound of the estimate.*

122. **Public Comment:** Triggers for management responses should be more conservative than currently proposed so that excessive mortality years are not masked and correcting the problem is still possible, similar to the triggers in the GYA that require reviews when mortality is exceeded in 2 or 3 consecutive years, instead of the current 6+ years proposed. Similarly, if female survival is < 0.90 for 2 consecutive years, a review should be triggered. If it is < 0.90 for 4 consecutive years, this population should be automatically relisted under the ESA. Defenders recommended a three consecutive year trigger.

Response: *Years of high mortality will not be masked. The reason for averaging across years is to allow years of high mortality to be counterbalanced with years of low mortality. We do not believe that single years of high mortality represent a threat to the long-term persistence of grizzly bears. Using a running average actually increased our ability to plan.*

123. **Public Comment:** It should be clearly stated that all nuisance bears that are relocated or captured will be fitted with a radio collar.

Response: *We added "All translocated management grizzly bears will be marked with microchips, ear tags, lip tattoos, radio tracking device, or any combination of such."*

Monitoring

124. **Public Comment:** Mortalities in Zone 2 should also be counted toward mortality limits so that connectivity is truly promoted.

Response: *The population and habitat management outlined in the draft and revised Conservation Strategy are based on our assumption that the DMA is large enough to support a self-sustaining population of grizzly bears, and this assumption is supported by our monitoring data. The DMA is comprised of the PCA, where the most conservative habitat protections apply, and Zone 1, which is a buffer area. Therefore, we believe it is most appropriate to apply the thresholds within this core area. Over time, even as the population expands outside of the DMA, we will be able to continue to evaluate the population trend within this defined core area through vital rate monitoring and assessment of demographic thresholds. We believe that maintaining this core population is vital to allowing for continued population expansion and potential connectivity with other ecosystems. We will continue to document, monitor, and report mortalities that occur within Zones 2 and 3, and utilize new methods and tools as needed.*

125. **Public Comment:** If an integrated approach to monitoring were implemented using multiple sources of data (instead of just a radio-collar sample), the precision of survival estimates, trend estimates, and management certainty could be improved.

Response: *We are developing an integrated population modeling approach. We agree it should improve the precision of vital rate estimates and thus improve management certainty. In the meantime, we have revised the demographic objectives and thresholds to incorporate uncertainty explicitly in independent survival and mortality thresholds.*

126. **Public Comment:** Because collared sample must be density distributed for estimates of trend to be valid using known fate analyses, the Strategy should state how often these estimates of relative density will be re-calculated so that high survival in GNP isn't masking peripheral mortality.

Response: *In the draft Conservation Strategy, the vital rate monitoring was restricted to research captured bears, which were captured using a density-distributed process. As reported in the revised Conservation Strategy, we now also include management-captured bears in our sample, but specifically account for management effects. The masking of peripheral mortality is unlikely, due to the inclusion of these management bears in our sample, and the unintended but very real influence of access on our ability to effectively capture bears for monitoring. Costello et al. (2016) found that areas with higher relative densities also had higher representation in our radio-marked sample, GNP and the area near the Middle Fork of the Flathead River were underrepresented in our monitored sample based on relative density estimates. This discrepancy was largely attributable to restrictions and/or impediments to trapping in GNP and the large Wilderness Areas situated in the interior of the DMA. Kendall et al. (2009) found that the highest densities of grizzly bears in the NCDE were in the northern part of the NCDE, especially in GNP in 2004, but more recent data (USGS, unpublished data) indicate that, although density is still higher in the north, density is becoming more uniform within the PCA. In the future, our approach for obtaining a representative sample within the DMA will be to distribute the sample across the entire occupied bear range within the DMA and to infer relative density from capture success (number of bear captures or visits (from photographs) per trap-night).*

127. **Public Comment:** The monitoring section states that "Survival and trajectory will be calculated for the most recent six-year period to ensure adequate sample sizes for these estimates. But, on p. 9 of Appendix 2, Harris states that "sample sizes were limited and the time period of this investigation spanned only 6 years." These two statements contradict each other.

Response: *Population modeling will not only estimate survival and trajectory within the last 6 most recent years but will include the trajectory since 2004, thus improving the overall estimate. The sample sizes for estimating vital rates which are incorporated into the model have increased compared to the analysis of Harris, due to the inclusion of bear captured from management (as described in Costello et al. 2016).*

128. **Public Comment:** The Strategy should identify how grizzly bear movements and survival rates will be monitored in connectivity areas (DCAs & Zone 2).

Response: *We have added detailed information in the revised Conservation Strategy about monitoring connectivity among populations using DNA analysis. Survival and movements of bears within the DCAs will be included in our monitoring program within the DMA. As more bears move into Zone 2, information on survival and movements will be primarily obtained when bears are captured and radio-marked for management, however additional research capturing of bears may be conducted as necessary and as suggested by the NCDE Coordinating Committee.*

129. **Public Comment:** Some comments asserted that the population monitoring proposed will not adequately address the concerns of Doak 1995 regarding habitat degradation and the lag time it takes to detect those changes in population parameters.

Response*: Doak (1995) states "for grizzlies, degradation is largely the results of human access to bear habitat, which in turn leads to greatly increased mortality rates due to increased human-bear encounters…". In the draft and revised Conservation Strategies, the general approach is to maintain the habitat conditions that existed during the period when the grizzly bear population was stable to increasing (i.e., as of 2011), in particular secure core and density of open and total motorized routes; developed recreation sites; livestock allotments; vegetation management; and oil and gas and/or hardrock mining activities. In other words, the Conservation Strategy expressly aims to minimize the potential for habitat degradation as described by Doak (1995).*

130. **Public Comment:** While annual reporting is good, it is necessary for conflict/relocation and mortality information to be made available to the public and updated on a weekly basis to have a transparent process. They thanked FWP for its current webpage showing all bear locations but requested that an NCDE grizzly bear specific page be created.

Response: *The grizzly bear relocations are published on the MFWP webpage (*fwp.mt.gov*). Grizzly bears are included on the same page as black bears and mountain lions, but they are clearly identified. At this time, NCDE grizzly bears can be identified as those within Region*

1, 2, and 4, while those in Region 3 and 5 are from the GYE (http://fwp.mt.gov/fishandwildlife/livingWithWildlife/relocation/default.html). MFWP does not currently post grizzly bear mortalities on the website, but may consider this for the future.

131. **Public Comment:** The Strategy has no provisions to ensure that grizzly bear foods are available seasonally and elevationally.

Response: *To date, we have no reason to believe that food resources have been limiting for grizzly bears in the NCDE. As described in Chapter 1, grizzly bears use a variety of food across many different habitats in the NCDE and have flexible diets making monitoring of individual foods infeasible. Grizzly bears are well adapted to use a wide variety of foods found in the NCDE and they evolved under conditions where food amounts and types varied annually. Given the many different types of foods bears eat and the numerous environmental variables that can influence these food types and preferences by bears over space and time, it would be virtually impossible to predict seasonal food availability for the NCDE grizzly bear population at the scale of the grizzly bear ecosystem. The availability of habitat for bears is determined largely by people and their activities, including habitat management by cooperating agencies that is aimed at maintaining or enhancing bear foods. By managing motorized routes and providing secure core in the primary conservation area by BMU subunit (an area that approximates the size of an annual female grizzly bear home range), there would be reasonable assurances that yearlong habitat needs of individual bears are met. In addition, a significant portion of the PCA is made up of very large Wilderness Areas (e.g., GNP, and Bob Marshall Wilderness Complex) where seasonal habitats are present that are minimally influenced by human activities. To ensure that the grizzly bear population is healthy, the body condition of bears and the distribution of females with young would continue to be monitored. This indirectly helps to show that habitat is well distributed, regardless of variation and ecological gradients that exist across the PCA.*

132. **Public Comment:** Some questioned the decision to no longer use the CEM to assess the impacts of multiple, concurrent activities. They asked how we would measure habitat quality or effectiveness in its absence. One peer reviewer said a "reliable, habitat quality base map" would be an "important improvement" to the Strategy.

Response: *The CEM was designed to predict the inherent productivity of habitat and the cumulative effects of human activities on bear use of that habitat. The model relies on relative value coefficients to calculate habitat value and habitat effectiveness indices across a large landscape. The indices were intended to provide managers with a tool to compare or predict how habitat value and habitat effectiveness indices change over time in response to management actions. However, several aspects of the model make it difficult to interpret the results. Many of the inputs to the model are expert opinion rather than empirically derived*

data from grizzly bears. There is substantial variation in annual food source availability and in individual bear behavior that is not accounted for in the model. Habitat coefficients derived in one part of the ecosystem may not be reliably extrapolated to geographically distant areas. Ultimately, it is unknown what a change in the index value actually means to the bear population. Stenhouse et al. (2003) evaluated a cumulative effects model but were unable to demonstrate a correlation between model predictions and actual habitat use by radiocollared bears in Canada. Due to these limitations of cumulative effects models, the Conservation Strategy has instead taken the approach of providing guidance for and monitoring of habitat and population trends in relation to an established baseline.

133. **Public Comment:** Agencies should begin comprehensive habitat mapping and key foods research as is done in the GYE. Agencies should quantify habitat quality across the ecosystem. Judge Friedman stated that grizzly numbers and distribution alone do not take the place of knowing "…how much habitat and of what quality is necessary for recovery…." Agencies should commit to this type of monitoring on a long-term, coordinated basis in order to assess the impacts of climate change. "GNP has already completed habitat mapping for the park…contact Richard Menicke at the park's USGS office." The USFWS should develop ecosystem-wide methods for annual berry plot sampling for huckleberry, serviceberry, chokecherry, and buffalo berry, similar to Kendall (1986) in the Apgar Range. Agencies should also assess the impacts of wildfires on plant succession and berry crops. Since Apgar burned twice in the last decade, the results could be compared to Kendall's earlier work.

Response: *Chapter 1 of the Conservation Strategy presents an overview of the wide array of habitats and food sources used by grizzly bears across the NCDE. Great variability in grizzly bear diets has been found between individuals, seasons, and years. Because of this wide variation, it is infeasible to maintain on-the-ground monitoring of availability and use of individual food sources. Instead, the Conservation Strategy proposes to monitor the habitat objectives in combination with the ratio of stable isotopes to assess any changes in the overall assimilated diet and the physiological condition of animals through bioelectrical impedance values. These data will provide insights into possible changes in food availability and nutritional condition of bears over time.*

Connectivity

134. **Public Comment:** It may be premature to state that connectivity is not needed for the NCDE population. Such connectivity may ultimately be key to delisting the NCDE grizzly bear if it is determined that the unrecovered populations are not DPSs, and therefore NCDE recovery depends on their recovery as well. This possibility should not be ignored.

Response: *Delisting requirements are under the purview of the USFWS. This Conservation Strategy is not a USFWS document but rather is a multi-agency document by the NCDE subcommittee and its purpose is to manage grizzly bears after they are delisted.*

135. **Public Comment:** DCAs should extend all the way to other recovery zones instead of falling 5–30 miles short as the Ninemile DCA does w/ the CYE.

Response: *The areas between recovery zones are currently listed and bears that move west of the two DCAs will be protected as a threatened species and therefore would have greater protections than a delisted DCA.*

136. **Public Comment:** Many commenters asked that mortality limits also apply in Zone 2. They note that connectivity with the GYA is unlikely to occur without mortality limits in this area.

Response: *The Conservation Strategy outlines our commitment to responding to and helping to reduce human-bear conflicts within Zone 2. As opposed to setting mortality limits, we believe this approach will be most effective for promoting tolerance, which is necessary for connectivity. The potential for connectivity between the NCDE and the GYE is likely higher than it has been for many decades. Peck et al. (2017) reported that in 2014 "the estimate of closest proximity between current occupied ranges for these populations is approximately 68 mi, which is within maximum dispersal distances (42–109 mi) documented for males in the region (Blanchard and Knight 1991, McLellan and Hovey 2001, Proctor et al. 2004)." Data from 2016 suggests that this distance has decreased to only 56 mi as of 2016.*

137. **Public Comment**: Linkage zones (DCAs and Zone 2) should be afforded the same habitat protections as inside the PCA. Amendment 19 should be applied in the DCAs. In Zone 2, the Strategy should require forests to (1) identify, map, and manage linkage habitats essential to grizzly bear movement, and (2) manage access to achieve lower road densities.

Response: *Servheen et al. (2001) identified linkage zones in their publication "Identification and Management of Linkage Zones for Grizzly Bears between the Large Blocks of Public Lands in the Northern Rocky Mountains." However, the authors pointed out that the linkage zone model they employed used coarse-grain data and did not consider habitat quality, and that field validation and testing of assumptions would be necessary before its application for management (p. 172). C. Servheen, one of the co-authors, more recently was involved in determining the boundaries of the DCAs for the NCDE Grizzly Bear Conservation Strategy, which encompass larger areas than individual linkage zones. The DCAs are intended to function as linkage zones in their entirety. The Conservation Strategy provides the rationale*

for using linear road density, rather than the moving windows method (as used in Flathead Forest Plan Amendment 19), for calculating open and TMRD outside of the PCA.

Based on the observed movement of grizzly bears that is already occurring into Zone 2, the Conservation Strategy concluded that existing management direction in Zone 2, including IRAs and travel management plans, likely will be sufficient to meet the objective of providing for movement of bears from the NCDE to the Greater Yellowstone Ecosystem. The areas recently identified by Peck et al. (2017) with the highest probabilities for linkage between the NCDE and GYE are contained within Zone 2. The signatories to the Conservation Strategy have committed to using adaptive management to make adjustments when new information is gained that would indicate a change is warranted.

138. **Public Comment:** While the presence of male grizzly bears indicates use in Zone 2, this does not prove current management is sufficient since connectivity has not occurred yet. The same is true for the USFWS's logic regarding female tolerance to high road densities in the Salish DCA.

Response: *Based on analysis of DNA, it appears that genetic connectivity between the NCDE and the GYE populations has not yet occurred. It is clear, however, that movement to the south is occurring and it is anticipated to be just a matter of time until breeding and genetic interchange occur. The 1993 Recovery Plan established the NCDE and GYE recovery zone boundaries based largely on the estimated occupied range. At that time, the distance between the NCDE and the GYE grizzly bear populations was approximately 124 mi (200 km); as of 2017 that distance is only approximately 68 mi (110 km) with an additional 21 confirmed locations between the occupied ranges (Peck et al. 2017). Monitoring will be ongoing to ascertain whether or when genetic interchange occurs.*

Costello et al. (2016) reported that, using verified grizzly bear locations from 2004–2014, 100% of the Salish DCA is within the current distribution of grizzly bears. Kendall et al. (2016) reported detection of a male bear immigrating to the CYE from the NCDE, and of a male bear of Yaak origin making multiple forays to the NCDE. Furthermore, discovery of four offspring of a Yaak male bear with two NCDE female bears suggested that the intervening areas in the Salish Mountains are permeable to and reasonably secure for bear movement (Kendall et al. 2016). See also the response to #70 regarding female grizzly bear occupancy of the Salish DCA.

139. **Public Comment:** It may be premature to state that connectivity is not needed for the NCDE population. Such connectivity may ultimately be key to delisting the NCDE grizzly

bear if it is determined that the unrecovered populations are not DPSs, and therefore NCDE recovery depends on their recovery as well. This possibility should not be ignored.

Response: *The development of this Conservation Strategy was guided by the Grizzly Bear Recovery Plan, which states that each recovery zone includes an area large enough and of sufficient habitat quality to support a recovered population (USFWS 1993, p. 17). Grizzly bears that move or reside permanently in areas outside the Recovery Zone are not considered necessary to the recovery of the population (p. 18). This Conservation Strategy is proactive in recognizing the potential for the NCDE population to serve as a source population for the small CYE population and the potential BE. USFWS will determine if the NCDE meets the criteria for a DPS in a separate analysis.*

140. **Public Comment:** Some commenters suggested that an additional DCA should be created across Hwy. 200 in the Ovando, Helmville, Avon areas where known grizzly movements have occurred. Others thought there should be an additional DCA between the NCDE and the Cabinets south of Hwy. 2 and north of Hwy. 200. Still others asked for a DCA to be created on the east side of the Bitterroot Valley from Rock Creek to Lost Trail Pass.

Response: *The DCAs were identified in key areas adjacent to the PCA. The DCAs were delineated to incorporate substantial Federal and State lands and where the habitat can support a female grizzly bear. Several of the areas suggested in the comment are relevant to other recovery zones, rather than the NCDE.*

141. **Public Comment:** Several commenters suggested the Strategy do more to maintain connectivity with Canadian populations. "The bear population in the NCDE does not confine itself to U.S. soil. This strategy should, at a minimum, include examination of the status and management of grizzly populations on adjacent landscapes in B.C. and Alberta. …this strategy should be prepared cooperatively with those jurisdictions…." Many people said the grizzly bear hunting season in Alberta is not sustainable and that should be taken into consideration.

Response: *The best available information shows that the NCDE population is connected to grizzly bears in Canada (Proctor et al. 2012). Currently there is no hunting season for grizzly bears in Alberta (*http://albertaregulations.ca/huntingregs/gameregs.html*). In British Columbia, there is no hunting of grizzly bears in nine threatened population units located in the southern portion of B.C., in an additional five units due to small population sizes or special designations, or in some additional areas in the province such as national parks, some provincial parks, and Grizzly Bear Management Areas (http://www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html). This*

Conservation Strategy was formulated to address a requirement of the 1993 Recovery Plan which was prepared under the ESA, thus limiting the scope to the United States portion of the grizzly bear population.

142. **Public Comment:** Some commenters criticize USFWS's reliance on the existence of Canadian grizzly populations to justify low population goals because the ESA does not apply to Canada. Moreover, the USFWS has recognized that Canadian grizzly bears suffer the same development pressures as do US bears. The USFWS has not explained how the uncontrollable threats to Canadian grizzly bears [identified in its own recovery plan at p. 23] were offset in the calculation of population targets. The USFWS must explain whether reliance on the existence of Canadian bears influenced its population targets and why such reliance is reasonable.

Response: *The NCDE Recovery Zone identified in the 1993 Recovery Plan does not include Canada. "The minimum population expected for recovery is the number of bears required for adequate distribution of reproducing females throughout the ecosystem, and sufficient numbers to sustain existing levels of human-caused mortality." The discussion of Canadian grizzly bears is in regards to the CYE and SE given their small population sizes.*

143. **Public Comment:** The USFWS's claims of 11 movements across Hwy. 3 in Canada north of the NCDE (10 males and 1 female) in the last 30 years seems to suggest that the NCDE is already becoming an isolated population, especially in terms of demographic rescue.

Response: *The comment references a study by Proctor et al. (2012) that took place in a discrete area, south of Highway. 3 in Canada. The study was based on a sample of radio-marked grizzly bears, and so the estimate of 11 movements across the highway is a minimum estimate. We do not know the total number of crossings, but it is very likely that additional, unmarked bears from their study area crossed Highway 3, and it is also likely that unmarked bears to the north crossed the highway. That study concluded that sufficient male movement was detected to mediate male gene flow.*

Economics

144. **Public Comment:** One commenter requested that the General Accounting Office (GAO) do an economic analysis comparing "…the long-term costs to Montana of following this outrageous genetic transfer by migrating grizzlies to the total cost of moving two grizzly bears every 10 years between GNP and YNP for several decades."

Response: *The Conservation Strategy does not propose any change in habitat management in Zone 2, and we do not anticipate additional financial costs to accrue to the State of Montana that are attributable to providing for genetic connectivity between the NCDE and the GYE. The 2007 delisting of the GYE grizzly bear population said that if natural connectivity had not occurred by 2020, two grizzly bears would be moved every 10 years from the NCDE to the GYE. However, Kamath et al. (2015) documented stable levels of heterozygosity and a fourfold increase in the effective population size of the grizzly bear population in the GYE from 1982 to 2010. Therefore, the 2017 delisting of the GYE grizzly bear population removed the 2020 deadline.*

Hunting

145. **Public Comment:** The Hunting section at the end of chapter 2 seems a little random/out of place.

Response*: That hunting section in Chapter 2 has been revised. If hunting is eventually allowed, any hunting mortality would be another form of mortality that would apply against the mortality thresholds and demographic parameters contained in Chapter 2.*

146. **Public Comment:** Most commenters were vehemently opposed to any form of grizzly bear hunting due to value-based reasons. Some commenters supported hunting if the population is delisted. Some expressed their opposition to a trapping season for grizzlies. Some said the Strategy should consider how hunting will disrupt social dynamics and have cascading ecological effects.

Response: *We understand that hunting of grizzly bears may be objectionable to some members of the public. However, as described in Montana's Management Plan for Grizzly Bears in Western Montana, the State of Montana's grizzly bear management program may use hunting as one tool among many for promoting the long-term conservation of grizzly bears. Harvest recommendations and/or programs will be conservatively applied and all mortalities from hunting will be counted against mortality thresholds. Regulated wildlife harvest is one factor that has allowed the recovery and maintenance of predator and prey populations in Montana and elsewhere. MFWP strongly believes that regulated harvest of predators builds tolerance by those most negatively impacted by their presence. That tolerance is necessary to help promote connectivity. In addition, persons who participate in regulated hunting often play a pivotal role in maintaining the prey populations that predators are dependent upon. It is therefore intended that regulated harvest of grizzly bears be a part of Montana's program and commitment to grizzlies, when and where appropriate. By managing grizzly bears as a game species they are provided recognition as a valuable wildlife*

species, protected from illegal harvest, afforded population monitoring and research, and all of the other benefits managed species receive.

147. **Public Comment:** Some comments requested that the Conservation Strategy explicitly prohibit hunting in the DCAs if female occupancy is truly the objective, at least for the first 6 years after delisting and/or until connectivity is documented. They noted that even though it is illegal to hunt female black bears with cubs, an average of 2 black bears with cubs die from hunting each year in Region 2 alone.

Response: *This Conservation Strategy does not directly address hunting decisions, such as whether or not hunting should be permitted in DCAs. Should hunting be considered as a viable option for grizzly bear management and conservation in the NCDE, MFWP would be required to go through a public process involving the Montana Fish and Wildlife Commission and interested stakeholders. Any proposed regulated public hunt must be evaluated in the context of the entire bear management program (including relevant mortality thresholds) and its efforts to promote tolerance and continued recovery of this species.*

148. **Public Comment:** The Strategy discussion of hunting is cursory. At the very least, the CS should state that hunting would be subject to the mortality limits. The CS should provide more details and guidelines to FWP and the Tribes regarding a hunting season. Specifically, hunting should be primarily in the front country (where most conflicts occur) and other identified areas of high concentration conflicts. Additional biological guidelines should be included, such as a commitment to no spring hunting season and not allowing females with offspring to be targeted.

Response: *The revised Strategy does clearly state "Within the DMA, thresholds for numbers of TRU (total reported and unreported mortality) for independent bears will include all forms of human-caused mortality, including hunting should that occur." Neither the draft nor the revised Strategy directly outlines details for a future hunting program, because these decisions must be made within distinct jurisdictions (i.e., State of Montana, the BIR, the FIR, and GNP in the area under State jurisdiction, MFWP will be required to go through a public process involving the Montana Fish and Wildlife Commission and interested stakeholders. Hunting within the BIR and FIR will involve decisions by their respective Tribal Councils and will follow this Strategy and applicable management plans. Hunting is prohibited within GNP. An example of this process is demonstrated with the following. A general framework for hunting grizzly bears in the GYE was developed by MFWP and was approved by the Commission in 2016 (http://fwp.mt.gov/fishAndWildlife/management/grizzlyBear/delisting.html). Subsequently, the Commission accepted the proposal by MFWP to not propose a grizzly bear hunt in the GYE in 2018.*

149. **Public Comment:** The Strategy must also show exactly what this means for discretionary mortality numbers with examples from past years.

Response: *We have substantially revised the demographic chapter and in doing so added examples with data from past years and possible future scenarios.*

150. **Public Comment:** The Service must consider the results of Gailus et al. 2010 and Gailus 2010, who found that B.C. and Alberta were both overharvesting grizzly bears in habitat units adjacent to the NCDE.

Response: *The population and habitat management outlined in the draft and revised Strategy are based on our assumption that the DMA is large enough to support a self-sustaining population of grizzly bears, and this assumption is supported by our monitoring data. We address boundary effects in our monitoring program by including trans-boundary bears that may be subject to mortality in Canada. We regularly observe movements of both female and male grizzly bears in both directions and do not have genetic evidence that the NCDE bear population is isolated.*

151. **Public Comment:** There are indications the Tribes intend to act unilaterally in regard to hunting grizzlies. This cannot be the case. Discretionary mortalities must be shared and coordinated across the ecosystem.

Response: *The CS&KT and the Blackfeet Nation are signatories to this memorandum. Mortalities within the DMA on reservations will be included in assessments of mortality thresholds. If hunting were to occur, quotas would be coordinated between the tribes and MFWP to ensure total mortality limits are not exceeded.*

APPENDIX 2

Methods to estimate vital rates and numbers of reported/unreported mortalities within the DMA

We will estimate survival rates, reproductive rates, and population trend of the NCDE grizzly bear population within the DMA using data collected from radio-marked bears. The techniques used to monitor and analyze data for the NCDE population were previously described by Mace et al. (2005), Mace et al. (2012), and Costello et al. (2016).

Grizzly bears are captured using leg-hold snares and culvert traps, by darting over baits, or in some instances, by helicopter darting. Bears are captured under various circumstances, primarily at research capture sites distributed throughout the study area designed to capture a random sample of grizzly bears for monitoring vital rates; or at other sites, especially those near bear-human conflict sites where specific bears are targeted for conflict management. At research capture sites, we fit most independent (≥2 years old) female grizzly bears and a sample of independent male bears with radio-transmitters. Bears captured at other sites are radio-marked as needed for management. Each bear is tagged with a subcutaneous passive transponder tag and a pre-molar tooth is extracted for age determination. We collect DNA samples for analysis of individual identification, relatedness, and population of origin. We collect data on body mass and body condition. All radio-marked bears that reside primarily within the DMA are included in analyses (except for bears translocated to the CYE). We developed a series of management-related individual covariates to quantify the potential effect of conflict on survival and other vital rates (Haroldson et al. 2006, Costello et al. 2016). We conduct observation flights in early spring to ascertain the reproductive status of each adult female, including age class of offspring (i.e., cubs, yearlings, or 2-year-olds) and litter size. When possible, we continue visual monitoring of reproductive status during telemetry sessions to document apparent offspring survival from changes in litter size.

