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# DRAFT Desired Conditions Helena and Lewis & Clark National Forests



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# **DRAFT Desired Conditions**

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**Abstract:** The Helena and Lewis & Clark National Forests have developed this DRAFT Desired Conditions document in accordance with the 2012 National Forest System land management planning rule (planning rule) adopted by the U.S. Department of Agriculture.



## *Table of Contents*

<b>Chapter 1. Overview</b> .....	<b>1</b>
<b>Introduction</b> .....	<b>1</b>
Document Organization.....	1
<b>Desired Conditions</b> .....	<b>2</b>
<b>Distinctive Roles and Contributions of the Helena and Lewis &amp; Clark National Forests</b> .....	<b>3</b>
Social and Economic Characteristics.....	3
Ecological Characteristics.....	4
Cultural and Historical Characteristics.....	6
<b>Chapter 2. Proposed Forestwide Desired Conditions</b> .....	<b>7</b>
<b>1. Introduction</b> .....	<b>7</b>
<b>2. Terrestrial Ecosystems</b> .....	<b>7</b>
Introduction.....	7
<b>2.1 Terrestrial Vegetation</b> .....	<b>8</b>
2.1.1 All Terrestrial Ecosystems.....	8
2.1.2 Forested Ecosystems.....	9
2.1.3 Plant Species of Interest.....	18
2.1.4 Fire.....	18
2.1.5 Rangelands and Nonforested Ecosystems.....	19
2.1.6 Noxious Weeds.....	22
<b>2.2 Terrestrial Wildlife</b> .....	<b>24</b>
2.2.1 All Species.....	24
2.2.2 Threatened, Endangered, Proposed and Candidate Wildlife Species.....	25
2.2.3 Wildlife Species of Conservation Concern (SCC).....	26
2.2.4 Other Wildlife Species.....	26
<b>3. Watershed, Aquatic, Soil, and Air</b> .....	<b>27</b>
Introduction.....	27
3.1 Watersheds and Water Quality.....	27
3.2 Wetlands and Riparian Areas.....	28
3.3 Aquatic Habitat and Species.....	28
3.4 Soil.....	29
3.5 Air Quality.....	31
<b>4. Benefits to people: multiple uses and ecosystem services</b> .....	<b>32</b>
Introduction.....	32
4.1 General Contributions to Social and Economic Sustainability.....	33
4.2 Outdoor Recreation.....	33
4.3 Scenery and Aesthetics.....	33
4.4 Livestock Grazing.....	33
4.5 Timber.....	34
4.6 Other Forest Products.....	35
4.7 Watershed.....	35
4.8 Fish and Wildlife.....	35
4.9 Energy and Minerals.....	35
4.10 Wood for Fuel.....	35
4.11 Clean Air.....	36

4.12 Cultural and Historical Resources .....36

4.13 Inspiration and Nonuse Values .....36

4.14 Research and Education.....36

4.15 Carbon storage and sequestration.....36

4.16 Partnerships and Coordination .....36

**5. Recreation Settings, Opportunities, Access, and Scenery .....37**

5.1 Sustainable Recreation .....37

5.2 Recreation Settings .....37

5.3 Recreation Opportunities – Developed Recreation .....38

5.4 Recreation Opportunities – Dispersed Recreation .....38

5.5 Recreation Access .....39

5.6 Recreation Special Uses .....39

5.7 Recreation Information, Interpretation, and Education .....40

5.8 Scenery.....40

**6. Designated Areas.....41**

Introduction .....41

6.1 Designated Wilderness .....41

6.2 Recommended Wilderness Areas .....42

6.3 Wilderness Study Act Areas .....42

6.4 Inventoried Roadless Areas (IRAs) and the Roadless Area Conservation Rule .....42

6.5 Eligible Wild and Scenic Rivers.....43

6.6 Nationally Designated Trails .....43

6.7 Lewis and Clark National Historic Trail Interpretive Center .....43

6.8 Nationally Significant Caves .....44

6.9 Research Natural Areas.....44

6.10 Special Areas .....45

6.11 Scenic Byways .....45

**7. Renewable and Nonrenewable Energy, Mineral Resources, and Geology .....45**

Introduction .....45

Desired Conditions.....46

**8. Infrastructure .....47**

Introduction .....47

Desired Conditions.....47

**9. Cultural and Historical Resources and Uses .....48**

Introduction .....48

9.1 Cultural Resources .....48

9.2 Areas of Tribal Importance .....49

**10. Land Status and Ownership, Land Uses, and Access Patterns .....49**

Introduction .....49

Desired Conditions.....50

**Chapter 3. Proposed Geographic Area Desired Conditions ..... 51**

**Introduction.....51**

**Big Belts Geographic Area.....53**

General Overview .....53

Unique Characteristics .....54

Desired Conditions.....55

**Castles Geographic Area .....55**

General Overview ..... 55  
 Desired Conditions ..... 56

**Crazies Geographic Area ..... 57**  
 General Overview ..... 57  
 Unique Characteristics ..... 57  
 Desired Conditions ..... 58

**Divide Geographic Area ..... 58**  
 General Overview ..... 58  
 Unique Characteristics ..... 59  
 Desired Conditions ..... 59

**Elkhorns Geographic Area ..... 60**  
 General Overview ..... 60  
 Unique Characteristics ..... 61  
 Desired Conditions ..... 62

**Highwoods Geographic Area ..... 62**  
 General Overview ..... 62  
 Unique Characteristics ..... 63  
 Desired Conditions ..... 63

**Little Belts Geographic Area ..... 64**  
 General Overview ..... 64  
 Unique Characteristics ..... 65  
 Desired Conditions ..... 65

**Rocky Mountain Range Geographic Area ..... 66**  
 General Overview ..... 66  
 Unique Characteristics ..... 68  
 Desired Conditions ..... 69

**Snowies Geographic Area ..... 70**  
 General Overview ..... 70  
 Unique Characteristics ..... 71  
 Desired Conditions ..... 72

**Upper Blackfoot Geographic Area ..... 72**  
 General Overview ..... 72  
 Unique Characteristics ..... 73  
 Desired Conditions ..... 74

List of Acronyms/Abbreviations ..... 77

Glossary ..... 79

### *List of Tables*

Table 1. Desired conditions forestwide for tree species presence <sup>a</sup> (percent of HLC NFs) .....	9
Table 2. Desired conditions forestwide for forest cover type proportions <sup>a</sup> (percent of HLC NFs) .	9
Table 3. Desired conditions by forested potential vegetation group for tree species presence <sup>a</sup> (percent of HLC NFs within the setting where species is present) .....	10
Table 4. Desired conditions by forested potential vegetation group for cover types <sup>a</sup> (percent of HLC NFs within the setting where species is present) .....	10
Table 5. Desired conditions forestwide for forest size classes <sup>a</sup> (percent of HLC NFS lands).....	11
Table 6. Desired conditions forestwide for forest density classes <sup>a</sup> (percent of HLC NFS lands)...	12
Table 7. Desired conditions by potential vegetation group for forest size class (percent of HLC NFs in the potential vegetation group in the size class) .....	12
Table 8. Desired conditions by potential vegetation group for forest density class (percent of HLC NFs in the potential vegetation group in the density class) .....	12
Table 9. Desired conditions of old growth forest forestwide and by potential vegetation group	15
Table 10. Desired range in average snags per acre of all conifer species as measured across all forested acres of the HLC NFs, by potential vegetation group and snag diameter class.....	16
Table 11. Desired range in average total tons per acre of downed woody material > 3” diameter, within each potential vegetation group across the HLC .....	17
Table 12. Desired range of % of the area that contains large and very large live tree components <sup>c, d, e</sup> , forestwide and within each potential vegetation group.....	17
Table 13. Potential vegetation groups and associated historic plant communities .....	21
Table 14. Current estimate and desired trend of rangeland and nonforested communities across the HLC NFs .....	22
Table 15. Soil ecological functions with attributes, indicators, and desired future conditions ....	30
Table 16. Acres within the ten GAs on the HLC NFs, within the administrative boundary .....	51

### *List of Figures*

Figure 1. Helena and Lewis & Clark National Forests vicinity map.....	2
Figure 2. GAs of the Helena and Lewis & Clark National Forests .....	52

# Chapter 1. Overview

## Introduction

The Helena and Lewis & Clark National Forests (HLC NFs) are in the process of revising their land and resource management plans (“forest plan” or “land management plan”). The two plans were both approved in 1986 and forest personnel are in the early stages of revising these plans into one plan under the guidance of the 2012 Planning Rule.

Forest personnel completed the *Assessment of the Helena and Lewis & Clark National Forests* in March of 2015. Preparation of this assessment included evaluating the best available scientific information (BASI), forest plan amendments, and annual monitoring reports. Additionally, outcomes from public meetings and other outreach efforts were considered.

The *Preliminary Need to Change* document was prepared during the spring and summer of 2015. This document identified the current plan direction that needs to be revised (added, modified, deleted) to address the conditions, trends, and risks evident from the assessment analysis. Public workshops were held and feedback received in ten communities across the two forests. The requirements of the 2012 Planning Rule, findings from the HLC NFs Assessment, changes in conditions and demands since the 1986 Forest Plans, and public concerns to date highlighted several areas where changes are needed to the current plans to necessitate plan revision.

Both the Assessment and the Need to Change documents are available at <http://www.fs.usda.gov/goto/hlc/forestplanrevision>

The next step in the forest plan revision process is to determine the desired conditions forestwide and by geographic area (GA). Revision team members have consulted with forest and regional personnel and have prepared this draft document.

## Document Organization

This document is organized into three chapters:

**Chapter 1** is the overview and describes the plan revision process and where the Forests are in the process, what is meant by desired conditions, and the distinctive roles and contributions of the Forests.

**Chapter 2** contains the proposed forestwide desired conditions related to terrestrial ecosystems (vegetation and wildlife); watershed, aquatic, soil, and air; benefits to people: multiple uses and ecosystem services; recreation settings, opportunities, access, and scenery; designated areas; renewable and nonrenewable energy, mineral resources, and geology; infrastructure; cultural and historical resources and uses; and land status and ownership, land uses, and access patterns.

**Chapter 3** contains the proposed GA desired conditions. Desired conditions specified at the geographic area level are those that are not adequately addressed by forestwide desired conditions. The HLC NFs are divided into ten GAs.

Following chapter 3 is a list of acronyms/abbreviations and a glossary.

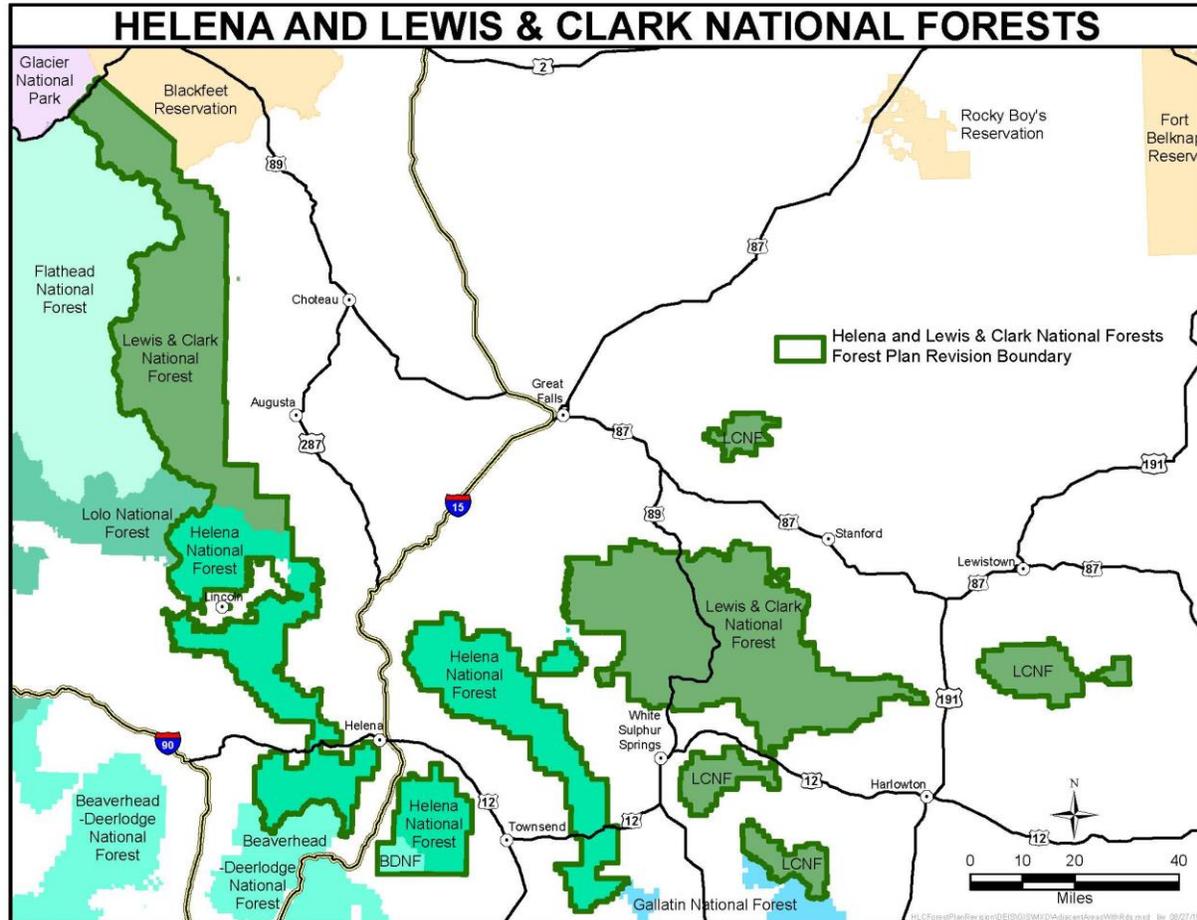


Figure 1. Helena and Lewis & Clark National Forests vicinity map

## Desired Conditions

A desired condition (DC) is a description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but not include completion dates (36 CFR 219.7(e)(1)(i)).

DCs essentially set forth the desired landscape of the future and the other plan components give guidance on how to get there. DCs should be developed within the context of the plan area's distinctive roles and contributions. DCs are not commitments or final decisions approving projects and activities. The DC for some resources may currently exist, or for other resources may only be achievable over a long time period.

This document presents two types of DCs as follows:

- Forestwide DCs apply across the landscape, but may be applicable to specific areas as designated on a map.
- Geographic area (GA) desired conditions are specific to an area or place, such as a river basin or valley, and reflect community values and local conditions within the area. GA desired conditions describe

what we want to achieve in specific GAs that are not necessarily covered by forestwide DCs. While all resources have been considered, the only DCs specified for a GA are those that are not adequately addressed by forestwide DCs. They do not substitute for or repeat forestwide DCs. These DCs allow us to focus on specific circumstances in specific geographic locations. The HLC NFs are divided into ten GAs (see chapter 3).

Specifically, this document identifies the draft DCs and is part of the transition from the Need to Change document to the proposed action. Management area (MA) desired conditions will be developed in future revision efforts in the upcoming months.

## Distinctive Roles and Contributions of the Helena and Lewis & Clark National Forests

The description of the plan area's distinctive roles and contribution within the broader landscape reflects those things that are truly unique and distinctive (36 CFR 219.2(b)). This description is important because it is a source of motivation or reasons behind desired conditions. The following are considered when describing the plan area's distinctive roles and contributions within the broader landscape:

- Distinct attributes of the plan area, or distinct benefits (uses, values, products, and services) provided by the plan area to the broader landscape;
- Important and relevant at the local, regional, and/or national level; and
- Contribute toward social, economic, and ecological sustainability.

### Social and Economic Characteristics

The HLC NFs serve as a backdrop, workplace, and playground for not only the small rural communities of central Montana, but also for visitors from around the world. The incredible scenery of the area contributes to community identity, sense of place, and quality of life. Deeply rooted in the culture and traditions of both Native American and early Euro-American settlers, the Forests' recreation settings and opportunities are enhanced by the many visible and accessible remnants of the past. A network of historic trails and roads gives visitors a chance to follow in the footsteps of the Native Americans, the Lewis and Clark expedition, and miners in search of silver and gold. Historic cabins and lookouts continue to serve as overnight destinations for today's visitors.

There is a wide variety of recreation opportunities available throughout the HLC NFs. These year-round opportunities range from highly developed sites to more primitive and dispersed recreation opportunities. Recreation opportunities include nonmotorized, motorized, developed, and dispersed recreation on land, water, and in the air. Visitors to the Forests come from near and far to enjoy these recreation opportunities, with 60% of visitors travelling from within a 75 mile radius to access the Forests. Seventeen percent of the visitors travel from over 500 miles away and 25% of visitors are from foreign countries. Nineteen percent of those visitors from foreign countries are from Canada.

Unique developed recreation opportunities include cabin and lookout rentals, historic lodges, two regionally significant ski areas, and a large visitor center that focuses on the journey of Lewis and Clark. Dispersed recreation opportunities include a network of motorized and nonmotorized roads and trails that provide access for hunting, fishing, and camping. Winter recreation includes extensive trail networks for snowmobiling, cross country and downhill skiing, snowshoeing, and dogsledding. Outfitter and guides provide additional access to unique backcountry, hunting, and floating opportunities along the Smith River.

The Forests contain over 500,000 acres of designated wilderness including portions of the Bob Marshall and Scapegoat Wilderness Areas and the entire Gates of the Mountains Wilderness Area. Additionally, approximately 50% of the Forests are allocated as inventoried roadless areas (IRAs). These IRAs, when combined with designated wilderness, provide for vast landscapes that allow for more primitive recreation experiences.

The Forests' recreation programs contribute to the economic sustainability of central Montana's rural communities. Both jobs and revenue directly and indirectly result from visitors' travel to the Forests. The remoteness of the Forests' recreational settings encourages visitors to stop and buy groceries, gas, and other supplies to support their motorized or nonmotorized recreation experiences. More jobs and revenue are directly associated with the Forests' outfitter and guide operations, downhill ski areas, and visitors to the Lewis and Clark National Historic Trail Interpretive Center.

The HLC NFs have contributed to the forest products industry, which has been a dominant feature of some local economies. Although the volume of timber harvest has declined, the industry continues to be important in some GAs, providing forest products to meet local and national needs. Timber harvest is an important tool for achieving other resource objectives, such as hazardous fuels reduction, increasing forest resiliency, and modifying wildlife habitat.

Livestock grazing is a prominent multiple use in many areas, owing to the native grass and shrub lands on the HLC NFs. This use contributes to local economies and the historic character of the landscape.

Wildlife-related activities (hunting, fishing, wildlife viewing) are important to residents of Montana, as well as to those visiting the state. Hunting is an important social and economic activity throughout central Montana. The mountain ranges of the HLC NFs also provide the nearest opportunity for hunters coming from the Midwestern and eastern U.S. where they can experience hunting in the mountain west. Numerous small communities in central Montana provide lodging and services to out-of-area and out-of-state hunters using NFS lands.

In addition, the Forests provide abundant water for drinking and downstream uses as well as four municipal watersheds: Tenmile Creek (Helena), McClellan Creek (East Helena), Shorty and O'Brien Creeks (Neihart), and Willow Creek (White Sulphur Springs).