We estimate survival of independent females using a “known-fate” model, because the fate (alive or dead) of each individual is generally known with certainty for each monitoring period (e.g. month, year). NCDE population managers have used known-fate monitoring methods since 2004. Methods for estimating the six-year mean annual survival rate will follow Costello et al. (2016), incorporating the management history and translocation covariates to account for their effects. Analysis will involve the time series since 2004 (to optimize estimation of management effects), but will explicitly estimate survival during the most recent six-year period. Methods for estimating reproductive parameters (e.g., proportion of females with cubs and litter size), dependent bear (e.g., cub and yearling) survival, and independent male survival will follow Costello et al. (2016).

We will follow the methods of Costello et al. (2016) to estimate the numbers of total reported and unreported mortalities (TRU mortality) of independent female and male bears within the DMA, based Cherry et al. (2002). To obtain this number for each sex, we classify documented mortalities into three groups: (1) agency-sanctioned management removals; (2) known or probable deaths of

bears wearing functional radio-transmitters (excluding agency removals); and (3) mortalities of non-radioed bears reported by the public or discovered by agency personnel. Management agencies thoroughly document removals and deaths of radio-marked bears, thus annual counts are considered censuses. Annual counts of reported mortalities of non-radioed bears represent some unknown fraction of the true number, therefore we apply the reporting rate observed among deaths of radio-marked bears to inflate this count to an estimate of the numbers of reported plus unreported mortalities of non-radioed bears. The sum of agency removals, radio-marked deaths, and non-radioed reported and unreported deaths is our estimated number of TRU mortality.

Currently, Program MARK (White and Burnham 1999) is used to perform individual-based analyses for estimating vital rates, numbers of TRU mortality, and population size, but future estimates will use the R statistical computing environment (R Development Core Team 2018). In addition, an integrated population model (Schaub and Abadi 2011, Bled et al. 2016), which will incorporate all relevant data to simultaneously estimate vital rates, population size, and total mortality is in development, and will likely be used in the future. This future model will incorporate the same analytical procedures currently used and will be developed within the R statistical computing environment. Other types of data sources and monitoring (e.g., non-invasive genetic sampling, occupancy modeling) may also be incorporated into population modeling in the future.

APPENDIX 3

Procedure for calculating survival and mortality thresholds for demographic objective 2

Objective 2: Manage mortalities from all sources to support an estimated probability of at least 90% that the grizzly bear population within the DMA remains above 800 bears, considering the uncertainty associated with all of the demographic parameters.

- Independent female survival threshold: Using a six-year running average, maintain estimated annual survival of independent females within the DMA of at least 90% and a rate at or above the minimum level consistent with a projected probability of at least 90% that the population within the DMA will remain above 800 bears based on population modeling.
- Independent female mortality threshold: Using a six-year running average, limit annual estimated number of total reported and unreported mortalities (TRU mortality) of independent females within the DMA to a number that is no more than 10% of the number of independent females estimated within the DMA based on population modeling and a number that is at or below the maximum consistent with a projected probability of at least 90% that the population within the DMA will remain above 800 bears based on population modeling.
- Independent male mortality threshold: Using a six-year running average, limit annual estimated number of TRU mortality of independent males within the DMA to a number that is no more than 15% of the number of independent males estimated within the DMA based on population modeling.

Since 2004, we have estimated the trend of the NCDE grizzly bear population using stochastic population modeling that incorporates observed survival and reproductive rates from a sample of radio-marked bears (Appendix 2), including independent (≥2 years old) female and male survival, yearling survival, cub survival, litter size, and proportion of reproductively mature (≥4 years old) females with cubs. Stochastic population modeling incorporates the uncertainties associated with each of the input demographic parameters to simulate annual variability in survival and reproductive rates, providing thousands of possible population trajectories from which it is possible to estimate the most likely current size of the population, along with quantifying the variability in that estimate. In addition, stochastic modeling is also used to project the population into the future to investigate the effects of potential changes in specific demographic rates (e.g., survival of independent bears). In regards to Objective 2, stochastic modeling allows us to estimate the probability that the population is, or will be, above 800 bears in a given year by quantifying the proportion of possible population trajectories with total population sizes more than 800 individuals. By focusing on the lower bound of the population estimate, rather than the median estimate, Objective 2 is inherently sensitive to the precision of demographic parameter estimates. In other words, if data are limited and precise demographic estimates are not feasible, management for larger estimated population sizes would be essential to make certain Objective 2 is met.

Thresholds designed to meet Objective 2 rely on monitoring and managing mortalities of independent female and male bears. Most mortality of independent bears is human-caused, and therefore independent bear survival rates have been, and will continue to be, effectively regulated through management. Conversely, management has little direct influence on reproductive or juvenile survival rates, because they are affected primarily by environmental factors and intra-specific competition. Independent bear survival also has the greatest impact on population trend. Through elasticity analyses for the GYE grizzly bear population, Harris et al. (2006) reported that "a unit change in independent [female] survival produced over 8 times as much unit change in lambda as the same proportional unit change in the other [reproductive and dependent bear survival] parameters." Although independent bears are our management focus, monitoring of all demographic parameters will continue as previously described (Appendix 2) and population models will be continually updated with current rates for all parameters, including reproduction and dependent bear survival.

Methods

We will continue to monitor survival and reproductive rates within the PCA and Zone 1, now identified as the DMA using methods described in Appendix 2. This area represents the core of the NCDE population, and was its approximate range limit in 2004 when the trend monitoring program began and the DNA-based population estimate was derived (Kendall et al. 2009). Recently, some grizzly bears have begun to establish home ranges outside of this area. Although radio-telemetry monitoring of individuals outside of the DMA might occur for management or research purposes, we will not include individuals residing primarily outside of the DMA in our estimation of vital rates for the DMA, in our population modeling, or in annual assessment of the independent female survival threshold within the DMA.

We will continue to estimate the numbers of TRU mortality of independent females and males within the DMA, as described in Appendix 2. We will continue to document and monitor mortalities that occur outside of the DMA, however we will not include those mortalities in our estimation of TRU mortality or in our assessment of the independent female and male mortality thresholds within the DMA.

We will estimate current population size and trend using a stochastic population projection model in the R statistical environment. This model produces a post-breeding population estimate including all age classes (at the end of hibernation after cubs are born, but prior to the onset of annual mortality). Population modeling will assume a starting population size of 765 bears in 2004 with associated uncertainty around that estimate (Kendall et al. 2009). The population model will include inputs for observed rates obtained through monitoring of radio-marked bears (annual cub survival, annual yearling survival, annual independent female survival, annual independent male survival, annual proportion of females with cubs, and litter size). Modeling will incorporate the uncertainties associated with each of the input demographic parameters, thus allowing explicit estimation of the probability that the population is, or will be, above 800 bears in a given year. Given that the NCDE grizzly bear population has expanded and now some proportion of the population resides outside of the DMA, we are currently developing and evaluating additional inputs to the model to explicitly estimate this proportion and exclude those individuals from the population estimate as well as the probability that the population is above 800 bears within the DMA. The example models described below do not include these inputs.

In the future, an integrated population model will likely be used, which can simultaneously estimate vital rates, population size, and numbers of TRU mortality.

Perpetual thresholds of ≥0.90 survival and ≤10% mortality of independent females will apply at all times. In addition, depending on current estimated vital rates and population size, more conservative, short-term thresholds may also apply. These short-term thresholds will be established for management periods ranging from 1–6 years. To ascertain minimum survival and maximum mortality thresholds for independent females, a series of population projections will also be extended into the future using multiple levels of independent female survival (i.e., 0.90, 0.91, 0.92, 0.93, and 0.94), while holding independent male survival at 0.85. By constraining the models to maximum allowable mortality for males, the resulting female thresholds will be the most conservative values associated with meeting Objective 2. For independent females, the lowest possible survival threshold and the highest possible mortality threshold will be equal the minimum survival rate and maximum mortality rate consistent with an estimated probability of at least 90% that the population within the DMA will remain above 800 bears for at least six years beyond the established management period. In other words, if a threshold is established for a one-year management period, the model must predict an estimated probability of at least 90% that the population within the DMA will remain above 800 bears for at least the next seven years. If a threshold for a six-year management period is established, the model must predict an estimated probability of at least 90% that the population within the DMA will remain above 800 bears for at least the next 12 years. The female survival threshold will be the specific survival rate associated with the model that fits these conditions. The female and male mortality thresholds will be calculated by multiplying the sex-specific mortality rate (1 – survival rate) × the mean number of independent females or males in the DMA estimated for the management period using the model that fits these conditions. As described by Costello et al. (2016), these calculated mortality thresholds will then be multiplied by 0.80 to obtain adjusted mortality thresholds. This adjustment was made because vital rates, population size, and numbers of TRU mortality were calculated using separate analyses and they were not entirely consistent with one another. This adjustment to a more conservative threshold is intended to account for potential overestimation of population size within the DMA and/or underestimation of the numbers of TRU mortality for independent bears within the DMA. If an integrated population model is developed in the future, this adjustment should not be necessary, because vital rates, population size, and numbers of TRU mortality will be estimated simultaneously instead of separately. In addition, as stated above, future models will include explicit estimation of the population size within the DMA.

Examples of Using Projection Models to Identify Demographic Thresholds

Hypothetical model for a population size near 900 bears: This example model was developed by simulating population growth using current estimates of vital rates to year 2012 (when the estimated population size was 927 and the probability that the population was above 800 was 97%) and then projecting another 25 years (model years 2013–2032) to predict effects of changing female and male independent bear survival (Table 1, Figure 1). This model illustrates possible thresholds that might have been established starting in 2013 to fulfill Objective 2, and provides us with an opportunity to compare observed rates with hypothetical thresholds. This scenario might also be representative of future thresholds if population size is closer to 900, assuming reproductive

and dependent survival rates do not change. To meet the management objective of maintaining an estimated probability of at least 90% that the population is above 800 bears within the management period and at least 6 years beyond the management period, the following thresholds would be established:

- For management periods of 1-, 2-, 3-, 4-, 5- or 6-year(s) duration, the lowest possible threshold for independent female survival would be 0.93, the highest possible threshold for the number of independent female mortalities would be 22, and the highest possible threshold for the number of independent male mortalities would be 28. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for >25 years.

Hypothetical model for a population size near 1000 bears: This example was developed by simulating population growth using current estimates of vital rates to model year 2018 (when median estimated population size would be 1046) and then projecting another 25 years (model years 2019–2043) to predict effects of changing female and male independent bear survival (Table 2, Figure 2). To meet the management objective of maintaining an estimated probability of at least 90% that the population is above 800 bears at least six years beyond the management period, the following thresholds would be established:

- For management periods of 1-, 2-, or 3-year(s) duration, the minimum threshold for independent female survival would be 0.91, the highest possible threshold for the number of independent female mortalities would be 29, and the highest possible threshold for the number of independent male mortalities would be 31. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately nine years. More conservative thresholds would allow the management objective to be met for a longer period.
- For management periods of 4-, 5-, or 6-years duration, the lowest possible threshold for independent female survival would be 0.92, the highest possible threshold for the number of independent female mortalities would be 27, and the highest possible threshold for the number of independent male mortalities would be 31. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately 20 years. More conservative thresholds would allow the management objective to be met for a longer period.

Hypothetical model for a population size near 1100 bears: This example was developed by projecting the population using current estimates of vital rates to model year 2021 (when median estimated population size would be 1112) and then projecting another 25 years (model years 2022–2046) to predict effects of changing female and male independent bear survival (Table 3, Figure 3). To meet the management objective of maintaining an estimated probability of at least 90% that the population is above 800 bears at least six years beyond the management period, the following thresholds would be established:

- For management periods of 1- or 2-year(s) duration, the lowest possible threshold for independent female survival would be 0.90, the highest possible threshold for the number of independent female mortalities would be 33, and the highest possible threshold for the number of independent male mortalities would be 33. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately 8 years. More conservative thresholds would allow the management objective to be met for a longer period.
- For management periods of 3-, 4-, 5-, or 6-years duration, the lowest possible threshold for independent female survival would be 0.91, the highest possible threshold for the number of independent female mortalities would be 31, and the highest possible threshold for the number of independent male mortalities would be 33. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately 12 years. More conservative thresholds would allow the management objective to be met for a longer period.

Hypothetical model for a population size near 1200 bears: This example was developed by projecting the population using current estimates of vital rates to model year 2025 (when median estimated population size would be 1211) and then projecting another 25 years (model years 2026–2050) to predict effects of changing female and male independent bear survival (Table 4, Figure 4). To meet the management objective of maintaining an estimated probability of at least 90% that the population is above 800 bears at least 6 years beyond the management period, the following thresholds would be established:

- For management periods of 1-, 2-, 3-, 4-, or 5-year(s) duration, the lowest possible threshold for independent female survival would be 0.90, the highest possible threshold for the number of independent female mortalities would be 37, and the highest possible threshold for the number of independent male mortalities would be 36. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately 11 years. More conservative thresholds would allow the management objective to be met for a longer period.
- For a management period of 6-years duration, the lowest possible threshold for independent female survival would be 0.91, the highest possible threshold for the number of independent female mortalities would be 34, and the highest possible threshold for the number of independent male mortalities would be 36. Assuming both female and male thresholds were actually met each year during the management period (and beyond), modeling indicates the management objective would continue to be met for approximately 17 years. More conservative thresholds would allow the management objective to be met for a longer period.

Table 1. Modeling results to illustrate thresholds for independent female survival and mortality for the NCDE population under a scenario of an estimated population size of approximately 900 bears. Mortality thresholds are based on mean number of females and males projected for the 6-year period.

Model input		Model output			Independent mortality thresholds (2013–2018)	
Independent survival during 2013–2037						
Female	Male	Probability population >800 in 2018	No. years before <90% probability population >800	Median λ (2013-2018)	Female	Male
0.90	0.85	0.48	0	0.98	28	28
0.91	0.85	0.69	0	0.98	26	28
0.92	0.85	0.84	0	0.99	24	28
0.93	0.85	0.93	>25	1.00	22	28
0.94	0.85	0.97	>25	1.01	19	28

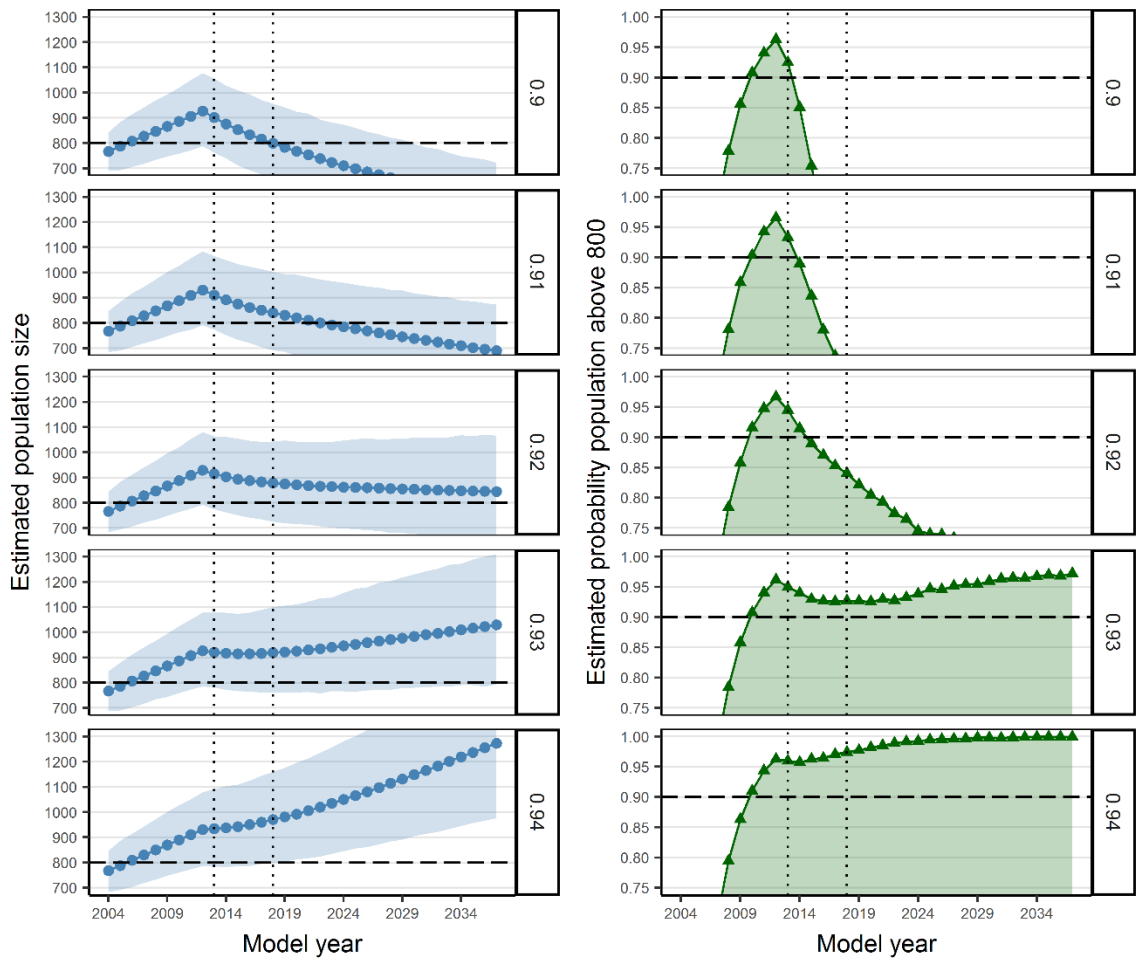

Figure 1. Projected population size (median and 95th percentile; right) and probability that the population is above 800 bears (left) for independent varying female survival rates under a scenario of an estimated population size of approximately 900 bears.

Table 2. Modeling results used to establish thresholds for independent female survival and mortality for the NCDE population under a scenario of an estimated population size of approximately 1000 bears.

Model input		Model output			Independent mortality thresholds (2019–2024)	
Independent survival during 2019–2043		Probability population >800 in 2024	No. years before <90% probability population >800	Median λ (2019-2024)		
Female	Male				Female	Male
0.90	0.85	0.87	5	0.98	32	31
0.91	0.85	0.93	9	0.99	29	31
0.92	0.85	0.98	20	1.00	27	31
0.93	0.85	0.99	>25	1.00	24	32
0.94	0.85	>0.99	>25	1.01	22	32

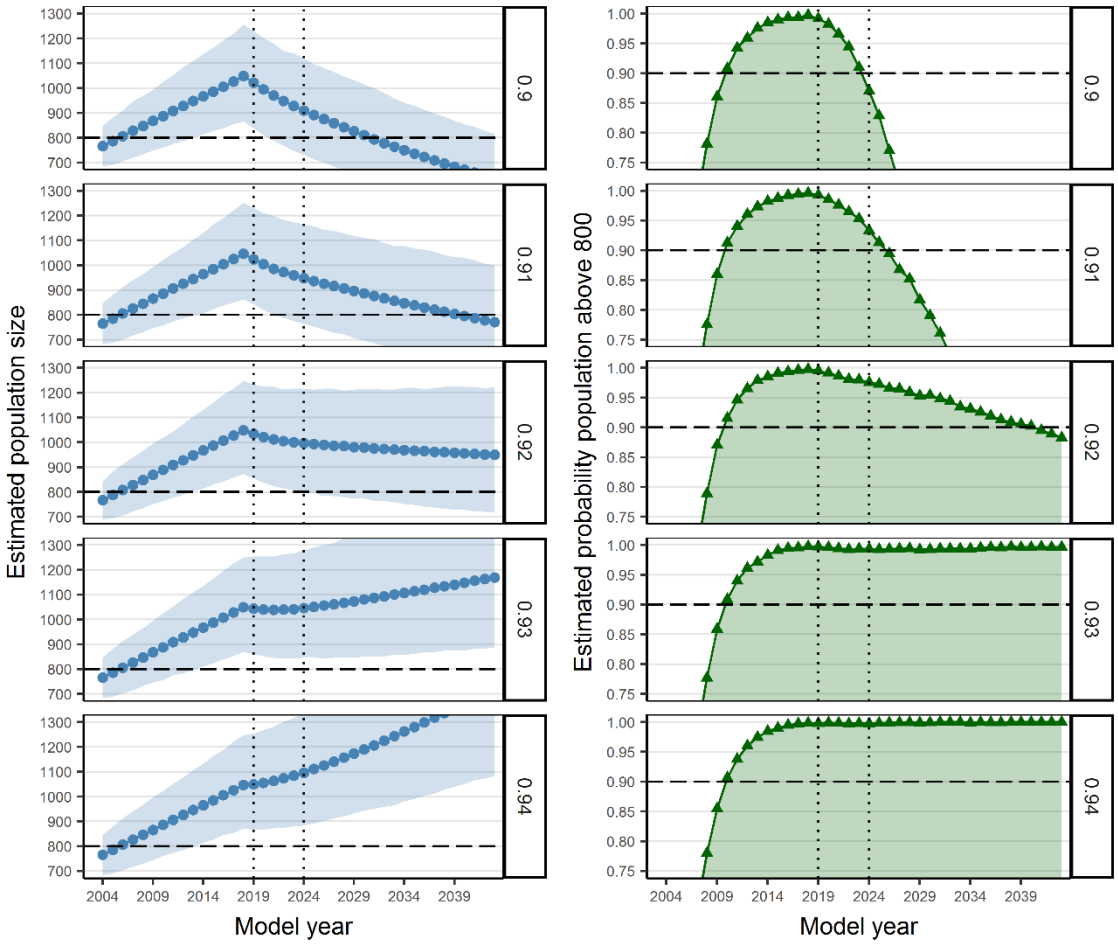

Figure 2. Projected population size (median and 95th percentile; right) and probability that the population is above 800 bears (left) for independent varying female survival rates under a scenario of an estimated population size of approximately 1000 bears.

Table 3. Modeling results for identifying thresholds for independent female survival and mortality for the NCDE population under a scenario of an estimated population size of approximately 1100 bears.

Model input		Model output			Independent mortality thresholds (2022–2028)	
Independent survival during 2022–2046		Probability population >800 in 2027	No. years before <90% probability population >800	Median λ (2022-2028)		
Female	Male				Female	Male
0.90	0.85	0.93	8	0.98	33	33
0.91	0.85	0.97	12	0.99	31	33
0.92	0.85	0.99	>25	0.99	29	33
0.93	0.85	>0.99	>25	1.00	26	34
0.94	0.85	>0.99	>25	1.01	23	34

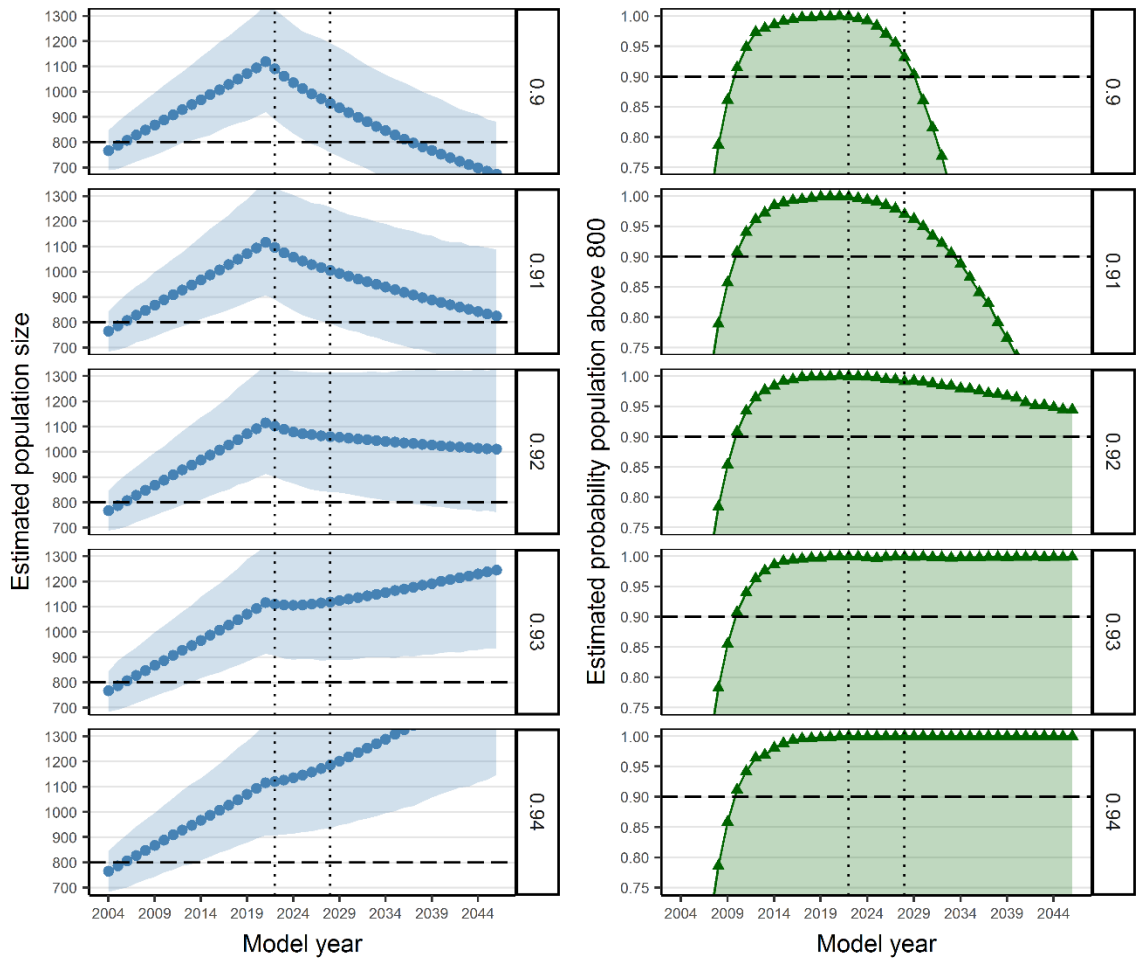

Figure 3. Projected population size (median and 95th percentile; right) and probability that the population is above 800 bears (left) for independent varying female survival rates under a scenario of an estimated population size of approximately 1100 bears.

Table 4. Modeling results for identifying thresholds for independent female survival and mortality for the NCDE population under a scenario of an estimated population size of approximately 1200 bears.

Model input		Model output			Independent mortality thresholds (2026–2031)	
Independent survival during 2026–2050		Probability population >800 in 2031	No. years before <90% probability population >800	Median λ (2026-2031)		
Female	Male				Female	Male
0.90	0.85	0.99	11	0.98	37	36
0.91	0.85	0.99	17	0.99	34	36
0.92	0.85	>0.99	>25	0.99	32	36
0.93	0.85	>0.99	>25	1.00	28	36
0.94	0.85	>0.99	>25	1.01	25	37

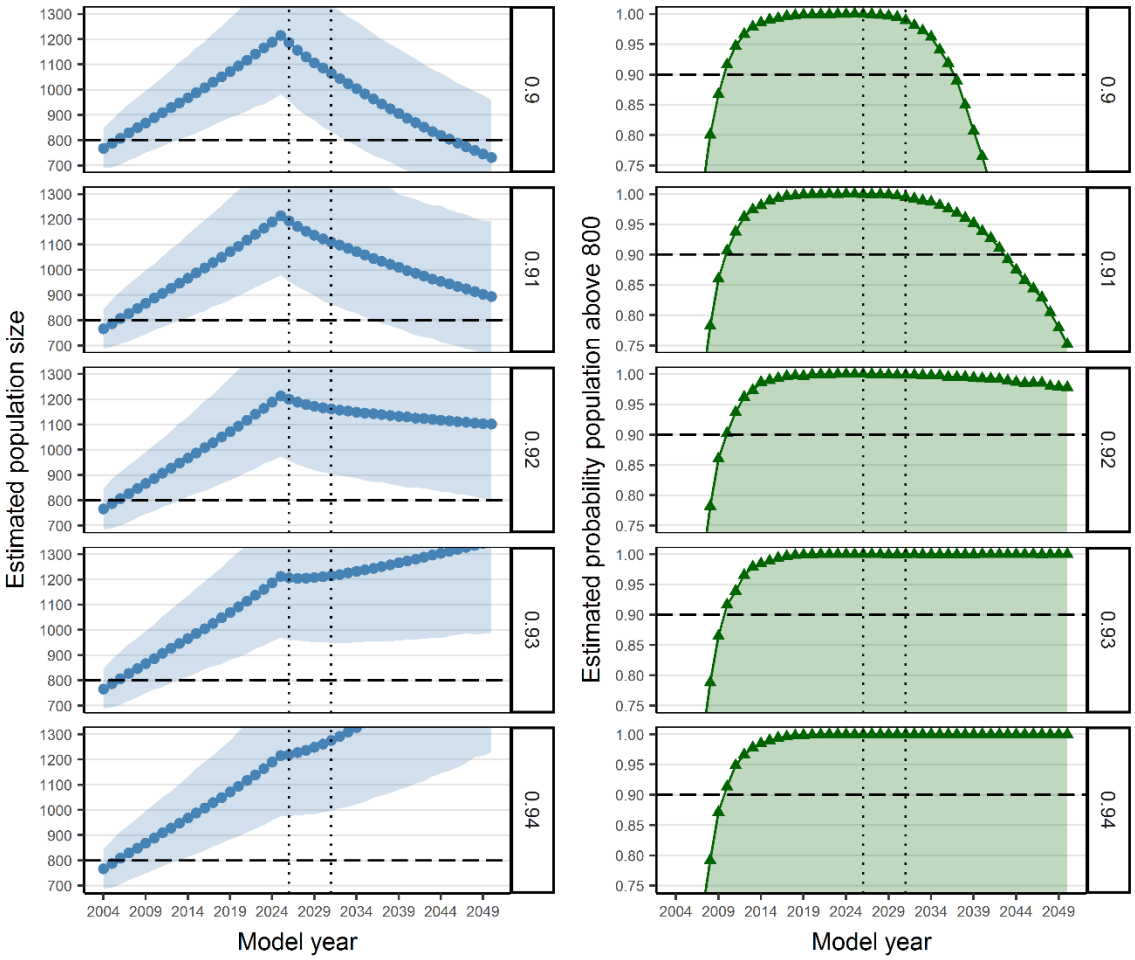

Figure 4. Projected population size (median and 95th percentile; right) and probability that the population is above 800 bears (left) for independent varying female survival rates under a scenario of an estimated population size of approximately 1200 bears.

APPENDIX 4

Habitat Baseline – Motorized Access in Each Bear Management Subunit

The baseline value for each subunit is the 2011 value unless there has been a change as allowed by the application rules in this document in the section called "Secure Core and Motorized Access Management on Federal Lands in the PCA". For those subunits with a baseline value change, the updated baseline value has a green shading for that "cell". For any whole percentage change since 2011, the value as of 2017 is shown in **BLACK BOLD**. If there is no green shading for that "cell", the change is not a baseline value change. Those subunits with any changes of one or more percentage from 2011 to 2017 are discussed below the table. The last page of this appendix has a map of the subunits. See Glossary for definitions of the terms "Open Motorized Road Density" (OMRD), "Total Motorized Road Density" (TMRD), and "secure core" (CORE).

OMRD is expressed as a percentage of the subunit that has greater than 1.0 mile of Open Road Motorized Density. For example, the Badger subunit has 0% >1.0 mi/sqmi.
TMRD is expressed as a percentage of the subunit that has greater than 2.0 miles of Total Motorized Road Density. For example, the Badger subunit has 0% >2.0 mi/sqmi.
CORE is expressed as a percentage of the subunit that meets the definition of secure core. For example, the Badger subunit provides 94% secure core.

Under the Application Rules for Motorized access on Federal Lands (Chapter 3), there was a list of acceptable changes that may adjust baseline values. All the baseline value changes for 2017 followed these application rules. The list is included here for reference.

- updated/improved data on a motorized route resulting in changed calculations without actual change on the ground
- technology or projections changed, resulting in changed calculations without actual change on the ground (e.g., a switch from NAD27 to NAD83)
- a road closure location is moved a short distance to a better location (e.g., to the nearest intersection or turnout) to allow a turn-around providing for public safety, to reduce vandalism, or to improve enforcement of the road closure
- land with or without motorized routes is exchanged, acquired, purchased or sold, resulting in a changed calculation
- a change in a motorized route is necessary to comply with Federal laws (e.g., Americans with Disabilities Act)
- a change in a motorized route is necessary to address human–grizzly bear conflicts, human safety concerns, or resource damage concerns
- an adjacent, non-federal landowner made changes to their motorized access management that resulted in a decrease in the percentage of secure core or an increase in motorized route densities on adjacent Federal lands.

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
BATM	Badger	HLCNF-Rocky Mtn Front RD	0	0	94	0	0	**73**
BATM	Heart Butte	HLCNF-Rocky Mtn Front RD	1	0	81	1	0	**61**
BATM	Two Medicine	HLCNF-Rocky Mtn Front RD	2	1	87	2	1	**78**
BGSM	Albino Pendant	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Big Salmon Holbrook	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Black Bear Mud	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Brushy Park	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Buck Holland	FNF-Swan Lake RD	24	41	49	24	41	**47**
BGSM	Burnt Bartlett	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Hungry Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Little Salmon Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
BGSM	Meadow Smith	FNF-Swan Lake RD	20	54	41	20	**53**	**42**
BGSM	White River	FNF-Spotted Bear RD	0	0	100	0	0	100
BITE	Birch	HLCNF-Rocky Mtn Front RD	0	0	93	0	0	93
BITE	Teton	HLCNF-Rocky Mtn Front RD	12	4	75	**11**	**5**	**71**
BNKR	Big Bill Shelf	FNF-Spotted Bear RD	11	7	87	11	**6**	87
BNKR	Bunker Creek	FNF-Spotted Bear RD	5	3	92	5	3	92
BNKR	Goat Creek	FNF-SLRD & DNRC	23	59	39	23	59	39
BNKR	Gorge Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
BNKR	Harrison Mid	FNF-Spotted Bear RD	1	0	99	1	0	99
BNKR	Jungle Addition	FNF-Spotted Bear RD	19	17	68	19	**19**	68

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
BNKR	Lion Creek	FNF-SLRD & DNRC	19	47	51	19	47	51
BNKR	South Fork Lost Soup	FNF-SLRD & DNRC	25	49	40	25	**47**	**37**
BNKR	Spotted Bear Mtn	FNF-Spotted Bear RD	20	18	68	**19**	18	68
CODV	Pentagon	FNF-Spotted Bear RD	0	0	100	0	0	100
CODV	Silvertip Wall	FNF-Spotted Bear RD	0	0	100	0	0	100
CODV	Strawberry Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
CODV	Trilobite Peak	FNF-Spotted Bear RD	0	0	100	0	0	100
DELK	Falls Creek	HLCNF-Rocky Mtn Front RD	0	0	85	0	0	85
DELK	Scapegoat	HLCNF-Rocky Mtn Front RD	2	0	83	**5**	**1**	**78**
HGHS	Coram Lake Five	FNF-Hungry Horse RD	30	46	14	30	46	14
HGHS	Doris Lost Johnny	FNF-Hungry Horse RD	57	19	36	57	**23**	36
HGHS	Emery Firefighter	FNF-Hungry Horse RD	19	20	53	19	**19**	**58**
HGHS	Peters Ridge	FNF-HHRD & SLRD	52	25	34	52	25	34
HGHS	Riverside Paint	FNF-Hungry Horse RD	19	16	72	**18**	16	72
HGHS	Wounded Buck Clayton	FNF-Hungry Horse RD	28	30	65	28	30	**66**
LMFF	Dickey Java	FNF-Hungry Horse RD	9	0	85	9	0	85
LMFF	Lincoln Harrison	Glacier NP	0	0	98	0	0	98
LMFF	Moccasin Crystal	FNF-Hungry Horse RD	8	1	81	8	1	81
LMFF	Muir Park	Glacier NP	0	0	98	0	0	98
LMFF	Nyack Creek	Glacier NP	0	0	100	0	0	100
LMFF	Ole Bear	Glacier NP	0	0	94	0	0	94
LMFF	Pinchot Coal	Glacier NP	0	0	99	1	0	99
LMFF	Stanton Paola	FNF-Hungry Horse RD	8	3	83	8	3	83
LNFF	Anaconda Creek	Glacier NP	5	0	94	5	0	94

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
LNFF	Apgar Mountains	Glacier NP	15	4	81	15	4	81
LNFF	Canyon McGinnis	FNF-GVRD & FNF-TLRD	18	31	52	**17**	**32**	52
LNFF	Cedar Teakettle	FNF-Glacier View RD	35	36	24	35	36	24
LNFF	Dutch Camas	Glacier NP	6	0	93	6	0	93
LNFF	Lake McDonald	Glacier NP	13	5	85	13	5	85
LNFF	Lower Big Creek	FNF-Glacier View RD	18	20	66	18	**19**	**71**
LNFF	Upper McDonald Creek	Glacier NP	9	2	90	9	2	90
LNFF	Werner Creek	FNF-Glacier View RD	19	21	42	**29**	**20**	**63**
MSRG	Beaver Creek	FNF-Swan Lake RD	6	26	66	6	26	66
MSRG	Cold Jim	FNF-Swan Lake RD	18	57	43	18	**55**	**44**
MSRG	Crane Mtn	FNF-Swan Lake RD	28	56	26	28	**55**	**25**
MSRG	Crow[1]	Flathead IR	6	3	92	6	3	92
MSRG	Glacier Loon	FNF-Swan Lake RD	22	43	45	22	**41**	**52**
MSRG	Hemlock Elk	FNF-Swan Lake RD	6	30	64	6	30	**63**
MSRG	Piper Creek	FNF-SLRD & DNRC	19	44	52	19	44	**55**
MSRG	Porcupine Woodward	FNF-SLRD & DNRC	28	73	15	28	**74**	15
MSRG	Post Creek[1]	Flathead IR	10	5	87	10	5	87
MSRG	Saint Marys[1]	Flathead IR	4	2	94	4	2	94
MLFK	Alice Creek	HLCNF-Lincoln RD	9	17	71	**10**	**18**	71
MLFK	Arrastra Mountain	HLCNF-Lincoln RD	15	19	75	**16**	19	**74**
MLFK	Monture	LNF-Seeley Lake RD	1	0	99	1	**1**	99
MLFK	Mor-Dun	LNF-Seeley Lake RD	17	17	78	**18**	**14**	**77**
MLFK	N-Scapegt	LNF-Seeley Lake RD	0	0	100	0	0	100

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
MLFK	Red Mountain	HLCNF-Lincoln RD	22	20	62	**24**	**21**	**61**
MLFK	S-Scapegt	LNF-Seeley Lake RD	10	14	79	**12**	**17**	**75**
MULK	Krinklehorn	KNF-Fortine RD	22	14	75	22	14	75
MULK	Therriault	KNF-Fortine RD	26	12	71	26	12	71
NFSR	Lick Rock	HLCNF-Rocky Mtn Front RD	0	0	100	0	0	100
NFSR	Roule Biggs	HLCNF-Rocky Mtn Front RD	0	0	100	0	0	100
NEGL	Belly River	Glacier NP	0	0	99	0	0	99
NEGL	Boulder Creek[1]	Glacier NP & Blackfeet IR	18	13	76	18	13	76
NEGL	Chief Mtn[1]	Glacier NP & Blackfeet IR	28	10	53	28	10	53
NEGL	Poia Duck[1]	Glacier NP & Blackfeet IR	23	8	68	23	8	68
NEGL	Upper Saint Mary	Glacier NP	11	1	89	11	1	89
NEGL	Waterton	Glacier NP	0	0	100	0	0	100
RTSN	Mission	LNF-Seeley Lk RD & FWP	23	57	33	**25**	**47**	**39**
RTSN	Rattlesnake	LNF-Missoula RD	3	13	86	3	**11**	**82**
RTSN	South Fork Jocko[1]	Flathead IR	38	14	59	38	14	59
SUBW	South Fork Willow	HLCNF-Rocky Mtn Front RD	8	2	88	**14**	**3**	**81**
SUBW	West Fork Beaver	HLCNF-Rocky Mtn Front RD	12	4	84	**17**	**5**	**80**
SEGL	Divide Mtn[1]	Glacier NP & Blackfeet IR	32	25	67	32	25	67
SEGL	Midvale[1]	Glacier NP & Blackfeet IR	7	4	87	7	4	87
SEGL	Spot Mtn[1]	Glacier NP & Blackfeet IR	10	3	79	10	3	79
STRV	Lazy Creek[1]	DNRC	68	62	10	68	62	10
STRV	Stryker[1]	DNRC	37	33	50	37	33	50
STRV	Upper Whitefish[1]	DNRC	34	57	54	34	57	54
SLVN	Ball Branch	FNF-Spotted Bear RD	8	7	84	8	**12**	84

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
SLVN	Jewel Basin Graves	FNF-Hungry Horse RD	19	19	72	**20**	19	**75**
SLVN	Kah Soldier	FNF-Spotted Bear RD	19	19	68	19	19	**67**
SLVN	Logan Dry Park	FNF-HHRD & FNF-SBRD	30	33	52	30	**36**	**51**
SLVN	Lower Twin	FNF-Spotted Bear RD	9	2	91	9	2	**92**
SLVN	Noisy Red Owl	FNF-Swan Lake RD	22	14	59	**20**	14	59
SLVN	Swan Lake	FNF-Swan Lake RD	40	24	46	40	**23**	46
SLVN	Twin Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
SLVN	Wheeler Quintonkon	FNF-HHRD & FNF-SBRD	25	18	66	25	**19**	**68**
TESR	Deep Creek	HLCNF-Rocky Mtn Front RD	4	2	73	**9**	**3**	**67**
TESR	Pine Butte	HLCNF-Rocky Mtn Front RD	6	2	71	**7**	2	**64**
UMFF	Flotilla Capitol	FNF-HHRD & FNF-SBRD	0	0	100	0	0	100
UMFF	Long Dirtyface	FNF-Hungry Horse RD	0	0	100	0	0	100
UMFF	Plume Mtn Lodgepole	FNF-HHRD & SBRD	0	0	100	0	0	100
UMFF	Skyland Challenge	FNF-Hungry Horse RD	20	17	63	20	17	**65**
UMFF	Tranquil Geifer	FNF-Hungry Horse RD	0	2	90	0	2	90
UNFF	Bowman Creek	Glacier NP	6	0	93	6	0	93
UNFF	Coal & South Coal	FNF-Glacier View RD	15	21	72	15	**24**	**73**
UNFF	Ford Akokala	Glacier NP	7	1	93	7	1	93
UNFF	Frozen Lake	FNF-Glacier View RD	10	4	86	10	4	86
UNFF	Hay Creek	FNF-Glacier View RD	24	16	55	**25**	16	55
UNFF	Ketchikan	FNF-Glacier View RD	16	3	72	**14**	3	**73**
UNFF	Kintla Creek	Glacier NP	3	0	96	3	0	96
UNFF	Logging Creek	Glacier NP	4	0	94	4	0	94

BMU	Subunit Name	Principal Agency	2011 OMRD	2011 TMRD	2011 CORE	2017 OMRD	2017 TMRD	2017 CORE
UNFF	Lower Whale	FNF-Glacier View RD	36	17	50	36	17	50
UNFF	Quartz Creek	Glacier NP	4	0	93	4	0	93
UNFF	Red Meadow Moose	FNF-Glacier View RD	25	17	55	25	**18**	**68**
UNFF	State Coal Cyclone	FNF-GVRD & DNRC	31	27	59	**29**	**25**	**58**
UNFF	Upper Trail	FNF-Glacier View RD	14	4	88	14	4	88
UNFF	Upper Whale Shorty	FNF-Glacier View RD	12	11	86	12	10	86
USFF	Basin Trident	FNF-Spotted Bear RD	0	0	100	0	0	100
USFF	Gordon Creek	FNF-Spotted Bear RD	0	0	100	0	0	100
USFF	Jumbo Foolhen	FNF-Spotted Bear RD	0	0	100	0	0	100
USFF	Swan	LNF-Seeley Lake RD	32	16	55	32	16	55
USFF	Youngs Creek	FNF-Spotted Bear RD	0	0	100	0	0	100

[1] – Subunits for the Flathead Indian Reservation, Blackfeet Indian Reservation, and Stillwater River BMU (Montana Department of Natural Resources & Conservation) have not been updated for 2017 motorized access.

Additional Information about Subunits with OMRD, TMRD, and/or secure core that changed by 1% or more between 2011 and 2017:

For any subunit that had a whole percentage change in OMRD, TMRD, or CORE from 2011 to 2017, the explanation of the change is described below. If the change will subsequently update the baseline, the percentage is noted in bold type. Those changes to the baseline are allowed under the application rules in this document in the section called "Secure Core and Motorized Access Management on Federal Lands in the PCA". Subunits are listed in the same order as the table above.

BATM Badger. Secure core decreased from 94% to 73%. Change is due to several significant changes to land ownership on the Blackfeet Indian Reservation. OMRD and TMRD were affected as well, but did not result in a whole percentage change. This is a change to the baseline, the secure core value will be **73%**.

BATM Heart Butte. Secure core decreased from 81% to 61%. Change is due to several significant changes to land ownership on the Blackfeet Indian Reservation. OMRD and TMRD were affected

as well, but did not result in a whole percentage change. This is a change to the baseline, the secure core value will be **61%**.

BATM Two Medicine. Secure core decreased from 87% to 78%. Change is due to 1) one road formerly gated road is not classified as impassable; and 2) several significant changes to land ownership on the Blackfeet Indian Reservation. OMRD and TMRD were affected as well, but did not result in a whole percentage change. This is a change to the baseline, the secure core value will be **78%**.

BGSM Buck Holland. Secure core decreased from 49% (48.56) to 47% (47.43). Change is due to 1) spatial realignment of road GIS layer to more accurately reflect on the ground conditions; and 2) one full section of land has changed from private to NFS land. The land exchange added 640 acres (1 mi^2) of land, which was not secure core, into calculations. OMRD and TMRD were affected as well, but did not result in a whole percentage change. This is a change to the baseline, the secure core value will be **47%**.

BGSM Meadow Smith. TMRD decreased to 53% and secure core increased to 42%. Secure core change is mainly due to three roads where the management was changed from open yearlong to currently closed yearlong by gate. Both the TMRD and secure core changes are also affected by land ownership exchanges and spatial re-alignment of road GIS layer to more accurately reflect on the ground conditions. All of these changes are either from the Meadow Smith project in consultation with USFWS, or allowed baseline changes. While the three roads are no longer open, between the spatial realignments and land ownership changes, it did not result in a whole percentage change for OMRD. This does result in new baseline values for TMRD of **53%** and for secure core of **42%**.

BITE Teton. OMRD decreased from 12% to 11%, TMRD increased from 4% to 5%, and secure core decreased from 75% to 71%. Changes are due to (1) updated road management mostly for BLM and MFWP, and less so for USFS; (2) changes in land ownership. This is a change to the baseline, the OMRD value will be **11%**, the TMRD value will be **5%**, and the secure core value will be **71%**.

BNKR Big Bill Shelf. TMRD decreased from 7% (6.68%) to 6% (6.47%). Change is due to spatial realignments of the road GIS layer to more accurately reflect conditions on the ground. OMRD and secure core were affected as well but did not result in a whole percentage change. This is a change to the baseline, TMRD value will be **6%**.

BNKR Jungle Addition. TMRD increased from 17% to 19%. One formerly gated yearlong road was considered impassable in 2011. However, as the road revegetated naturally and there was not a decision to change the road to impassable, the road should have been included in TMRD. The change from impassable to being buffered in the secure core routine did not change the percent of secure core due to the juxtaposition of the road network. This is a change to the baseline, the TMRD value will be **19%**.

BNKR South Fork Lost Soup. TMRD decreased from 49% to 47%, and secure core decreased from 40% to 37%. The decrease in TMRD is a result of updated DNRC road information from

the Swan River State Forest and not Forest Service actions. The decrease in secure core is mainly due to one long NFS road that was closed yearlong by barrier in 2013 and currently closed yearlong by gate since 2014 and is used to access state land, as well as the updated DNRC road information. This is does result in new baseline values for TMRD of **47%** and for secure core of **37%**.

BNKR Spotted Bear Mtn. OMRD decreased from 20% to 19%. Road GIS layer in this subunit and surrounding areas has been spatially re-aligned to more accurately reflect on the ground conditions. No changes to road management have occurred. While this affects OMRD, TMRD, and secure core, only OMRD had a whole percentage change. This is a change to the baseline, the OMRD value will be **19%**.

DELK Scapegoat. OMRD increased from 2% to 5%, TMRD increased from 0% to 1%, and secure core decreased from 83% to 78%. Change is due to one trail that was incorrectly not classified as motorized in 2011 and is correctly classified as motorized in 2017. This is a change to the baseline, the OMRD value will be **5%**, the TMRD value will be **1%**, and the secure core value will be **78%**.

HGHS Doris Lost Johnny. TMRD increased from 19% to 23%. Motorized trails in this subunit and adjacent subunits have been spatially re-aligned to more accurately reflect on the ground conditions. Two formerly impassable are now included in TMRD calculations. As these roads revegetated naturally, have stream aligned culverts, and there was not a decision to change the road to impassable, the roads should have been included in TMRD. This is a change to the baseline, the TMRD value will be **23%**.

HGHS Emery Firefighter. TMRD decreased from 20% to 19%, and secure core increased from 53% to 58%. Changes are due to the implementation of the Firefighter project in consultation with USFWS. This is a change to the baseline, the TMRD value will be **19%** and the secure core value will be **58%**.

HGHS Riverside Paint. OMRD decreased from 19% to 18%. Roads in this subunit have been spatially re-aligned to more accurately reflect on the ground conditions. No changes to road management have occurred. While this affects OMRD, TMRD, and secure core, only OMRD had a whole percentage change. This is a change to the baseline, the OMRD value will be **18%**.

HGHS Wounded Buck Clayton. Secure core increased from 65% to 66%. Change is due implementation of West Side Reservoir Post-Fire project in consultation with USFWS. This is a change to the baseline, the secure core value will be **66%**.

LMFF Pinchot Coal. OMRD increased from 0% to 1%. Change is due to roads and motorized trails on adjacent Moccasin Crystal subunit, which were incorrectly excluded in the 2011 baseline analysis. This is a change to the baseline, the OMRD value will be **1%**.

LNFF Canyon McGinnis. OMRD decreased from 18% to 17%, and TMRD increased from 31% to 32%. OMRD change is due to one open seasonally road being closed by physical barrier as a result of a slump. There is a signed closure order but this is considered temporary. One formerly impassable is now included in TMRD calculations. As this road revegetated naturally, has stream aligned culverts, and there was not a decision to change the road to impassable, the roads should

have been included in TMRD. For OMRD, the change is not a baseline change, and the value will remain at 18%. For TMRD, this is a change to the baseline, the TMRD value will be **32%**.

LNFF Lower Big Creek. TMRD decreased from 20% to 19%, and secure core increased from 66% to 71%. TMRD and secure core changes are due to implementation of Big Mtn Ski & Summer Resort (TMRD) and Moose Post-Fire (secure core), both in consultation with USFWS. This is a change to the baseline, the TMRD value will be **19%**, and the secure core values will be **71%**.

LNFF Werner Creek. OMRD increased from 19% to 29%, TMRD decreased from 21% to 20%, and secure core increased from 42% to 63%. Changes are due to implementation of Moose Post-Fire project, in consultation with USFWS. This is a change to the baseline, OMRD value will be **29%**, TMRD value will be **20%,** and secure core value will be **63%**.