## Ecological Characteristics

The HLC NFs straddle the Continental Divide in central Montana, and are characterized by the topographical transition between western mountainous terrains and eastern prairie grasslands. Bisected by the Missouri River, the area supports a wide diversity of vegetation due to its geographic extent, topography, and climate. Vegetation ranges from grassland prairie, to dense coniferous forests on foothills and mountain slopes, to sparse vegetation on cold, steep, high-elevation sites. The elevation ranges from about 3,000 feet along the Missouri River to over 9,000 feet on mountain peaks. Landforms include flat grassland, rolling foothills, and steep mountains. The HLC NFs stretch over 150 miles north to south and 200 miles east to west. The plan area is made up of a series of distinctive landscapes and "island" mountain ranges, identified as GAs. The dissected nature of the area has unique implications for ecosystem function.

The planning area extends into three distinct ecoregion sections: the Belt Mountain Section, the Bitterroot Valley Section, and the Rocky Mountain Front Section (USDA 1994). The Belt Mountain section encompasses most of the plan area east of the Rocky Mountain Front. These areas are characterized by high mountains, gravel-capped benches, and intermontane valleys bordered by terraces and fans. Plains and rolling hills surround the isolated mountain ranges. The climate is cold continental,

with temperature extremes common in the winter months; strong winds are common throughout the year. Precipitation ranges from 10-40", with maximum occurring in the spring and early fall; winter precipitation is snow. Much of the area is foothills prairie and dry conifer forest. The Bitterroot Valley section covers some portions of the Upper Blackfoot and Divide GAs west of the Continental Divide, and is characterized by high, glaciated mountains with alpine ridges and cirques at higher elevations and glacial and lacustrine basins at lower elevations. Climate is cool-temperate with some maritime influence. Precipitation ranges from 14-80"+, and most of the precipitation in fall, winter, and spring is snow. The section supports substantial conifer forest and foothills prairie. The Rocky Mountain Front section covers the Rocky Mountain Range GA in the northeastern part of the planning area. It is characterized by glaciated mountains with limestone scarps and ridges interspersed with glacial and lacustrine intermontane basins. The climate is cold continental, with severe chinook winds and dramatic fluctuations of winter temperatures. Precipitation ranges from 18-100"+, with maximum precipitation occurring from spring through early summer and winter precipitation being snow. Foothill prairies make up an extensive proportion of vegetation, occurring on lower elevation foothills, with conifer forests and aspen above 4000'.

The HLC NFs are inhabited by hundreds of species of native mammals, birds, fish, reptiles, amphibians and invertebrates. The diversity of wildlife species is enhanced by the diverse ecology and large geographic span of the planning area. A number of wildlife species are at either the eastern or western edge of their range on the HLC NFs, with some (e.g., Canada lynx, flammulated owl, Lewis's woodpecker, harlequin duck) occurring only in the eastern or western GAs. A number of carnivore species occur, including black bear, mountain lion, pine marten, and wolverine.

Grizzly bears are present in the westernmost GAs. The Rocky Mountain Range and Upper Blackfoot GAs are part of the Northern Continental Divide Ecosystem (NCDE) for grizzly bears, and within the NCDE grizzly bear Recovery Zone. The grizzly bear population is currently expanding eastward from the Rocky Mountain Range GA into historic habitat on the plains, and southward into the Divide GA. Grizzly bears occasionally moving south through the Divide, Elkhorns, and possibly the Big Belts GAs may provide some genetic connectivity with the population of grizzly bears in the Greater Yellowstone Ecosystem.

The Rocky Mountain Range, Upper Blackfoot, and Divide GAs also support Canada lynx, and are wholly or partly within Unit 3 of Critical Habitat for Canada lynx as designated under the Endangered Species Act (ESA). The remaining GAs are not occupied by Canada lynx and provide much less in the way of potential lynx habitat. These GAs are geographically isolated from the rest of the northern Rockies lynx population.

The HLC NFs span the Continental Divide, with the portions to the west of the divide draining into the Upper Clark Fork and Blackfoot Rivers and the portions to the east draining into the Missouri River. Prominent streams include the Upper Blackfoot and Blackfoot Rivers west of the divide and multiple prominent drainages within each GA east of the divide, including the Sun and Judith Rivers. The networks of streams within the GAs are important aquatic ecosystems that support diverse riparian and wetland areas. Several bull trout fisheries occur on the west side of the divide, and westslope cutthroat trout inhabit multiple streams on both sides of the divide.

The HLC NFs also have thirteen research natural areas (RNAs), which are part of a national network of ecological areas for research, education, and maintenance of biological diversity. Additionally, the HLC NFs is home to the Tenderfoot Creek Experimental Forest where research focuses on the sustainable productivity and biodiversity of lodgepole pine forests and watersheds.

## Cultural and Historical Characteristics

Historically, the plan area was the ancestral homeland and travel way of native bands now referred to as the Assiniboine, Blackfeet, Chippewa Cree, Confederated Salish and Kootenai, Crow, Eastern Shoshone, Gros Ventre, Sioux, Nez Perce, Northern Arapahoe, Northern Cheyenne, Shoshone-Bannock, and Little Shell Tribes (Aaberg et al 2007; Knight 1989; Deaver 1995). Most prominent among these groups found in the plan area were those historically known as the Blackfeet, Gros Ventre, Salish, Shoshone, and Kootenai. Today, these groups retain an active culture with an unbroken tie to the greater plan area.

The plan area's landscape is characterized by broad, flat, river valleys and a wide variety of mountains ranging from the peaks of the Rocky Mountain Front to the rolling uplands of the Belts. The Continental Divide passes north-south through the plan area. The landscape is significant to archaeological history because it strongly influenced aboriginal travel and settlement patterns. Aboriginal use of the plan area over the centuries is manifest in hundreds of archaeological, sacred sites, and other areas of traditional cultural importance.

Approximately 1,851 cultural resource sites are currently identified on the HLC NFs. In accordance with criteria in 36 CFR 60.4, eight cultural resources are listed on the National Register of Historic Places (NRHP). In addition to the NRHP listed sites, one Traditional Cultural Property District (TCP) related to tribal cultural values, and two National Historic Trails are identified. Another 944 cultural resources have been formally determined to be eligible for listing on the NRHP by the Forest Service and the Montana State Historic Preservation Officer but are not yet formally nominated to the NRHP. Some 1,507 cultural resource sites are not yet evaluated and therefore are considered to be significant or NRHP eligible and require management consideration by the HLC NFs. To date, some 344 cultural resource sites have been formally determined to be historically insignificant and not eligible for listing on the NRHP and may fall outside of management concern.

## Chapter 2. Proposed Forestwide Desired Conditions

This chapter is organized by topic, similar to the Assessment and the Need to Change documents, but with a few changes. Climate Change and Carbon Stocks (chapter 4 in the Assessment) are key parts of the development of plan components, and have therefore been integrated into the resource sections where appropriate. Social, Cultural, and Economic Conditions (chapter 5 of the Assessment) and Multiple Uses and Ecosystem Services (chapter 6 of the Assessment) have been combined into one section called Benefits to People: Multiple Uses and Ecosystem Services.

This document therefore includes the following topics:

1. Introduction
2. Terrestrial Ecosystems (vegetation and wildlife)
3. Watershed, Aquatic, Soil, and Air
4. Benefits to People: Multiple Uses and Ecosystem Services
5. Recreation Settings, Opportunities, Access, and Scenery
6. Designated Areas
7. Renewable and Nonrenewable Energy, Mineral Resources, and Geology
8. Infrastructure
9. Cultural and Historical Resources and Uses, and
10. Land Status and Ownership, Land Uses, and Access Patterns

### 1. Introduction

This chapter contains proposed desired conditions that apply forestwide, unless more stringent or restrictive direction is found in chapter 3. Other Forest Service direction including the retained direction (see chapter 1), laws, regulations, policies, executive orders, and Forest Service directives (manual and handbook) are not repeated here. The desired conditions are described here as they relate to the HLC NFs.

The HLC NFs intend to move toward these proposed forestwide desired conditions over the next 10 to 15 years, although they may not all be achieved for many decades. Some desired conditions may be very difficult to achieve, but it is important to move toward them over time.

Plan components are developed that together provide for ecological sustainability and contribute to social and economic sustainability in the plan area, as well as the broader landscape (FSH 1902.12.23). The Plan must be within the inherent capability of the plan area, Forest Service authority, and the fiscal capability of the unit (36 CFR 219.1(g)).

### 2. Terrestrial Ecosystems

#### Introduction

This section addresses the proposed forestwide desired conditions for the terrestrial ecosystems of the HLC NFs. Integrated plan components are designed to maintain ecological sustainability and diversity of plant and animal communities, taking into account the effects of a changing climate.

The 2012 Planning Rule adopts a complementary ecosystem and species-specific approach, known as a coarse-filter/fine-filter approach, to provide for the diversity of plant and animal communities and the long-term persistence of native species in the plan area. The coarse-filter plan components are designed to maintain or restore ecological conditions for ecosystem integrity and ecosystem diversity in the plan area within agency authority and the inherent capability of the land. Fine-filter plan components are designed to provide for additional specific habitat needs, when those needs are not met through the coarse-filter components. Habitat for most animal species would be managed via coarse-filter components.

## **2.1 Terrestrial Vegetation**

### **2.1.1 All Terrestrial Ecosystems**

#### **Introduction**

The HLC NFs support a wide diversity of plant communities growing on sites that range from warm, dry foothills and prairies to cold, steep timberline ecosystems. These communities support a diverse assortment of plants and animals. The characteristics of plant and animal communities are influenced by fixed site features such as soils and topography which interact with dynamic system drivers such as climate, vegetative succession, fire, insects, disease, invasive species, and human uses and developments.

The strategy for the HLC NFs is to maintain and/or restore the full spectrum of ecosystem biodiversity in the planning area. This is essential to ensure the integrity and sustainability of the ecosystem, and its ability to provide desired ecological, social, and economic services. The HLC utilizes the concept of natural range of variability (NRV) to describe native ecosystem diversity of key vegetation characteristics.

The following sections describe desired conditions that collectively contribute to biodiversity across the plan area. Biodiversity is the variety and abundance of plants, animals, and other living organisms and the ecosystem processes, functions, and structures that sustain them. Biodiversity includes the relative complexity of species and communities across the landscape at a variety of scales, connected in a way that provides for the genetic diversity to sustain species over the long-term. Some desired conditions apply forestwide; others are specific to individual GAs, MAs, and/or potential vegetation types. For additional information refer to the *Assessment of the Helena and Lewis & Clark National Forests* and the *Helena and Lewis & Clark Forests Natural Range of Variation for Forest Plan Revision Summary Report*.

#### **Desired Conditions**

- 01** Vegetation occurs across the landscape in a diverse pattern of species compositions and structures within the NRV. Desired conditions are resilient, having the capacity to maintain or regain normal functioning following disturbances (such as fire or large-scale insect outbreaks), and in the face of a changing climate. Post-disturbance conditions include effective recovery and re-establishment of vegetation as appropriate. Vegetation is dynamic, varying across time and space as influenced by site conditions, climate, and processes such as succession, fire, insects and disease, floods, and droughts.
- 02** Vegetation conditions provide habitat requirements for viable populations of plant and animal species of conservation concern (SCC), threatened or endangered (T&E) species, and other species of management interest, based upon the inherent capability of HLC NFS lands.
- 03** Plant communities across the HLC are composed of a diverse mix of native grass, forb, shrub and tree species, with a diverse structure and pattern that contribute to the survival, reproduction, and dispersal of native terrestrial wildlife, insect, avian, and pollinator species as well as desired nonnative species.

- 04** The pattern of vegetation across the landscape provides for adequate habitat connectivity, dispersal, and genetic interchange for native plant and animal species. Patterns support potential range shifts of plant and animal species that may occur in response to climate change.
- 05** Permitted lands special uses, recreation areas, administrative sites, infrastructure, utility corridors, mine repositories and reclamation sites are managed for purposes specific to the site, and the vegetation desired conditions described Section 2 are not necessarily applicable.

## 2.1.2 Forested Ecosystems

### Introduction

Forested ecosystems on the HLC NFs are classified based on their potential vegetation as warm dry types, cool moist types, or cold types. While Douglas-fir and lodgepole pine are the most common tree species on the HLC NFs, the planning area also supports ponderosa pine, limber pine, aspen, whitebark pine, subalpine fir, Engelmann spruce, cottonwood, and Rocky Mountain juniper.

### Desired Conditions

- 01** The HLC NFs support a diversity of native tree species and forest cover types within the NRV. Forestwide desired conditions for the presence of major species and proportions of cover types are displayed in Table 1 and Table 2. Table 3 and Table 4 display the desired condition for each forested potential vegetation group across the HLC NFs.

**Table 1. Desired conditions forestwide for tree species presence<sup>a</sup> (percent of HLC NFs)**

Tree species	Current estimate <sup>b</sup> %	Desired trend
Limber pine	12% (10-15%)	Increase and maintain at the upper end of the NRV range.
Rocky mountain juniper	4% (3-5%)	Decrease and maintain at the lower end of the NRV range.
Ponderosa pine	6% (4-8%)	Increase and maintain at the upper end of the NRV range.
Douglas-fir	48% (45-52%)	Decrease and maintain within the NRV range.
Lodgepole pine	40% (36-44%)	Maintain within the NRV range.
Subalpine fir	31% (27-34%)	Decrease and maintain at the lower end of the NRV range.
Engelmann spruce	26% (23-29%)	Maintain within the NRV range.
Quaking aspen	3% (1-3%)	Increase and maintain at the upper end of the NRV range.
Whitebark pine	12% (10-15%)	Increase and maintain at the upper end of the NRV range.

a. Presence refers to the existence of at least one live tree of the species per acre, in any size class.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced by the Forest Inventory and Analysis (FIA) and intensified grid program.

**Table 2. Desired conditions forestwide for forest cover type proportions<sup>a</sup> (percent of HLC NFs)**

Forested Cover Type	Current estimate <sup>b</sup> (%)	Desired trend
Ponderosa Pine	8% (6-10%)	Increase and maintain at upper end of NRV range.
Dry Douglas-fir	16% (13-19%)	Slightly decrease and maintain within the NRV range.
Mixed Mesic Conifer	15% (12-17%)	Maintain within the NRV range.
Lodgepole Pine	29% (26-33%)	Maintain within the NRV range.
Aspen/Hardwood	1% (0.5-2%)	Increase and maintain at upper end of NRV range.
Spruce Fir	15% (12-18%)	Decrease and maintain at lower end of NRV range.
Whitebark Pine	4% (2-5%)	Increase and maintain at upper end of NRV range.

a. Cover types are groups that reflect the most common tree species in the stand.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced by the Forest Inventory and Analysis (FIA) and intensified grid program.

**Table 3. Desired conditions by forested potential vegetation group for tree species presence<sup>a</sup> (percent of HLC NFs within the setting where species is present)**

Potential Vegetation Group	Tree Species	Current estimate <sup>b</sup> (%)	Desired trend
Warm-Dry	Aspen	3% (2-5%)	Increased ponderosa pine and limber pine. Decreased small Douglas-fir and juniper. Lodgepole pine maintained at mid to low end of desired range. Pure or nearly pure stands of Douglas-fir are present on sites not suitable for limber or ponderosa pine. In big game winter range, species with full crowns, (Douglas-fir and ponderosa pine) are well-represented. Aspen expands where site conditions allow. Spruce and fir are minor components limited to the wettest/coolest sites. Whitebark pine is maintained but is not a primary component.
	Rocky Mountain juniper	8% (6-11%)	
	Limber pine	16% (12-20%)	
	Ponderosa pine	15% (11-19%)	
	Douglas-fir	73% (69-78%)	
	Lodgepole pine	26% (21-31%)	
	Engelmann spruce	5% (3-7%)	
	Subalpine fir	1% (0.5-2%)	
	Whitebark pine	2% (1-4%)	
Cool-Moist	Aspen	3% (1-4%)	Presence of Douglas-fir maintained or increased particularly large size classes. Increased whitebark and limber pine on suitable sites. Lodgepole pine maintained at mid to lower end of desired range. In Canada lynx habitat, subalpine fir and Engelmann spruce are maintained in the understory, but decreased in the overstory. Pure stands of subalpine fir or Engelmann spruce are present, but more commonly stands will contain Douglas-fir and/or lodgepole pine. Pure or nearly pure stands of lodgepole pine are present where frequent moderate or stand-replacing wildfires have occurred. Aspen extent is increased. Ponderosa pine may occur but is not likely to thrive.
	Rocky Mountain Juniper	<1% (0-1%)	
	Limber pine	10% (6-14%)	
	Ponderosa pine	<1% (0-1%)	
	Douglas-fir	42% (36-48%)	
	Lodgepole pine	53% (47-59%)	
	Engelmann spruce	47% (41-53%)	
	Subalpine fir	51% (45-57%)	
	Whitebark pine	12% (8-16%)	
Cold	Aspen	<1% (0-1%)	On exposed sites and other areas where whitebark pine is likely to persist, there is decreased subalpine fir and increased whitebark pine. On gentler slopes especially in lynx habitat, subalpine fir and/or Engelmann spruce is present in the understory, but decreased in the overstory. Lodgepole pine is maintained, especially where subalpine fir is the only species. Aspen is maintained or increased on suitable sites. Douglas-fir may occur but is not likely to thrive.
	Rocky Mountain Juniper	<1% (0-1%)	
	Limber pine	8% (4-13%)	
	Douglas-fir	14% (9-20%)	
	Lodgepole pine	52% (44-60%)	
	Engelmann spruce	36% (29-46%)	
	Subalpine fir	60% (52-67%)	
		Whitebark pine	

a. Presence refers to the existence of at least one live tree of the species per acre, in any size class.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base, from data produced from the Forest Inventory and Analysis (FIA) and FIA intensified grid program.

**Table 4. Desired conditions by forested potential vegetation group for cover types<sup>a</sup> (percent of HLC NFs within the setting where species is present)**

Potential Vegetation Group	Cover Type	Current estimate <sup>b</sup> (%)	Desired trends and conditions
Warm-Dry	Ponderosa pine	15% (11-19%)	The ponderosa pine cover type is increased. Ponderosa pine and dry Douglas-fir types make up
	Dry Douglas-fir	37% (31-42%)	

Potential Vegetation Group	Cover Type	Current estimate <sup>b</sup> (%)	Desired trends and conditions
	Mixed Mesic Conifer	16% (12-20%)	a substantial proportion of these settings. Mixed mesic conifer and lodgepole pine stands occur on higher elevation sites on moist aspects. Aspen is maintained and increased as conifer encroachment is reduced. The spruce/fir cover type is limited to the coolest/wettest sites.
	Lodgepole pine	19% (15-24%)	
	Aspen/Hardwood	2% (0.5-3%)	
	Spruce/fir	<1% (0-1%)	
Cool-Moist	Ponderosa pine	3% (1-5%)	Mixed mesic conifer and lodgepole pine cover types continue to dominate. The lodgepole pine type should be maintained at the low end of the range, and mixed conifer type increased slightly. The whitebark pine cover type is present on colder sites after stand replacing disturbance and is maintained/increased. The aspen cover type is increased. The spruce/fir cover type is maintained in lynx habitat areas and the coolest/wettest sites but decreases to the low end of the desired range.
	Dry Douglas-fir	1% (0-2%)	
	Mixed Mesic Conifer	22% (17-27%)	
	Lodgepole pine	37% (31-43%)	
	Aspen/Hardwood	1% (0.2-3%)	
	Spruce/fir	24% (19-29%)	
	Whitebark pine	3% (1-5%)	
Cold	Ponderosa pine	2% (1-5%)	Increase the amount of the setting in the whitebark pine cover type and decrease the proportion in the lodgepole pine and spruce/fir cover types. The spruce/fir cover type should be decreased and maintained at the mid to lower end of the desired range. Other cover types may occur in small amounts but are not likely to thrive on these sites.
	Dry Douglas-fir	<1% (0-2%)	
	Mixed Mesic Conifer	4% (2-7%)	
	Lodgepole pine	40% (32-48%)	
	Spruce/fir	31% (24-38%)	
	Whitebark pine	12% (7-17%)	

a. Cover types are groups that reflect the most common tree species in the stand.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced from the Forest Inventory and Analysis (FIA) and Intensified Grid program.