MSRG Cold Jim. TMRD decreased from 57% to 55%, secure core increased from 43% to 44%. Changes are due to 1) spatial realignment of road GIS layer to more accurately reflect on the ground locations; 2) implementation of Chilly James Restoration project, in consultation with USFWS. This is a change to the baseline, TMRD value will be **55%**, and secure core value will be **44%**.

MSRG Crane Mtn. TMRD decreased from 56% to 55%, and secure core decreased from 26% to 25%. TMRD change is due to one physical barriered road to naturally re-vegetated with active reclamation for first 0.25 miles per the Crane Mtn Salvage project, in consultation with USFWS. Secure core change is due to an update to the database with the addition private roads to the east off of MT Highway 35. This is a change to the baseline, TMRD value will be **55%**, and secure core value will be **26%**.

MSRG Glacier Loon. TMRD decreased from 43% to 41%, and secure core increased from 45% to 52%. Changes are due to 1) spatial realignment road GIS layer to more accurately reflect on the ground locations; 2) implementation of Glacier Loon Fuels Reduction and Forest Health project, in consultation with USFWS. This is a change to the baseline, TMRD value will be **41%**, and secure core value will be **52%**.

MSRG Hemlock Elk. Secure core decreased from 64% to 63%. Change is due to spatial realignment of road GIS layer to more accurately reflect on the ground locations. No changes were made to road management. This is a change to the baseline, secure core value will be **63%**.

MSRG Piper Creek. Secure core increased from 52% to 55%. Change is due to 1) spatial realignment of roads GIS layer to more accurately reflect on the ground locations; and 2) update to the database from a on the ground review of roads on lands acquired through the MT Legacy Project. The spatial realignment did not result in a whole percentage change in OMRD or TMRD. This is a change to the baseline, secure core value will be **55%**.

MSRG Porcupine Woodward. TMRD increased form 73% to 74%. Change is due to 1) spatial realignment of road GIS layer to more accurately reflect on the ground locations; and 2) additional

DNRC roads as well as changes in road management of DNRC roads. This is a change to the baseline, TMRD value will be **74%**.

MLFK Alice Creek. OMRD increased from 9% to 10%, TMRD increased from 17% to 18%. Changes are due to updates/corrections to the database, and not a change on the ground. This is a change to the baseline, OMRD value will be **10%**, TMRD value will be **18%**.

MLFK Arrastra Mountain. OMRD increased from 15% to 16%, secure core decreased from 75% to 74%. Changes are due to updates/corrections to the database, and not a change on the ground. This is a change to the baseline, OMRD value will be **16%**, and secure core value will be **74%**.

MLFK Monture. TMRD increased from 0% to 1%. Change is due to updates to the database to more accurately reflect on the ground conditions from project analysis and implementation of Center Horse Landscape Restoration project, in consultation with USFWS. This is a change to the baseline, TMRD value will be **1%**.

MLFK Mor-Dun. OMRD increased from 17% to 18%, TMRD decreased from 17% to 14%, and secure core decreased from 78% to 77%. Changes are due to updates to the database to more accurately reflect on the ground conditions from project analysis and implementation of Center Horse Landscape Restoration project, in consultation with USFWS. This is a change to the baseline, OMRD value will be **18%**, TMRD value will be **14%**, and secure core value will be **77%**.

MLFK Red Mountain. OMRD increased from 22% to 24%, TMRD increased from 20% to 21%, and secure core decreased from 62% to 61%. Changes are due to updates/corrections to the database, and not a change on the ground. This is a change to the baseline, OMRD value will be **24%**, TMRD value will be **21%**, and secure core value will be **61%**.

MLFK S-Scapegt. OMRD increased from 10% to 12%, TMRD increased from 14% to 17%, and secure core decreased from 79% to 74%. Changes are due to 1) updates to the database to more accurately reflect conditions on the ground; 2) corrections to the trail database for motorized trails; and 3) updates to the database to more accurately reflect on the ground conditions from project analysis and implementation of Center Horse Landscape Restoration project, in consultation with USFWS. This is a change to the baseline, OMRD value will be **12%**, TMRD value will be **17%**, and secure core value will be **75%**.

RTSN Mission. OMRD increased from 23% to 25%, TMRD decreased from 57% to 47%, and secure core increased from 33% to 39%. Changes are due to 1) spatial realignment of road GIS layer to more accurately reflect on the ground conditions; 2) project implementation of Colt Summit project, in consultation with USFWS; and 3) updates to MFWP roads in the Lake Marshall WMA. This is a change to the baseline, OMRD value will be **25%**, TMRD value will be **47%**, and secure core value will be **39%**.

RTSN Rattlesnake. TMRD decreased from 13% to 11%, and secure core decreased from 86% to 82%. Changes are due to 1) updates to the database to more accurately reflect conditions on the

ground; and 2) spatial realignments to road GIS layer to more accurately reflect on the ground conditions. This is a change to the baseline, TMRD will be **11%** and secure core will be **82%**.

SUBW South Fork Willow. OMRD increased from 8% to 14%, TMRD increased from 2% to 3%, and secure core decreased from 88% to 81%. Change is due to updates and corrections for roads accessing recreational residences. This is a change to the baseline, the OMRD value will be **14%**, the TMRD value will be **3%**, and secure core value will be **81%**.

SUBW West Fork Beaver. OMRD increased from 12% to 17%, TMRD increased from 4% to 5%, and secure core decreased from 84% to 80%. Change is due to updates to roads on state land, as well as changes in land ownership. This is a change to the baseline, OMRD value will be **17%**, TMRD value will be **5%**, and secure core will be **80%**.

SLVN Ball Branch. TMRD increased from 7% to 12%. Change is due to three formerly impassable roads that are now included in TMRD calculations. These roads were impassable due to natural revegetation as well as two different bridges/large culverts being removed. There was not a decision to change these roads to impassable, therefore the roads should have been included in TMRD. This is a change to the baseline, TMRD value will be **12%**.

SLVN Jewel Basin Graves. OMRD increased form 19% (19.44) to 20% (19.52), and secure core increased from 72% to 75%. OMRD change is due to spatial realignment of road GIS layer to more accurately reflect conditions on the ground. Secure core change is due to implementation of West Side Reservoir Post-Fire project, in consultation with USFWS. This is a change to the baseline, OMRD value will be **20%** and secure core will be **75%**.

SLVN Kah Soldier. Secure core decreased from 68% (67.51) to 67% (67.48). Change is due to spatial realignment of road GIS layer to more accurately reflect on the ground locations. The spatial realignment did not result in a whole percentage change in OMRD or TMRD. This is a change to the baseline, secure core value will be **67%**.

SLVN Logan Dry Park. TMRD increased from 33% to 36%, and secure core decreased from 52% to 51%. Change is due to 1) spatial realignments of road GIS layer to more accurately reflect on the ground locations; 2) updates to the database from the Betty Baptiste project review of the actual on the ground conditions; and 3) five (5) formerly impassable roads that are now included in TMRD calculations. These roads were impassable due to natural revegetation. There was not a decision to change these roads to impassable, therefore the roads should have been included in TMRD. This will be a change to the baseline, TMRD value will be **36%** and secure core value will be **51%**.

SLVN Lower Twin. Secure core increased from 91% (91.49) to 92% (91.50). Change is due to spatial realignment of road GIS layer to more accurately reflect on the ground locations. The spatial realignment did not result in a whole percentage change in OMRD or TMRD. This is a change to the baseline, secure core value will be **92%**.

SLVN Noisy Red Owl. OMRD decreased from 22% to 20%. Change is due to 1) updates to database of DNRC roads to accurately reflect the actual ownership and jurisdiction of some roads;

2) spatial realignment of road and trail GIS layer to more accurately reflect on the ground locations; and 3) corrections to the ownership GIS layer. The updates to the DNRC road attributes is the main reason for the change in OMRD. This is a change to the baseline, OMRD value will be **20%**.

SLVN Swan Lake. TMRD decreased from 24% (23.52) to 23% (23.37). Change is due to updates to the database of a DNRC road to accurately reflect the actual ownership and jurisdiction of a road. This is a change to the baseline, TMRD value will be **23%**.

SLVN Wheeler Quintonkon. TMRD increased from 18% to 19%, and secure core increased from 66% to 68%. Change is due to 1) spatial realignments of road GIS layer to more accurately reflect on the ground locations; 2) two (2) formerly impassable roads that should have been included in TMRD calculations as there was not a decision to make these roads impassable; and 3) implementation of West Side Reservoir Post-Fire project, in consultation with USFWS. This is a baseline change, TMRD value will be **19%**, and secure core value will be **68%**.

TESR Deep Creek. OMRD increased from 4% to 9%, TMRD increased from 2% to 3%, and secure core decreased from 73% to 67%. Changes are due to updates/corrections on BLM roads as well as changes in land ownership. This is a change to baseline, OMRD value will be **9%**, TMRD value will be **3%**, and secure core value will be **67%**.

TESR Pine Butte. OMRD increased from 6% to 7%, and secure core decreased from 71% to 64%. Changes are due to updates/correction on state land as well as changes in land ownership. This is a change to the baseline, OMRD value will be 7%, secure core value will be 64%.

UMFF Skyland Challenge. Secure core increased from 63% to 65%. Change is due to 1) spatial realignments of road GIS layer to more accurately reflect on the ground locations; and 2) implementation of Granite Lodgepole project, in consultation with USFWS. Spatial realignments did not result in a whole percentage change to OMRD or TMRD. This is a change to the baseline, secure core value will be **65%**.

UNFF Coal & South Coal. TMRD increased from 21% to 24%, and secure core increased from 72% to 73%. TMRD change is due to 3 formerly impassable roads from bridges/large culvert removals that should have been included in TMRD calculations. Secure core change is due to implementation of Shorty and Coal Creeks Stream Restoration project, in consultation with USFWS. This is a change to the baseline, TMRD value will be **24%**, and secure value will be **73%**.

UNFF Hay Creek. OMRD increased from 24% to 25%. Change is due to two (2) corrections to the database: 1) location of where the road stops and the trail begins; and 2) to more accurately reflect the ownership and jurisdiction of one section of a DNRC road. This is a baseline change, OMRD value will be **25%**.

UNFF Ketchikan. OMRD decreased form 16% to 14%, and secure core increased from 72% to 73%. Change is due to four (4) open yearlong DNRC roads that are now closed by physical barrier. This is a change to the baseline, OMRD value will be **14%**, and secure core will be **73%**.

UNFF Red Meadow Moose. TMRD increased from 17% to 18%, and secure core increased from 55% to 68%. TMRD change is due to one formerly impassable road due to natural revegetation that should have been included in TMRD calculations as there was not a decision to make this road impassable. Secure core change is due to implementation of Red Whale project, in consultation with USFWS. This is a change to the baseline, TMRD value will be **18%**, and secure core value will be **68%**.

UNFF State Coal Cyclone. OMRD decreased from 31% to 29%, TMRD decreased from 27% to 25%, and secure core decreased from 59% to 58%. Changes for OMRD and TMRD are a result of changes in road management for state roads. Changes for secure core is a result of corrected information on one NFSR road to match on the ground conditions. This is a change to the baseline, OMRD will be **29%,** TMRD will be **25%**, and secure core will be **58%**.

APPENDIX 5

Habitat Baseline– Developed Recreation Sites in Each Bear Management Unit

BMU Name	Residences	Overnight Sites		Campgrounds	Day-Use	Trail-heads	Admin.
		# sites	type of capacity				
Badger Two Medicine	-	-	-	1 (17)	1	7	2
Big Salmon	32	2	7 cabins; 9 rooms	4 (50)	5	8	12
Birch Teton	7	1	6 cabins; 1 room	3 (23)	3	8	1
Bunker	-	3	17 cabins; 2 rooms; 4 bunkhouses	7 (54)	6	26	5
Continental Divide	-	-	-	-	-	-	5
Dearborn Elk	1	-	-	-	1	3	2
Hungry Horse	-	-	-	11 (139)	20	39	6
Lower Middle Fork Flathead	10	-	-	12 (32)	7	16	12
Lower North Fork Flathead	82	9	54 cabins; 185 rooms; 2 bunkhouses; 362 emp. beds	19 (726)	35	60	24
Mission Range	1	1	1 cabin	1 (22)	5	17	-
Monture Landers Fork	-	1	1 cabin	4 (42)	11	28	8
Murphy Lake	-	5	5 cabins	8 (29)	12	41	1
Northeast Glacier	-	4	27 cabins; 350 rooms; 294 emp. beds	27 (429)	16	28	14
North Fork Sun River	-	-	-	-	-	-	5
Rattlesnake	-	1	1 cabin	1 (3)	-	6	-
Southeast Glacier	-	-	-	11 (143)	9	14	8
Sullivan	20	2	9 cabins; 1 room; 1 bunkhouse	8 (89)	9	30	6
Stillwater River	-	-	-	2 (3)	-	2	1
South Fork Sun Beaver Willow	74	4	19 cabins; 2 rooms; 3 bunkhouses; 3 RV	6 (65)	2	15	8
Teton Sun River	17	1	2 bunkhouses	2 (32)	2	10	4
Upper Middle Fork Flathead	-	2	2 cabins	2 (21)	3	12	4
Upper North Fork Flathead	7	7	7 cabins	24 (153)	6	36	21
Upper South Fork Flathead	-	1	1 cabin	-	3	5	6

Residences: These are full-time or seasonal recreational residences. We have no authority to limit

increases in capacity at these sites so it is not reported for these essentially private residences. However, there will be no new residences allowed.

Overnight Sites: Cabin rentals, guest lodges with or without rooms and/or cabins, camps, etc.

Capacity: The number of cabins, rooms, bunkhouses, employee beds (Glacier NP) and RV sites.

Campgrounds: List # of campgrounds with # of campsites in parentheses, i.e. "2 (32)" is two separate campgrounds with a total number of 32 sites. Campground development ranges from fully developed with all amenities to very minimal development. There are group sites included; however, the number accommodated at one group site is variable.

Day-Use: Site includes businesses, restaurants, river/lake access, picnic areas, points of interests, etc.

Trailheads: Trailheads range from fully developed to a turn-out at a road closure.

Admin: Administrative sites include ranger stations, work centers, guard stations, active fire lookouts, etc. While these sites are not subject to the Developed Site standards, increases in the number of administrative sites on Federal lands will be minimized so they are reported here to provide transparency and accountability.

APPENDIX 6

Protocol Paper for Motorized Access Analyses Application Rule

Executive Summary

This Protocol Paper clarifies the application rules for motorized access density and secure core analyses for the PCA and for Zone 1, including key points for the components, input Geographic Information System (GIS) layers, and actual processes. The paper is intended to provide the reader with both a general background for moving window route density, secure core analyses, and linear road densities as well as specific information and requirements for motorized access management in the Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Conservation Strategy.

A moving window type of motorized access density analysis requires several components: (1) a road layer; (2) a trail layer; (3) analysis area(s); and (4) a good vector, and a raster-based GIS software package. The secure core area analysis uses GIS software to buffer routes a specified distance. The linear density analysis uses GIS software to clip line and polygon features or to combine line and polygons features. Either raster or vector GIS software will work for the secure core and linear density analyses, but vector software is more commonly used.

There are five sections within the Protocol Paper:

1. Background gives some history and rationale for methods of calculating road densities and a general description of the moving window and security analyses.
2. Analysis Components describes the GIS software and individual GIS layers needed for the analyses.
3. GIS Processes outlines and describes the procedures for the analyses.
4. NCDE Conservation Strategy Analyses gives the specifics for running the moving window and secure core procedures for grizzly bear analysis for programmatic and project level work within the NCDE, as well as methods for calculating linear miles or density for Zone 1 and the Salish and Ninemile demographic connectivity areas.
5. Literature Cited

Background

Until 1993, road density was calculated by dividing the total miles of roads by the square miles in an analysis area resulting in a linear average density. Since that time, GIS technology has allowed the user to place buffers around roads or trails, create density contour maps, and calculate densities. Traditionally, the analysis area has been about 5,000 to 15,000 acres (7.81 mi^2 to 23.44 mi^2). Currently, BMU subunits are used for the analysis area, approximating the 50 mi^2 representative of a female grizzly bear's home range.

For a moving window route density, each pixel (a square unit of landwhich is 30 meters by 30 meters in size for the NCDE) is assigned an access route density value based upon the roads and motorized trails within the specified surrounding window, where the window size is commonly 1 square mile or 1 square kilometer. The square mile or kilometer is the "window" surrounding a pixel. The "moving window" refers to the methodical process that the GIS software program utilizes. Starting in the upper left (northwest) corner of the analysis area, the first pixel is assigned an access route density value based upon its surrounding window; the program moves over 1 pixel and assigns this next pixel a density value based upon its surrounding window; move over 1 pixel and that pixel is assigned a density; etc. until the entire file has been analyzed pixel-by-pixel from the upper left (northwest) to the lower right (southwest). The output can then be summarized as the proportion of the analysis area in various density classes.

As described in the Interagency Grizzly Bear Committee (IGBC) Motorized Access Management report (1994, 1998) and referenced in the NCDE Conservation Strategy chapter 3, the moving window analysis should be used for calculating the open motorized route and total motorized route densities by BMU subunit in the PCA. Moving window processes are used to create two access route density maps: 1) open motorized access (open roads and open motorized trails); and 2) total motorized access (open and closed motorized roads and motorized trails). The output for the analysis area is provided in percentages of one-mile-increment route-density classes. Traditionally, in linear average density we might have only been able to state that analysis area 'B' has 1.0 miles of total roads per square mile. In contrast, the main benefit from the moving window density analysis is the spatial display or map of the access route density by one-mile classes. The user can see where the density is relatively high or low within the analysis area, rather than just the average density over the entire area. Instead of knowing that analysis area 'B' had 1.0 mile/sq mile, we would know that 33% of the area had greater than 3.0 mile/sq mile and 67% had 0.0 mile/sq mile density, and more importantly, we can see where that high density occurs within the analysis area relative to secure core.

Secure core is made up of areas that do not have motorized access. Referred to as Core Areas in the IGBC Motorized Access Management report (1994, 1998), these areas are defined as being >0.31 miles (500 meters) from any open road, motorized road, or trail. Per IGBC direction, core areas are to include seasonal habitats represented in proportion to that of the analysis area. And once established, core areas are to remain in place for at least ten years. The South Fork Grizzly Bear Study defined secure habitat as polygons greater than 2,000 acres (3 mi^2), all farther than a mile from any road or trail. The NCDE Conservation Strategy defines secure core as areas more than 500m (0.31 miles) from open or gated wheeled motorized access routes, at least 2,500 acres (3.9 mi^2) in size, and in place for at least 10 years.

For the purposes of this protocol paper, the standards, prodecures, and analyses will follow those outlined in the NCDE Conservation Strategy for OMRD, TMRD, secure core in the PCA; and linear density for Zone 1 and the Salish and Ninemile demographic connectivity areas (DCA).

Analysis Components

GIS Software

Raster GIS software packages generally include some sort of moving window program. This program systematically moves throughout a whole file, analyzing each pixel based upon the surrounding pixels (= window). For instance, a 3x3 window would analyze 3 rows by 3 columns of pixels, or 9 pixels, at one time. The center pixel would be the analysis pixel and would be assigned a new value based upon the class values of the 9 window pixels. The road density analysis utilizes a sum, or count, analysis of the window. Four GIS software packages have been used to run a moving window analysis: ERDAS, ARC/Info GRID, ArcGIS, and EPPL7. For the NCDE, Arc/Info GRID, and ArcGIS are currently used. However, some software packages do not have the program set with a large enough window size to allow a one square mile moving window. At 50 meter pixels, it is 32 by 32 pixels for one square mile; at 30 meters, it is 54 by 54 pixels.

Due to differences between vector to raster algorithms and in actual moving window calculations, it is strongly recommended that the same software package that was utlized to develop the standards is also utilized for all subsequent analyses. If this is not feasible, then extra steps in the analysis may be needed so that, using the same GIS coverages, the processes and software used to analyze will provide comparable results as the processes and software used to develop the standards.

Analysis Area Layer

The analysis area is the geographical extent for which the road density classes are evaluated. For grizzly bear analyses, the IGBC Motorized Access Management report recommends analysis areas that approximate a female grizzly bear's home range, incorporate all seasonal habitats when possible, and generally follow watershed boundaries or other topographic features. These analysis areas have been delineated for the NCDE and are referred to as Bear Management Unit subunits, or just subunits.

Due to motorized routes sometimes being close enough to affect route densities or secure core within the analysis area(s), the BMU subunit(s) should be buffered out a distance so that they include all routes within the influence zone. For NCDE Conservation Strategy analyses, the distance used is one mile (1609.344 meters), although the actual minimum distance required is 0.7072 miles (1138 meters), or half the distance of the diagonal within the one mile square window. This buffered area should be used for clipping all data as well as the area for the raster moving window analysis. If using a circular moving window, it is the radius of that circular window.

When determining what BMU subunits should be included for a project's analysis, any subunit that will have proposed road management or project activities should be included. Additionally, if the influence zone of the roads or project activities affect an adjacent subunit, that subunit needs to be included in the analysis as well.

While BMU subunits are not needed to directly run the moving window or secure core analyses, they are required to summarize the results of the analyses. Moving window analyses may be used

to look at route density for other purposes than habitat analysis for grizzly bears. In those cases, it may be appropriate to use some other analysis area for summarizing the results.

For linear densities, the actual NCDE Conservation Strategy polygons for Zone 1 and the Salish and Ninemile DCA are used.

Road Layer

All roads in the analysis area should be included. Each road which is applicable to the analysis should be uniquely identified so that the user can develop "what-if" scenarios. While it may be obvious to one person that several roads will always be included in all alternatives, someone else may wish to analyze a situation where some or all of those roads are decomissioned.

Regardless of whether or not each road is uniquely identified, roads should be attributed with their jurisdiction, access management, and, if applicable, type of closure device. Jurisdiction refers to what agency has jurisdiction on the road. This is not always the same as the agency managing the land. For example, where a Montana Department of Natural Resources and Conservation (DNRC) road crosses Forest Service land, the jurisdiction of the road can be State, while the landowner is Forest Service. For the purposes of the motorized access analysis, this would be is a State road. Federal and State highways (primary and secondary only), county roads, private roads, State roads, tribal roads, and Federal roads will also need to be identified.

Road management provides information on whether the road is open yearlong or seasonally, closed (= restricted) yearlong, etc. Seasonally open roads will need to have the dates of closure. If a road is closed for all or part of the year, the type of closure device will be required. Additionally, each road should be attributed for the following characteristics during the grizzly bear's non-denning season (April 1 through November 30 west of the continental divide, and April 16 through November 30 east of the divide).

- Road — All created or evolved roads more than 50 inches wide and >500 feet long, which are or were reasonably and prudently driveable with a conventional passenger car or pickup, unless identified and managed as a trail.

- Open Road — A road that does not have legal restriction or physical obstructions on wheeled motorized vehicle use.

- Restricted Road — A road on which wheeled motorized vehicle use is legally restricted seasonally or yearlong. The road requires a physical obstruction (gate, berm, jersey barrier, etc.). As indicated above, restricted roads will need two attributes: duration of restriction/obstruction and type of closure device. For duration of restriction/obstruction, assign yearlong or seasonal. If seasonal, include dates of restriction. For closure device, provide the type, such as gate, berm, barrier, rock, natural vegetation, etc.

- Historical (Decommissioned) Road — Sometimes referred to as a reclaimed or obliterated road, a historical road has been treated in such a manner so as to no

longer function as a road, and the road is no longer considered part of the agency's road system. This can be accomplished through one or a combination of means, including: recontouring to original slope; placement of logging, road, or forest debris; planting or shrubs or trees, etc. Culverts and bridges may or may not have been removed. The road needs to be impassable to all wheeled motorzied vehicles in order to be excluded from TMRD calculations.

Trail Layer

Each trail should be attributed with the following characteristic during the non-denning season.

Trail — All created or evolved access routes that do not qualify as a "road". They are not reasonably and prudently driveable with a conventional passenger car or pickup. Generally, these routes are maintained and inventoried as part of the trail system.

Open Motorized Trail — A trail without legal restriction or physical obstruction, open for motorized use by wheeled motorized vehicles that are less than 50 inches wide. For the purposes of these analyses, a trail is considered to be open if it is open yearlong or seasonally during during the grizzly's non-denning season. Trails that are used by 4-wheelers and motorized trail bikes are examples of this type of access route.

Non-Motorized Trail — Any trail that does not have legal motorized use during the grizzly's non-denning season.

Lake Layer

For the NCDE, if the analysis area contains all or a portion of any large lake (≥320 acres, (0.5 mi^2), the lake acreage will need to be subtracted from the analysis acres. The subtraction occurs after the moving window procedure has been completed. Either within or 1 mile from the NCDE Primary Conservation Area (PCA) boundary, the following is a list of large lakes: Flathead, Upper Stillwater, Whitefish, Echo, Swan, Holland, Lindbergh, Gray Wolf, and Big Salmon Lakes, Lake Blaine, and Hungry Horse Reservoir (Flathead National Forest); Duck and Lower Saint Mary Lake (Blackfeet Indian Reservatuion); Dickey Lake (Fortine Ranger District); Kicking Horse Reservoir (Flathead Indian Reservation); Waterton, Upper Kintla, Kintla, Bowman, Quartz, Logging, Lower McDonald, Harrison, Saint Mary, Two Medicine, and Lower Two Medicine Lakes, and Lake Sherburne (Glacier National Park); Bynum, Eureka, Farmers, Gibson, Swift, and Nilan Reservoirs (Rocky Mtn Front Ranger District).

Large lakes are not considered as grizzly bear habitat, and therefore these large bodies of water should not be considered when calculating motorized access densities or secure core percentages. The 320 acre (1/2 square mile) figure was agreed to by Tom Wittinger (Flathead NF Forest Wildlife Biologist), Nancy Warren (Flathead NF Wildlife Biologist), and Kathy Ake (Flathead NF GIS Specialist) in 1994, and has been used for all IGBC motorized access analyses since 1994.

Land Ownership Layer

This layer is required for projects occurring within the NCDE. Direction from the US FWS states that roads within small private land holdings are not to be considered in calculating the motorized access densities or secure core percentages. Small-tract private lands are treated just like the large lakes, by subtracting from the analysis acres before calculating the percent road density. The subtraction occurs after the moving window procedure has been completed. Originally, Plum Creek Timber Company (now Weyerhaeuser) lands were not considered small-tract private lands. However since the Montana Legacy Project, in which most of these lands were purchased and transferred to public ownership through a cooperative effort, the acreage of Weyerhaeuser lands in the NCDE have dramatically decreased. For the Conservation Strategy, Weyerhaeuser lands will be considered small-tract private lands.

GIS Processes

This section provides a description of the processes and not the actual GIS programs and steps. Nor does the section specify the requirements, such as window size, for motorized route access and secure core analyses in the NCDE Conservation Strategy.

Moving Window Road Density Analysis

The analysis entails having a 1 square mile window "move" across the entire rasterized road/trail file. For a 1 square mile window, it is a 32x32 window for 50 meter cells, and a 54x54 window for 30 meter cells. For a 'circular' 1 square mile window, it is a radius of 18 of the 50 meter cells and 31 of the 30 meter cells. If a 1 square kilometer (metric) window is required, it is a 20x20 window for 50 meter cells, and a 33x33 window for 30 meter cells. A circular 1 square kilometer window has a radius of 11 of the 50 meter cells or 19 of the 30 meter cells. The center cell of the window is assigned the sum total of road and trail cells that fall within the window. Starting with the first cell in the upper left corner (northwest), the program counts the total number of road and trail cells within the square mile window and assigns the value to the center cell. Then the window moves over to the next cell, counts the road and trail cells within its window and assigns the value to that center cell. This process repeats itself until the entire file has been completed. Since the moving window uses a summation of the GIS values for each cell, the input GIS file for the actual moving window step needs to have value '1' for all roads and trails to be counted and value '0' for cells that do not represent roads and trails. A 'nodata' or null cell within the analysis area will not suffice; those cells need to be a value '0'.

The output from the moving window program is a file where each cell represents the number of road/trail cells within its surrounding window. The next step is to recode the sum total values into one mile (or one kilometer) increments. To equate the sum totals to the number of cells for route density ranges, each mi/sq mi value is divided by the miles/cell value. This is based upon a 50 meter pixel equaling 0.03107 miles and a 30 meter pixel equaling 0.018642 miles. Using a 50 meter pixel, for the 0.5 mi/sq mi break, divide 0.5 mi/sq mi by 0.03107 mi/pixel, and the number of pixels is 16. Thus, if the sum total value is between 1 and 16, the density is 0.1 to 0.5 miles per

square mile. Table 1 is a breakdown for 50 meter and 30 meter pixel sizes for both English (miles) and metric (kilometer) windows. The number of cells was rounded to the nearest whole number.

Table 1. Breakdown of Road Density Classes for Various Window and Cell Sizes.

Route Density Class Range	Number of cells for 1 MILE^2		Number of cells for 1 KM^2	
	At 30 meters	At 50 meters	At 30 meters	At 50 meters
0.0	0	0	0	0
0.1– 0.5	1–27	1–16	1–17	1–10
0.6 – 1.0	28–54	17–32	18–33	11–20
1.1 – 1.5	55–80	33–48	34–50	21–30
1.6 – 2.0	81–107	49–64	51–67	31–40
2.1 – 2.5	108–134	65–80	68–83	41–50
2.6 – 3.0	135–161	81–97	84–100	51–60
>3.0	≥162	≥98	≥101	≥61

A 50 or 30 meter pixel size is not mandatory, although these are commonly used cell sizes. The smaller the cell size, the better the file approximates the actual width of a road, down to about a 10 meter file (approximately 32.8 feet). Note that changing a GIS layer to a smaller pixel size does not necessarily mean that the layer is more accurate. Accuracy level depends more upon the resolution and accuracy of the original map used to create the GIS layer.

Secure Core Analysis

The analysis involves buffering specific roads and trails by 500 meters. While the total road and motorized trail density moving window analysis can result in a 0.0 route density category, this is not the same as secure areas that are greater than 500 meters (0.31 miles) from a motorized route. The user needs to execute a buffering routine to accurately map the areas of secure core.

Summaries and Displays

For each BMU subunit it is useful to produce a summary table listing the following:

- percentage of each route density class for open route density
- percentage of each route density class for total route density
- percentages of secure core and non-core areas
- miles of roads and trails by their access management class (open yearlong, closed yearlong by gate, etc.)

At a minimum, the summary table should provide the percentage of cells that are >1.0 mi/sqmi for OMRD, the percentage >2.0 mi/sqmi for TMRD, and the percentage of secure core for each BMU subunit.

The process will also produce three maps of each area anlayzed that will either show the OMRD classes, the TMRD classes, or the secure core areas. Additional information should include the roads and trails by access class management, BMU subunit boundaries, and small-tract private land or large lakes areas, if appropriate.

Cautions

The project window needs to extend at least either half the distance of the diagonal of a square window, or the radius of a circular window, from the actual analysis area. A distance of 1 mile would cover all potential square mile or square kilometer window sizes and 30 or 50 meter cell sizes. If the analysis boundary line follows a ridge, then the project window needs to extend another mile beyond the ridge line, so that the cells on the boundary of the analysis area can be assigned the correct density value. If the area directly outside the analysis area is cut off, then those cells just within the analysis area will not factor in any road or trail cells that fall within 1 mile of the analysis area and influence the density values. This applies to the secure core analysis as well.

Additionally, all maps and outputs for the route density and security analyses should only display to the extent of 1 mile past the analysis area. Nothing should be displayed beyond 1 mile from the analysis area because the user may or may not have the correct and/or updated information beyond their area of interest.

As different grizzly bear ecosystems develop standards for access management, it is very possible that slightly different steps, order of processes, cell sizes, window shapes, and determinations of roads or trails required will be developed. It is strongly recommended that the processes, parameters, and software package used to determine the standards are also used for running the analyses to assess compliance. For example, if the standard was developed using ERDAS software and their rasterization algorithm, measuring compliance using ARC/Info's rasterization algorithm would be inappropriate. Using ARC/Info results in approximately 18% more "road" cells than the same vector coverage rasterized in ERDAS. If differences are unavoidable, then extra steps in the analysis may be needed so that, using the same GIS coverages, the processes and software used to analyze compliance will provide the same results as the processes and software used to develop the standards.

Linear Density Analysis

Because the grizzly bear habitat management objectives for the demographic connectivity areas and Zone 1 are different from the PCA, a different method for analyzing motorized roads/routes will be used. Instead of a moving window analysis, the linear density of roads or routes open to public motorized use during the non-denning season is calculated for those areas. Linear density is calculated by simply dividing the miles of roads (or roads and motorized trails) by the square miles of the analysis area. As a reminder, linear road density values reveal average conditions across an anlysis area, but they do not map out where the density is relatively high or low. Because of this, the output is a number not a map.

General Outline of the Procedures

I. Open Motorized Route Density

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails into one layer
d) Rasterize vector dataset
e) Run the moving window
f) Recode raw density value to road density classes
g) Vectorize the road density raster layer
h) If appropriate or required, subtract out acreages for large lakes and small private
i) Summarize the percentage of each open route density class within the analysis areas
j) Create required map(s)

II. Total Motorized Route Density

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails into one layer
d) Rasterize vector dataset
e) Run the moving window
f) Recode raw density value to road density classes
g) Vectorize the road density raster layer
h) If appropriate or required, subtract out acreages for large lakes and small private
i) Summarize the percentage of each total route density class within the analysis areas
j) Create required map(s)

III. Secure Core Analysis

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails into one layer
d) Buffer combined roads/trails 500 meters
e) Recode output from buffer routine
f) If appropriate or required, subtract out acreages for large lakes and small private
g) Summarize the percentage of secure core areas within the analysis areas
h) Create required map(s)

IV. Linear Route Density Analysis

a) Select the required land polygons for the area to be analyzed
b) Select required arcs from road layer
c) Determine the number of road miles, or appropriate unit, on the lands to be analyzed
d) Select required arcs from trail layer
e) Determine the number of trail miles, or appropriate unit, on the lands to be analyzed
f) Divide the road/trail miles, or appropriate unit, by the square miles, or appropriate unit of land

NCDE Conservation Strategy Analyses

There are two sections. The first section applies to all Federal, Tribal and State land agencies within the NCDE Conservation Strategy's Primary Conservation Area (PCA). The second section applies to all Federal lands within the NCDE Zone 1 and Zone 1 Demographic Connectivity Areas (DCA).

Primary Conservation Area (PCA)

Motorized access route density and security analyses will be applied to BMU subunits. These areas are meant to approximate a grizzly bear female home range, incorporate all seasonal habitats if possible, and generally follow watershed boundaries or other topographic features. BMU subunits have been delineated for the entire NCDE by biologists from USFS, USFWS, NPS, DNRC, MFWP, CS&KT, and Blackfeet Nation.

Within the PCA, it was decided to keep the same process that was utlitized when the grizzly bear was listed. From a historical perspective for both NCDE and Flathead N.F. Amendment 19, the access standards were developed using EPPL7 software, 30 and 50 meter pixel sizes, a square 1 square mile window, breakpoints between classes as listed above in Table 1, and (due to software limitations) a 32x32 window size. The area was the South Fork Grizzly Bear Study Area and radio-collared female grizzly bears were used for telemetry points. The recommended NCDE procedures have two steps added to the process to account for differences between ARC/Info's rasterization algorithm and EPPL7's algorithm as well as any other differences in cell and/or window size. The GRID THIN function is used to mitigate for most of the rasterization algorithm differences. A regression equation is applied after the moving window step to mitigate for the remaining differences. The regression equation was developed by comparing results from EPPL7 and ARC/Info analyses using the same road and analysis area files.

Application Rules

The following provides the specifics for calculating open and total motorzied route density as well as secure core.

- Open Motorized Route Density (OMRD) includes: all Federal, State, and Tribal roads and motorized trails that are open to public wheeled use for any part of the non-denning season, along with motorized routes that are only closed by signage or map. Signs or maps are not considered an effective closure device by the Interagency Grizzly Bear Committee (IGBC, 1998) and therefore roads that are only signed as closed are included in OMRD calculations. While highways, county, city, or private roads are open to public wheeled use, these routes are not included in calculations of OMRD.

- Total Motorized Route Density (TMRD) includes: all Federal, State, and Tribal roads and motorized trails, whether they are open or closed to wheeled public access. Highways, county, city, or private roads are not included in calculations of TMRD.
- Secure core is defined as:

- >500 meters (0.31 miles) from an open motorized route or a road closed yearlong by a gate, or from a helicopter flight line meeting the definition of "recurring" use. All Federal, State, and Tribal open motorized routes included in the OMRD calculations are buffered this distance, as are all Federal, State, and Tribal routes closed by gates. All primary and secondary highways, county, city and private roads are included and buffered.
- ≥2,500 acres (3.9 mi^2) in size.

- Acceptable routes in secure core: roads that are restricted with permanent physical barriers (not gates), decommissioned or obliterated roads, and/or non-motorized trails.

- Activities that are allowed in secure core do not require road construction, road reconstruction, opening a restricted road, or recurring low-elevation helicopter flights. Aircraft used in emergency firefighting are allowed in secure core. Non-wheeled, over-snow motorized use (i.e., snowmobiles) are allowed. Activities from projects that remain within the limits established for temporary increases in OMRD and TMRD or temporary decreases in secure core are allowed.

- Motorized Routes in the Database or Layer include: All routes, regardless of ownership or jurisdiction, having motorized use or the potential for motorized use. These include motorized trails; highways; and county/city, Federal, State, Tribal, corporate and private roads.

- Lands in the Database or Layer include: All lands are included in database. However, after the moving window or buffering routine is completed, large lakes (≥ 320 acres (0.5 mi^2)) and private lands are excluded from calculations of secure core, OMRD, or TMRD.

- Season Definitions. Denning season on the west side of the continental divide is from 1 December through 31 March. Denning season on the east side of the continental divide is from 1 December through 15 April. Wheeled motorized access standards do not apply during the denning season and do apply during the non-denning season. Conversely, the non-denning season for west of the continental divide would be April 1 through November 30; for east of the continental divide April 16 through November 30.

- Motorized administrative use is permitted as either 6 trips (3 round trips) per week OR a single 30-day unlimited use period during the non-denning season.

- Individual projects on Federal lands will be analyzed if the project requires construction of new roads, reconstruction or opening a restricted road, use of a restricted road above administrative levels allowed, or recurring helicopter flights at low elevations (< 500m). Any project meeting this definition will require analysis to determine the OMRD, TMRD, and secure core for the route management situation during the project, i.e. when project activities are occurring and temporary or haul routes are being utilized. All temporary and haul routes used for the project will be labeled as 'OPEN yearlong' for the analysis of the during project activities. By definition, a temporary road is necessary for emergency operations, or authorized by contract, permit, lease, or other written authorization that is not a current existing road and that is not included in a transportation atlas. In the NCDE primary conservation area,

temporary roads will meet the definition of impassable when they are no longer needed for the project.

- The baseline for OMRD and TMRD may be temporarily exceeded and secure core may be temporarily reduced to accommodate projects if the 10-year running averages for these parameters in the BMU subunit do not exceed the following limits:
  - 5% temporary increase in OMRD baseline plus 5%
  - 3% temporary increase in TMRD baseline plus 3%
  - 2% temporary decrease for secure core (secure core baseline minus 2%)

- Permanent changes in OMRD, TMRD, and secure core may occur due to:
  - updated/improved data on a motorized route resulting in changed calculations without actual change on the ground;
  - technology or projections changed, resulting in changed calculations without actual change on the ground (e.g., a switch from NAD27 to NAD83);
  - a road closure location is moved a short distance to a better location (e.g., to the nearest intersection or turnout) to allow a turn-around providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
  - land with or without motorized routes is exchanged, acquired, purchased, or sold, which results in a change in the denominator used in calculations;
  - a change in a motorized route is necessary to comply with Federal laws (e.g., Americans with Disabilities Act);
  - a change in a motorized route is necessary to address grizzly bear-human conflicts, human safety concerns, or resource damage concerns;
  - an adjacent, non-federal landowner makes changes to their motorized access management that results in a decrease in the percentage of secure core or an increase in motorized route densities on adjacent Federal lands.

Python Script Requirements

To insure consistency across the NCDE, a Python script available through ArcToolBox will be used. Each agency unit will have a "master" grid to be used in the moving window routine. Through investigation, it has been discovered that the output values will vary even if slightly different extents are used for the moving window; therefore, a single "master" grid will be created for each agency's unit. The script follows the steps from the General Outline of the Procedures in the GIS Processes section above.

The remap table (ArcGIS terminology) used by the Python script for converting the actual count of "road" cells in the one mile window to mile/square mile density classes has a specfic format, as shown in Table 2. The remap table needs to be a text file with a '.txt' extension, and the specific values as shown in the last column below.

Table 2. Remap table for converting raw density values to mile/square mile classes.

Mile/Square Mile Density Class	# of "route" pixels	Output GRID Value	Remap Table
0.0 mile/squre mile	0	1	0 0:1
0.1 to 1.0 mile/square mile	>0 – ≤54	2	0 54:2
1.1 to 2.0 mile/square mile	>54 – ≤107	3	54 107:3
>2.0 mile/square mile	>107 – ≤5000	4	107 5000:4

The Python script requires specific values for road management, motorzied trails, ownership, land and large lakes. Tables 3, 4, and 5 provide that information. Refer to narratives above for additional information about what qualifies routes for these road management description values.

Table 3. Road management descriptions and attribute values used in OMRD and TMRD.

Road Management Description	Specific Value in Attribute for Script	Road Used in Analysis		
		OMRD	TMRD	CORE
Open yearlong roads, no restriction	OPEN yearlong	X	X	X
Open seasonally roads, has seasonal restriction	OPEN seasonally	X	X	X
Closed yearlong by sign closure	CLOSED yrlng sign	X	X	X
Closed yearlong by gate closure, but with high administrative use[1]	CLOSED yrlng ADH	X	X	X
Closed yearlong by gate closure	CLOSED yrlng gate		X	X
Closed yearlong by physical barrier, but should be closed by gate[2]	CLOSED yrlng BNC		X	X
Closed yearlong by physical barrier[3]	CLOSED yrlng barrier		X	
Closed yearlong and naturally revegetated, but should be closed by gate[4]	CLOSED yrlng VEGNC		X	X
Primary or secondary Federal/State highways	hwys, cnty/city road			X
County or city roads	hwys, cnty/city road			X
Small-tract private roads or Federal special use permitted roads[5]	small PVT roads			X

Road Management Description	Specific Value in Attribute for Script	Road Used in Analysis		
		OMRD	TMRD	CORE
Closed yearlong and is either naturally revegetated, entrance has been obliterated, or bridge/large <4ft culvert removed. Essentially, the road is completely impassable.[6]	CLOSED yrlng impass			
Decommissioned or historical roads[7]	historical roads			

[1] ADH – closed by gate but receives high administrative use (i.e. administrative compounds on Flathead NF).

[2] BNC – closed by berm, but to be buffered for secure core. Barrier installed due to frequent damage to gate.

[3] barrier – refers to berms, rocks, jersey barriers, etc. Does not include roads closed by a bridge or large (<4ft) culvert being removed, obliterated road entrances, and live vegetation. Any of these last three types make the road impassable (no standard vehicle or two-wheel motorized vehicle can pass). These roads are not included in any analyses.

[4] VEGNC – refers to roads currently closed by live vegetation, but planning or project documents indicate that the road is closed by gate. For the purposes of TOTAL route density and secure core, the road is to be included.

[5] small PVT roads – typcially the permitee of a Special Use permitted road does not have road management restrictions. As a result, the road could be open or closed according to the permittee, therefore the road is classified as "small PVT roads" for the analyses.

[6] Impassable road – has been treated in such a manner that the road is blocked and there is little resource risk if road maintenance is not performed on a regular basis (self-maintaining). These roads are not counted in the total motorized route density as long as the road (generally the first 50 to 300 feet) has been treated to make it inaccessible to all wheeled motorized vehicles (passenger car, truck, 4WD vehicle, ATV, motorcycle, etc.) during the non-denning season. Roads may become impassable as a result of a variety of means, including but not limited to one or more of the following: natural vegetation growth, road entrance obliteration, scarified ground, fallen trees, boulders, bridge or large >4 ft culvert removal, etc. Impassable roads may remain on the inventoried road system if use of the road is anticipated at some point in the future. The caveat is: if an impassable road is bladed open (i.e. for fire suppression), or if the bridge/culvert is repaired, the road will be included in analyses based upon the type of closure device. If the new closure device is a physical barrier (berm, rock, etc.), the road will be included in TMRD calculations. If the new closure device is a gate, the road will be included in TMRD calculations and it will be buffered in secure core analysis. If no closure device is installed (i.e. the road is open), the route will be included in both OMRD and TMRD calculations and will be buffered in secure core analysis. If the road is made impassable again after the project is completed, it will not be included in OMRD, TMRD, or buffered for secure core

[7] Decommissioned or historical road - is no longer on the system, are not included in the analyses,

i.e. they do not count in OMRD or TMRD calculations, nor are they buffered in the secure core analysis.

Table 4. Motorized route attributes.

Motorized Route Description	Specific Value in Attribute for Script	Route Used in Analysis		
		OMRD	TMRD	CORE
Roads or trails legally open to motorized use anytime during the non-denning season.	M	X	X	X
Non-motorized routes	<blank>			

The trail or road is considered motorized if the route is legally open to two-wheeled motorized traffic (pick-up truck, ATV, motorcycles, etc.). These routes can either be included in the road dataset or kept separately. Either way, a specific text attribute as indicated above is required.

Table 5. Attributes for ownership, small private lands, and large lakes.

Land Ownership and Lake Descriptions	Specific Value in Attribute for Script
Federal, State, and tribal lands	FED STATE TRIBAL
Large lakes, >320 acres (0.5 mi^2)	large lakes
Small-tract private lands	small PVT lands

While State and Tribal lands do not have OMRD, TMRD, and secure core standards, their lands are included in the analyses run by Federal land agencies. For tribal lands, only those lands designated as "tribal" and open for public use are included. Tribal allotments (land owned by tribal members) and tribal fee lands (owned or leased to private individuals) are to be considered "small PVT lands" for the purposes of the anlsyses. For private lands, these are small-tract, corporate, or Non-Governmental Organization (NGO) lands.

Typically, agencies keep ownership and lakes in separate GIS datasets. For the purposes of the Python script, they need to be combined into one layer and attributed as indicated.

Calculating Percentages

Once the Python script has been completed, the output files will need to be summarized by each BMU subunit in the analysis area. There is a Python script that may be used. If the script is not used, the following GIS steps should be followed:

1. Combine the BMU subunit layer with each of the 3 outputs: OMRD, TMRD, and secure core.
2. Re-calculate the acres in each of these 3 combined layers.
3. Execute a frequency analysis summarizing by the subunit name and IGBC description field by the recalculated acres field.
4. Export the 3 outputs from the frequency into a spreadsheet.

Examples of the actual calculations for OMRD, TMRD, and secure core in the spreadsheet are shown below. The percentages should be always be reported as whole percentages without decimal places. Decimal places may be veiwed when determining how close the percentage value is to being rounded up or down. It should be noted that there may be values for large lakes and private land, but those acres are not included in the total of acres for the denominator.

OMRD for Buck Holland subunit is calculated by adding the values for the 1.1–2.0 mi/sqmi and 2.0+ mi/sqmi classes, and dividing by the sum of the four density classes. Using the values, the equation would be:

$$\frac{(4935.49 + 1587.95)}{(14951.44 + 6012.61 + 4935.49 + 1587.95)} = 0.2373$$

In an Excel spreadsheet, the formula would look like:
=SUM(E35:E36)/SUM(E33:E36)

Table 6. Open Motorzied Route Density for Buck Holland subunit.

$ID	freq.	Subunit Name	IGBC Description	acres	percent	%
27	5	Buck Holland	0.0 mi/sqmi	14,951.44	23.73%	24%
28	5	Buck Holland	0.1–1.0 mi/sqmi	6,012.61		
29	9	Buck Holland	1.1–2.0 mi/sqmi	4,935.49		
30	9	Buck Holland	2.0+ mi/sqmi	1,587.95		
31	3	Buck Holland	large lakes	414.04		
32	28	Buck Holland	small PVT	7,984.47		

TMRD for Buck Holland subunit is calculated by dividing the 2.0+ mi/mi^2 class by the sum of the four density classes. Using the values, the equation would be:

$$\frac{11230.00}{(9689.70 + 3170.95 + 3396.83 + 11230.00)} = 0.4085$$

In an Excel, spreadsheet the formula would look like: =E36/SUM(E33:E36)

Table 7. Total Motorzied Route Density for Buck Holland subunit.

$ID	freq.	Subunit Name	IGBC Description	acres	percent	%
27	5	Buck Holland	0.0 mi/sqmi	9,689.70	46.85%	41%
28	5	Buck Holland	0.1–1.0 mi/sqmi	3,170.95		
29	8	Buck Holland	1.1–2.0 mi/sqmi	3,396.83		
30	7	Buck Holland	2.0+ mi/sqmi	11,230.00		
31	3	Buck Holland	large lakes	414.04		
32	28	Buck Holland	small PVT	7,984.47		

Secure core for Buck Holland subunit is calculated by dividing the "CORE >=2,500 acres" by the sum of the "CORE >=2,500 acres", "gt 500m from rd/tr", and "w/in 500m of rd/tr classe"s. Using the values, the equation would be:

$$\frac{13038.53}{(13038.53 + 428.87 + 14020.09)} = 0.4743$$

In an Excel spreadsheet, the formula would look like: =E28/SUM(E28:E30)

Table 8. Secure Core for Buck Holland subunit.

$ID	freq.	Subunit Name	IGBC Description	acres	percent	%
21	1	Buck Holland	CORE >=250 acres	13,038.53	47.43%	47%
22	8	Buck Holland	gt 500m from rd/tr	428.87		
23	7	Buck Holland	w/in 500m of rd/tr	14,020.09		
24	1	Buck Holland	large lakes	414.04		
25	8	Buck Holland	small PVT	7,984.47		

For project analysis and tracking, each agency or agency's unit will use a spreadsheet to calculate the temporary change for the affected subunit(s). As an example, using the Buck Holland subunit, a project was determined to occur for 5 years during 2020 through 2024. The baseline was last reported at 24% for OMRD, 41% for TMRD, and 47% for secure core. In the course of analyzing the existing road system for the project, several roads were re-aligned in the database to match the on-the-ground conditions, which resulted in the baseline being updated to 24% OMRD, 42% TMRD, and 47% secure core. During the project, OMRD would be at 34%, an increase of 10%; TMRD would be at 49%, an increase of 7% from the updated baseline; and secure core would be at 43%, a decrease of 4%. The spreadsheets would show this as depicted below. The upper spreadsheet example has the actual increases/decreases from the baseline values. OMRD was increased by 10%, so the value of 10 is shown for the years the project is active, 2020 through 2024. TMRD was increased by 7%, so the value of 7 is shown for the years the project is active,

2020 through 2024. Secure core decreased by 4%, so a value of 4 is shown for when the project is active. The orange highlighted cells are when the project is active. The lower spreadsheet example averages the increases over a 10-year running average. For TMRD, for example, the 10-year period of 2018 through 2027 would calculate as (0 + 0 + 7 + 7 + 7 + 7 + 7 + 0 + 0 + 0) / 10, or 3.5. This is rounded to 4, as percentages are rounded to whole numbers. For this example of a project lasting five years (orange shading in the upper spreasdsheet example), TMRD would be out of compliance for 3 of the 10-year running averages (pink shading in the lower spreadsheet example).

Table 9. Sample spreadsheets for OMRD, TMRD, and Secure Core for a hypothetical 5-year project.

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
OMRD	0	0	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0
TMRD	0	0	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0
CORE	0	0	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0

	Periods for 10-year running averages							
	1-10	**2-11**	**3-12**	**4-13**	**5-14**	**6-15**	**7-16**	**8-17**
OMRD	5	5	5	4	3	2	1	0
TMRD	**4**	**4**	**4**	3	2	1	1	0
CORE	2	2	2	2	1	1	0	0

However, if the project was active for 4 years instead of 5, it would be in compliance with the 3% allowable increase for TMRD as shown below.