**02** The HLC NFs support a distribution of forest size and density classes within the NRV that reflect the natural distribution of successional stages, growth rates, and productivity. Table 5 and Table 6 display the desired Forestwide proportions of size and density class. Table 7 and Table 8 display the desired condition for each potential vegetation group. The amount and distribution of size and density classes will fluctuate over time as forests develop and change in response to disturbances.

**Table 5. Desired conditions forestwide for forest size classes<sup>a</sup> (percent of HLC NFS lands)**

Forest size class and successional stage	Current estimate <sup>b</sup> (%)	Desired trend
Seedling and sapling (<5" d.b.h. <sup>c</sup> ); early successional	16% (13-20%)	Increase and maintain within NRV.
Small tree (5-9.9" d.b.h.); mid successional	39% (36-42%)	Decrease and maintain within NRV.
Medium tree (10-14.9" d.b.h.); mid successional	24% (21-26%)	Decrease and maintain within NRV.
Large tree (>15-19.9" d.b.h.); mid-late successional	7% (5-8%)	Increase and maintain within NRV.
Very large tree (>20" d.b.h.); late successional	2% (1-3%)	Increase slightly to be within NRV.

a. The *predominant* diameter class of live trees, calculated as basal area weighted average diameter. A stand in a forest size class may contain trees of multiple diameters.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced from the Forest Inventory and Analysis (FIA) and FIA Intensified Grid program.

c. diameter [at] breast height (4.5 feet above ground level).

**Table 6. Desired conditions forestwide for forest density classes<sup>a</sup> (percent of HLC NFS lands)**

Forest density class	Current estimate <sup>b</sup> (%)	Desired trend
Nonforested (0-9% CC. <sup>c</sup> )	19% (16-22)	Increase and maintain within NRV.
Low Tree Density (10-24.9% CC)	8% (6-9)	Increase and maintain within NRV
Low-Moderate Tree Density (25-39.9% CC)	11% (9-13)	Increase and maintain within NRV.
Moderate-High Tree Density (40-59.9% CC)	26% (23-29)	Decrease and maintain within NRV.
High Tree Density (>=60% CC)	36% (33-40)	Decrease and maintain within NRV.

a. Defined as the average density of live trees, calculated as % canopy cover.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced from the Forest Inventory and Analysis (FIA) and FIA Intensified Grid program.

c. % canopy cover, or the percent of the land area covered by the vertical projection of live trees.

**Table 7. Desired conditions by potential vegetation group for forest size class (percent of HLC NFs in the potential vegetation group in the size class)**

Potential Vegetation Group	Forest size class <sup>a</sup>	Current estimate <sup>b</sup> (%)	Desired trend
Warm-Dry	Seed/Sapling	12% (8-16%)	Decrease medium classes; increase large tree, very large tree, and seedling/sapling to be within the NRV.
	Small	38% (33-43%)	
	Medium	25% (21-29%)	
	Large	10% (7-13%)	
	Very large	4% (2-6%)	
Cool-Moist	Seed/Sapling	15% (10-22%)	Decrease medium classes; increase large tree and seedling/sapling to be within the NRV.
	Small	43% (37-48%)	
	Medium	26% (22-31%)	
	Large	6% (3-8%)	
	Very large	<1% (0-1%)	
Cold	Seed/Sapling	28% (19-38%)	Increase large and very large classes; maintain seedling/sapling and reduce the small tree class to be within the NRV.
	Small	39% (33-46%)	
	Medium	19% (14-24%)	
	Large	3% (1-5%)	
	Very Large	<1% (0-1%)	

a. Seed/Sapl <5 in. diameter [at] breast height (d.b.h.); Small 5-10" d.b.h.; Medium 11-15 in. d.b.h.; Large >15 in. d.b.h.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base, from data produced from the Forest Service's Inventory and Analysis (FIA) program.

**Table 8. Desired conditions by potential vegetation group for forest density class (percent of HLC NFs in the potential vegetation group in the density class)**

Potential Vegetation Group	Forest density class <sup>a</sup>	Current estimate <sup>b</sup> (%)	Desired trend
Warm-Dry	Nonforested	18% (14-22%)	Decrease mod/high and high density classes, and increase the low and low/mod density classes to be within the NRV.
	Low	9% (6-12%)	
	Low/Moderate	14% (11-17%)	
	Moderate/High	27% (22-31%)	
	High	33% (28-37%)	
Cool-Moist	Nonforested	14% (10-19%)	Decrease high density class to the lower end of the NRV range; maintain other
	Low	5% (3-7%)	

Potential Vegetation Group	Forest density class <sup>a</sup>	Current estimate <sup>b</sup> (%)	Desired trend
	Low/Moderate	10% (7-13%)	density classes within the NRV.
	Moderate/High	27% (23-32%)	
	High	44% (39-50%)	
Cold	Nonforested	18% (13-25%)	Decrease mod/high and high density classes and increase the low and low/mod density classes to be within the NRV.
	Low	10% (6-15%)	
	Low/Moderate	10% (7-15%)	
	Moderate/High	26% (20-32%)	
	High	35% (28-42%)	

a. Defined as the average density of live trees, calculated as % canopy cover.

b. Estimated mean across HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced from the Forest Inventory and Analysis (FIA) and FIA Intensified Grid program.

- 03** Forest patches range in size, shape and condition. Patches of early successional seedling/sapling forests are dispersed among patches of small, medium and large forest size classes, forming a pattern consistent with the NRV. This pattern contributes to resilience at the stand and landscape scale and to habitat connectivity. Small patches are most common especially in warm dry forest types, but very large patches also occur especially in cool moist types.
- 04** Desired conditions, patches, and pattern for each forested potential vegetation type are described below. These conditions provide the full range of natural variation and associated habitat needs.
- **Warm-Dry:** This setting represents roughly **42%** of the HLC NFs. This potential vegetation group includes hot and dry habitat types at low elevations adjacent to grass and shrub communities. On these sites, limber pine is the climax species and the community is often dominated by limber pine or ponderosa pine, with lesser components of Rocky Mountain juniper and/or Douglas-fir. The group also includes ponderosa pine and dry Douglas-fir habitat types, where ponderosa pine and/or Douglas-fir dominate with open canopy structure and bunchgrass understories. In addition, moderately warm and dry Douglas-fir habitat types are included where Douglas-fir dominates with minor components of ponderosa pine or lodgepole pine. Rocky Mountain juniper can be an understory component in some forests in the absence of fire. Aspen occurs in mesic microsites and is maintained by frequent fire. Small amounts of Engelmann spruce are present on the wettest microsites and riparian areas. These vegetation types are tied strongly to terrain, aspect, elevation, and disturbance history. Forest patterns are shaped primarily by non-lethal surface fire that results in minimal overstory mortality, edge, and patch size; overstory mortality is generally less than 20% although there may be pockets of mixed severity where mortality is greater than 20%. Frequent, non-lethal, low intensity fire maintains the dominance of fire-resistant species and promotes open, often multi-aged structures, but there may be areas protected from frequent fire that burn less often than the surrounding vegetation. Fires maintain a mosaic of grass and shrublands interspersed throughout the landscape and a shifting distribution of the dry limber pine/juniper transition zone.

The desired condition includes relatively small patches of different sizes, shapes, and forest conditions that form a complex pattern with high heterogeneity at the stand level. These patches could be created with different management activities, including prescribed fire or wildfire. Early successional patches are interspersed with similarly sized patches of medium and larger sized trees. Though some early successional patches are even aged, most are two-aged or multi-aged since overstory trees remain as scattered individuals, small groups, or patches. This diverse structure persists as the seedling/sapling trees grow into the small, medium and large size classes.

Individuals or small groups of very large trees occur across the landscape, at varying densities, reflecting the widespread presence of fire tolerant species (ponderosa pine and Douglas-fir). Grass, forb or shrub-dominated vegetation types occur in this matrix in canopy gaps and in the understory of open forests. Stand densities range widely. In areas where fuel conditions on HLC NFS lands currently pose the highest wildfire threat to communities and community assets, wildland fuel will be modified so the threat is decreased to a manageable level.

- **Cool-Moist:** This setting represents approximately **33%** of the HLC NFs. It encompasses cool moist, cool wet, and cool moderately dry to moist habitat type groups where subalpine fir, Engelmann spruce, or lodgepole pine are the climax species and Douglas-fir and aspen are commonly present. Limber pine can occur as well, typically on limestone substrates. Other species associated with drier sites, such as ponderosa pine and Rocky mountain juniper, occur in minor amounts. Western larch is found primarily in the Upper Blackfoot GA and very rarely on the Rocky Mountain Range GA. Whitebark pine may be found in the coldest sites where disturbance has provided suitable conditions for establishment. Lodgepole pine forests tend to grow in large even-aged patches whereas the more shade tolerant species develop additional canopy layers and have smaller patch sizes. Forest patterns often reflect the variation that occurs in mixed and stand-replacing fire regimes. Mixed severity regimes are essentially a combination of fire intensities ranging from non-lethal, low intensity surface fire, group torching, and some amount of stand-replacing fire that creates patches of intermediate size and an abundant amount of edge; overstory mortality generally ranges from 20 to 80%. A crown fire or stand-replacing fire is a moderate to high intensity fire with nearly complete overstory mortality creating large patch sizes with an intermediate amount of edge.

The desired condition and landscape pattern is commonly even-aged, single canopy forest patches in the early (seedling/sapling) and mid-successional stages of forest development that may result from active vegetation management and/or natural disturbances and processes. Early successional openings across this landscape are highly variable in size. Over time, large patches of even-aged, single canopy forests may become more diverse in size and structure, as understory canopy layers of shade tolerant trees develop and other disturbances (such as insects, disease, fires) create smaller patches of different tree sizes, species, or stand structures. Large fire-tolerant overstory trees occur at low to moderate density unevenly distributed across the landscape, and are predominantly Douglas-fir or Engelmann spruce. Most forests are moderately to densely stocked with trees, except where wildland fuel conditions pose a threat to communities or other values. In these areas, the vegetation may be modified to reduce the threat and most forest stands are low or moderately stocked with trees to achieve desired forest and fuel conditions.

- **Cold:** This potential vegetation group covers approximately **21%** of the HLC NFs. It includes cold and cold timberline habitat type groups, where whitebark pine is either the climax species or a dominant seral component in cold and dry subalpine fir climax types or lodgepole pine climax types. Whitebark pine is the most common component, but some sites are dominated by Engelmann spruce, subalpine fir, or lodgepole pine. Whitebark pine regeneration occurs in recently burned areas. Limber pine can also occur, particularly in areas with a limestone substrate. Other species occur rarely, but do not thrive on these harsh sites. Forest patterns generally reflect the variation that would occur in nonlethal (low intensity), mixed, and stand-replacing fire regimes. Nonlethal fires, resulting in less than 20% tree mortality, generally occur where fuels are sparse and discontinuous, weather conditions are not conducive for fire growth, and fuel moisture is too high to effectively carry fire. Mixed severity fires are common and result in approximately 20 to 80% tree mortality across the fire area. Mixed severity fires often occur in stands of whitebark pine that may have a component of lodgepole pine, but stand densities tend to be open

and surface fuels are dominated by compact vegetation such as grouse whortleberry (*Vaccinium scoparium*). The presence of moderate amounts of subalpine fir or contiguous lodgepole stands may tend to burn as a crown fire or stand-replacing fire under the right conditions, with tree mortality generally greater than 80%; the resulting early successional openings are highly variable in size.

The desired condition and landscape pattern is driven primarily by natural disturbances and processes but management may occur. A diverse pattern which includes forested and non-forested vegetation with multiple age classes of trees reflects the influence of disturbances and the complex relationship of site and environmental conditions that prevent or delay tree establishment and growth. Variable size patches of small, medium or large trees are intermingled with grass/forb/shrub openings. Forest characteristics within patches are variable, usually composed of multiple canopy layers, tree ages and size classes. Tree density is dictated by site conditions and varies from very low (less than 20% canopy cover) on harsh sites and steep slopes with shallow soils to high density in moist basins. The highest elevations and most exposed sites have trees that may exhibit a “krumholz” form – stunted, with twisted stems and crowns that are dense at the ground level. On ridges, steep slopes, or drier sites, trees of all sizes have lower density and groundcover is often low-growing and sparse. Whitebark pine should be a dominant component on many sites, where frequent disturbance limits the establishment and persistence of subalpine fir. Fires create conditions suitable for regeneration of whitebark pine trees, which provide forage for species such as Clark’s nutcrackers and grizzly bears. An increase in suitable sites for regeneration is desired so blister rust resistance can be increased through natural selection. The more gently sloped, moist basin areas are more densely stocked (e.g., 40 to 60% canopy cover), providing cover interspersed with forage. Moister or more protected sites support shrub species.

- 05** Maintain the abundance, type, and distribution of old growth in forested potential vegetation types within the NRV (Table 9). The desired condition is generally an increasing trend in patch sizes. Old growth develops as a result of natural processes or management.

**Table 9. Desired conditions of old growth forest forestwide and by potential vegetation group**

Potential Vegetation Group	Current Estimate <sup>a</sup>	Desired composition, structure and other ecological conditions of old growth
General forestwide conditions	13% (11-16%)	Old growth forests at the landscape and stand-level are resilient, persisting over time as a dynamic but enduring component within the natural range of variability. Old growth is resistant to undesirable impacts from insects, disease, wildfire, drought and potential climate change. As old growth dies, younger stands develop into old growth. Old growth forest is represented across the forest in amounts, distributions, and patch sizes that provide for wildlife habitat needs. The distribution, patch size and average percentage of old growth will vary over time as influenced by disturbances and processes. Old growth contains a substantial amount of the associated components that provide high quality habitat, such as large snags; large live trees with heart rot or broken tops; large diameter down woody material; and a diversity of tree size classes.
Warm Dry	8% (6-11%)	Ponderosa pine and Douglas-fir are the most common species in the large, old tree class. Forest canopy is relatively open, and the structure is either single canopy or small patch mosaic (patches typically less than one acre) where there are two or more tree size classes interspersed with patches of shrubs, forbs, and grasses. Old growth should be more abundant in this setting than in the cool moist setting due to the long-lived tree species present and natural nonlethal, high fire frequency disturbance regimes.
Cool Moist	17% (13-22)	Many of these forests are dominated by lodgepole pine, which can develop into old growth but is often not long-lived and subject to stand replacing disturbances such as fire and mountain pine beetle. Therefore the natural proportion of old growth should be

Potential Vegetation Group	Current Estimate <sup>a</sup>	Desired composition, structure and other ecological conditions of old growth
		lower in this type than in warm dry settings. It is desirable for old growth in this setting to include long-lived species such as Douglas-fir, Engelmann spruce, and subalpine fir. Large, old Engelmann spruce are common in riparian areas and sites with high soil moisture. Overall tree density is moderate to high, with wide diversity in tree sizes. Stands often have two or more canopy layers. Small gaps in upper canopy layers are associated with dense patches of understory trees.
Cold	17% (12-23%)	Engelmann spruce, subalpine fir, and/or whitebark pine are the most common species in the large, old tree class. Over time, large, old whitebark pine should increase within old growth stands in some portions of this setting. Tree density varies depending upon soil development and climatic conditions. Patch size of old growth is variable and develops under a mixed severity to stand-replacing fire disturbance regime.

a. Estimated mean across all HLC NFS lands, rounded to the nearest whole number. Lower and upper bounds at 90% confidence interval. R1 Summary Data Base; data produced from the Forest Inventory and Analysis (FIA) and FIA Intensified Grid program.

**06** Snags, particularly of large and very large size, are maintained within the NRV, contributing to forest structure and habitat. Snag distribution, density, size, and species vary by potential vegetation group, cover type, successional stage and stand history. Snags are unevenly distributed and dynamic over time. The highest densities of snags occur in burned areas and forests impacted by insect infestations. The lowest densities of snags occur along roads, in areas accessible to firewood cutting close to communities, in developed sites or other areas where the concern for human safety is elevated, and in fuel breaks. Species that are windfirm and grow to large sizes, such as ponderosa pine and Douglas-fir, are preferred as snags. Desired conditions for snag are displayed in Table 10, measured as an average for the entire HLC or potential vegetation group. Individual stands may have no snags, or a higher number of snags, depending upon site-specific conditions and disturbance history.

**Table 10. Desired range in average snags per acre of all conifer species as measured across all forested acres of the HLC NFs, by potential vegetation group and snag diameter class**

Scale	Current estimate <sup>a</sup> (15+in. d.b.h. <sup>b</sup> )	Desired Range average snags per acre 15+in. d.b.h. <sup>c</sup>	Current estimate (20+ in. d.b.h.)	Desired Range in average snags per acre 20+ in. d.b.h. <sup>c</sup>
Forestwide	2.14	1.9-4.9	0.7	0.3-1.6
Warm-Dry	2.14	0.6-2.9	0.9	0.1-0.5
Cool Moist	2.18	0.0-4.9	0.5	0.7-2.1
Cold	2.72	2.2-5.1	0.7	0.0-1.4

- a. Data source: R1 Summary Data Base (Forest FIA program), rounded to the nearest 10<sup>th</sup>. 15"+ estimates include trees >20".
- b. diameter [at] breast height (4.5 feet above ground level)
- c. Forestwide ranges based on the estimated number of snags in wilderness areas, R1 Summary Database, rounded to the nearest tenth. Ranges by vegetation type are interpreted from the snags found in wilderness areas as reported in Bollenbacher 2008 for similar vegetation groups.

**07** Downed woody material is maintained within the NRV. Down woody material, especially of large sizes, contributes to long-term nutrient cycling, structural diversity, and habitat. Downed wood is highly variable in amount, sizes, species and stages of decay across space and time. The desired conditions for down woody material greater than 3” diameter are displayed in Table 11. Ranges are an average across all forested acres. Amounts on the low end will generally be found on hot, dry sites; areas where concern for fire hazard is elevated. Amounts on the high end will generally be found in more moist sites; areas with lower direct human influence, such as wilderness or unroaded areas; and in areas that burned in the recent past or have had recent insect/disease infestations. Individual stands

may have no down wood, or a much higher amount of down wood, depending upon site conditions and disturbance history.

**Table 11. Desired range in average total tons per acre of downed woody material > 3" diameter, within each potential vegetation group across the HLC**

Potential Vegetation Group	Current estimate <sup>a</sup> (ton per acre)	Desired Range of average tons per acre >3" diameter
Warm-Dry	4	3–30
Cool-Moist	10	10–50
Cold	10	10–60

a. Data source: R1 Summary Data Base, rounded to the nearest whole number, from the Forest Inventory and Analysis (FIA) program. Current estimates do not fully capture the results of the recent mountain pine beetle outbreak, as many dead trees are still standing. Therefore there is an expected upward trend.

**08** Large and very large tree components are maintained within the NRV. These components may occur in any forest size class and are not mutually exclusive (i.e., an area might have both a large and very large tree component). The desired condition is for an upward trend in the distribution of large and very large live trees, with a focus in the warm dry potential vegetation type and long lived species such as ponderosa pine and Douglas-fir. These trees contribute to diversity of structure, resilience and recovery after disturbance, habitat sustainability. They provide opportunity for development into future late successional forest, and for long-term recruitment of large rotten trees and snags. Presence, distribution, density, size and species are variable across space and time. They are unevenly distributed and vary by potential vegetation group, cover type, successional stage, and stand history.