Table 10. Sample spreadsheets for OMRD, TMRD and Secure Core for a hypothetical 4-year project.

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
OMRD	0	0	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0
TMRD	0	0	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0
CORE	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0

	Periods for 10-year running averages							
	1-10	**2-11**	**3-12**	**4-13**	**5-14**	**6-15**	**7-16**	**8-17**
OMRD	4	4	4	3	2	1	0	0
TMRD	3	3	3	2	1	1	0	0
CORE	2	2	2	1	1	0	0	0

The lengh of the project, timing of active units, or winter logging are just a few tools that could be used to bring a project into consistency with the maximum allowed 5% increase in OMRD, 3% increase in TMRD, and 2% decrease in secure core calculated using the 10-year running average.

Federal Lands Within Zone 1

In Zone 1, including the Ninemile and Salish Demographic Connectivity Areas, route density will be calculated using a linear (or average) density, i.e. X miles of route divided by X square miles, not with a moving window analysis.

Application Rules

- All routes that are open to public motorized vehicle use are to be included in calculations. This includes highways, and county, city and private roads, as well as Federal, State and Tribal roads that are open to the public during some part of the non-denning season.
- All motorized trails are included in calculations, depending upon the individual forest or BLM district (see forest Land Mangement Resource Plans, or BLM Resource Management Plans).
- All lands are included in the database. However, for this calculation, only those lands that the agency is responsible for are used, e.g. the Kootenai NF would only use NFS lands within their jurisdiction, BLM would only use BLM lands.
- Analysis units are the Ninemile DCA, Salish DCA, and Zone 1 outside of the DCAs for each forest and BLM district. As an example, the Salish DCA is partly on the Kootenai NF and partly on the Flathead NF. Each forest will calculate the linear density for those NFS lands on their forest's portion of the Salish DCA. As another example, Zone 1 outside the DCAs is found on across several forests, but will be calculated for each forest only on those NFS lands within their forest's jurisdiction.

Calculating Percentages

A Python script has not been created to do this relatively simple analysis. There are several ways to accomplish this analysis, and there is not a right or wrong way as long as the user obtains the following information for the particular analysis unit/area (see Application Rules):

- Miles of roads open to motorized wheeled use by the public on National Forest System (NFS) lands, or BLM lands if this is for that agency.
- Miles of motorized trails on NFS lands, or BLM lands if this is for that agency
- Square miles of NFS lands, or BLM lands if this is for that agency.

Once the information is gathered, the mi/sqmi is calculated by adding the miles of roads and trails and dividing this total by the square miles. In an Excel spreadsheet the formula would be, for example:

=SUM(K8:L8)/M8 or (216.872 + 13.849) / 150 = 1.5

Table 11. Linear Route Density for Demographic Connectivity Areas

Unit	Open to Public Roads Miles	Motorized Trail Miles	NFS land sq.miles	Roads/Trails mi/sqmi
Salish DCA (Flathead NF)	216.872	13.849	150	1.5
Salish DCA (Kootenai NF)	870.320	none	433	2.0
Ninemile DCA (Lolo NF)	754.196	36.351	399	2.0

Literature Cited

Interagency Grizzly Bear Committee. 1994. Task Force Report, Grizzly Bear/Motorized Access Management. 6pp. (Final Approved by IGBC July 21, 1994)

Interagency Grizzly Bear Committee. 1998. Task Force Report, Grizzly Bear/Motorized Access Management. 6pp. (Revision Approved by IGBC July 29, 1998)

APPENDIX 7

Comparison Between 2011 NCDE Conservation Strategy Secure Core Levels and Security CORE Levels in Each Bear Management Subunit

BMU	Subunit Name	Principal Agency	2011 Cons. Strategy Secure Core	2011 Security CORE
BATM	Badger	LCNF-Rocky Mtn Front RD	94	94
BATM	Heart Butte	LCNF-Rocky Mtn Front RD	81	81
BATM	Two Medicine	LCNF-Rocky Mtn Front RD	87	87
BGSM	Albino Pendant	FNF-Spotted Bear RD	100	88
BGSM	Big Salmon Holbrook	FNF-Spotted Bear RD	100	87
BGSM	Black Bear Mud	FNF-Spotted Bear RD	100	84
BGSM	Brushy Park	FNF-Spotted Bear RD	100	84
BGSM	Buck Holland	FNF-Swan Lake RD	49	40
BGSM	Burnt Bartlett	FNF-Spotted Bear RD	100	92
BGSM	Hungry Creek	FNF-Spotted Bear RD	100	88
BGSM	Little Salmon Creek	FNF-Spotted Bear RD	100	98
BGSM	Meadow Smith	FNF-Swan Lake RD	41	41
BGSM	White River	FNF, Spotted Bear RD	100	74
BITE	Birch	LCNF-Rocky Mtn Front RD	93	93
BITE	Teton	LCNF-Rocky Mtn Front RD	75	75
BNKR	Big Bill Shelf	FNF-Spotted Bear RD	87	80
BNKR	Bunker Creek	FNF-Spotted Bear RD	92	92
BNKR	Goat Creek	FNF-SLRD & MT DNRC	42	39
BNKR	Gorge Creek	FNF-Spotted Bear RD	100	90
BNKR	Harrison Mid	FNF, - Spotted Bear RD	99	95

BNKR	Jungle Addition	FNF-Spotted Bear RD	68	68
BNKR	Lion Creek	FNF-SLRD & MT DNRC	51	41
BNKR	South Fork Lost Soup	FNF-SLRD & MT DNRC	40	40
BNKR	Spotted Bear Mtn	FNF-Spotted Bear RD	68	68
CODV	Pentagon	FNF-Spotted Bear RD	100	94
CODV	Silvertip Wall	FNF-Spotted Bear RD	100	97
CODV	Strawberry Creek	FNF-Spotted Bear RD	100	100
CODV	Trilobite Peak	FNF-Spotted Bear RD	100	100
DELK	Falls Creek	LCNF-Rocky Mtn Front RD	85	85
DELK	Scapegoat	LCNF-Rocky Mtn Front RD	83	83
HGHS	Coram Lake Five	FNF-Hungry Horse RD	18	14
HGHS	Doris Lost Johnny	FNF-Hungry Horse RD	36	36
HGHS	Emery Firefighter	FNF-Hungry Horse RD	53	53
HGHS	Peters Ridge	FNF-HHRD & SLRD	34	34
HGHS	Riverside Paint	FNF-Hungry Horse RD	73	72
HGHS	Wounded Buck Clayton	FNF-Hungry Horse RD	65	64
LMFF	Dickey Java	FNF-Hungry Horse RD	85	81
LMFF	Lincoln Harrison	Glacier NP	98	90
LMFF	Moccasin Crystal	FNF-Hungry Horse RD	81	81
LMFF	Muir Park	Glacier NP	98	97

BMU	Subunit Name	Principal Agency	Cons. Strategy Secure Core	Current Security CORE
LMFF	Nyack Creek	Glacier NP	100	98
LMFF	Ole Bear	Glacier NP	94	93
LMFF	Pinchot Coal	Glacier NP	99	99
LMFF	Stanton Paola	FNF-Hungry Horse RD	83	81
LNFF	Anaconda Creek	Glacier NP	94	94

LNFF	Apgar Mountains	Glacier NP	81	70
LNFF	Canyon McGinnis	FNF-GVRD & FNF-TLRD	56	51
LNFF	Cedar Teakettle	FNF-Glacier View RD	24	24
LNFF	Dutch Camas	Glacier NP	93	86
LNFF	Lake McDonald	Glacier NP	85	66
LNFF	Lower Big Creek	FNF-Glacier View RD	66	66
LNFF	Upper McDonald Creek	Glacier NP	90	76
LNFF	Werner Creek	FNF-Glacier View RD	42	42
MSRG	Beaver Creek	FNF-Swan Lake RD	66	66
MSRG	Cold Jim	FNF-Swan Lake RD	43	43
MSRG	Crane Mtn	FNF-Swan Lake RD	38	26
MSRG	Crow	Flathead IR	92	92
MSRG	Glacier Loon	FNF-Swan Lake RD	45	41
MSRG	Hemlock Elk	FNF-Swan Lake RD	64	64
MSRG	Piper Creek	FNF-SLRD & MT DNRC	52	52
MSRG	Porcupine Woodward	FNF-SLRD & MT DNRC	15	15
MSRG	Post Creek	Flathead IR	87	87
MSRG	Saint Marys	Flathead IR	94	94
MLFK	Alice Creek	HNF-Lincoln RD	71	70
MLFK	Arrastra Mountain	HNF-Lincoln RD	75	75
MLFK	Monture	LNF-Seeley Lake RD	99	99
MLFK	Mor-Dun	LNF-Seeley Lake RD	78	74
MLFK	N-Scapegt	LNF-Seeley Lake RD	100	94
MLFK	Red Mountain	HNF-Lincoln RD	62	59
MLFK	S-Scapegt	LNF-Seeley Lake RD	79	78
MULK	Krinklehorn	KNF-Fortine RD	75	75
MULK	Therriault	KNF-Fortine RD	72	72
NFSR	Lick Rock	LCNF-Rocky Mtn Front RD	100	91

NFSR	Roule Biggs	LCNF-Rocky Mtn Front RD	100	89
NEGL	Belly River	Glacier NP	99	79
NEGL	Boulder Creek	Glacier NP & Blackfeet IR	76	64
NEGL	Chief Mtn	Glacier NP & Blackfeet IR	53	51
NEGL	Poia Duck	Glacier NP & Blackfeet IR	68	51
NEGL	Upper Saint Mary	Glacier NP	89	68
NEGL	Waterton	Glacier NP	100	84
RTSN	Mission	LNF-Seeley Lk RD & MFWP	33	33
RTSN	Rattlesnake	LNF-Missoula RD	86	85
RTSN	South Fork Jocko	Flathead IR	59	59
SUBW	South Fork Willow	LCNF-Rocky Mtn Front RD	88	85

BMU	Subunit Name	Principal Agency	Cons. Strategy Secure Core	Current Security CORE
SUBW	West Fork Beaver	LCNF-Rocky Mtn Front RD	84	76
SEGL	Divide Mtn	Glacier NP & Blackfeet IR	67	59
SEGL	Midvale	Glacier NP & Blackfeet IR	87	78
SEGL	Spot Mtn	Glacier NP & Blackfeet IR	79	61
STRV	Lazy Creek	MT DNRC	10	5
STRV	Stryker	MT DNRC	50	50
STRV	Upper Whitefish	MT DNRC	54	54
SLVN	Ball Branch	FNF-Spotted Bear RD	84	84
SLVN	Jewel Basin Graves	FNF-Hungry Horse RD	72	65
SLVN	Kah Soldier	FNF-Spotted Bear RD	69	68
SLVN	Logan Dry Park	FNF-HHRD & FNF-SBRD	54	52
SLVN	Lower Twin	FNF-Spotted Bear RD	91	91

SLVN	Noisy Red Owl	FNF-Swan Lake RD	59	52
SLVN	Swan Lake	FNF-Swan Lake RD	46	45
SLVN	Twin Creek	FNF-Spotted Bear RD	100	100
SLVN	Wheeler Quintonkon	FNF-HHRD & FNF-SBRD	66	66
TESR	Deep Creek	LCNF-Rocky Mtn Front RD	73	70
TESR	Pine Butte	LCNF-Rocky Mtn Front RD	71	68
UMFF	Flotilla Capitol	FNF-HHRD & FNF-SBRD	100	99
UMFF	Long Dirtyface	FNF-Hungry Horse RD	100	100
UMFF	Plume Mtn Lodgepole	FNF-HHRD & SBRD	100	97
UMFF	Skyland Challenge	FNF-Hungry Horse RD	63	63
UMFF	Tranquil Geifer	FNF-Hungry Horse RD	90	85
UNFF	Bowman Creek	Glacier NP	93	70
UNFF	Coal & South Coal	FNF-Glacier View RD	72	72
UNFF	Ford Akokala	Glacier NP	93	92
UNFF	Frozen Lake	FNF-Glacier View RD	86	80
UNFF	Hay Creek	FNF-Glacier View RD	55	55
UNFF	Ketchikan	FNF-Glacier View RD	72	68
UNFF	Kintla Creek	Glacier NP	96	86
UNFF	Logging Creek	Glacier NP	94	94
UNFF	Lower Whale	FNF-Glacier View RD	50	49
UNFF	Quartz Creek	Glacier NP	93	86
UNFF	Red Meadow Moose	FNF-Glacier View RD	55	55
UNFF	State Coal Cyclone	FNF-GVRD & MT DNRC	59	59
UNFF	Upper Trail	FNF-Glacier View RD	88	88
UNFF	Upper Whale Shorty	FNF-Glacier View RD	86	86
USFF	Basin Trident	FNF-Spotted Bear RD	100	85
USFF	Gordon Creek	FNF-Spotted Bear RD	100	82

USFF	Jumbo Foolhen	FNF-Spotted Bear RD	100	94
USFF	Swan	LNF-Seeley Lake RD	55	55
USFF	Youngs Creek	FNF-Spotted Bear RD	100	92

	Indicates subunit is ≥50% Federal or Tribal wilderness of all lands within subunit.

The differences between the process under the Conservation Strategy and the current IGBC Motorized Access are listed in the following table.

NCDE Conservation Strategy Process	**Current IGBC Motorized Access Process**
Plum Creek Timber Company roads and lands are treated as "private" roads & lands. After the MT Legacy Project, Plum Creek Timber Company lands are a small percentage of the NCDE.	Plum Creek Timber Company roads and lands were treated like Federal/State lands. Prior to the MT Legacy Project, Plum Creek Timber Company lands were a significant percentage in the NCDE.
Grizzly Bear Management Situation 3 (MS-3) is no longer used post delisting; therefore, these lands are now included in route density calculations.	Grizzly Bear Management Situation 3 (MS-3) lands were excluded from open & total route density calculations.
High-intensity Use (>20 parties/week for at least 25% of the non-denning season) trails are not used, i.e. they are not buffered when calculating Secure Core and do occur in Secure Core.	High-intensity Use (>20 parties/week for at least 25% of the non-denning season) trails were buffered when calculation Security CORE, i.e. high-use trails could not occur in Security CORE.

APPENDIX 8

Detailed Summary of Current BLM Management Plan Direction Relevant to Grizzly Bears in the PCA, Management Zone 1, and 2 for the Butte, Lewistown, and Missoula Field Offices

Butte Field Office Resource Management Plan

The Butte Field Office has 363 mi^2 in Zones 1 and 2 (7.81 mi^2 in the PCA). Management of BLM lands here occurs under the Butte Resource Management Plan 2009. The following management guidelines in the plan are relevant to grizzly bears and/or their habitat:

- Manage dry forest types to contain healthy, relatively open stands with reproducing site-appropriate, desired vegetation species.
- Manage moist forest types to contain healthy stands that combine into a diversity of age classes, densities, and structure (including dead and down material).
- Forest and woodland health assessments will be incorporated into Land Health Standards at the activity plan level to determine forest health conditions in project areas.
- Vegetation manipulation projects will be designed to minimize impacts to wildlife habitat and improve it when possible.
- New permanent and temporary road construction will be kept to a minimum. Temporary roads will be decommissioned (route will be closed and rehabilitated to eliminate resource impacts such as erosion, and rendered no longer useable for public or administrative uses) within one year of project completion. In addition, replacement, maintenance, or decommissioning of existing roads to meet transportation planning and management objectives may also occur as part of forest product removals or stewardship treatment projects.
- Firewood cutting will not be allowed within 100 feet of live (yearlong flow) streams or within 50 feet of intermittent streams.
- When salvage is proposed in dead and dying forests, contiguous acres of undisturbed standing and down woody material will be retained in adequate amounts for those wildlife species that depend on this type of habitat.
- The BLM will strive to maintain and/or restore stands with old forest structure within historic range of variability to maintain and/or enhance habitat for species dependent on this type of habitat. Existing and developing old forests will be retained and protected from uncharacteristically severe natural disturbances such as; stand replacing wildland fire, and insect and disease epidemics.
- Manage riparian and wetland communities to move toward or remain in proper functioning condition (appropriate vegetative species composition, density, and age structure for their specific area). Manage these communities to be sustainable and

provide physical stability and adequate habitat for a wide range of aquatic and riparian dependent species.

- At the Field Office scale, management will maintain, protect, restore and/or improve riparian areas and wetlands. Riparian areas that are functioning at risk will be a high priority for restoration.
- Restorative treatments in riparian areas will focus on re-establishing willows, aspen, and cottonwood stands as well as other riparian vegetation, and to move towards pre-fire suppression stem densities in conifer stands.
- Where conifers are outcompeting or precluding regeneration of aspen, or preventing establishment of aspen or cottonwood stands, conifers will be removed (via mechanical methods and/or prescribed burning) to provide suitable habitat for expansion of these species.
- Forested riparian habitats will be managed to accelerate the development of mature forest communities to promote shade, bank stability, and down woody material recruitment. Late-successional riparian vegetation will be promoted in amounts and distribution similar to historic conditions.
- Grazing practices in riparian areas (accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of riparian goals or proper functioning condition will be modified.
- Sufficient forage and cover will be provided for wildlife on seasonal habitat.
- BLM will develop and implement appropriate grazing strategies in grizzly bear management zones.
- BLM will continue to use a combination of cultural, physical, chemical, and biological treatments for weed control.
- BLM will encourage the development of weed management areas where the landowners and users are cooperatively working to manage noxious weeds within designated areas.
- BLM will focus prevention of weed spread along roads, trails, waterways, recreation sites, and disturbed sites associated with project implementation.
- Weed management prescriptions will be included in all new vegetation treatment projects and incorporated where possible in all existing contracts, agreements, and land use authorizations that would result in ground-disturbing activities.
- Weed seed free forage will be used on BLM lands. Forage subject to this rule will include hay, grains, cubes, pelletized feeds, straw, and mulch.
- The BLM will maintain an up-to-date record of the grizzly bear conflicts and management actions that occur on lands managed by the Butte Field Office.
- The BLM will manage habitat for sensitive terrestrial and aquatic species in a manner consistent with current and future restoration, conservation and recovery plans, and conservation agreements. Management activities will be designed and implemented consistent with adopted conservation strategies, including Montana's Comprehensive

Fish and Wildlife Conservation Strategy (MFWP 2005), and current, accepted science for special status and priority species.

- The BLM will emphasize actions that promote conservation of special status wildlife species and the ecosystems on which they depend. BLM will also emphasize maintaining and supporting healthy, productive, and diverse populations and communities of native plants and animals (including big game species such as deer, elk, and bighorn sheep) appropriate to soil, climate, and landform.
- The BLM will maintain functional blocks of security habitat for big game species across BLM lands. Where minimum-size blocks of security habitat (250 acres), as defined by Hillis et al. (1991), are located, they will be addressed and retained in a suitable condition throughout project planning and implementation. Protection of larger blocks of security habitat will also be addressed during project or watershed level planning. Where security habitat is limited or fragmented across the landscape, the BLM will emphasize improving habitat through vegetation treatments and road closures (including seasonal closures) to increase security habitat for big game species.
- To minimize disturbance to big game and grizzly bears, there will be no net increase in permanent roads built in areas where open road densities are 1 mi/mi^2 or less in big game winter and calving ranges, and within the current distribution of grizzly bear unless this is not possible due to rights-of-way, leases, or permits. All practicable measures will be taken to assure that important habitats with low road densities remain in that condition. Open road densities in big game winter and calving ranges, and within the current distribution of grizzly bear will be reduced where they currently exceed 1 mi/mi^2.

Grazing

BLM will include a clause in all new and revised grazing permits for the area within the grizzly bear distribution line requiring the permittee to properly treat or dispose of livestock carcasses as deemed necessary on a case-by-case basis by BLM in coordination with USFWS, so as to eliminate any potential attractant for bears. BLM will include guidance to permittees to contact MFWP if they need carcass disposal assistance.

Connectivity

The BLM will participate in ongoing interagency efforts to identify, map and manage linkage habitats essential to grizzly bear movement between ecosystems.

The BLM will maintain suitable habitat conditions and minimize fragmentation in linkage corridors among habitats for priority species.

The BLM will continue to manage roads on BLM lands to achieve lower road densities in grizzly bear habitat.

Vegetation Management

- Where grizzly bear use is known or likely to occur and where practicable, the BLM will delay disturbing activities during the spring in spring habitats to minimize displacement of grizzly bears.
- There will be a focus on biological diversity by restoring vegetation cover types and structural stages that have declined substantially including dry, open forest habitats with low tree densities, meadow habitats, shrub and hardwood dominated riparian systems, as well as open grasslands and shrublands with low tree densities.
- As identified through project-level NEPA analyses, seasonal timing restrictions on projects that cause disturbance to wildlife will be applied where needed to minimize the impacts of human activities on important seasonal wildlife habitat including grizzly bear spring and summer range (4/1 to 9/1), and grizzly bear denning habitat (10/1 to 4/30). These dates may be revised when new data become available.

BLM will develop and implement human food storage regulations and guidelines in grizzly bear distribution zones in coordination with MFWP and other agencies.

Human food storage regulations will be developed and implemented for all recreation sites with high potential and/or known encounters between people and bears.

Oil and Gas Stipulations

Oil and gas stipulation – Timing Limitation. Activity is prohibited from April 1 to June 30 and from September 15 – October 15 in the Grizzly Bear Distribution Zone.

Lewiston Field Office Resource Management Plan (Revision potentially beginning in 2013)

Lewistown Field Office has a total of 16,000 acres within the PCA). BLM lands within the Conservation Strategy Management Area within the Lewistown Field Office are managed under the 1984 Headwaters Resource Management Plan.

The following management guidelines in the PCA would protect grizzly bear under this plan:

1. Special guidance for oil and gas development along the Rocky Mountain Front – for Federal mineral estate (includes both surface and sub-surface acres) 3,167 acres
2. Low priority for forest management (8,361 acres)
3. High priority for forest management (398 acres)
4. No disposal of BLM lands (4,119 acres)

5. Closed to motorcycles (3,131 acres) –
6. Closed to motorized use (0 acres).
7. Restricted motorized use (3,131 acres) –
8. Avoidance areas for utility and transmission corridors (3,131 acres)

Guidelines that could benefit the grizzly bear on all BLM Lewistown Field Office management lands in Zones 1 and 2 (19,000 acres) include:

- Habitat improvement projects will be implemented where necessary to stabilize and/or improve unsatisfactory or declining wildlife habitat condition.
- Seasonal restrictions – no activity in grizzly bear spring and summer range (4/1 through 9/1) and denning habitat (10/1 through 4/30)
- To the extent practicable, management actions within occupied grizzly bear habitat will be consistent with the goals and objectives contained in the Grizzly Bear Recovery Plan.
- Sufficient forage and cover will be provided for wildlife on seasonal habitat.
- Vegetative manipulation projects will be designed to minimize impact on wildlife habitat and to improve it whenever possible.
- Montana Fish, Wildlife & Parks will be consulted in advance on all vegetative manipulation projects, including timber harvest activities involving: the construction of new access into roadless elk summer/fall ranges; critical, crucial or essential wildlife habitat and sales over 250,000 board feet.
- Management actions within floodplains and wetlands will include measures to preserve, protect and, if necessary, restore their natural functions.
- Management techniques will be used to minimize the degradation of streambanks and the loss of riparian vegetation.
- Riparian habitat needs will be taken into consideration in developing livestock grazing systems and pasture designs.
- Manage public access to maintain the habitat effectiveness of security cover and key seasonal habitat (such as winter range and calving/nursery areas) for elk and deer.
- Maintain adequate untreated peripheral zones around important wet meadows, springs and riparian zones.
- Discourage thinning immediately adjacent to clearcuts.
- Use of new grizzly bear information acquired from current or future studies of the effects of oil and gas development on grizzly bear will be incorporated into activity decisions affecting the species (from FWS BO).

Missoula Field Office Resource Management Plan (1986, with amendments; revision potentially beginning in 2014)

The most recent RMP under which Missoula FO has been operation does not address grizzly management in the original document. In 2006, Backlog Consultation as conducted with FWS to amend the RMP. FWS issued a Biological Opinion with terms and conditions to address effects to grizzlies from livestock and roads.

The Missoula Field Office has **129,956 acres** in Zone 1 and 2 (no acres in the PCA). BLM lands within the Conservation Strategy Management Area within the Missoula Field Office are managed under the Garnet Resource Area Resource Management Plan 1986.

The following management guidelines would protect grizzly bear under this plan:

Riparian Protection Zones (411 acres) – where the emphasis is on maintaining or enhancing riparian values while providing elements of old-growth or mature forest for wildlife habitat and providing opportunities for other uses. Utility corridors will not be permitted. Timber management activities will be prohibited. These lands will remain in public ownership.

Elk Summer and Fall Habitat Components (9,605 acres) – where the emphasis is on maintaining or improving elk summer and fall habitat components and other wildlife habitat values while managing timber and providing for other uses. A broad range of timber management activities will be allowed but will be designed to maintain or improve elk summer and fall habitat components and will include special measures to protect riparian values. These lands will remain in public ownership.

Big Game Summer and Fall Range (43,374 acres) – where the emphasis will be on balancing forage and cover requirements for big game on summer and fall ranges while managing timber and providing for other uses. Timber management will be designed to maintain or improve big game summer and fall habitat, particularly cover and forage relationships, and include special measures to protect riparian values.

Big Game Winter Range (14,494 acres) – where the emphasis will be on enhancing forage production and cover for big game on winter ranges while managing timber and providing for other uses. Timber management will be designed to maintain or improve big game winter range, particularly cover and forage relationships, and include special measures to protect riparian values.

Management activities in riparian zones generally will be designed to maintain or, where possible, improve riparian habitat condition. Roads and utility corridors will avoid riparian zones to the extent practicable. Prescribed fire will not be used within 75 feet of stream channels.

Corrective measures will be applied where unsatisfactory watershed conditions are identified. Such measures may be implemented through project-level plans (watershed, habitat, allotment, or compartment management plans); such measures may also be implemented through stipulations attached to permits, leases, and other authorizations.