**Table 12. Desired range of % of the area that contains large and very large live tree components<sup>c, d, e</sup>, forestwide and within each potential vegetation group**

Potential Vegetation Group	Current estimate <sup>a</sup> Large Tree	Desired Range Large Tree	Current estimate <sup>a</sup> Very Large Tree	Desired Range Very Large Tree
Forestwide	14% (12-17%)	Maintain	9% (7-11%)	Maintain
Warm-Dry <sup>b</sup>	15% (12-18%)	Increase	12% (9-16%)	Increase
Cool-Moist <sup>c</sup>	17% (13-21%)	Maintain	8% (5-11%)	Maintain
Cold <sup>d</sup>	10% (6-14%)	Maintain	3% (1-5%)	Maintain

a. Data source: R1 Summary Data Base, Forest Inventory and Analysis (FIA) program, rounded to the nearest whole number.

b. Warm Dry: Very Large Tree indicates there are at least 8 trees per acre greater than or equal to 20" diameter. Large Tree indicates there are at least 10 trees per acre greater than or equal to 15" diameter.

c. Cool Moist: Very Large Tree indicates there are at least 10 trees per acre greater than or equal to 20" diameter. Large Tree indicates there are at least 12 trees per acre greater than or equal to 15" diameter.

d. Cold: Very Large Tree indicates there are at least 5 trees per acre greater than or equal to 20" diameter. Large Tree indicates there are at least 5 trees per acre greater than or equal to 15" diameter.

**09** Desired ecological conditions in un-roaded landscapes (such as wilderness, recommended wilderness and some backcountry areas) are primarily achieved as a result of natural ecological processes and disturbances such as fire (both planned and unplanned ignitions). Outside of these landscapes, human influences and actions are more evident and play a larger role in achieving desired conditions.

**10** The diversity and condition of vegetation across the landscape should reduce the extent and intensity of native forest insect and disease activity and effects and maintain these levels within the NRV. Occasional outbreaks occur with frequency and resultant effects that are within the NRV.

- 11 Designated tree improvement areas are managed in accordance with the Regional Tree Improvement Program within the unit's fiscal capability.

### 2.1.3 Plant Species of Interest

#### Introduction

Species of Conservation Concern (SCC) are defined as “Any 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.” (36 CFR 219.9; draft FSH 1909.12.52). SCC may be refined as additional information is gathered and analysis occurs throughout the plan revision process. This document addresses potential SCC as identified through the HLC NFs Assessment and subsequent analysis occurring in coordination with the Regional Forester. Note that some SCC requirements may be adequately addressed under the coarse-filter, ecosystem approach outlined in the 2012 Planning Rule. Only those species for which additional, fine filter components may be needed are specifically addressed here or in the GA sections.

#### Desired Conditions

- 01 Habitat conditions support the recovery of plant species listed as threatened, endangered, proposed, or candidate species under the Endangered Species Act (ESA). Ecological conditions and processes that sustain the habitats currently or potentially occupied by these species are retained or restored.
- 02 Vegetation conditions and ecological processes that currently or potentially support plant species of conservation concern (SCC) and species of management interest are maintained or restored.
- 03 Native plants and plant communities dominate the landscape, while nonnative invasive species are in low abundance and do not disrupt ecological functioning.

### 2.1.4 Fire

#### Introduction

Fire is an important disturbance process within the HLC NFs that has shaped the structure and composition of forested and nonforested ecosystems. Fire can influence the pattern of vegetation across the landscape and is a critical part of the life cycle for many plant and wildlife species.

Fire management strives to balance the natural role of fire while protecting values from adverse impacts. This can be accomplished by implementing a coordinated risk management approach to promote landscapes that are resilient to fire-related disturbances and preparing for and executing a safe, effective, and efficient response to fire. Fire management includes prescribed fire and wildfire, collectively referred to as wildland fire. Prescribed fires are planned ignitions whereas wildfires include unplanned ignitions and prescribed fires that are declared wildfires. The fire season is generally from March through November. Prescribed fire is most common in the spring (March – June) and fall (September – November) and includes ignitions on NFS land, private land and land managed by the State of Montana and other local and federal agencies. Wildfires include unplanned ignitions occurring from lightning or human causes. The height of the wildfire season is mid-July through mid-September and the most common causes of wildfires on HLC NFS lands since 1990 are lightning and campfires.

#### Desired Conditions

- 01 Fire management activities minimize the risk of loss of life and damage to property or ecosystem function. Firefighter and public safety is the first priority in every fire management activity.

- 02** Fire is a key ecological process which creates, restores, and maintains the desired diversity of vegetation conditions. Planned and unplanned (natural) ignitions are managed to promote fire as an ecological process, recognizing its natural role in changing vegetation structure and composition over time as well as driving other ecological functions such as cycling nutrients and creating snags.
- 03** Fires of variable size occur periodically across the HLC NFs, creating recently burned vegetation in amounts, distributions, and patch sizes that provide habitat for associated wildlife. Both planned and unplanned ignitions help achieve desired conditions. Desired characteristics of fire types and burned vegetation are described in this document, Section 2.1.2, Forested Ecosystems, Desired Conditions Item 04.
- 04** In areas where fuel conditions on HLC NFS lands currently pose the highest wildfire threat to communities and community assets (e.g., power lines, communication towers, developed recreation sites, municipal watersheds and infrastructure, major highways and roads, etc), wildland fuel will be modified so the threat is decreased to manageable levels. In these areas, vegetation conditions may vary from the desired conditions specified in Section 2.1.1. Fires in the wildland-urban interface (WUI) result in minimal loss of life, property and characteristic ecosystem function. Forest areas adjacent to WUI are void of heavy down woody fuel and ladder fuels, resulting in non-lethal, low severity surface fires. Firefighters are able to safely and efficiently suppress wildfires in the WUI.
- 05** The full range of fire management activities, including prescribed fire and wildfire, are recognized and used by forest administrators as an integral part of achieving ecosystem sustainability, including interrelated ecological, economic, and social components such as creating desired wildlife habitat, protection of property and other values, and public safety.
- 06** Wildland fires burn along a spectrum of differing intensity (nonlethal to stand-replacing), severity, and frequency that allows ecosystems to function in a healthy and sustainable manner. Wildland fire is accepted as a necessary process integral to the sustainability of the forest's fire-adapted ecosystems.
- 07** Fire management uses an all-lands landscape approach that is risk-based, consistent with current national policy guidance and strategy, adaptable to rapidly changing conditions, and responsive to pertinent fire and social sciences research. Wildfire management is coordinated with relevant state, local, and adjacent federal agencies.
- 08** Community leaders, service providers, business owners, homeowners, and permittees who are invested in or adjacent to the HLC NFs are knowledgeable about wildfire risk. They understand the need to adapt their communities, properties, and structures to the inevitable wildfire while recognizing that wildland fire is an ecological process. The maintenance of ingress and egress routes, defensible space, and fire resistant buildings in addition to reducing potential fire intensity around community assets to allow for direct suppression tactics, are examples of adapting to wildfire.

## 2.1.5 Rangelands and Nonforested Ecosystems

### Introduction

The HLC NFs support a wide variety of rangeland plant communities. Rangeland plant communities are influenced by specific soil and physical characteristics. Variation across the landscape in regards to these characteristics result in differing plant communities. These plant communities are best described as ecological sites. Ecological sites exhibit distinct species composition, structure, function, and associated ecological processes. They differ in their ability to produce distinctive kinds and amounts of vegetation and in their ability to respond similarly to management actions and natural disturbances.

Management actions, climate change, and other disturbances can affect the condition and type of ecological sites realized across a landscape. The strategy for the HLC NFs is to maintain and/or restore a spectrum of rangeland diversity (e.g., range of ecological site types) within the planning area. Diversity lends itself to integrity and sustainability of an ecosystem, as well as its ability to provide the desired ecological, social, and economic services.

Work to fully describe the rangeland ecological sites across the HLC NFs (though ongoing) is not yet completed. As a result, for the purposes of this document, rangeland plant communities have been grouped and described under broad potential vegetation groups. These groups are intended to articulate the historic dominant rangeland plant communities known to occur on the HLC NFs. However, ecological sites and their associated utility are referenced in the desired conditions below to enable the HLC NFs to utilize the best available science for management in future years. It should be noted that as rangeland science evolves, ecological sites may be replaced over time by the current and equally applicable tool(s).

The following sections describe the desired conditions that collectively contribute to the diversity of rangeland ecological sites across the plan area. Many influences on ecological sites are not easily controlled. However, the desired conditions described below are intended to provide for resistant and resilient rangeland plant communities (i.e., ecological sites) and/or identify opportunities to influence rangeland health through management actions.

### **Desired Conditions**

- 01** Native plant communities are protected, maintained, and/or improved through management and/or natural processes so that they support diverse age classes of shrubs and a vigorous, diverse, self-sustaining understory of grasses and forbs relative to site potential, while providing for multiple uses. Site potential should be derived by reviewing the associated ecological site description(s) (or its equivalent as new tools are developed).
- 02** The presence and distribution of the general broad potential rangeland vegetation types (type) are maintained. The associated plant communities for each type are protected, maintained, and/or improved relative to site potential as described under desired condition number 01 above. The historic plant communities for each type are described below:

**Table 13. Potential vegetation groups and associated historic plant communities**

Potential Vegetation Type Group	Description	Historic Plant Community
Xeric Grassland	Bluebunch wheatgrass habitat types.	Xeric Grassland plant communities are the driest of the grassland potential vegetation types. However, they do contain a high diversity of tall and medium height, cool and warm season grasses (e.g., bluebunch wheatgrass, green/Columbia/Letterman's/wester needlegrass), and short grasses (e.g., Sandberg bluegrass). There are abundant forbs at varying amounts. The diversity of plant species present allows for drought tolerance. Individual species can vary greatly in the amount of production depending on growing conditions such as temperature and timing and amount of precipitation. Plants present on these sites typically have strong and robust root systems that allow production to increase considerably with favorable growing conditions. This plant community provides for soil stability and a properly functioning hydrologic cycle. Plant litter is a common component across the site and is available for soil building and moisture retention. Plant litter is properly distributed with very little movement off-site with natural plant mortality typically being low. Bare ground is present because of the warm dry nature of these sites but at low amounts.
Mesic Grassland	Western wheatgrass and fescue habitat types.	Mesic grassland plant communities are typically the most productive grassland potential vegetation types. Typically, the communities have greater amounts of mesic forbs, denser cover, and more species richness. The functional plant groups are typically characterized by long lived, moderately deep rooted cool and warm season grass species (e.g., rough fescue, Idaho fescue, blue gramma, tufted hairgrass, etc.) with a minor component of forbs and some shrubs. Exact species composition will vary by site but introduced species are universally rare in occurrence across these sites. However, bare ground is typically minimal (>3%) across most sites with litter being a common component and available for soil building and moisture retention. Plant litter movement is expected to be limited with plant litter being properly distributed and rarely moving off-site.
Mesic Shrubland	Mesic shrubland habitat types, supporting species such as snowberry, ninebark, and potentilla.	Mesic shrubland plant communities typically occur at higher elevations than those associated with xeric shrubland/woodland sites. These sites are generally more moist and productive than then the xeric sites. Shrub species such as mountain big sagebrush and threetip sage brush are the dominant over story species with gramanoid species (e.g., Idaho fescue) typically dominating the understory. Canopy cover varies depending on the site and growing conditions such as temperature and timing and amount of precipitation, but is typically dense resulting in lower cover of understory species due to the dense canopy of the overstory species.

Potential Vegetation Type Group	Description	Historic Plant Community
Xeric Shrubland / Woodland	Low shrubland (hot and dry); mountain shrubland (higher elevation mesic sites with mountain big sagebrush); xeric shrubland (low elevation, hot and dry with Wyoming and basin big sagebrush); and mountain mahogany and juniper woodlands.	<p>Xeric shrubland plant communities typically occur at lower elevations and are dryer and less productive than those communities associated with mesic shrubland sites. Shrub species such as Wyoming big sagebrush, basin big sagebrush, low sagebrush and black sagebrush dominate the overstory. Exact overstory species present will vary by location and site type. For example low sagebrush tends to occupy the lower, dryer and hotter sites with shallow soils where basin big sagebrush is typically the dominant overstory species within the areas with deeper soils and more plant available moisture. The understory is typically dominated by graminoid species such as needle and thread, Sanberg bluegrass and bluebunch wheatgrass. Canopy cover varies depending on the site and growing conditions such as temperature and timing and amount of precipitation, but is typically low to moderate. Bare ground is present at higher amounts on these sites when compared to mesic shrubland sites. These sites are also considered to be more vulnerable to invasion by exotic annual grasses and noxious weeds due to the lower cover as well as their dryer and more fragile nature.</p> <p>Xeric woodlands are also included in this potential vegetation type group. Like xeric shrublands these sites tend to occupy hot and dry sites and or occupy steep rocky soils. The dominant overstory species will vary by site but include rocky mountain juniper and mountain mahogany. Mountain mahogany is a specific site type which occur in much lower amounts than juniper and are typically isolated to steep rocky soils and rock outcrops. Understory species are similar to xeric shrublands and include bluebunch wheatgrass and needle and thread grass species.</p>

- 03 The presence of rangeland plant communities (in % of HLC NFS lands) across the HLC NFs is maintained and/or restored to be at a level within the NRV. Expansion of conifers and other invasive species into rangeland and nonforested plant communities is reduced so that the overall abundance and health of these communities is within the NRV.

**Table 14. Current estimate and desired trend of rangeland and nonforested communities across the HLC NFs**

Current estimate <sup>a</sup>	Desired Trend
13% (10-15%)	Maintain

a. R1 Summary Data Base; Forest Inventory and Analysis (FIA) and intensified grid program, rounded to the nearest whole number

- 04 Unique and/or limited ecological sites are protected and/or maintained across the HLC NFs relative to site potential.

### 2.1.6 Noxious Weeds

#### Introduction

A species is considered to be invasive if it meets two criteria: (1) it is nonnative to the ecosystem under consideration, and (2) its introduction causes, or is likely to cause economic, or environmental harm or harm to human health (Executive Order 13112, 1999). A noxious weed is defined by Montana Code

Annotated (MCA 7-22-2101) as, “any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities”. Invasive plants are capable of successfully expanding their populations into new ecosystems beyond their natural range and can create lasting impacts to native plant communities. Adverse impacts from invasive species can be exacerbated by interactions with fire, native pests, weather events, human actions, and environmental change.

Multiple factors can affect a habitat’s vulnerability to invasion by nonnative plants. Factors that can increase vulnerability to invasion include 1) increased sunlight, 2) exposed or disturbed soils, and 3) proximity to existing infestation or disturbance, such as along roadsides.

Areas with low vulnerability may include a variety of undisturbed habitats in which the ground surface is densely vegetated. Areas with higher vulnerability include habitats that are subjected to soil disturbance combined with high light levels, such as recently logged areas, landslide areas, riparian areas with regular soil disturbance such as alluvial fans and floodplains, and wetlands with water flow-through. The presence of existing invasive plant infestations adjacent to vulnerable habitats further increases the risk of colonization by nonnative invasive plants.

The following desired conditions are complimentary to other sections of this document that provide for healthy resilient and/resistant plant communities. Natural landscapes, the associated plant communities and the invasive plants that have the potential to impact them are diverse and dynamic. As such, management actions intended to prevent and respond to those potential impacts should be equally dynamic and designed in a manner that allow for and frame an adaptive management approach. The following desired conditions are intended to describe the conditions associated with noxious weeds and the landscapes across the HLC NFs and articulate the platform on which future management actions should be designed to address noxious weeds and other priority invasive plants. These conditions should be addressed within the bounds of resource constraints with future actions balanced with recognition and attention given to the relative return on investment (ROI). ROI is a means to evaluate the conservation benefits of an invasive plant control project in relation to cost (Murdock et al. 2007).

## Desired Conditions

- 01** Integrated pest management practices are utilized (in a strategic and adaptive manner) for vegetation management efforts across resource programs for State of Montana listed noxious weeds and other priority invasive plant species (e.g., cheatgrass) so that:
  - a. New infestations are prevented.
  - b. Densities of existing infestations are reduced.
  - c. Total acres infested are reduced.
  - d. Infested acres are restored / rehabilitated.
  - e. Existing infestations are contained, controlled, suppressed, or eradicated depending on infestation characteristics (e.g., size, density, species, location, etc.), management opportunities, and resource values at risk.
- 02** Strategic management responses, investments, and priorities are established that reduce and/or prevent the introduction and spread of invasive plant species on the HLC NFs to the extent feasible so that:
  - a. New invaders are identified and prevented or eradicated to the extent possible.
  - b. Areas are maintained as weed free to the extent possible.
- 03** A coordinated (internally and externally) invasive plant awareness and education approach is utilized so that:

- a. Invasive plant awareness is maintained and or improved.
- b. Opportunities for cooperators, organizations and members of the public to adopt areas for invasive plant management are provided. This would include one or more of the following; survey, inventory, monitoring and treatment.
- c. Invasive plant education materials are made available at high use areas, Forest Service Offices.

## **2.2 Terrestrial Wildlife**

### **Introduction**

A wide diversity of wildlife species are found on the HLC NFs, supported by the wide diversity of plant communities occurring across both forests. As discussed in the Terrestrial Vegetation section, the strategy for the HLC NFs is to maintain and/or restore the full spectrum of ecosystem biodiversity in the planning area, ensuring the integrity and sustainability of ecosystems, including their component wildlife species. Specifically, the 2012 Planning Rule requires that ecological conditions are provided that “maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area” (36 CFR 219.9). The rule calls for a coarse-filter approach in which maintaining the integrity of ecosystems will maintain the species depending on them. It also directs a fine-filter approach, where needed, in which specific plan components may be required to ensure that the plan area maintains viability, or contributes to maintaining viability of native species, including species of conservation concern (36 CFR 219.9(b)).

Wildlife habitats depend on terrestrial vegetation, so it follows that the desired conditions for terrestrial vegetation are, for the most part, also desired conditions for wildlife habitats. Some specific references to wildlife habitat needs are included in the desired conditions for terrestrial vegetation above. Desired conditions for wildlife are described below where specific, fine-filter plan components may be required, or for needs that exist separately from the described vegetation desired conditions.

Desired conditions for wildlife are relevant at differing scales, including across the entire plan area (forestwide desired conditions). Because the HLC NFs span a large area with a wide diversity of habitat types, and because not all wildlife species and habitats naturally occur in all parts of the plan area, some desired conditions are discussed only for certain geographic areas, in the appropriate sections of this document. Forestwide desired conditions are split into sub-sections: desired conditions relevant to management of all wildlife species or habitats, those specifically relevant to threatened, endangered, proposed, or candidate species, those specifically relevant to species of conservation concern, and those relevant to other species that may be of specific management interest.

### **2.2.1 All Species**

#### **Desired Conditions**

- 01** The diversity of terrestrial wildlife species native to the plan area is retained or restored. Habitats and habitat conditions for terrestrial wildlife species are retained or restored as needed to support populations of wildlife species in the plan area that are resilient and capable of persisting over the long term. (Note: individual GAs include, where appropriate, more specific desired conditions for particular wildlife species or populations).
- 02** Effective interagency coordination occurs, particularly with MTFWP, at all stages of project planning and implementation to ensure consideration of wildlife habitat needs, and goals and objectives for wildlife populations managed by MTFWP or other agencies. Interagency coordination also ensures

that maps, databases, and other information regarding wildlife distribution, seasonal ranges, key habitats, etc. are updated, maintained, and shared in a timely fashion.

- 03** An effective information and education program is implemented, providing community leaders, youth and schools, homeowners, contractors, permittees, and other forest users with information how to work, live, and recreate where wildlife species are present. Particular emphasis is placed on working, living, and recreating safely in bear habitat, and information is provided and routinely made available regarding how to reduce the risk of bear-human encounters, and how to prevent bears from becoming food-conditioned.

## 2.2.2 Threatened, Endangered, Proposed and Candidate Wildlife Species

### Introduction

At the time of this document, there are two species listed under the Endangered Species Act as threatened (grizzly bear and Canada lynx) on the HLC NFs. Forest plan components, including desired conditions, are needed for currently-listed species in order to comply with recovery plans or other required management. If species are de-listed, plan components for those species could be changed.

Desired conditions for the grizzly bear are incorporated from the proposed forest plan amendment to incorporate relevant direction from the Draft NCDE Grizzly Bear Conservation Strategy (Draft CS) (USDI 2013) into the existing Helena, Lewis and Clark, Kootenai, and Lolo National Forest plans and the revised Flathead National Forest plan. The Draft CS and proposed amendment establishes management criteria required to be in place and carried into the future in order for grizzly bears to be de-listed in the NCDE. Therefore this management direction must be carried forward into the revised HLC NFs plan.

Grizzly bears are present in the Rocky Mountain Range and Upper Blackfoot GAs, and are found increasingly in the Divide GA. The Rocky Mountain Range and northern portion of the Upper Blackfoot GA are within the existing Northern Continental Divide Ecosystem (NCDE) Recovery Zone for grizzly bears, and within the Primary Conservation Area (PCA) and Zone 1 identified in the Draft CS and proposed amendment. The Divide, Elkhorns, and Big Belts GAs are within Zone 2 identified in the Draft CS and proposed amendment. Because grizzly bear management outlined in the draft CS and proposed amendment is specific to identified Management Zones, desired conditions for grizzly bears are described in the GA sections that correspond to those zones. The remaining GAs on the HLC NFs fall within Zone 3 identified in the Draft CS and proposed amendment, where no management specific to grizzly bears would be required.

Desired conditions for Canada lynx are based on the 2007 Northern Rockies Lynx Management Direction (NRLMD), amended to existing forest plans as part of requirements identified when the species was listed. If requirements are changed under a Canada lynx recovery plan or other guidance, or if the species is de-listed, plan components for lynx could change. According to the NRLMD, the Rocky Mountain Range, Upper Blackfoot, and Divide GAs are considered occupied by lynx. These GAs are also entirely or partially within Unit 3 of Canada lynx Critical Habitat as designated under the ESA, and are identified as core habitat in the Lynx Conservation Assessment and Strategy (LCAS) (Interagency Lynx Biology Team 2013). Desired conditions for this species are therefore described in those GA sections.

### Desired Conditions

- 01** Habitat conditions support the recovery and persistence of terrestrial wildlife species listed as endangered, threatened, candidate, or proposed species under the ESA, in line with recovery plans or other federal recovery guidance. Ecological conditions and processes that sustain the habitats required by these species, as well as connectivity among those habitats, are retained or restored.

### 2.2.3 Wildlife Species of Conservation Concern (SCC)

#### Introduction

Species of Conservation Concern (SCC) are defined as “Any 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.” (36 CFR 219.9; draft FSH 1909.12.52). SCC may be refined as additional information is gathered and analysis occurs throughout the plan revision process. This document addresses potential SCC as identified through the HLC NFs Assessment and subsequent analysis occurring in coordination with the Regional Forester. Note that some SCC requirements may be adequately addressed under the coarse-filter, ecosystem approach outlined in the 2012 Planning Rule. Only those species for which additional, fine filter components may be needed are specifically addressed here or in the GA sections.

#### Desired Conditions

- 01 Habitat conditions and ecological processes that support wildlife SCC are maintained or restored to contribute to populations that persist over the long term, with sufficient distribution to be resilient and adaptable to stressors and likely future environments.
- 02 Caves and mines that are closed for human safety or cave resource protection, but that provide suitable habitat for Townsend’s big-eared bats, remain accessible to bats. Buildings known to be used as roosts by Townsend’s big-eared bats are retained, if possible, unless risks to human safety cannot be mitigated.
- 03 Peatlands are well connected by wetland and riparian habitats and associated native vegetation, allowing for potential movement of northern bog lemmings.

### 2.2.4 Other Wildlife Species

#### Introduction

Most wildlife species occurring on the HLC NFs are neither listed under the ESA nor identified as SCC, but some are of interest to the public or to Forest or wildlife managers. Most species and habitats that are not considered ‘at-risk’ (FSH 1909.12, Chapter 20, 23.13) are expected to be maintained through application of the coarse-filter, ecosystem approach outlined in the 2012 Planning Rule. Some, however, may warrant management attention because of their specific habitat needs, the potential impacts of management of other resources on their populations or habitats, or because of their importance for hunting, viewing, or other activities. Although there are no desired conditions identified that apply across the entire plan area, individual GAs may have desired conditions for wildlife species that are found in those GAs and are important for the reasons described above.

#### Desired Conditions

- 01 Habitat conditions and ecological processes that support hunted and trapped species are maintained or restored, contributing to populations with sufficient numbers and distribution to provide for hunting and trapping opportunities. Habitat management for hunted and trapped species is informed by MFWP management plans, goals, and objectives.
- 02 Management of potential disturbances (e.g. motorized travel) in big game habitat considers seasonal security needs for hunted species occurring in that area.

## 3. Watershed, Aquatic, Soil, and Air

### Introduction

This chapter describes the desired future conditions for watershed, water quality, wetlands and riparian areas, aquatic habitat and species, soils, and air resources across the HLC NFs planning area.

### 3.1 Watersheds and Water Quality

#### Introduction

The plan area is located in 296 subwatersheds. According to the 2011 Watershed Condition Framework (WCF) data, 103 watersheds were rated as functioning properly, 159 watersheds were rated as functioning at risk, and 34 watersheds were rated as impaired. The biggest sources of impairment overall was aquatic biota (nonnative species), roads and trail issues, and water quality impairment. At the time of this plan revision, there are 6 priority watersheds in the plan area that have planned or ongoing restoration work occurring.

The Montana Department of Environmental Quality (2014) lists fifty-five streams on the HLC NFs as being water-quality impaired. During the last several years, the HLC NFs have been working to restore soil, watershed, and aquatic habitat conditions in these and other impaired streams by implementing best management practices (BMPs), removing excess roads, improving road conditions (reducing sediment), removing fish migration barriers, abandoned mine reclamation, implementing riparian conservation strategies and threatened and endangered species conservation strategies. Some of this work has been accomplished as part of Total Maximum Daily Load (TMDL) implementation plans in cooperation with the State of Montana and Environmental Protection Agency (EPA). Some of this work is also being done through cleanup in Superfund Sites in several watersheds.

#### Desired Conditions

- 01** Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances without long-term, adverse changes to their physical or biological integrity. Watersheds remain in or are moving toward fully functioning conditions as defined by the WCF.
- 02** Where within the FS's span of control, surface and groundwater quality on NFS lands meet or is moving toward meeting applicable state water quality standards and fully supporting beneficial uses across the HLC NFs. Flow and habitat conditions in watersheds, streams, lakes, springs, wetlands, and groundwater aquifers support beneficial uses and meet the ecological needs of native species (including SCC, T&E species and species that may be of other management interest).
- 03** Stream flow regimes maintain natural channel and floodplain dimensions within the natural range of variation. Floodplains are accessible and sediment deposits from over-bank floods allow floodplain development and the propagation of flood-dependent riparian plant species. Surface and subsurface flows provide late-season stream flows, cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems. Areas not meeting desired conditions are restored as priorities and funding allow.
- 04** Stream channels transport sediment and woody material over time while maintaining reference dimensions (e.g., bankfull width, depth, entrenchment ratio, slope and sinuosity). Watershed conditions support a natural frequency and magnitude of base flows and flood flows.

- 05 Municipal watersheds and public water systems meet or exceed water quality standards. To reduce potential water supply threats from high severity fire, projects to reduce the risk of wildfire are planned and implemented as funding and priorities allow.
- 06 Water rights for consumptive and nonconsumptive water uses support instream flows that provide for channel maintenance, water quality, aquatic habitats, and riparian vegetation.
- 07 Water quality and beneficial uses are fully protected under special use permits related to water uses.
- 08 Educational and informational programs are provided to enhance understanding of wetlands, stream ecosystems, and watersheds.
- 09 As funding allows, areas that are delivering water, sediment, nutrients, and/or chemical pollutants that would result in surface or groundwater pollution that violate the State of Montana's water quality standards are restored.

## 3.2 Wetlands and Riparian Areas

### Introduction

Riparian and wetland vegetation types are mapped on over 70,000 acres of the HLC NFs administrative area, which is less than 3%. Riparian areas are important elements of watersheds that provide critical transition zones linking terrestrial and aquatic ecosystems. The majority were rated to be in fair condition in the WCF. Riparian management zones, with associated plan components, will be established to protect the ecological integrity of these areas.

### Desired Conditions

- 01 Groundwater Dependent Ecosystems (GDEs), including peatlands, bogs, fens, wetlands, seeps, springs, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size, seasonal and annual timing, and water table elevation within the natural range of variability in order to maintain biodiversity of flora and fauna (including potential SCCs), as well as soil and hydrologic functions.
- 02 Beaver complexes, including wetlands and riparian areas, are maintained unless their activities directly threaten roads/other human developments or create habitat conditions that threaten reproduction and survival of T&E fish species or fish SCC.
- 03 Riparian areas provide healthy, functioning aquatic, riparian, upland, and wetland ecosystems that support desired plant, vertebrate, and invertebrate communities, distributed across the landscape.
- 04 Riparian areas contribute to stream channel integrity, channel processes, and sediment regimes that function characteristically for a given landscape and climatic setting.
- 05 Unique ecosystem and resource values associated with riparian areas are actively managed and maintained in order to provide resilience to ecosystem stressors such as climate change.

## 3.3 Aquatic Habitat and Species

### Desired Conditions

- 01 Water bodies (and associated wetland or riparian vegetation) and adjacent uplands provide habitats that support self-sustaining native and desirable nonnative aquatic communities, which include fish, amphibians, invertebrates, plants, and other wildlife species. Aquatic habitats are diverse, with

channel, lacustrine, and wetland characteristics and water quality reflective of the climate, geology, and natural vegetation of the area. Water quality supports native amphibians and diverse invertebrate communities. Streams, lakes, and rivers provide habitats that contribute toward recovery of threatened and endangered fish species and address the habitat needs of all native aquatic species, as appropriate.

- 02** Connectivity between water bodies provides for migration and travel between habitats associated with species' life stages and for processes such as recolonization (e.g., fish migration to spawning areas, amphibian migration between seasonal breeding, foraging, and overwintering habitats) and for processes such as recolonization of historic habitats. Stream channels supply the required structure for desired stream habitat features.
- 03** Over the long term, habitat contributes to the support of self-sustaining populations of native and desired nonnative aquatic species (fish, amphibians, birds, mammals, invertebrates, plants, and other aquatic-associated species) distributed across the landscape. In the short term, stronghold populations of native fish continue to thrive and expand into neighboring unoccupied habitats, and depressed populations increase in numbers. Available habitat supports genetic integrity and life history strategies of native fish, macro-invertebrates, and amphibian, aquatic bird, and aquatic mammal populations. Human caused migration barriers are absent unless they are needed to prevent invasions by nonnative species.
- 04** Stream habitat features, including large woody material, percent pools, residual pool depth, median particle size, and percent fines are within reference ranges as defined by agency monitoring.
- 05** Nonnative fish species are not expanding into water bodies that support native fish on NFS lands. Impacts of nonnative fish species on native salmonids, such as hybridization, competition, and predation, are minimized to the extent possible.
- 06** Aquatic ecosystems are free of invasive species such as zebra mussels, New Zealand mud snails, quagga mussels, and Eurasian milfoil. Nonnative plant and amphibian species are not expanding into water bodies that support native amphibian breeding sites (e.g., nonnative bullfrogs, Chytrid fungus, or Reed canary grass are not expanding into boreal toad breeding sites).
- 07** Habitat conditions improve in occupied bull trout and westslope cutthroat trout streams and in connected streams that were historically occupied, resulting in an increase in the overall number of stronghold populations. Trout habitat and populations continue to be protected through forest plan direction.
- 08** Where NFS lands are adjacent to lakes, ponds, and reservoirs, lands have shoreline conditions that provide nesting, breeding, and feeding habitats for associated wildlife.
- 09** The remaining genetic diversity of threatened, endangered, or sensitive aquatic wildlife species is protected and replicated within appropriate geographic scales such as within watershed or nearest neighbor. Other resource uses are managed to reduce risk of extirpation and increase habitat and population resiliency.

## 3.4 Soil

### Introduction

The National Forest Management Act (NFMA) states that management activities on NFS lands will not produce substantial and permanent impairment of productivity. The agency assures that productivity is maintained by establishing soil quality standards. Since 1999, physical soil disturbance has been the focus

of soil management on NFS lands. In 2010, FSM Chapter 2550 Soil Management was revised at the national level. The emphasis of soil management was changed to include long-term soil quality and ecological function. The FSM defines six soil functions: soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering. The objectives of the national direction on NFS lands are 1) to maintain or restore soil quality, and 2) to manage resource uses and soil resources to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity. In order to provide for multiple uses and ecosystem services in perpetuity, these 6 soil functions need to be active.

## Desired Conditions

- 01** Long-term soil quality and productivity, in the productive land base, is not impaired and supports desired conditions for terrestrial and aquatic ecosystems. Soil functions provide ecosystem services in perpetuity.
- 02** The Total Soil Resource Commitment (TSRC) is no more than 5% of watersheds at the 6<sup>th</sup> HUC level. The soil stability and support function is maintained (see Table 15) within the TSRC.

**Table 15. Soil ecological functions with attributes, indicators, and desired future conditions**

Soil Function	Selected Attributes	Soil Quality Indicator	Desired Future Condition
Biological	Roots and Aeration	Root Growth	Root growth, both vertically and laterally, is unimpeded by compaction.
		Root Distribution	Root distribution and depth is expected for vegetation type and successional stage or desired plant community.
		Porosity	Macro and micro-pores are as expected for soil texture and type.
	Flora and Fauna Community Potential and Thermodynamics	Flora and Fauna Community Composition	The soil is capable of supporting a distribution of desirable plant species by vegetative layer (i.e. trees, shrubs, herbaceous) as identified in the potential plant community. The site has not transitioned to an undesirable state.
		Canopy cover and Soil Cover	Soil temperature and moisture regimes are maintained in conditions to support desired plant communities.
Hydrologic	Infiltration	Surface Structure	Surface structure is as expected for the site (e.g. granular, subangular blocky, single grain).
		Surface Pore Space	There are common to many tubular pores with high vertical continuity.
		Surface Crusting	Surface crusting is as expected for the site.
	Water Absorption and Storage	Available Water	Site water is as expected for the soil type or has been improved.
	Water Transmission	Subsurface Flow Connectivity	Maintain subsurface flow connectivity with the streams (i.e. subsurface flow is not obstructed or intercepted).
Nutrient Cycling	Organic Matter Composition	Forest or Rangeland Floor	Forest and rangeland floor is distributed and the composition is appropriate for vegetation type and successional stage. Rangeland to be determined by Ecological Site Descriptions (ESD) specific to soil type.
		Fine Woody Material (less than 3 inches)	Fine woody material is on site in various stages of decay in amounts appropriate for habitat type.

Soil Function	Selected Attributes	Soil Quality Indicator	Desired Future Condition
	Nutrient Availability	Coarse Woody Material (Greater than 3 inches)	Coarse woody material is on site in various stages of decay and size classes in amounts appropriate for habitat type. See vegetation section for specific recommendations.
		Surface (A) horizon or mollic layer	"A" horizon is present, well distributed, not fragmented. The depth of the A horizon is within expected range.
		Surface (O) horizon or organic layer	"O" horizon is present and within expected range on forested sites
		Nutrient Deficiency	Soil nutrients are maintained at levels to support desired vegetation.
		Ash Cap	Soil ash cap is intact and as expected for the site.
Support and Stability	Stability	Surface erosion (wind, rill, or sheet)	Erosion is occurring at natural levels or not evident. Bare ground is within expected ranges for soil and habitat type.
		Site stability (mass erosion, landslide prone)	Site stability potential is unchanged or stability has been improved.
	Deposition	Soil deposition	Deposition is at natural levels and recent depositional material is vegetated.
Filtering and Buffering	Filtering	Soil Contamination	Soil is free of chemical or industrial contamination.

### 3.5 Air Quality

#### Introduction

The EPA establishes national ambient air quality standards as directed by the Clean Air Act, and the Montana Department of Environmental Quality (MTDEQ) manages these standards within the state of Montana. MTDEQ, along with select counties, monitor for air pollution and provide reports summarizing air quality data. The National Ambient Air Quality Standards (NAAQS) established by the EPA focus on six criteria pollutants including: ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb), and particulate matter (PM) including both PM<sub>10</sub> and PM<sub>2.5</sub> as defined by the aerodynamic diameter of the particulate in microns.

Forest Service air quality policy directs coordination of National Forest activities with state and federal air quality control efforts. This is done by properly managing and/or mitigating the sources of air pollution created by Forest Service activities, such as prescribed burning, the construction and use of roads, and the operation of various facilities. Mandatory Class I federal areas enjoy special protection afforded by amendments to the Clean Air Act in 1977. The EPA has designated the Bob Marshall Wilderness, Scapegoat Wilderness, and Gates of the Mountains Wilderness Areas as Class I federal areas. The Forest Service has the responsibility to protect the air quality related values (AQRVs) of Class I areas as directed by the Wilderness Act and Clean Air Act.

The HLC NFs and adjacent communities generally have very good air quality. In the Helena Valley, December and January tend to register the highest PM<sub>2.5</sub> concentrations as inversions are common during winter and trap residential wood smoke. In the remainder of the plan area, the months of July, August, and September are likely to register increases in PM<sub>2.5</sub>. During these months, wildfires, prescribed fires, agricultural burning, and agriculture dust can adversely impact air quality, although pollutants do not generally reach unhealthy levels based on the air quality sensors. Much of the plan area is sparsely

populated and subject to transport winds that serve to disperse pollutant emissions but high pressure systems common in the summer can stall dispersion and impact air quality. Smoke from agricultural, personal debris burning, prescribed burning, or wildfires can settle for days, producing unhealthy conditions in valley bottoms. Usually, these conditions only occur for a few days at a time. However, the fine particles associated with smoke from wildland fires can be especially problematic for those with ongoing health problems, such as lung disease or asthma, and for the elderly and children. MTDEQ and counties regulate open burning throughout the year while working with the Montana/Idaho Airshed Group to coordinate projects and identify potential air quality impacts from each prescribed burn.

### Desired Conditions

- 01 The Forests meet applicable federal, state, or tribal air quality standards, including the Class 1 areas in existing or future wilderness areas. Prescribed burning is planned to comply with those standards, recognizing that seasonal exemptions to those standards may be requested to achieve landscape goals.
- 02 Forest administrators recognize the need to use the full spectrum of vegetation management activities, including prescribed fire and wildfire, to reduce wildland fuel loadings and potential harmful smoke emissions from future high intensity wildfires.