All oil and gas leases will be issued with standard stipulations attached. Special stipulations will be attached where needed to protect seasonal wildlife habitat and/or other sensitive resource values. In highly sensitive areas, where special stipulations are not sufficient to protect important surface values, stipulations prohibiting surface occupancy will be attached.

Habitat improvement and maintenance projects will be implemented where needed to stabilize or improve habitat conditions. These projects will be identified through coordinated resource activity plans.

Road and area closures will be pursued for wildlife security and other resource values. Wildlife habitat goals and objectives will be included in all resource activity plans and projects that could affect wildlife habitat.

The Montana Department of Fish, Wildlife, and Parks (MFWP) will be consulted prior to vegetative manipulation projects in accordance with Supplement #1 of the Master Memorandum of Understanding, 1977. In addition, MFWP will be consulted on timber harvest and timber stand improvement projects

Management actions within floodplains and wetlands will include measures to preserve, protect, and if necessary, restore their natural functions.

Food Storage Stipulations Under Special Recreation Permits

Food/attractant storage stipulations for conservation of the grizzly bear and other wildlife – Human, pet and livestock food (except baled or cubed hay without additives), and garbage will be attended or stored in an approved bear-resistant manner (a) during daytime hours, at least one adult person must be physically present within 100' of attractants. During nighttime hours, all attractants shall be stored in a bear-resistant manner and (b) Food, garbage and other attractants will be stored using an approved storage technique when camp is unattended. Attractants will not be buried, discarded or burned in an open campfire. Leftover food, food waste or other attractants may be placed in an appropriate, sealed container and packed out with garbage or could be burned in a contained stove. Wildlife carcasses, birds, fish or other animal parts that are within ½ mile of any camp or sleep area will be stored in a bear-resistant manner during nighttime hours.

APPENDIX 9

Summary of Protective Measures in the DNRC Habitat Conservation Plan

The full document is available online at: http://dnrc.mt.gov/HCP/FinalEIS.asp

Covered Habitat Conservation Plan Lands

On all covered Habitat Conservation Plan (HCP) lands (referred to as PR lands in the HCP) (984 mi^2; 2,549 km^2), the DNRC commits to the following for its 50-year term:

- minimizing construction of new open roads in riparian areas, wetlands, and avalanche chutes. (p. 2–6)
- providing I&E brochures about living and working in bear habitat to all contractors and employees
- providing bear encounter avoidance training to DNRC personnel every 5 years
- prohibiting DNRC employees and contractors from carrying firearms while on duty
- requiring all DNRC employees and contractors store food, garbage, and other attractants properly
- suspending any motorized forest management activity within 0.6 miles of an active den site until May 31 or earlier if DNRC confirms the bear has left the den site vicinity
- retaining visual cover for grizzly bears in riparian and wetland areas by maintaining a 50 foot no-harvest buffer for Class 1 streams and lakes
- managing and preventing noxious weeds at gravel pit sites
- minimizing helicopter operations requiring flights lower than 500m in seasonally important grizzly habitat by designing flight paths at least 1 mile from such areas, where practicable

Non-recovery Occupied Habitat and Lands in the PCA

On non-recovery occupied habitat (NROH) and lands in the PCA (RZ) (401 mi^2; 1,041 km^2), the DNRC would implement NROH commitments contained in the DNRC HCP. The HCP applies to approximately 143 mi^2 (370 km^2) outside the PCA in occupied habitat termed "Non Recovery (Zone) Occupied Habitat" in the HCP. The NROH measures would also apply to approximately 260 mi^2 (671 km^2) within the RZ. DNRC agrees to implement the following protective measures on NROH and RZ lands for the 50-year term of the HCP:

- minimizing the construction of new open roads
- prohibiting commercial forest management activities during the spring period (Apr. 1-June 15) in spring habitat, as defined in the HCP

- prohibiting pre-commercial thinning and heavy equipment slash treatments during the spring period in spring habitat
- minimizing motorized activities on restricted roads during the spring period associated with low-intensity forest management
- discouraging new domestic sheep grazing allotments
- submitting a mitigation plan to the USFWS 30 days prior to a decision about the use of small livestock to manage weeds
- minimizing helicopter operations requiring flights lower than 500m in seasonally important grizzly habitat by designing flight paths at least 1 mile from such areas, where practicable
- discouraging the granting of future easements that relinquish DNRC control of roads, except for reciprocal access agreements, cost share agreements, and other Federal road agreements
- ensuring that vegetation or topographic breaks be no greater than 600 feet in at least 1 direction from any point in the unit for new clear cut and seed tree cutting units (except for when this is impractical due to steep open faces, broadcast burning as a post-harvest treatment, or where insects, disease, prescribed fire, or wildfire have hampered retention of live vegetation)
- submitting a mitigation plan to the FWS 30 days prior to a decision about the use of small livestock to manage weeds
- limiting the number of active gravel pits in occupied habitat outside the Recovery Zone to three per administrative unit, with no more than 2 of these being large pits
- Retention of visual cover for grizzly bears in riparian and wetland areas by maintaining a 50 foot no-harvest buffer and restrictions on cover removal within defined riparian management zones

DNRC Lands in the PCA

On DNRC lands in the PCA (RZ lands) (165,838 acres; 671 km^2**),** the DNRC commits to applying these additional protective measures within the PCA for the 50-year term of the HCP:

- Development of site-specific mitigation measures to minimize the impacts to important grizzly bear habitat elements (berry fields, avalanche chutes, riparian areas, wetlands, WBP stands, and feeding/congregation areas);
- Retention of up to 100 feet of vegetation between open roads and clearcut or seed tree harvest units
- Examine and repair all primary road closure devices annually
- Prohibit authorization of any new grazing licenses for sheep and other small livestock (smaller than a cow)
- Will not initiate any new grazing licenses in this zone. Public generated proposals could be considered

- Carefully review and incorporate mitigations to the extent possible to minimize adverse impacts associated with granting access easements to private entities across DNRC lands
- Prohibit motorized activities above 6,300 feet elevation from April 1 through May 31
- Require access restrictions that are a part of the Stillwater Block and Swan River State Forest transportation plans that cap open and restricted road amounts
- Require 4-year commercial activity with 8-year rest restrictions on scattered lands
- Require no net increase in open roads on scattered lands at the administrative unit level
- Require 3-year commercial activity with 6-year rest restrictions for 5 management subzones on the Swan River State Forest
- Prohibit motorized activities during the non-denning season in seven security zones totaling 22,007 acres on the Stillwater Block

APPENDIX 10

Detailed Summary of DNRC Habitat Management Developed for Grizzly Bears in the PCA, Zone 1, and Zone 2

The Trust Land Management Division (TLMD) of DNRC manages State trust lands to generate revenue for the maintenance and support of public State schools and institutions. Management actions on State trust lands are carried out under the direction of the Montana Board of Land Commissioners, which consists of Montana's top five elected officials: the Governor, Attorney General, Superintendent of Public Instruction, Commissioner of Securities and Insurance, and the Secretary of State. In cooperation with the Montana Board of Land Commissioners, DNRC's obligation for management of trust lands is to obtain the greatest benefit for the beneficiaries. Within the TLMD, there are four bureaus: (1) the Agriculture and Grazing Management Bureau; (2) the Forest Management Bureau; (3) the Minerals Management Bureau (includes mining and oil and gas development); and (4) the Real Estate Management Bureau. Within the entirety of the NCDE grizzly bear Delisting Area, DNRC manages approximately 897 mi^2 of State trust lands. Of these acres, approximately 347 mi^2 occur within the PCA. The following draft measures would be intended to apply to one or more of the four management areas identified in this Conservation Strategy: the Primary Conservation Area (PCA) (existing Recovery Zone), Management Zone 1, Management Zone 2, and Management Zone 3.

DNRC NCDE Grizzly Bear Conservation Measures

<u>Programs – All (Real Estate, Ag and Grazing, Minerals Management, Forest Management)</u>

1. DNRC shall consider grizzly bears as a sensitive species in Montana during planning and environmental review on all TLMD projects for the term of this Conservation Strategy. (Applicable to all lands covered by this Conservation Strategy).

2. For the term of this agreement, DNRC trust lands staff, while also considering Trust obligations, shall cooperate with Montana FWP bear management specialists to eliminate or minimize to the extent possible, any associated risks to bears associated with trust lands projects, leases, or agreements that may adversely affect grizzly bears. (Applicable to all lands included in this Conservation Strategy).

3. For the term of this Conservation Strategy, for all TLMD projects and developments having potential to influence grizzly bears or their habitat, DNRC shall incorporate mitigations to minimize impacts to the extent possible, while also considering Trust obligations. (Applicable to all lands included in this Conservation Strategy).

4. For the term of this Conservation Strategy, for all TLMD projects and developments on State Trust Lands within the PCA, Zone 1, and Zone 2, DNRC will incorporate mitigations into lease, license, and operating plan agreements (as applicable), to minimize adverse

impacts to grizzly bears at a level commensurate with the level of intensity, risk, scope, and duration of effects likely to occur as a result of implementing the project or activity. When risk of bear impacts is deemed present, mitigations shall at a minimum consider proper storage of bear attractants (food, garbage, pet foods, livestock carcasses, game carcasses etc. Attachment 1 below), vegetation/cover alteration, seasonal use of important habitats (particularly riparian), firearms restrictions, information/education and avoidance of bear-human encounters, minimization of new motorized access routes, and minimization of disturbance during spring and fall periods. DNRC employees and contractors and their employees are prohibited from carrying firearms while on duty, unless the person is specifically authorized to carry a firearm under DNRC policy 3-0621 (grazing licensees and lessees excluded).

5. Inside the PCA, Zone 1, and Zone 2, all TLMD lease and license agreements that permit uses and/or activities that may involve the use or presence of bear attractants (eg. leases/licenses for cabin and home sites, grazing, outfitting, group use licenses for camping, picnicking etc.) shall contain applicable clauses requiring unnatural bear foods and attractants to be contained and/or managed in a bear-resistant manner.

<u>Program – Forest Management</u>

HCP and Non-HCP Lands (Portions of the PCA, Zone 1, and Zone 2)

6. As the primary component of a Conservation Strategy for grizzly bears on State trust lands associated with the NCDE and elsewhere in western Montana, DNRC would rely primarily on successful implementation of its Habitat Conservation Plan (HCP) for forest management activities, in cooperation with the USFWS. The HCP provides protective measures regarding forest management for grizzly bears across approximately 984 mi^2 in western Montana. Within the PCA, Zone 1, and Zone 2, the HCP would require the implementation of agreed-to conservation measures on approximately 530 mi^2, of which 259 mi^2 occur within the PCA. The plan contains measures that include: requiring restriction of open road density, requiring food storage protections that apply to employees and contractors, providing security during important seasons, restricting use of firearms, providing cover, protecting important areas for feeding and denning, and monitoring. The term of the HCP and associated Incidental Take Permit is 50 years.

7. Within the PCA, Zone 1, and Zone 2, on all non-HCP Trust lands where forest management activities would occur, grizzly bears would be considered a sensitive species and administrative rules for forest management activities would be in place that would provide protective measures addressing: storage of unnatural foods and attractants, firearms possession, cover retention (particularly along riparian areas), duration of activities, seasonal restrictions, protection of important feeding areas, and minimization of roads.

<u>Program – Ag and Grazing</u>

8. Within the PCA, Zone 1, and Zone 2, all grazing leases and licenses issued within these geographic areas would require the following language:

a) Re-locate livestock carcasses in areas with high risk of bringing grizzlies into conflict with humans within 24 hours of discovery to minimize risk of human/bear conflicts. Lessee shall cooperate with DNRC managers and MFWP bear management specialists as necessary to address prompt removal of problem livestock carcasses.

b) Established bone yards that would promote habituation and frequent use by grizzly bears are prohibited.

9. Within the PCA (Recovery Zone) for the term of this Conservation Strategy, DNRC will prohibit authorization of any new small livestock (smaller than a cow) grazing leases, including those for the purposes of weed control, and will also not convert existing licenses to allow the grazing of small livestock.

10. For the term of this Conservation Strategy, within Zone 1, grazing of domestic sheep would be discouraged on DNRC lands to minimize risk to grizzly bears. DNRC may authorize grazing of small livestock (including use for weed control) following development and implementation of a management plan incorporating measures effective for minimizing risks to grizzly bears. Mitigation measures in the plan may include, but are not limited to, requirement of a full-time shepherd, guard dogs, nighttime electric pens, prohibition of grazing in spring habitat during spring periods etc. When grazing small livestock in this zone, the lessee shall assume any cost of losses associated with grizzly bears and the bear will typically not be removed unless management authorities judge that the particular circumstances warrant removal and document those circumstances (e.g., the behavior resulted in a human fatality, the bear had a prior conflict history, etc).

11. To limit attractants associated with dispersed recreation on State trust lands within the PCA, Zone 1, and Zone 2, DNRC shall maintain its existing pack-it-in/pack-it-out policy for litter control, limit camping to 2 days on leased or licensed lands in areas not designated as campgrounds, and prohibit campfires on leased and licensed lands ARM 36.25.149. Camping shall be restricted in designated campgrounds to 16 consecutive days, and it shall be restricted on unleased or unlicensed lands outside a campground to 16 days per calendar year, unless permission for a longer period is obtained from the department ARM 36.25.149. DNRC lands managed as a part of block management areas and wildlife management areas in cooperation with MFWP, will adhere to regulations agreed to by both agencies specific to each block management area (ARM 36.25.149(i), ARM 36.25.163).

12. For the term of this Conservation Strategy, DNRC will make information/education materials available at all applicable field offices, emphasizing effective storage of foods and other grizzly bear attractants.

13. For the term of this Conservation Strategy, where DNRC lands exist within Wildlife Management Areas (WMA) and Block Management Areas managed by MFWP, food storage policies applicable to the WMA and BMAs as appropriate shall apply and be enforced.

14. For the term of this Conservation Strategy, DNRC will cooperate with other entities and agencies as opportunities arise to enact and enforce food storage measures in high use recreation areas, trailheads etc. to minimize risks to grizzly bears.

<u>Program – Real Estate Management (Includes cabin/home sites, other developments, wind generation facilities, outfitting, camping, and other special use licenses, etc.)</u>

Measures 1 through 4 above would also apply.

15. Within the PCA, Zone 1, and Zone 2, for the term of this Conservation Strategy on cabin sites leased by DNRC, containment of garbage, proper sewage disposal, prohibition of livestock and prohibition of the use of firearms would be enforced through DNRC's existing "Rules and Regulations –[for] DNRC Cabin sites," and "Terms and Conditions – DNRC Residential Lease Lots" and renewal inspections.

16. Within the PCA, Zone 1, and Zone 2, in areas where land uses are non-compatible with grizzly bear conservation goals DNRC will, to the extent practicable, in its sole discretion, cooperate with other entities to enact land transactions (eg. land sales, conservation easements, land exchanges etc.) that facilitate conservation of grizzly bears.

<u>Program – Minerals Management (Includes oil and gas, coal, gravel, metalliferous and non-metalliferous leases)</u>

Seismic Exploration

17. For the term of this Conservation Strategy, within the PCA and Zone 1 (Rocky Mountain Front Portion), the following measures would be incorporated as applicable into stipulations developed to mitigate impacts to grizzly bears.
    a. Limit the window of operation to the extent possible to avoid the spring period from April 1 to June 30, and fall period September 15 to November 30.
    b. To minimize disturbance to grizzly bears, limit the duration of activities to the extent possible.
    c. Prohibit activities within 0.25 miles of riparian areas and prohibit ground crews from entering such areas.
    d. To minimize the spatial extent of displacement, to the extent practicable, conduct activities in a sequential (localized) versus a concurrent, dispersed manner where activities would be occurring at different locations at the same time.
    e. To minimize disturbance and displacement of bears, prohibit aerial flight routes within 0.25 miles of dense shrublands, wooded areas and riparian areas.
    f. For human safety, train staff conducting ground activities on working safely in bear habitat and the effective use of bear spray and require crews to carry bear spray.
    g. Bear attractants (including food and garbage) must be stored in a bear-resistant manner at all times when unattended. On-site camping is prohibited. No vehicle oil changes or petroleum disposal shall occur on the State land.

h. To avoid risk of human/bear encounters in known high use bear areas, nighttime foot travel away from vehicles is prohibited.

i. To minimize potential for disturbance and adverse impacts to important bear foods and feeding areas, all use of vehicles, ATVs and ground crews are not authorized within 100 feet of wetlands and other riparian areas on or adjacent to State lands.

Oil and Gas Exploration and Development

18. Oil and Gas exploration, development and reclamation activities on State lands are under the regulatory authority of the Montana Board of Oil and Gas Conservation. Measures, mitigations, and reviews will recognize this regulatory permitting process and authority, and may not conflict with regulatory requirements. Where appropriate, the department may participate in or rely on MEPA analysis prepared by applicable regulatory agencies. Any action by the DNRC is contingent upon a determination by the regulatory oil & gas permitting agency that the proposed action creates a significant impact on grizzly bears or habitat within the NCDE area. The DNRC will implement mitigation measures consistent with the requirements of the permitting agency.

State trust lands within the PCA and Zone 1, shall be considered as Sensitive Areas and the DNRC Montana Oil and Gas Stipulations (December 2009) shall apply. The density of appreciable surface operations shall be limited to the extent practicable, while allowing for prudent development of the resource and protection from drainage by adjacent operations. Density of surface operations shall be addressed through implementation of these stipulations following appropriate MEPA environmental review and development of approved operating plans that minimize impacts on grizzly bears. Measures as described in the *"Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species"* (September 1987) (Attachment 2), shall be incorporated into operating plans prior to their approval, as specified by the DNRC Montana Oil and Gas Stipulations (December 2009) [Attachment 3].

Mineral Mining

Within the PCA and Zone 1, mortality risk to grizzly bears from mineral development on DNRC lands will be largely mitigated through project specific mitigation measures. The purpose of these guidelines is to avoid, minimize and mitigate environmental impacts to grizzly bears and their habitat from mining activities occurring on State lands. The guidelines would be applied during review and approval of a site-specific plan of operations. Operating procedures, reclamation plans, or other mitigating measures would be incorporated into the Operating Plan, or could become agency-imposed operating conditions, provided such measures were consistent with applicable mining laws. All exploration, development production, mitigation measures, reclamation, and closure activities for locatable minerals on Federal, State and private lands are under the regulatory permitting authority of the Montana Department of Environmental Quality (DEQ). DNRC works cooperatively with the DEQ in the administration and management of mining operations.

Mitigation measures may not conflict with the regulatory permitting authority of the DEQ. Any action by the DNRC is contingent upon a determination by DEQ [the permitting agency] that the proposed action creates a significant impact on grizzly bears or habitat within the PCA and/or Zone 1. The DNRC will implement mitigation measures consistent with the requirements of the permitting agency. The following measures would apply to all new hardrock mining Plans of Operation on lands managed by the DNRC in both the PCA and Zone 1.

Project Evaluation

The potential effects to grizzly bears and bear habitat, and the necessary mitigation measures will be determined at the project level by the authorizing or permitting agency through project review, an Environmental Assessment or EIS. For projects with the potential to significantly, negatively affect grizzly bears or their habitat, operating plans, notices and permits will include a mitigation plan with measures to protect grizzly bears and minimize detrimental impacts to them during and after operations. Operators are required to comply with the mitigation plan through the agency's approval of the Operating Plan.

Operating plans and notices will include specific measures to reasonably mitigate potential impacts to grizzly bears or their habitat from the following activities:

- Land surface and vegetation disturbance,
- Water table alterations,
- Construction, operation, and reclamation of mine-related facilities such as impoundments, rights of way, roads, pipelines, canals, transmission lines or other structures,
- Food storage and sanitation.

Performance of operating and reclamation measures, and site-specific mitigation measures used to protect grizzly bears or bear habitat will be enforced through the respective DEQ and Federal surface management regulations. Operators who fail to comply with mitigation measures for grizzly bear protection in the DEQ approved operating plan will be subject to a noncompliance order or notice issued by the DEQ. Non-compliance orders specify the noncompliance and what is needed for the operator to come into compliance. The financial assurance (bond) for reclamation performance will be calculated and managed by the agencies. Bonding may include the cost of implementing the reclamation measures required to mitigate impacts to grizzly bears and bear habitat. The financial assurance instrument for reclamation performance will be held by the Montana DEQ for mining operations on private lands.

For operations where it is determined there is potential for significant impacts ("significance" as determined through environmental review and permitting) to the grizzly bear population or its habitat, a monitoring plan will be developed by the operator with approval by the DEQ, and in

close coordination with MFWP for the life of the project. The monitoring plan will outline how changes in habitat and disturbance to bears will be measured (and include monitoring of reclamation measures). The plan will identify trigger levels or criteria for habitat parameters to determine if direct research of local grizzly bears (i.e., capturing and radio-collaring bears) is warranted and to what extent monitoring should be conducted.

Food and Attractants

For projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include food storage/handling and garbage disposal measures and will incorporate any existing food storage measures for human occupancy. Mitigation plans for grizzly bears will include the following measures regarding food and attractants:

- Bear proof containers will be used, and garbage will be removed in a timely manner at mine facilities.
- Road kills will be removed daily to a designated location determined in close coordination with MFWP.
- The use of clover will be discouraged as part of any reclamation seed mixes used during mine construction, operation, or when reclamation activities are concurrent with operations. Native seed mixes will be promoted and used whenever practicable.
- No feeding of any wildlife will be allowed.

Implementation of the Food and Attractants measures is the sole responsibility of the operator. Compliance with these requirements will be evaluated during site inspections conducted by the authorizing agencies. The number and type of inspections as well as the mechanism for inspections will be identified through the planning process (MEPA or NEPA). Failure to comply with the measures will subject the operator to a noncompliance process as noted above.

Motorized Access

For projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include the following measures regarding motorized access:

- New roads constructed for mineral exploration and/or development will be single-purpose roads only and will be closed to public use not associated with mineral activities.
- A traffic management plan will be developed as part of any proposed activity to identify when and how mine roads will be used, maintained, and monitored, if required, and how roads will be closed after mineral activities have ended.

- On State lands only, roads constructed for mineral operations may be retained by the land management agency for use associated with other concurrent or future activities (such as timber sales or rights-of-ways). However, impacts associated with all uses of the road(s) must be analyzed in a MEPA environmental review, and impacts to grizzly bears minimized to the extent practicable.

Habitat

For projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include the following measures regarding habitat:

- Mineral exploration and/or development activities will occur at a time or season when the area is of little or no biological importance to grizzlies. If timing restrictions are not practicable, reasonable and appropriate measures will be taken to mitigate negative impacts of mineral activity to the bear.
- Reasonable and appropriate measures regarding the maintenance, rehabilitation, restoration or mitigation of functioning aquatic systems and riparian zones will be implemented. State regulatory permits may include reasonable and appropriate measures as part of a riparian reclamation plan identifying how reclamation will occur, vegetation species used in reclamation, a timeframe of when reclamation will be completed, and monitoring criteria.
- Reclamation and revegetation of roads, drilling pads, and other areas disturbed from mineral exploration and development activities will be completed as soon as practicable by the operator.
- For new projects in the PCA with the potential to significantly affect grizzly bears or their habitat, DNRC will work cooperatively with DEQ, lessees and operators to minimize adverse impacts. The level of mitigation required for individual projects would be commensurate with the degree and duration of impacts to affected lands. DNRC would be responsible only for ensuring mitigation of impacts associated with their lands. To minimize potentially significant impacts to grizzly bears the following measures would be considered and implemented to the extent reasonable and practicable as determined by DNRC.
- In the first order of preference, operators shall be required to reclaim the affected area back to suitable bear habitat that has similar or improved characteristics and qualities as the original habitat (such as the same native vegetation).
- If reclamation efforts alone are deemed inadequate or inappropriate by DNRC for mitigating impacts to grizzly bears, the following measures may be considered and applied.

- Operators and/or lessees as applicable may either acquire a perpetual conservation easements or purchase fee title comparable or better replacement grizzly bear habitat in the PCA to mitigate adverse impacts. A purchase rate of >1:1 on an acreage basis would be considered for acquiring habitat, depending on the quality of habitat degraded and the habitat available for acquisition. Acquisition of habitat in distant areas of the PCA associated with identified linkage corridors could also be considered for mitigation, and may be desirable. Prior to any purchase, MFWP will be given at least 30 days to provide input to DNRC on the quality and suitability of the lands proposed as mitigation. DNRC will have final approval as to the adequacy and suitability of proposed mitigations. Easements/deeds would be transferred to a Federal or State agency, or private conservation organization to ensure the long-term integrity of the habitat as deemed appropriate by DNRC.
- Other feasible measures to offset adverse impacts to grizzly bears could include (but would not be limited to) radio telemetry monitoring of grizzly bear movements in an affected area in coordination with MFWP, or other more intensive grizzly bear research efforts conducted with MFWP involvement. Other feasible measures could include providing regional funding to help support the acquisition and distribution of bear-resistant waste containers, electric fencing materials, information/education outreach efforts regarding living safely in bear habitat, and/or funding a bear management specialist or enforcement officer.

Human Conflict

For projects with the potential to significantly affect grizzly bears or their habitat, the Operating Plan will include the following mitigation measures regarding human conflict:

- Firearms will be prohibited on site during operations except for security personnel and other designated persons. Carrying of bear spray will be recommended to the operator.
- The operator should require employees to attend training related to living near and working in grizzly bear habitat prior to starting work and on an annual basis thereafter.

(Attachment 1)

<u>Example Recommended Language to Address Food Storage Requirements in the PCA, Zone 1, and Zone 2.</u>

List of measures that would be included in new or existing licenses/leases on renewal to address food storage risks to grizzly bears (adapted from the Draft MFWP measures for WMAs dated Feb. 2011).