## 4. Benefits to people: multiple uses and ecosystem services

### Introduction

Social, cultural and economic resources in the plan area contribute to the social and economic sustainability of local communities and the public. The 2012 Planning Rule calls those resources “ecosystem services” or, put more simply, the benefits people obtain from the forest. Healthy forest ecosystems are life-supporting systems that provide a full suite of goods and services that are vital to human health, financial sustainability and wellbeing. These “ecosystem services” or benefits include all the multiple uses that people traditionally have relied on, such as recreation and mineral extraction, as well as less obvious or apparent benefits, such as clean air and carbon sequestration.

Multiple use is defined by the Multiple-Use Sustained-Yield Act (MUSY) of 1960 (16 U.S.C. 528–531) as follows:

...the management of the various renewable surface resources of the NFS so that they are utilized in the combination that will best meet the needs of the American people; making 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; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

Additionally, the first paragraph of the MUSY Act states, “Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that, it is the policy of the Congress that the national forests are established and shall be administered for *outdoor recreation, range, timber, watershed, and wildlife and fish purposes*” (emphasis added).

The benefits to people discussed here include: general contributions to social and economic sustainability, outdoor recreation, scenery and aesthetics, livestock grazing, timber, other forest products, watershed, fish and wildlife, energy and minerals, wood for fuel, clean air, cultural and historical resources, inspiration and nonuse values, research and education, and carbon sequestration.

The 2012 Planning Rule also requires that forests take an *all lands* approach to ensure that ecological sustainability and contributions to social and economic sustainability are considered in the context of the larger landscape. This involves managing the plan area in partnership with both public and private land owners and stakeholders to ensure management efforts are coordinated whenever possible. Included in this section are desired conditions related to partnership and coordination.

## 4.1 General Contributions to Social and Economic Sustainability

### Desired Conditions

- 01 Maintain ecological and vegetative conditions to yield a variety of benefits that contribute to community sustainability and the quality of life in nearby communities and the larger population. These benefits may include: clean water, forest products, livestock grazing, carbon sequestration, energy generation, recreational opportunities, aesthetics, cultural uses, and habitat for biodiversity in the forest.
- 02 Sustainable levels of goods and services (such as wilderness hunting and fishing opportunities, timber, downhill skiing, etc.) contribute value to communities and the economy. Ample opportunities, including employment, exist across the Forest to connect adults and youth with nature. (Additional conditions can be found in Recreation).

## 4.2 Outdoor Recreation

Outdoor Recreation is an important use throughout the HLC NFs by both local residents and nonlocal visitors. Detailed information about the desired conditions for recreation can be found in Section 5, Recreation Settings, Opportunities, Access, and Scenery. Hunting and fishing are discussed below in the Fish and Wildlife subheading.

## 4.3 Scenery and Aesthetics

Aesthetics is also an important ecosystem service associated with these landscapes. As with recreation, detailed desired conditions can be found Section 5, Recreation Settings, Opportunities, Access, and Scenery.

## 4.4 Livestock Grazing

### Introduction

Livestock grazing is one of the many multiple uses provided for by NFS lands. Livestock grazing can be an important contributor to local economies and helps preserve the heritage and character of rural landscapes.

Livestock grazing is an authorized use of NFS lands which must be managed appropriately so as to maintain the health and integrity of associated lands and resources. As such, the following desired conditions provide a platform for the future management and design of authorized grazing practices. The desired conditions are intended to articulate livestock grazing conditions that are complimentary to and do not impair the desired conditions of other resources and multiple uses. This approach is constructed in a manner that provides for the sustainability of NFS lands and the livestock operations that rely upon them.

### Desired Conditions

- 01 Livestock grazing is managed in a balanced manner to maintain or enhance rangeland and riparian health while incorporating the multiple uses of public lands.

- 02 Opportunities for livestock grazing are provided in order to help preserve the rural landscape and cultural heritage, and contribute to the local economies within the planning area.
- 03 Dispersed grazing is available for use by transportation stock.
- 04 Range improvements are designed and maintained in a manner that supplements livestock management and balances multiple uses.
- 05 Where appropriate and consistent with other resource values, targeted grazing may be used to address contemporary vegetation management challenges (e.g., controlling invasive plants, reducing fire risk, etc.)
- 06 Livestock are managed in a manner that minimizes intermingling of, conflicts between, and potential disease transmission between domestic and wild animals (e.g., bighorn sheep, grizzly bears, etc.).
- 07 Changes in livestock kind are considered in order to facilitate resource management goals and/or address resource concerns.

## 4.5 Timber

### Introduction

The 2012 Planning Rule requires identification of lands that are suited and not suited for timber production, based on several factors that include legal withdrawal (e.g., timber production prohibited due to statute, Executive order, etc.), technical factors (nonforest lands, geology or soil conditions, etc.), and compatibility with desired conditions and objectives stated in the plan (forestwide or management area plan components).

### Desired Conditions

- 01 Vegetation conditions and treatments provide sustainable levels of timber harvest and wood fiber products.
- 02 Timber harvest contributes to ecological and economic sustainability, providing jobs and income to local economies while achieving ecosystem health. A sustainable mix of timber products (including both sawtimber and nonsawtimber) is offered under a variety of harvest and contract methods based on market conditions.
- 03 On lands identified as suitable for timber production, regularly scheduled timber harvest is conducted to provide desired timber outputs at a sustainable level, and vegetation treatments are designed to move forests towards desired conditions (such as size classes, forest landscape patterns, tree densities, and resilience to insects and disease) that ensure forest resiliency. Dead or dying trees are salvaged to recover as much of the economic value of the wood as possible while achieving desired conditions for other resources.
- 04 Lands identified as not suitable for timber production, but where timber harvesting could occur for other multiple-use purposes, have an irregular, unscheduled timber harvest program. Harvest meets management direction and desired conditions, while providing services and benefits to people. Dead or dying trees may be salvaged when necessary to meet resource objectives. Vegetation treatments are designed to move forests towards desired conditions (such as size classes, forest landscape patterns, tree densities, and resilience to insects and disease).

## 4.6 Other Forest Products

### Desired Conditions

- 01 Provide a variety of public services and special forest products (such as mushrooms, firewood, biofuels, posts and poles, Christmas trees, medicinal plants, tepee poles, mushrooms, and berries) for commercial, tribal, personal, educational, and scientific uses. Special forest and botanical products are harvested in a sustainable manner, providing products for current and future generations. Vegetation management activities augment the firewood program providing opportunities for collecting firewood.

## 4.7 Watershed

### Desired Conditions

- 01 Lands that contribute municipal watershed and source water protection areas provide clean surface water that meets or exceeds State of Montana water quality standards and meets the supply needs of users. Municipal watersheds are not Clean Water Act Section 303(d) State-listed as impaired or threatened for any pollutant. Vegetation is similar in structure, function, and composition as stated in the Terrestrial Ecosystems Plan components, scaled to the size of each municipal watershed. Vegetation is vigorous and resistant to insect attacks. Fuel loadings and stand structure are at levels and arrangements that would not support a large high severity forest fire event. The transportation system is hydrologically disconnected from streams. Recreational facilities are designed and maintained such that water quality is not impaired. No documented lands/areas exist that are delivering water, sediment, nutrients, or chemical pollutants that would result in water pollution that is significantly and/or permanently above natural or background levels.

## 4.8 Fish and Wildlife

See sections 2 and 3 for DFCs for terrestrial and aquatic species.

### Desired Conditions

- 01 Habitat and access management support the persistence and availability of species for hunting and trapping subject to existing laws and regulations of the State of Montana. Management of habitat for hunted and trapped species considers MTFWP population and harvest goals and objectives.
- 02 Habitat management supports the persistence and availability of species for viewing.
- 03 Diverse opportunities exist for hunting, trapping, wildlife viewing, and fishing on NFS lands. Examples include assisted outfitted/guided and unassisted, motorized and nonmotorized opportunities.
- 04 Levels and types of hunter or trapper access are balanced with desired conditions for wildlife populations and habitat security.

## 4.9 Energy and Minerals

See section 7, Renewable and Nonrenewable Energy, Mineral Resources, and Geology.

## 4.10 Wood for Fuel

See section 4.6, Other Forest Products.

#### 4.11 Clean Air

See section 3.7, Air Quality.

#### 4.12 Cultural and Historical Resources

See section 9, Cultural and Historic Resources and Uses.

#### 4.13 Inspiration and Nonuse Values

##### **Desired Conditions**

- 01 The Forests will maintain areas of outstanding wilderness characteristics, as well as places for solitude and inspiration.
- 02 The Forests will ensure that wild and scenic areas will be preserved for those who value, and are inspired by, their existence. Additional conditions can be found in section 5.8, Scenery and in section 6.0, which covers designated areas including designated Wilderness, recommended wilderness, Wilderness Study Act areas, wild and scenic rivers and many other specially designated areas that provide opportunities for solitude and inspiration.

#### 4.14 Research and Education

##### **Desired Conditions**

- 01 Promote interpretation and educational opportunities that enrich the visitor's experience through a greater understanding of the natural, cultural and historic resources on the Forest.
- 02 Offer a suite of educational activities including hands-on outdoor experiences to engage youth with nature. Support educators in teaching science and natural resource topics by providing a diversity of resources, including new technologies such as social media and smart phone applications.
- 03 Research and subsequent results continue to provide information and guide management about ecological, social, and economic conditions across the landscape.

#### 4.15 Carbon storage and sequestration

##### **Desired Conditions**

- 01 Carbon storage and sequestration potential is sustained through maintenance or enhancement of ecosystem biodiversity and function, and managing for resilient forests adapted to natural disturbance processes and changing climates.

#### 4.16 Partnerships and Coordination

##### **Desired Conditions**

- 01 Promote, maintain and foster cooperation and coordination with state agencies, federal agencies, tribes, counties and other interested stakeholder groups.
- 02 Develop partnerships with various interest and user groups to participate in evaluation, planning, and monitoring programs.
- 03 Partnerships with federal and non-federal entities helps achieve desired conditions and improve overall resources management. Partnerships and/or collaborative processes within the local

communities fosters relationships that help accomplish projects in the communities' and HLC NFs' shared interest.

- 04 Federal, state, local and tribal agencies, universities, non-governmental organizations, and private landowners are partners in the development and implementation of monitoring efforts.
- 05 The HLC NFs and potential partners would have an expressed mutual interest in, benefit from, and understanding of a common purpose(s) that helps achieve their respective missions.
- 06 Partnerships and projects would be widely recognized by the public as beneficial to resource management, and as an appropriate and efficient use of Forest Service cooperative efforts and funding.
- 07 Partnerships arrangements would be transparent to the public and free of real or apparent conflicts of interest, or endorsement of commercial products, services, or entities.
- 08 Coordinate with scientists from Rocky Mountain Research Station on the effects of climate change.
- 09 Cooperative partnerships with other agencies, organizations, outfitter and guides, schools and others support a quality educational program and program delivery.
- 10 Work towards an all-lands approach to management of species of conservation concern, cooperating with other land managers across the range of a species, including efforts to mitigate threats or stressors and to provide ecological conditions that would support the species.

## 5. Recreation Settings, Opportunities, Access, and Scenery

### 5.1 Sustainable Recreation

Sustainable recreation is defined as the set of recreation settings and opportunities on the NFS that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

#### Desired Conditions

- 01 Recreation settings and opportunities are compatible with other resources and allow for ecological sustainability and to the extent possible within the control of NFS lands, healthy social relationships among recreationists and local communities. Recreation opportunities are managed within the fiscal capability of the planning unit.
- 02 Recreation opportunities are proactively managed in anticipation of changes to the timing, quantity, and duration of water flows, snow levels and elevations, and potential climate change effects on fish and wildlife habitat.
- 03 Recreation opportunities contribute to jobs and income in the local economy, community stability and growth, tourism, and the quality of lifestyles in the area.
- 04 The HLC Forests facilitate the operation and maintenance of recreation facilities, programs, and services through strong partnerships and volunteers.

### 5.2 Recreation Settings

The Forest Service uses the Recreation Opportunity Spectrum (ROS) system to define recreation settings and categorize them into six distinct classes: primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and urban. ROS categories serve as a framework for planning and

managing recreation settings and opportunities on NFS lands. Specific ROS classes convey the physical setting, mode(s) of transportation, anticipated concentration of people, and levels of management and infrastructure. By identifying recreation settings, the Forests can ensure a sustainable set of recreation opportunities for future generations and visitors can select where they recreate based on what they want to do, what equipment they want to bring, and the type of recreation experience they want.

### **Desired Conditions**

- 01** The recreation opportunity spectrum (ROS) system is used to describe desired conditions for recreation settings. Recreation settings are managed to connect people with the natural and cultural resources of the Forests, while ensuring the health and resilience of ecosystems for future generations. ROS categories include Primitive, Semi-Primitive Non-motorized, Semi-Primitive Motorized, Roded Natural, Rural and Urban areas. Definitions for these ROS categories are found in the glossary.
- 02** ROS settings are in alignment with current travel plan decisions.
- 03** ROS settings are provided for both summer and the winter recreation opportunities.

### **5.3 Recreation Opportunities – Developed Recreation**

Developed recreation opportunities are located throughout the plan area but are primarily concentrated in the Roded Natural (RN) and Rural (R) ROS settings. Developed recreation facilities are often destination locations and/or act as portals (trailheads and airstrips) to adjacent recreation settings and opportunities. Developed sites have infrastructure or “facilities” that have been designed to address public health and safety and to facilitate visitor comfort. Recreation facilities are managed within the fiscal capability of the forests.

### **Desired Conditions**

- 01** The HLC NFs provide opportunities for a wide variety of developed recreation opportunities including, but not limited to: developed campgrounds, trailheads, picnic areas, downhill and cross country ski areas, interpretive sites, fishing sites, boating areas, cabin and lookout rentals, airstrips, and visitor centers.
- 02** Desired ROS settings and travel management plans determine where developed recreation facilities are located.
- 03** Developed recreation facilities are specifically designed and maintained to enhance the recreation experiences of forest visitors, ensure public health and safety, and protect natural resources. Facilities are designed to incorporate universal design concepts.
- 04** Developed recreation facilities are managed to ensure environmental impacts are sustainable. Environmental impacts to natural resources will be considered in the planning, development, and management of additional developed recreation facilities.

### **5.4 Recreation Opportunities – Dispersed Recreation**

Dispersed recreation includes recreation opportunities that take place outside of developed recreation sites. Dispersed recreation activities generally do not have fees associated with them and contain little to no facilities such as toilets, tables, or garbage collection. Dispersed recreation activities are managed according to fiscal capability.

## Desired Conditions

- 01 The HLC NFs provide opportunities for a wide variety of dispersed recreation activities including, but not limited to: camping, hunting, fishing, hiking, off highway vehicle (OHV) use, rock climbing, mountain biking, wildlife viewing, photography, cross-country skiing, snow shoeing, snowmobiling, dog sledding, visiting historic sites, viewing scenery, recreation aviation, and driving for pleasure.
- 02 The desired ROS settings and travel management plans determine where existing dispersed recreation activities are appropriate.
- 03 Dispersed recreation opportunities are managed to ensure environmental impacts are sustainable and social use is aligned with ROS settings. Concentrated dispersed recreation activities and use areas are managed to minimize impacts to natural resources. Environmental impacts of natural resources will be considered in the management of new and emerging dispersed recreation opportunities.
- 04 New or emerging dispersed recreation opportunities or uses occur in the appropriate ROS settings and do not conflict with the current travel management plans and existing recreation uses.

## 5.5 Recreation Access

Recreation access to and through the Forests is facilitated in a number of ways through travel management plans. Visitors select their access based on their preferred setting, experience, and mode of transportation. Roads, motorized trails, nonmotorized trails, rivers, and airstrips provide access for visitors to walk, bike, ride, drive, boat, or fly to their destinations.

## Desired Conditions

- 01 Travel management plans provide direction to users on which areas of the Forests may be accessed for motorized, nonmotorized, and winter recreation opportunities. Forest visitors use the designated system of roads, trails, rivers, and airstrips to access their preferred recreation setting.
- 02 Travel management plans align with desired ROS settings.
- 03 Within budgetary constraints, Forest system roads and trails provide a variety of high-quality motorized and nonmotorized recreational access to the Forests, during both summer and winter months. The road and trail systems provide recreation access to destination locations and loop opportunities within the Forests.
- 04 Recreation access is designed and managed to be compatible with other natural resources. Environmental impacts to natural resources will be considered in the planning, development, and management of existing and additional recreation access structures and to be compatible with other natural resources and/or facilities.
- 05 Trailheads are strategically located to provide safe, convenient staging for recreation opportunities in a variety of ROS settings throughout the year.
- 06 Airstrips provide recreational and administrative access on NFS lands.
- 07 Access to NFS lands is protected, and identified access needs are procured.

## 5.6 Recreation Special Uses

Recreation special use permits provide for occupancy and use of the national forest through issuance of permits. Permitted recreation uses provide specific recreational opportunities to the public and deliver

economic benefits to rural economies. There are both commercial recreation special use permits and noncommercial. Commercial special use permits include opportunities such as ski resorts, outfitter and guiding services, resorts and organizational camps. Noncommercial special uses permits are used by individuals and single families, such as permits issued for recreation residences.

### **Desired Conditions**

- 01 The HLC NFs provide opportunities for a wide variety of recreation special uses of the national forests that include, but are not limited to: commercial ski areas, outfitter and guiding services, resorts and lodging, organizational camps, and recreation residences.
- 02 Desired ROS settings and travel management plans determine where recreation opportunities and facilities are offered through recreation special use permits.
- 03 All recreation special use permits are managed within the standards set by the permit. Historic buildings associated with recreation special use permits are managed to protect identified historic values while still providing for functional use by the permit holders.
- 04 Recreation special use permits are managed to be ecologically sustainable.

## **5.7 Recreation Information, Interpretation, and Education**

Connecting people to their environment has been one of the Forest Service's main stated goals for managing the recreation program and public expectation for activities on NFS lands.

### **Desired Conditions**

- 01 Interpretation and education programming enhance visitor's understanding and appreciation for the rich natural and cultural resources of the Forests.
- 02 Outfitter and guides, partners, and other permittees assist the forest in delivering interpretation and education messages that instill an appreciation for the natural and cultural resources of the Forests, and promotes conservation and stewardship.
- 03 Visitor information is readily available in a variety of formats to keep the public up to date, informed and educated on current Forest Service policies and issues.

## **5.8 Scenery**

Scenic character is defined as a combination of the physical, biological, and cultural images that give an area its scenic identity and sense of place. It recognizes that natural disturbance processes such as fire, insects, and diseases are dynamic and a part of the natural appearing landscape. This system also establishes scenic integrity objectives (SIOs) which are a measure of the degree to which a landscape is visually perceived to be complete when compared to the inherent scenic character of that area.

### **Desired Conditions**

- 01 The HLC NFs scenery reflects healthy resilient landscapes and exhibits attributes of the scenic characters identified on the forests. Island mountain ranges with unique geology, scenic river valleys, mountain silhouettes, vast expanses of natural appearing forests, and striking visual contrasts, enhance the quality of life for residents and visitors.
- 02 Scenery is an integral component of the Forests' recreation settings, opportunities, and experiences. Scenery is considered in all forest activities and management practices across the forests. (Reference SIO maps).

- 03 The HLC NFs scenery provides a range of scenic quality as described by the scenic integrity objectives. Desired Scenic Integrity Objectives include Very High, High, Moderate, and Low. Definitions of these SIOs may be found in the glossary.
- 04 Historic cabins and fire lookouts and remnants of historic mining districts add to the unique scenic character of the HLC NFs planning area. More modern facilities reflect the architectural character of the area and utilize materials that blend with natural settings.

## 6. Designated Areas

### Introduction

Milestone legislation was established by Congress in the 1960s to create a system of designated areas that included, in part, the National Wilderness Preservation System, National Wild and Scenic Rivers, and the National Trails System. These designated areas established a national system of connected conservation areas providing for the enduring resource of wilderness, protecting rivers, and preserving scenic and significant natural, historic, and cultural resources along national scenic trails.

Specially designated areas also include the Montana Wilderness Study Act Areas; the Elkhorns Wildlife Management Unit; the Rocky Mountain Front Conservation Management Area; Research Natural Areas; Nationally Significant Caves; the King's Hill Forest Service Scenic Byway and the Lewis and Clark National Historic Trail Interpretive Center.

Special designations that span multiple geographic areas are described below. Specially designated areas that fall entirely within the boundary of a GA are included in the GA desired future condition descriptions below.

### 6.1 Designated Wilderness

The Wilderness Act of 1964 set up a system of wilderness areas across the United States and defined wilderness as a place “in contrast with those areas where man and his own works dominate the landscape...where earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain...an area of undeveloped federal lands retain its primeval character and influence, without permanent improvements or human habitation, which is protected and managed to preserve its natural condition.”

#### Desired Conditions

- 01 Wilderness areas provide the qualities of wilderness character as defined by the Wilderness Act of 1964 and the individual wilderness areas' enabling legislation.
- 02 Wilderness areas will be managed as determined by wilderness management plans.
- 03 Administrative facilities within wilderness areas provide for the management and protection of wilderness areas and minimize competition with the public for campsites and grazing.
- 04 Natural, ecological processes and disturbance (e.g. wildfire, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation within wilderness. Wilderness areas provide opportunities for visitors to experience natural ecological processes and disturbances with limited amount of human influence.

- 05 An attempt is made to ensure priority nonnative invasive plant species are nonexistent or in low abundance and do not disrupt ecological functions. Endemic species have been identified and have been conserved and/or recovered in these wilderness areas.
- 06 Trails systems are managed to provide for wilderness experiences.
- 07 Existing outfitter and guide service recreation special uses are managed as determined by identified public need.

## 6.2 Recommended Wilderness Areas

Recommended wilderness areas are lands that have the potential to become designated as official wilderness through legislation. The recommendation for this designation comes from the Forest Service. Ultimately, Congress and the President establish the legislation that officially designates wilderness areas.

### Desired Conditions

- 01 Recommended wilderness areas preserve opportunities for inclusion in the National Wilderness Preservation System. Ecological and social characteristics are maintained and protected to provide the basis for each area's suitability for wilderness recommendation.
- 02 Recommended wilderness areas are characterized by a natural environment where ecological processes such as natural succession, fire, insects, and disease function exists with limited amount of human influence. Impacts from visitor use do not detract from the natural setting.

## 6.3 Wilderness Study Act Areas

On November 1, 1977, Congress passed the Montana Wilderness Study Act. This Act required the Secretary of Agriculture to study and make recommendations to Congress on the wilderness suitability of nine separate National Forest areas within Montana. The Middle Fork Judith and the Big Snowies are two of the areas identified in this legislation. Wilderness study areas are to be administered by the Secretary of Agriculture so as to maintain their presently existing wilderness character and potential inclusion in the National Wilderness Preservation System until Congress determines otherwise.

### Desired Conditions

- 01 Preserve opportunities for inclusion in the National Wilderness Preservation System by maintaining and protecting the ecological and social characteristics that provided the basis for each area's suitability for potential designated wilderness.
- 02 Natural, ecological processes and disturbance (e.g. wildfire, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation within the wilderness study act areas. Impacts from visitor use do not detract from the natural setting.

## 6.4 Inventoried Roadless Areas (IRAs) and the Roadless Area Conservation Rule

The 2001 Roadless Area Conservation Rule (Roadless Rule) established prohibitions and permissions on road construction, road reconstruction, and timber harvesting on 58.5 million acres of NFS lands. This includes 1,447,892 acres of inventoried roadless areas on the HLC NFs. The intent of the Roadless Rule is to provide lasting protection for inventoried roadless areas within the NFS in the context of multiple-use management.

## Desired Conditions

- 01 IRAs are managed in accordance with direction found in the 2001 Roadless Area Conservation Rule and clarification provided by the Secretary of Agriculture's Memorandum 1042-156.

## 6.5 Eligible Wild and Scenic Rivers

Congress passed the Wild and Scenic Rivers Act in 1968 for the purpose of preserving rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. This act is recognized for safeguarding the special character of these rivers while also allowing for their appropriate use and development. For management purposes, river segments are classified as wild, scenic, or recreational. There are currently no designated wild and scenic rivers within the planning area. However, a number of rivers have been identified as eligible for consideration within the wild and scenic rivers system.

### Desired Conditions

- 01 The free-flowing condition and outstandingly remarkable values that made a river segment eligible for designation, under the Wild and Scenic Rivers Act of 1968, are protected and perpetuated.
- 02 Federal lands within eligible wild and scenic river corridors are retained in public ownership.
- 03 Administrative and recreation facilities located within eligible wild and scenic river corridors are screened from view or are designed to blend into the natural river environment.

## 6.6 Nationally Designated Trails

Congressionally designated national trails are a network of scenic, historic, and recreational trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs; promote enjoyment, appreciation, and preservation of open-air, outdoor areas and historic resources; and encourage public access and citizen involvement. These trails are generally single track, linear features that pass through a great variety of physical features ranging from natural-appearing settings to locations where developments are noticeable. There are 7 national recreation trails, 1 national historic trail (Lewis and Clark National Historic Trail), and 25 national scenic trails within the planning area. Twenty three of the 25 individual national scenic trails, when combined, form portions of the Continental Divide National Scenic Trail (CDNST).

### Desired Conditions

- 01 National scenic trails outside of wilderness are clearly marked and identified with the national recreation or scenic trail symbol, especially at trail termini and junctions with side trails. Access allows for public use, interpretation, and education of the specified feature of the trail in a manner that does not impair the feature(s) for which the individual trail was established.
- 02 Nationally designated trails are managed to enhance and/or protect the recreation values for which they were established.

## 6.7 Lewis and Clark National Historic Trail Interpretive Center

On October 28, 1988 Congress passed Public Law 100-552, establishing the Lewis and Clark National Historic Trail Interpretive Center (LCIC), which opened its doors to the public on May 5, 1998. The building is approximately 25,000 square feet and includes a 158 seat theater, a 6000 square foot exhibit hall, and a 1500 square foot resource center that are used for educational programs, trainings, and receptions. The facility is open year round and serves about 45,000 visitors and 4,000 children annually. Approximately 20% of the visitors to the center come from foreign countries, primarily Canada.

## Desired Conditions

- 01 The interpretive center is managed according to Public Law 100-552, which authorizes the Forest Service to plan, build, and administer the facility. Interpretation and education programming at the Lewis and Clark Interpretive Center enhances visitor understanding and appreciation for the history surrounding the journey of Lewis and Clark through central Montana landscapes during the years of 1805-1806.
- 02 Interpretive and education themes at the interpretive center focus on early exploration (Lewis and Clark), Native American history, mining, trapping, agricultural settlement and the natural resources found throughout the area. Interpretation and education themes are expanded to natural resources management and history within the surrounding National Forests.
- 03 The interpretive center is located on the Lewis and Clark National Historic Trail and has vibrant partnerships both nationally and within the local community. Volunteerism is a valued resource and provides strong connections to the local community while providing a valuable service to the Forest Service in the management of the interpretive center.
- 04 The interpretive center contributes to the economic sustainability of the local community as well as to the State of Montana.

## 6.8 Nationally Significant Caves

The Federal Cave Resources Protection Act was passed in 1988. This act recognizes that significant caves on federal lands are an invaluable and irreplaceable part of the Nation's natural heritage.

### Desired Conditions

- 01 Nationally Significant Caves are managed according to the Federal Cave Resources Protection Act of 1988. Caves are inventoried and monitored to identify and protect important cave and wildlife resources and to ensure safe recreational use with minimal impacts to cave resources.

## 6.9 Research Natural Areas

The Helena and Lewis & Clark National Forests have 13 Research Natural Areas (RNAs) which total approximately 16,955 acres. These RNAs are part of a national network of ecological areas designated in perpetuity for research, education, and/or to maintain biological diversity of NFS lands. They serve as baseline areas for non-manipulative research, observation, and study. RNAs are cooperatively managed with the Rocky Mountain Research Station.

### Desired Conditions

- 01 RNAs are generally natural appearing. Ecological processes such as plant succession, fire, and insect and disease activity function with limited human influences. The ecological features and values for which the RNA was established are and managed in accordance with the establishment records.
- 02 Management activities within RNAs are allowed to the extent that these activities are in harmony with the purpose for which the RNA was designated.
- 03 Additions to the RNA network are accomplished through a prioritization and designation process that has been cooperatively developed by the Forest Service and the Rocky Mountain Research Station.

## 6.10 Special Areas

Special areas may be designated for sites with scenic, geological, botanical, zoological, paleontological, archaeological, historical, recreational, or other special characteristics or special values

### Desired Conditions

- 01 The ecosystems within special areas are generally managed to reflect the influence of natural processes.
- 02 Other uses and management actions within special areas are allowed to the extent that these activities are in harmony with the purpose for which the area was designated.
- 03 Education and research opportunities are provided within special areas.

## 6.11 Scenic Byways

### Desired Conditions

- 01 Landscapes seen from designated scenic byway are generally managed to protect and/or enhance the natural appearing scenic quality along the route. Other uses and management action within the scenic byway corridor are allowed to the extent that these activities are in harmony with the purposes for which the scenic byway was designated.
- 02 The Forest Service works in partnership with State and Local Highway Districts to encourage Scenic Byways to be sufficiently signed.
- 03 The scenery, viewing opportunities, interpretive and recreation infrastructure that service visitors along scenic byways are designed to protect, complement, and promote the intrinsic values for which the route was designated. Management emphasis is outlined in individual corridor management plans.

# 7. Renewable and Nonrenewable Energy, Mineral Resources, and Geology

## Introduction

The Forest Service has a minerals management mission to encourage, facilitate, and administer the orderly exploration, development, and production of mineral and energy resources on NFS lands to help meet the present and future needs of the Nation. Management of mineral and energy resources has been defined by Federal laws, regulations and legal decision. There are three types of mineral and energy resources:

- **Locatable Minerals:** includes commodities such as gold, silver, copper, zinc, nickel, lead, platinum, etc. and some nonmetallic minerals such as asbestos, gypsum, and gemstones. Under the Mining Law of 1872 (as codified by 36 CFR 228), US citizens are guaranteed the right to prospect and explore lands reserved from the public domain and open to mineral entry.
- **Salable Minerals:** includes common varieties of sand, stone, gravel, cinders, clay, pumice and pumicite. The Forest Service has the authority to dispose of these materials on public lands through a variety of methods. The disposal of these materials is discretionary.

- **Leasable Minerals:** includes commodities such as oil, gas, coal, geothermal, potassium, sodium phosphates, oil shale, sulfur, and solid leasable minerals on acquired lands. Areas of the forest are open to leasable minerals exploration, development and production.

## Desired Conditions

- 01** Locatable minerals are available for prospecting, exploring, developing, and producing; in consideration of the conditions and needs of other resources. The lands are reclaimed in an appropriate manner following exploration, development and production activities as per 36 CFR 228.
- 02** Abandoned/inactive mines that present a physical or chemical hazard to humans are identified, inventoried, assessed and reclaimed in the appropriate manner to provide for public safety, to restore environmental conditions, and to minimize impacts to cultural resources, water quality, and habitats.
- 03** Salable materials are available based upon public interest, in-service needs, material availability, and valid existing rights where consistent with desired conditions for other resources. The lands developed for salable materials are reclaimed in the appropriate manner.
- 04** The Forests' salable materials resources (e.g. aggregate, riprap, gabion rock, landscaping rock) are used to build and maintain trails, roads, campgrounds, and watershed improvement projects; control erosion and sedimentation; restore riparian and aquatic habitat; prevent or repair flood damage; sustain forest infrastructure; and meet public use demand and other governmental agency needs.
- 05** Opportunities for rock hounding and other types of noncommercial mineral collecting (e.g. for scientific, research, or educational purposes) are available and managed to protect natural resources and public health and safety.
- 06** Energy and nonenergy leasable minerals and resources are available for lease where the lands are open to leasing and the lands are reclaimed in the appropriate manner.
- 07** Geologic resources provide ecological, scientific, educational, interpretative, scenic, recreational, and paleontological benefits for the public and academia.
- 08** Caves, including nationally significant caves (see below) are managed considering the needs of bat species, such as the Townsend's big-eared bat (potential wildlife SCC).
- 09** Geologic hazards (i.e. landslides, floods, sinkholes, etc.) and associated risks to public health and safety and facilities and infrastructure are minimized or mitigated.
- 10** Unique geologic features and scenery are conserved for their intrinsic values and characteristics.
- 11** Mine waste repositories and mine reclamation sites are protected and managed from activities that could compromise the infrastructure and remedy that was applied.
- 12** Areas for the development of solar and wind energy are made available.
- 13** Superfund sites will be managed within the context of the Superfund designation in coordination with EPA and MT DEQ.

## 8. Infrastructure

### Introduction

The HLC NF's infrastructure includes a system of roads, motorized and nonmotorized trails, airstrips, and bridges, as well as a variety of recreation and administrative facilities that were constructed to support forest management activities and meet management objectives, such as fire suppression, timber harvesting, and recreation. Infrastructure also includes campground and recreation facilities, gates, cabins, research station and other administrative sites.

In the last few decades, funding has been insufficient to maintain all forest infrastructure to national standards that are important for minimizing resource impacts. Trail maintenance is generally focused on high-use infrastructure.

Recreation use and the demand for motorized and nonmotorized access, especially loop trails, have increased. Advances in outdoor recreational equipment performance and technology have resulted in increased year-around use.

The infrastructure necessary for management in the future may be different than what is currently on the ground. Budget constraints currently limit the ability to adjust to changing needs.

### Desired Conditions

- 01** Motor vehicle use designations are complete and motorized vehicle use maps are available. User conflicts are minimized. Loop opportunities are a part of both the road and trail systems. Community involvement is promoted and user awareness programs (educational and informational) enhance the recreational experience. Partnerships are developed with various interest and user groups to participate in evaluation, planning, and maintenance programs for both roads and trails.
- 02** The transportation system serves land management and public needs and purposes. It is interconnected with federal, state, and local public roads and trails to provide access to lands, infrastructure, dispersed camping, and inholdings where appropriate. Although roads maintained for passenger cars meet public road safety standards, roads maintained for high clearance vehicles may have hazards and require operator judgment and skill to negotiate. The transportation system provides reasonable access for program management; and to facilities, private inholdings by negotiation, and infrastructure (e.g., buildings, recreation facilities, municipal water systems, reservoirs, electronic and communication sites, and utility lines).
- 03** The transportation system and other infrastructure are managed to minimize adverse water quality impacts. Facilities impacting water resources are decommissioned or mitigations are in place.
- 04** Forest Service infrastructure, including administration, interpretive and recreation facilities are maintained to health and safety standards for the protection of visitors and the environment.
- 05** Forest Service infrastructure is managed with consideration for climate change and sustainability.
- 06** Roads not needed to serve current management and public needs and purposes are placed in intermittent stored service or decommissioned.
- 07** The Forests' trail system provides a variety of motorized and nonmotorized recreational opportunities during summer and winter. Trails access destinations, provide for loop opportunities that also connect

to a larger trail systems, provide linkage from local communities to the Forests, and are compatible with other resources.

- 08 Forest system trails are sustainably designed and managed to provide a variety of high-quality motorized and nonmotorized summer and winter public access that connects people to nature.
- 09 Trails are in the appropriate trail class for existing use levels and use type. The management of trails is responsive to changes in demand, while protecting natural and cultural resources.
- 10 Infrastructure placement minimizes permanent loss of aquatic or terrestrial T&E species or critical habitat. Facilities that cross aquatic habitat will allow for appropriate passage of water and organisms.
- 11 Maintenance will incorporate BMPs to minimize adverse water quality impacts and risks to safety from the felling and removal of hazard trees.
- 12 All private and commercial road uses are correctly authorized and the commensurate share of road maintenance is collected and/or performed
- 13 The existing backlog of deferred maintenance on bridges, buildings, and other structures is addressed as funding allows.
- 14 Access and transportation needs are considered critical components of all planning projects or management actions, including reasonable access to private inholdings.

## 9. Cultural and Historical Resources and Uses

### Introduction

Heritage program goals, objectives, standards and guidelines need to be revised to meet the intent of legislation, executive orders, and FS Manual policy and direction that has been implemented since the original plan was approved. The revised plan also needs to acknowledge the agency's 1992 change from a program focused primarily on the National Historic Preservation Act (NHPA) Section 106 project compliance to one that emphasizes a balance between compliance and the stewardship and protection of cultural resources across the HLC NFs.

Significant archaeological and historical research has taken place on the HLC NFs, yet much remains to be done. Additional sites, districts, and traditional cultural properties and cultural landscapes have yet to be documented or even identified. For many identified properties only limited information is available on their current condition or significance. Additionally, many of the early surveys and site records were done to standards that are no longer considered adequate and need to be redone to current standards.

### 9.1 Cultural Resources

#### Desired Conditions

- 01 Cultural resources (e.g., buildings, sites, districts, structures, and objects) having scientific, cultural, or social values are preserved and protected for their cultural importance.
- 02 Site integrity and stability is protected and maintained on sites that are susceptible to imminent risks or threats, or where the values are rare or unique.
- 03 Priority heritage assets are stable and their significant values protected.

- 04 Cultural resources that maintain significance and integrity are maintained through conservation and preservation efforts and receive minimal impact from visitors and forest projects.
- 05 Identified traditional cultural properties, cultural landscapes, sacred sites, and other culturally significant areas which provide tangible links to historically rooted beliefs, customs, and practices are protected through consultation with American Indian tribes, traditional cultural practitioners, consulting parties, and project design.
- 06 Cultural resources are enhanced to provide educational opportunities that connect people, past and present, to the land and its history.
- 07 Opportunities are provided for volunteers to participate in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation.
- 08 Sites identified as significant, under the NHPA, are inventoried, protected, and if warranted, nominated to the National Register of Historic Places.
- 09 Restored historic buildings can be placed on the Forest Service facility rental program which would add to forest recreation program diversity and generate revenue.
- 10 Historic Forest Service administrative buildings and sites are maintained to reflect agency history, identity, and function.
- 11 Opportunities exist to conduct non-project driven inventories in portions of the Forests believed to contain cultural resources, for the benefit of cultural resources management.
- 12 Currently identified historic landscapes/districts are managed to the standards outlined in their historic preservation plans.

## 9.2 Areas of Tribal Importance

### Desired Conditions

- 01 The Forests recognize and maintain culturally significant species and the habitat necessary to support healthy, sustainable, and harvestable plant and animal populations to ensure that rights reserved by tribes are not significantly impacted or diminished.
- 02 The Forests recognize, ensure, and accommodate tribal member access to the Forests for the exercise of treaty rights and to provide opportunities to practice traditional, cultural, and religious activities, such as plant gathering and ceremonial activities that are essential to sustaining their way of life, cultural integrity, social cohesion, and economic well-being.