1. Human, pet and livestock food (except baled or cubed hay without additives), garbage, and all other attractants shall be stored in an approved bear resistant manner or container when camp is unattended. (see definition of attended below) or during nighttime hours.
2. Wildlife carcasses, birds, fish or other animal parts that are within 1/2-mile of any camp or sleeping area shall be stored in an approved bear-resistant manner or container during when unattended. If a wildlife carcass is within an attended camp during daytime hours it may be on the ground. In areas where upright supports such as poles or trees are not present, carcasses shall be removed as soon as prudently possible to minimize the potential for attracting grizzly bears into camp areas.
3. Attractants (such as food leftovers or bacon grease) shall not be buried, discarded, or burned in an open campfire.
    a. Leftover food or food waste products shall be placed in an appropriate, sealed container and packed out with garbage.
    b. Leftover food or other attractants may be burned in a contained stove fire.
    c. Attractants may be placed into a suitable container (i.e. tin can) to prevent leaching into the ground and burned over an open campfire. Any remaining attractants unconsumed by burning shall be packed out.
4. The responsible party shall report the death and location of any livestock to a DNRC employee within 24 hours of discovery.
5. Approved bear-resistant containers for use in grizzly country meet the following criteria: A securable container constructed of solid material capable of withstanding 200 foot-pounds of energy applied by direct impact. The container, when secured and under stress, will not have any openings greater than one-quarter (1/4) inch, that would allow a bear to gain entry by biting or pulling with its claws.
6. Bear-resistant manner means any attractants, including food and garbage, must be stored in one of the following ways if unattended:
    a. Secured in a hard-sided camper or vehicle trunk or cab or trailer cab.
    b. Secured in a hard-sided dwelling or storage building.
    c. Suspended at least 10 feet up (from the bottom of the suspended item) and 4 feet out from any upright support, i.e. tree, pole.
    d. Stored in an agency approved bear-resistant container.
    e. Stored within an approved and operating electric fence.
    f. Stored in any combination of these methods.

Attachment 2

Interagency

ROCKY MOUNTAIN FRONT

Wildlife Monitoring/Evaluation Program

Management Guidelines for Selected Species, Rocky Mountain Front Studies.

PART A — GENERAL MANAGEMENT GUIDELINES

The following general management guidelines are applicable coordination measures that will be considered when evaluating the effects of existing and proposed human activities in identified seasonally important habitats for a variety of wildlife species:

1. Identify and evaluate for each project proposal the cumulative effects of all activities, both existing uses and other planned projects. Potential site specific effects of the project being analyzed are a part of the cumulative effects evaluation which will apply to all lands within a designated biological unit. A biological unit is an area of land which is ecologically similar and includes all of the yearlong habitat requirements for a sub-population of one or more selected wildlife species.

2. Evaluate human activities, combinations of activities, or the zones of influence of such activities that occur on seasonally important wildlife habitats and avoid those which may adversely impact the species or reduce habitat effectiveness.

3. Space concurrently active seismographic lines or line segments at least nine (9) air miles apart to allow an undisturbed corridor into which wildlife can move when displaced (Olson, G., 1981).

4. Establish helicopter flight patterns of not more than one-half (1/2) mile in width along all seismographic lines, between landing zones and the lines, and between landing zones and other operations, unless flying conditions dictate deviations due to safety factors.

5. Because helicopters produce a more pronounced behavioral reaction by big game and raptors than do fixed-wing aircraft, helicopters will maintain a minimum altitude of 600 feet (183 meters) above ground level when flying between landing zones and work areas where landing zones are not located on seismic lines, unless species specific guidelines recommend otherwise (Hinman, H., 1974; McCourt, K.H., et al. 1974; Klein, D.R., 1973; Miller, F.L. and A. Gunn, 1979).

6. Designate landing zones for helicopters in areas where helicopter traffic and associated human disturbances will have the minimum impact on wildlife populations. Adequate visual and/or topographic barriers should be located between landing zones and occupied seasonal use areas.

7. The use of helicopters instead of new road construction to accomplish energy exploration and development is encouraged.

8. Base road construction proposals on a completed transportation plan which considers important wildlife habitat components and seasonal use areas in relation to road location, construction period, road standards, seasons of heavy vehicle use, road management requirements, etc.

9. Use minimum road and site construction specifications based on projected transportation needs. Schedule construction times to avoid seasonal use periods for wildlife as designated in the species specific guidelines.

10. Locate roads, drill sites, landing zones, etc. to avoid important wildlife habitat components based on a site specific evaluation.

11. Insert "dog-legs" or visual barriers on pipelines and roads built through dense vegetative cover areas to prevent straight corridors exceeding one-fourth (1/4) mile where vegetation has been removed (Stubbs, C.W. and G.J. Markham, 1979).

12. Roads which are not compatible with area management objectives and are no longer needed for the purpose for which they were built will be closed and reclaimed. Native plant species will be used whenever possible to provide proper watershed protection on disturbed areas. Wildlife forage and/or cover species will be utilized in rehabilitation projects where deemed appropriate.

13. Keep roads which are in use during oil and gas exploration and development activity closed to unauthorized use. Place locked gates and/or road guards at strategic locations to deter unauthorized use when activities are occurring on key seasonal ranges.

14. Impose seasonal closures and/or vehicle restrictions based on wildlife or other resource needs on roads which remain open.

15. Bus crews to and from drill sites to reduce activity levels on roads. Shift changes should be scheduled to avoid morning and evening wildlife feeding periods.

16. Keep noise levels at a minimum by muffling such things as engines, generators and energy production facilities.

17. Prohibit dogs during work periods.

18. Prohibit firearms during work periods or in vehicles traveling to and from work locations.

19. Seismographic and exploration companies should keep a daily log of activities. Items such as shift changes, shut down/start up times, major changes in noises or activity levels, and the location on the line where seismic crews are working should be recorded.

Specific Guidelines for Grizzly Bears

1. Avoid human activities in identified grizzly bear habitat constituent elements or portions of constituent elements containing specific habitat values during the following seasonal use periods (see data summarization):

   A. Spring habitat (concentrated use areas) ..... April 1 - June 30
   B. Alpine feeding sites ..... July 1 - Sept. 15
   C. Subalpine fir/whitebark pine habitat types ..... Aug. 1 - Nov. 30
   D. Denning habitat ..... Oct. 15 - Apr. 15

2. Avoid human activities in grizzly bear habitat components which provide important food sources during spring and early summer, April 1 - July 15. These habitat components include riparian shrub types, *Populus* stands, wet meadows, sidehill parks, and avalanche chutes. Maintain an undisturbed zone of at least 1/2 mile between activities and the edge of these habitat components where many important bear foods occur.

3. 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.

4. No seismic or exploratory drilling activities should be conducted within a minimum of one mile of den sites during the October 15 - April 15 period (Reynolds, P.E. et al, 1983).

5. Seismic permits should include a clause providing for cancellation or temporary cessation of activities, if necessary, to prevent grizzly/human conflicts.

6. 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.

7. 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.

8. 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 or potential conflicts between man and grizzly bear.

9. Retain frequent dense cover areas adjacent to roads for travel corridors and security cover necessary to protect important habitat components. Three sight distances are desirable to provide visual security for grizzlies. A sight distance is the average distance at which a grizzly or other large animal is essentially hidden from the view of an observer by vegetation cover. The same security cover guidelines also applies to timber harvest units.

10. No off-duty work camps will be allowed within occupied seasonally important constituent elements.

11. Incinerate garbage daily or store in bear proof containers and remove to local landfill dumps daily.

12. Commercial activities permitted on public land should be planned and coordinated to avoid conflicts with grizzly bear trapping operations being conducted under the monitoring program. General public use of areas where trapping operations are active will be controlled through appropriate administrative actions by the agencies involved.

Attachment 3

DNRC Montana Oil and Gas Stipulations (December 2009)

These stipulations may be used on MT oil and gas leases, in the Special Provisions Section (36), "Exhibit A" depending on the specific circumstances for the tract being leased.

Sensitive Areas

F-1. This lease includes areas that may be environmentally sensitive. Therefore, if the lessee intends to conduct any activities on the lease premises, the lessee shall submit to TLMD one copy of an Operating Plan or Amendment to an existing Operating Plan, describing in detail the proposed activities. No activities shall occur on the tract until the Operating Plan or Amendments have been approved in writing by the Director of the Department. TLMD shall review the Operating Plan or Amendment and notify the lessee if the Plan or Amendment is approved or disapproved.

After an opportunity for an informal hearing with the lessee, surface activity may be denied or restricted on all or portions of any tract if the Director determines in writing that the proposed surface activity will be detrimental to trust resources and therefore not in the best interests of the trust.

F-2. This lease is located near the Rocky Mountain Front and includes areas that are environmentally sensitive. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1. If the lessee proposes an activity that does not entail any significant surface disturbance, the Board may approve the same after completion of the appropriate environmental review in accordance with the Montana Environmental Policy Act (MEPA) and an opportunity for public comment on the proposed activity has been provided.

2. Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance, an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale as the ecosystem is defined by the "Limits of Acceptable Change--Bob Marshall Wilderness Complex" adopted by the Montana Department of Fish, Wildlife

& Parks in December 1991. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least three communities including Great Falls and Helena.

3. The proposed surface activity shall adhere to the "Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species" adopted by the Montana Department of Fish, Wildlife & Parks in September 1987, or any successor guidelines thereto.

4. The Board may refuse to approve any proposed surface operations if it determines that they do not constitute the best use of trust resources or are not in the best interest of the State of Montana.

F-3. This lease is located within or adjacent to the Sleeping Giant and Sheep Creek Wilderness Study Area, the Beartooth State Wildlife Management Area, and/or the Gates of the Mountains Wilderness and includes areas that are environmentally sensitive. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1. If the lessee proposes an activity that does not entail any significant surface disturbance, the Board may approve the same after completion of the appropriate environmental review in accordance with the MEPA and an opportunity for public comment on the proposed activity has been provided.

2. Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance, an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least two communities including Great Falls and Helena.

3. The Board may refuse to approve any proposed surface operations if it determines that they do not constitute the best use of trust resources or are not in the best interest of the State of Montana.

F-4. This lease is located within the Rocky Mountain Front area established under Federal legislation removing mineral leasing and development on Federal fee title lands, and Federal minerals and has been identified as environmentally sensitive. The Rocky Mountain Front area is a crucial fish or wildlife area or corridor; has FWP owned surface rights; has an existing or is in the process of having conservation easements established and has important recreational value to the citizens of Montana. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners and notify the Director of Fish, Wildlife and Parks describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1. If the lessee proposes an activity that does not entail any significant surface disturbance (not in excess of 1 well pad/640 acres), the Board may approve the same after completion of the appropriate environmental review in accordance with the MEPA. As part of the MEPA process, DNRC will provide for an on the ground consultation with MFWP, and an opportunity for public comment on the proposed activity. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in three major daily publications including Missoula, Great Falls and Helena; legal notices to those non-daily papers in the affected counties, and detailed notification of landowners who own the surface rights, or directly adjacent rights, who would be impacted by development.

2. Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance (in excess of 1 well pad/640 acres), an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale as the ecosystem is defined by the "Limits of Acceptable Change - Bob Marshall Wilderness Complex" adopted by the MFWP in December 1991, and any successor thereto. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans, and new data concerning climate change, private lands conservation efforts, and fish and wildlife distribution and migration patterns. Public involvement in the environmental review process shall be actively solicited by the preparer

of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least three communities including Great Falls and Helena.

3. The proposed surface activity shall adhere to the "Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species" adopted by the Montana Department of Fish, Wildlife and Parks in September 1987, or any successor guidelines thereto.

4. The Board may refuse to approve any proposed surface operations if it:

   - determines that they do not constitute the best use of trust resources or are

   - not in the best interest of the State of Montana.

APPENDIX 11

Bureau of Land Management Habitat Standards for Missoula, Butte, and Lewistown Field Offices

Road Density Standards for Zone 1

There will be no net increase in the linear miles or density of roads that are open for public motorized use during the non-denning season in Zone 1. This includes BLM lands in the Butte, Lewistown, and Missoula Field Offices. Open roads are defined as any roads open to public use during the period of April 1 through November 30. Closed roads or roads open only to administrative uses would not be considered "open" roads. If the BLM is able to acquire lands through acquisitions, analysis would be completed to determine if road density standards would apply to these areas.

Adequate vehicle access will be maintained for management activities and treatments. Temporary road locations will be minimized in important bear habitats such as foraging areas, riparian habitats, and elk calving areas.

Temporary roads will be closed or decommissioned within one year of project completion (roads could stay open for one year after project completion to allow for firewood cutting, weed control or other short-term uses of the road). Project completion refers to all work associated with a project including, but not limited to timber harvest, thinning, seeding, broadcast burning, pile burning and weed spraying.

Road Density Standards for PCA

Baseline levels of secure core, OMRD, and TMRD will be maintained in each BMU subunit.

The BLM will monitor administrative use of closed roads for 3 years to determine the baseline using surveys and road counters. After baseline levels are determined, the field office will identify the appropriate level of administrative use. After the appropriate level of administrative use is identified, this type of use will be monitored. How long-term administrative use is monitored will be identified by each field office.

Exceptions to administrative use could be granted for longer term projects (such as habitat restoration activities, salvage logging, etc.) after analysis of the effects to grizzly bear have been completed and disturbance to the bear has been considered and minimized to the extent possible. Another exception to administrative use is for monitoring/documenting trespass livestock.

Vegetation Standards and Guidelines for Zone 1

Standards

All proposed management activities will be evaluated for their effects on grizzlies and/or their habitats. Vegetation manipulation projects will be designed to minimize impacts to or improve grizzly bear habitat unless the project is designed primarily to benefit a Federally Listed species.

Timber sale contracts will include a clause providing for cancellation or temporary cessation of activities if needed to resolve a grizzly-human conflict situation (i.e. such as kill sites). Prior to beginning work all contractors, operators and their employees will be informed of safe procedures for working and recreating in grizzly country.

Contracts will include a clause prohibiting firearms on site during operations related to the contracts. Carrying of bear pepper spray will be recommended to contractors.

Contractors, operators and contractor employees must follow food/attractant storage orders.

Contractors must get approval before camping on BLM lands.

Fire camps must follow food/attractant storage orders.

Activities that will permanently reduce habitat quality or quantity, reduce the population of grizzly bear or cause bears to be conditioned to human food or presence will not be permitted.

Vegetation structure, density, species composition, patch size, pattern, and distribution will be managed in a manner to maintain or improve grizzly bear habitat across the landscape.

Whitebark pine restoration will be promoted at suitable sites. Whitebark pine is a minor component of the forests on BLM lands in Zone 1.

Guidelines

Silvicultural treatments, restoration activities, and prescribed burning may be used to improve grizzly bear habitat.

Silvicultural treatments in forested cover should provide a balance of all successional stages at the landscape scale.

Vegetation and fuels management activities should occur at a time or season when the area is of little or no biological importance to grizzlies.

Livestock Grazing Habitat Standards – for Zone 1 Unless Otherwise Identified

No sheep allotments will be allowed in Zone 1.

The use of sheep and goats for the purpose of weed control will be allowed and follow existing Federal/State permitting processes.

In areas currently unleased, no new livestock grazing allotments will be created for any class of livestock in Zone 1.

If BLM acquires lands that were grazed before the acquisition occurred, grazing will be allowed for livestock but not for sheep. If monitoring data indicates over utilization or other land health issues, the number of AUMs could be reduced and the season of use modified.

If BLM acquires lands that were not grazed before the acquisition occurred, grazing allotments will not be allowed.

Within Zone 1, the BLM will include a clause in all new and revised grazing permits/leases requiring the permittee/lessees to properly treat or dispose of livestock carcasses to eliminate any potential attractant for bears. The BLM will work with the permittee/lessee and MFWP on the appropriate manner and location of carcass disposal.

Within Zone 1, the BLM will include a clause in all new and revised grazing permits/leases requiring the permittee/lessee to notify the BLM as soon as practical of any grizzly bear depredation on livestock or conflicts between grizzly bears and livestock, even if the conflict does not result in the loss of livestock.

Apiaries permitted on BLM lands must be enclosed within an approved and operating electric fence as described in the NCDE Food Storage Order. Currently, there are no permitted apiaries on BLM lands in Zone 1.

Livestock salting/minerals will be allowed in all Zones.

Oil and Gas Leasing Standard – for the PCA and Zone 1

No Surface Occupancy for all BLM and split estate lands in Zone 1.

Stipulation: No Surface Occupancy. Surface occupancy and use is prohibited within the boundary of the Grizzly Bear Recovery Zone and Management Zone 1.

Objective: To avoid surface disturbing and disruptive activities in the Grizzly Bear Recovery Zone (called the PCA in this Conservation Strategy) and Management Zone 1.

Exception: An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect grizzly bears or grizzly bear habitat. If the authorized officer determines that the action may have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in close coordination with MFWP.

Modification: This stipulation may be modified if the authorized officer, in coordination with MFWP determines a portion of the area is no longer important to grizzly bear conservation or the boundaries of the stipulated area may be modified if the area can be occupied without adversely affecting grizzly bears or grizzly bear habitat.

Waiver: This stipulation may be waived if the authorized officer, in coordination with MFWP, determines that the entire leasehold can be occupied without adversely affecting grizzly bears or grizzly bear habitat.

Mining Standards for Zone 1

Mining standards would be the same for Zone 1 as described for the PCA in the Conservation Strategy.

Developed Sites Standards and Guidelines in Zone 1

Guidelines

The BLM will try to prevent changes in the capacity of sites or creating new developed sites but this will not always be possible. Any potential detrimental effects to bears will be mitigated to the best of BLM's ability.

Where conflicts occur between grizzly bear and humans, the BLM will consider elimination of dispersed camping.

New communication site users will be grouped into existing facilities at established communication sites, to the extent practicable, to reduce impacts and expedite application processing.

New right-of-way facilities will be located within or adjacent to existing rights-of-way, to the extent practicable, in order to minimize adverse environmental impacts and the proliferation of separate rights-of-way.

Standards

Any proposed increase, expansion, or change of use of developed sites will be analyzed, and potential detrimental and positive impacts documented through project evaluation by the BLM. Areas with high risk of grizzly bear/human interaction (such as riparian areas) will be avoided.

All new developed sites will have mandatory food storage regulations in place as well as education kiosks.

Communication site plans will be completed prior to authorizing communication site uses in new areas.

Right-of-way applications across roads that have been closed or have seasonal restrictions will be analyzed on a case-by-case basis.

Food/Attractant Storage Strategy for Zones 1 and 2

Introduction

Grizzly bear occurrence is increasing on BLM lands along with an increase in human population and recreational use within the region. In order to reduce the potential for negative human/wildlife conflicts related to accessibility to food, refuse, and other attractants, the Bureau of Land Management (BLM) has developed food storage orders for all BLM managed lands in Zones 1 and 2 identified in the Grizzly Bear Conservation Strategy.

The purpose of these restrictions are to minimize grizzly bear-human conflicts and, thereby, provide for visitor safety and recovery of the grizzly bear within the Northern Continental Divide Ecosystem (NCDE).

Communication Plan

To educate and inform the public before food storage orders take effect, one or more of the following will be implemented starting upon adoption of the Conservation Strategy:

- Development of press releases for local newspapers, television and radio stations.

- Development of flyers, brochures, and educational materials.

- Development of kiosk notices and signage to be installed at various BLM campgrounds, boat launches, parking areas, and other locations with concentrated recreational use.

- Internal and external dissemination of information to agencies, local governments, clubs, schools, permittees, contractors, outfitters/guides, non-governmental organizations, and the general public.

Management Practices

- Special Food Order requirements will be applied to BLM lands in Zones 1 and 2 and will be in effect from April 1 to December 1, annually.
- Bear-resistant containers may be placed and maintained at priority BLM locations having the potential for concentrated human activity, such as: campgrounds, trailheads, parking areas, and boat launches.
- The BLM lands in Zone 2 would be placed under mandatory food storage orders except where superseded by site specific regulations such as those for designated campgrounds or developed recreation sites. This exception would mostly be in the high use, high traffic recreation sites (e.g. along the Missouri River) where congestion and urban interface make food storage orders difficult to implement and of marginal effectiveness when considering other activities in the area.

- For campgrounds and recreation areas without specific regulations, the BLM would review the specific needs of each facility and determine the appropriate food storage restrictions. Mandatory or voluntary food storage orders could be implemented depending on the location of the site and the types of habitat. In additions, there could be a phased-in schedule in conjunction with infrastructure upgrades and public education efforts.
- Should the frequency bear-human interactions (including black bear) increase in the vicinity of recreation facilities, the BLM would modify those areas where mandatory food storage orders would apply.

Under this food storage order it is required that:

The following restrictions will be implemented in the Missoula, Butte and Lewistown Field Offices within the PCA, Zone 1 and Zone 2. These restrictions shall remain in effect until rescinded or revoked. Violations for these prohibitions are punishable by a fine of not more than $1,000 or imprisonment for not more than 12 months, or both (FLPMA Section 303 43 U.S.C. 1733).

1. Human, pet and livestock food (except baled or cubed hay without additives or salt for livestock), and garbage should be attended or stored in an approved bear-resistant manner: Food, garbage, and other attractants, including all livestock grain and pellets, should be stored using an approved storage technique when camp is unattended.

2. Wildlife carcasses, birds, fish or other animal parts that are within 1/2-mile of any camp or sleeping area should be stored in a bear-resistant manner during nighttime hours: If a wildlife carcass is within an attended camp during daytime hours it may be on the ground.

3. Attractants (such as food leftovers or cooking grease) should not be buried, discarded, or burned in an open campfire:

- Leftover food or food waste products may be placed in an appropriate, sealed container and packed out with garbage.
- Leftover food or other attractants may be burned in a contained stove fire.
- Attractants may be placed into a suitable container (i.e. tin can) to prevent leaching into the ground and burned over an open campfire. Any remaining attractants unconsumed by burning should be placed with other garbage and packed out.

4. Approved bear-resistant containers will meet the following criteria: A securable container constructed of solid material capable of withstanding 200 foot-pounds of energy applied by direct impact. Only commercial and personal-use bear-resistant containers, approved for use by the USDA, Forest Service, Missoula Technology and Development Center (MTDC), should be used.

5. The responsible party shall report the death and location of any livestock to a BLM or Forest Service Official within 24 hours of discovery. In some very remote areas, it may not

be possible to meet the 24-hour requirement. In these special cases, the responsible party shall report to a BLM or Forest Official the discovery of any dead livestock within 48 hours.

The following persons may be exempt from this order (The BLM State Director is delegated the authority to grant the exemption in writing):

- Persons with a permit specifically authorizing the prohibited act or omission.
- Any Federal, State, or local officer, or member of an organized rescue or firefighting force in the performance of an official duty.

Definitions

Attended – At least one adult person (attendee) is physically present within 100 feet of attractants during daytime hours. During the nighttime hours, all attractants must be within 50 feet of the attendee, or attractants must be stored in a bear-resistant manner.

Attractant – Food as defined below and garbage from human, livestock or pet foods.

Food – Any nourishing substance, which includes human food or drink (canned, solid or liquid), livestock feed (except baled or cubed hay without additives) and pet food.

Attendee – An adult (18 years of age or older) in control of attractants.

Bear-resistant container – A securable container constructed of solid material capable of withstanding 200 foot-pounds of energy applied by direct impact. The container, when secured and under stress, will not have any openings greater than one-quarter (1/4) inch, that would allow a bear to gain entry by biting or pulling with its claws.

- Bear-resistant manner – Any attractants, including food and garbage, stored in one of the following ways if unattended:
- Secured in a hard-sided camper or vehicle trunk or cab or trailer cab.
- Secured in a hard-sided dwelling or storage building.
- Suspended at least 10 feet up (from the bottom of the suspended item) and 4 feet out from any upright support, i.e. tree, pole.
- Stored in an approved bear-resistant container.
- Stored within an approved and operating electric fence.
- Stored in any combination of these methods, or
- Stored by methods other than those described in Section #6, a-f, that are approved in writing by the BLM.

Contained fire stove – a metal stove that completely encloses the fire.

Daytime – 1/2-hour before sunrise until 1/2-hour after sunset.

Nighttime – 1/2-hour after sunset until 1/2-hour before sunrise.

Livestock – A domesticated animal, such as mule, horse, llama, or goat.

Wildlife carcass – The body, or any parts thereof, of any deceased wild animal, bird, or fish.

An approved electric fence will meet at a minimum the following specifications –

- The fence will be set up as a "tight wire" fence. The wire will be tight and under tension, not loose or sagging.
- Minimum fence height = 4 feet.
- Minimum post height = 5 feet.
- Maximum spacing between posts = 8 feet.
- Conductors (wire): Minimum of 7 wires, with 6-10 inch spacing between wires. Bottom wire must be within 2 inches of the ground. All wire must be smooth metal fence wire of at least 16 gauge or poly wire, except the top wire which may be poly tape of at least six strand stainless steel.
- The system will be set up to operate both as a ground wire return and a grounded system. The 2 top wires will be hot, with all other wires alternating hot and ground. The minimum length ground rod is 2 feet.
- Fence charger (minimum): (1) stored energy of 0.7 joules; (2) tested peak output of 5000 volts; (3) 40 shocks per minute. User must be able to test electrical output in the field.
- The charger must be made inaccessible to disturbance from a bear. The charger may be stored within the interior of the fence or located a minimum of 10 feet above ground.
- Minimum distance between fence and items enclosed by electric fence = 3 feet.

APPENDIX 12

Lead Agencies and Tribes Responsible for Monitoring Population and Habitat

Task	BLM	GNP	USFS	USFWS, Refuges	BIR	CS&KT	DNRC	MFWP	APHIS	USFWS-Recovery Office
Annual GIS layer updates and reporting motorized access and developed sites & livestock allotments	L	S	L		S	S	S	S		
Habitat management	L	L	L	L	L	L	L	L		
Habitat condition (isotope ratio & body condition monitoring)		S			S	S		L		
Prepare habitat monitoring report	S	S	L	S	S	S	S	S		
Limiting mortality to sustainable levels								L		
Distribution of females w/ offspring		S			S	S		L		
Radio collar and monitor sample of females to calculate survival and mortality thresholds		S	S		S	S		L		S
Conflict management and response		L	S		L	L		L	L	S
Prepare annual population monitoring and conflict report		S			S	S		L		
Public outreach and education		L	L		L	L	S	L	S	S

Parameters Under this Conservation Strategy