## 10. Land Status and Ownership, Land Uses, and Access Patterns

### Introduction

Management of NFS lands on the HLC NFs is important to protect the public's estate interest in its national forest. Surveying and posting the national forest boundary, maintaining posted property lines, and defending public lands from trespass or encroachment are activities that maintain the integrity of the NFS. About 1,050 miles of property boundary lines have been surveyed, marked, and posted, out of 1,430 total miles (73 percent complete). Approximately 610 miles of nonproperty boundaries such as wilderness boundaries, have been identified as needing to be surveyed and posted.

Land ownership adjustments are one of the tools used to simplify and improve management of NFS lands. The acquisition, protection, and management of road and trail rights-of-way also ensure public access to NFS land.

Special use permits authorize the occupancy and use of NFS land by private individuals or companies for a wide variety of activities, such as roads, utility corridors, communication sites, and other private or commercial uses, that cannot be accommodated on private lands.

## Desired Conditions

- 01** Land ownership adjustments, through purchase, donation, exchange, or other authority, are encouraged to simplify and improve national forest management (e.g., consolidate ownership, reduce grizzly-human conflicts, and provide for wildlife habitat connectivity).
- 02** Existing road and trail easements that allow access to NFS land are maintained and additional easements are acquired as appropriate.
- 03** Utility corridors and communications sites are managed in a manner that meet safety and permittee needs as well as resource considerations. They are also consolidated, thereby limiting the number of new sites needed.
- 04** Utility corridors and communications sites are sized to fit the intended use and obsolete or unused facilities are not present on the landscape.
- 05** Conservation easements are managed to standard, and opportunities are explored for purchasing additional easements to maintain and protect resource values.
- 06** Occupancy trespass on NFS lands is eliminated.
- 07** Special use authorizations meet forest management and public needs consistent with the ROS and ecosystem desired conditions.

## Chapter 3. Proposed Geographic Area Desired Conditions

### Introduction

While the forestwide desired conditions indicate broad trends which we would expect to see over the next 10 to 15 years, we recognize that individual places across the HLC NFs have their own unique characteristics and conditions. These places, referred to as “geographic areas” (GAs), define a landscape that people associate with on the Forests. Identifying these areas gives us the opportunity to fine-tune our forestwide management to better respond to more local conditions and situations. The HLC NFs have been divided into the following ten GAs (see figure 1):

- Big Belts
- Castles
- Crazies
- Divide
- Elkhorns
- Highwoods
- Little Belts
- Rocky Mountain Range
- Snowies
- Upper Blackfoot

GAs provide a means for describing conditions and trends at a more local scale if appropriate. GAs are ecological areas that are synonymous with basin and watershed. Table 16 displays total acres and the acres of the HLC NFs by GA.

**Table 16. Acres within the ten GAs on the HLC NFs, within the administrative boundary**

GA	Total Acres (All Ownerships)	NFS acres within GA	% of GA in NFS Lands
Big Belts	452,292	312,983	69
Castles	79,862	69,610	87
Crazies	70,036	57,618	82
Divide	232,890	202,577	87
Elkhorns	175,259	160,599	92
Highwoods	44,495	42,315	95
Little Belts	900,961	802,711	89
Rocky Mountain Range	782,986	777,963	99
Snowies	121,897	117,989	98
Upper Blackfoot	348,185	333,215	96

Each GA section on the following pages provides an overview of the area, including unique characteristics and GA desired conditions that describe what we want to achieve in specific GAs that are not necessarily covered by forestwide desired conditions.

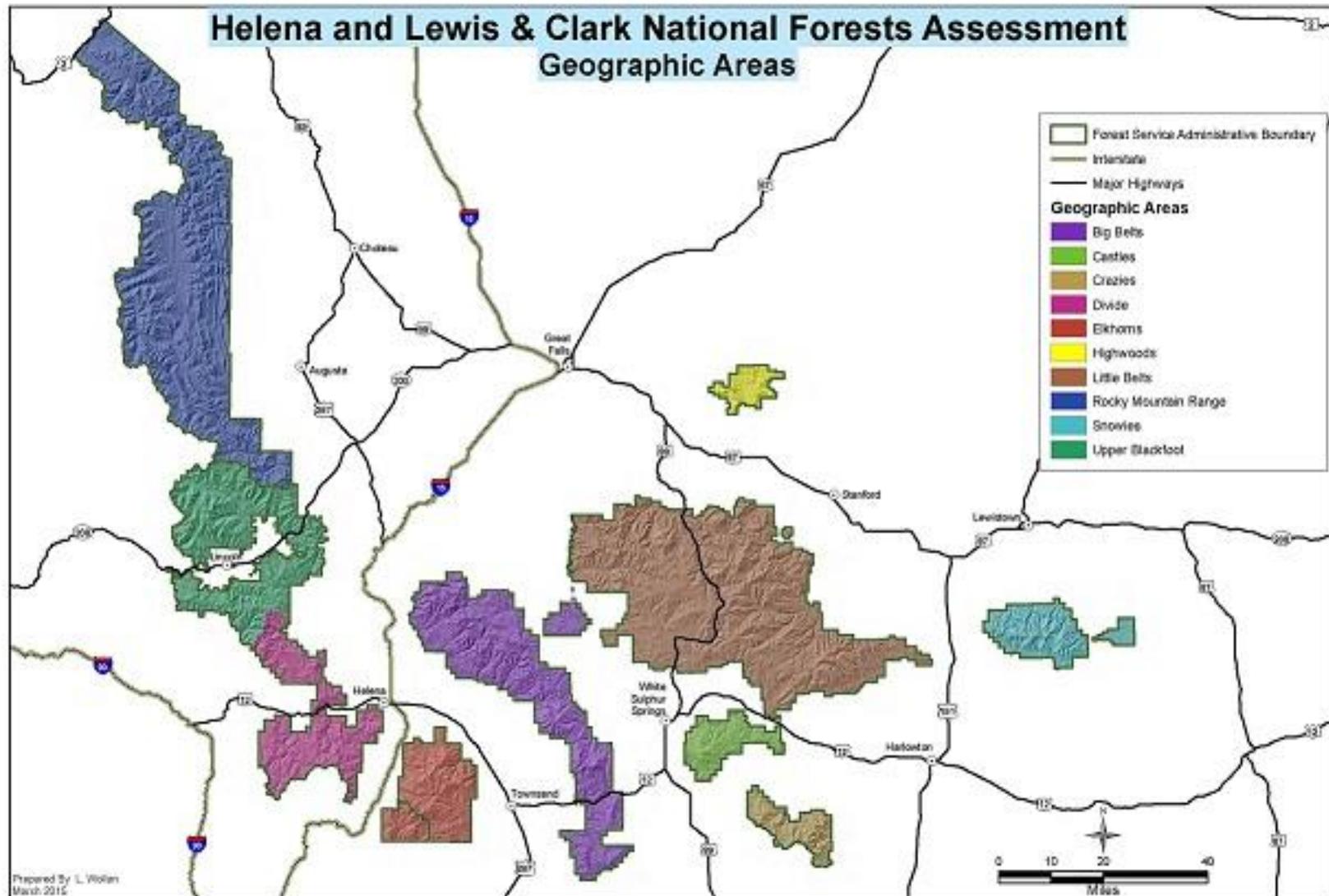


Figure 2. GAs of the Helena and Lewis & Clark National Forests

## Big Belts Geographic Area

### General Overview

The Big Belt Mountains are an island range primarily in Broadwater, Lewis and Clark, and Meagher counties with small portions in Gallatin and Cascade counties. The GA includes the Gates of the Mountains Wilderness, the outlying Dry Range, and the small communities of York and Nelson. The nearest population center is Helena.

The mountain range is located between the predominantly treeless Smith and Missouri river valleys and makes a long arc, approximately 75 miles long, on a northwest to southeast axis. The Missouri River is located along the northwest boundary. This section of the river was named the Gates of the Mountains by the Lewis and Clark expedition because the river is constricted through tall, picturesque limestone cliffs that open like a gate when you pass through them on water. An area of canyons adjacent to this stretch of river shares similar geology and has been designated as the Gates of the Mountains wilderness. The tallest mountains are found in the south central part of the range, Mount Baldy and Mount Edith. Slopes are typically steep and rugged. Some of the highest elevations have evidence of localized glaciation, such as the cirque on Mount Edith. The mountains are characterized by many steep sided gulches and canyons that drain to both the east and west. Another prominent local landform feature is “the bar”, which is a deposition of material within a stream body over time. Many, such as Montana Bar, have been productive sources for valuable minerals for placer miners.

The Dry Range is a distinct geologic unit to the east of the Big Belt Mountain range and is included in the Big Belt GA because of its close proximity. This landform can be described as low mountains with elevations ranging between 4500-6500 feet. Ellis Canyon is a prominent, branching drainage network that runs south to north through the range. The Smith River is located along the north and western border of the Dry Range.

The geology of this GA is predominantly sedimentary limestone. There are some pockets of rock from metamorphic and volcanic activity that are rich in minerals. Both the Big Belts and the Dry Range lack abundant surface water. The west side of the range is relatively dry, but the east side and high elevation slopes are relatively moist. They are in the rain shadow of the Continental Divide to the west. The underlying geology is porous, and many of the streams are intermittent. High elevation lakes such as Camas, Edith, and Boulder are in basins east of Mount Baldy and Boulder Baldy. Gypsy Lake, a manmade reservoir, is also on the east side.

The GA supports productive grasslands and conifer forests, ranging from limber pine and ponderosa pine on low elevation dry sites; Douglas-fir, lodgepole pine, Engelmann spruce, and subalpine fir on mesic sites; and whitebark pine communities at the highest elevations. Extensive sagebrush and aspen communities are also present. Most of the Dry Range and a portion of the Big Belts along the Missouri River can be characterized as partially forested foothills with large grassland openings. A large range program is active in the GA.

The Big Belts GA provides a variety of habitats for a diversity of wildlife species, including mountain goats, bighorn sheep, bald eagles, and cliff-nesting raptors such as peregrine falcons and golden eagles. Lewis's woodpeckers, flammulated owls, and Townsend's big-eared bats, all proposed SCC, are also found in the Big Belts. This GA is not within the NCDE Recovery Zone for grizzly bears, but is within Zone 2 identified in the Draft NCDE Grizzly Bear Conservation Strategy (USDI 2013) and in the proposed Forest Plan Amendment to incorporate relevant direction from the NCDE Grizzly Bear Conservation Strategy into the Helena, Lewis and Clark, Kootenai, and Lolo National Forest Plans. The Big Belts GA is not occupied by Canada lynx, and is not within designated Critical Habitat for lynx. Very

little of the Big Belts GA contains mapped potential Canada lynx habitat. The Big Belts GA provides hunting opportunities for a variety of big game species including elk, mule deer, and white-tailed deer.

The Big Belts GA has a rich history of occupation beginning with prehistoric peoples. Many cliff faces and rock shelters bear their signature in the form of pictographs and petroglyphs. Artifacts such as projectile points and associated flakes are commonly encountered. The Flathead Trail, a historic travel corridor, traverses the southern Big Belt Mountains. The presence of valuable minerals has endowed the Big Belts with a robust mining history. Relics of historic mining infrastructure and tools are frequent. Many small communities have come and gone such as Whites City, Diamond City, Watson, Vista, Manger, Duck Creek, Blackwell, Cement Gulch City, and Trout Creek to name a few. Thompson Civilian Conservation Corp Camp, Meriwether Guard Station, and Hogback Lookout stand as reminders of the CCC and Forest Service history.

Roads have been constructed for resource extraction and now fragment much of the GA. The road network serves as the primary platform from which visitors experience the area. Timber management is evident in the roaded areas. Communication towers have been constructed on high points. Utilities and transmission corridors transect the GA. In contrast to the roaded landscapes in the GA, inventoried roadless areas are located in the GA, including the Boulder Baldy Inventoried Roadless Area which provides a particularly remote expanse of land.

The Mann Gulch Wildfire Historic District in the northern Big Belts was listed in the National Register of Historic Places in 1999. Mann Gulch is significant in firefighting history due to the fact that thirteen firefighters lost their lives in this drainage in 1949 while working to suppress a wildfire. Many make pilgrimages here to pay their respects, strengthen internal relationships, and revisit lessons learned.

The Big Belts GA provides a large variety of recreation opportunities. The GA has an established system of motorized trails offering access and loop opportunities for users. Snowmobiling is also very popular in the Big Belts GA. Additionally, a number of nonmotorized trails offer recreation opportunities into quiet areas, such as the Gates of the Mountains wilderness and the Boulder Baldy IRA. These motorized and nonmotorized trail opportunities are supported by numerous trailheads and developed recreation sites strategically located throughout the Big Belts GA. The Big Belts also hosts multiple popular historic and/or recreational rental cabins, such as Bar Gulch, Rillway, and Miller. These cabins are a highlight of the Big Belts GA and draw many visitors who appreciate the history of the cabins and enjoy their unique recreation settings. Additionally, the Missouri River along the northern border of the Big Belt GA draws both local and regional recreation users who enjoy fishing, boating, and camping. Visitors may take an interpretive boat ride on the Missouri River, or may boat on their own through the Gates of the Mountains to access unique recreation and camping opportunities that are inaccessible by vehicle.

## Unique Characteristics

- Dry Range is a distinct geologic unit which is isolated, inaccessible, and characterized by mixed ownership
- Stunning geologic features and rock formations
- Expansive sagebrush and aspen communities in the southern portion of the GA
- Rich history of occupation that includes prehistoric peoples, mining, and Forest Service land management, including the road and trail system, the popular Smith River, the cabin rental program and the historic Gates of the Mountain wilderness, .
- Mann Gulch Wildfire Historic District
- Missouri River corridor offers unique fishing, boating and camping opportunities.

- South portion of the Smith River, a popular recreation destination, which is eligible for wild and scenic river status, lies along the northwestern boarder of the Dry Range.

## Desired Conditions

### Terrestrial Vegetation

- 01 Enhance sagebrush, grassland, and aspen communities.

### Terrestrial Wildlife

- 02 Within the NCDE Zone 2, bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear–human conflicts in the NCDE.
- 03 Separation is maintained between the wild bighorn sheep population and domestic sheep, to minimize the risk of disease transmission from domestic to wild sheep.
- 04 Potential disturbance by recreational climbing or other activities to nesting of cliff-nesting raptors is minimized.
- 05 Big-game winter range adjacent to the Beartooth Wildlife Management Area (WMA) is maintained or enhanced, considering MTFWP goals and objectives for big game use of the WMA

### Cultural

- 06 The Mann Gulch historic landscape is managed in accordance with its Historic Preservation Plan.

## Castles Geographic Area

### General Overview

The Castles GA is an island mountain range east of White Sulphur Springs in Meagher County. The Castle's forested higher elevations are surrounded by lower elevations that are predominantly treeless, instilling an island appearance.

The Castle Mountains have their own geologic story unique from the other island ranges. The range is a combination of landforms that appear as one. Western slopes culminate in a gently rising, flat-topped dome of volcanic origin that is comprised of a group of mountains punctuated by castle-like outcrops of granite. The eastern section is characterized by plateaus of sedimentary origin. Vantages throughout the GA provide impressive views of the Little Belts to the north, the Crazies to the south, the Big Belts to the west, the Bridger Mountains to the southwest, and a vast expanse of prairie to the east.

North and northwestern aspects are cloaked with a dense canopy of conifers. At higher elevations and on sun exposed aspects, forest intergrades with grassland meadows, or parks. These expansive grasslands consist of robust native plant communities that provide forage for both wildlife and livestock. Shrublands dominated by sagebrush were also common historically at the lower elevations surrounding the GA. Aspen stands grow in moist areas. On the drier, eastern sections, plant communities are dominated by grassy parks interspersed with patches of conifers. White bark pine is also a component at the highest elevations. Historically, fire was the primary shaper of plant communities.

The Castles GA is surrounded in the lower grassland elevations by the North and South Forks of the Smith River on the west and the North and South Forks of the Musselshell River on the east. Many spring fed streams drain from the mountains into these forks, some cutting deep gorges and some sinking underground. Willow Creek is the municipal water source for White Sulphur Springs. The western slopes

are wetter than the porous eastern limestone slopes. There is also a small lake known as Castle Lake located within this GA.

#### Private inholdings

The Castles GA provides habitat for a variety of wildlife species, including elk, mule deer, white-tailed deer, and black bear. This GA includes extensive sagebrush grasslands, likely supporting a number of species that use that habitat type, such as pronghorn, and possibly Brewer's sparrow and loggerhead shrike. There are two historic records of greater sage grouse in or immediately adjacent to the Castles GA, although the details and importance of those observations are unclear. The northeastern portion of the GA has important elk winter range.

This GA has a long history of occupation. Its mineral deposits were used as quarries for first people's needs, such as projectile points and scrapers. They left behind cultural artifacts, many of which lay undisturbed. Euro-American settlement began with the discovery of some of the same mineral deposits, causing it to be one of the first areas in Montana to be settled. The small towns of Lennep and Checkerboard are remnants of this era, as are the ghost towns of Castletown and Blackhawk. Some remnants of their structures can still be found. Livestock grazing is a primary multiple use on this GA.

The recreation opportunities in the Castles primarily consist of trails that allow for year-round motorized access; two small campgrounds, one developed and one primitive, that provide overnight camping opportunities; and unique geologic formations that provide for interesting hiking and exploring. Nonmotorized access to the Castles is limited.

### Unique Characteristics

- Island mountain range
- Unique geologic landforms
- Long history of occupation – prehistoric and mining
- Expansive native grassland areas

### Desired Conditions

#### Terrestrial Vegetation

- 01 The extent of native grass and shrublands is maintained or increased through the reduction of conifer encroachment.

#### Terrestrial Wildlife

- 02 Big game winter range in the northeastern corner of the GA is maintained or enhanced, and provides seasonal habitat for elk

#### Multiple Uses

- 03 Willow Creek provides a reliable and clean water supply for the city of White Sulphur Springs.

## Crazies Geographic Area

### General Overview

The Crazies GA encompasses the northern portion of the Crazy Mountains. The southern portion of the GA is administered by the Gallatin National Forest. The GA is at the junction of Meagher, Wheatland, Sweet Grass, and Park counties. White Sulphur Springs is the nearest population center.

The Crazy Mountains make up an island range that abruptly rises from the surrounding Shield, Musselshell, and Yellowstone River valleys. The rugged and awe-inspiring range has captivated people over time. The Mountain Crow visited its tall peaks and special areas for vision quests. Euro-American settlement has lightly affected the area with only a few signs of habitation. Forest Lake Guard Station still stands as a sentry for Forest Service administration. Today people still seek spiritual experiences through various recreational and other means.

This island range is a discrete geologic unit, unique from the adjacent ranges. The form of the Crazies is bold and craggy. They are of volcanic origin and enriched with granitic geology. Talus, scree, and boulder areas dot steep and moderate slopes. Broad valleys and long finger ridges radiate outward from its center. Many ridge tops and summits lack vegetation residing in the alpine. Glaciation has imparted many of these landforms with sharp, scoured edges. All of the GA's streams drain into the Musselshell River on their way to the Gulf of Mexico via the Missouri River. Riparian forests of aspen, willow, dogwood, and cottonwood grow along their courses. Grasslands occupy much of the lower elevations and intergrade with coniferous forest at higher elevations. Small patches of aspen punctuate the dense canopy of evergreen trees such as Douglas-fir, lodgepole pine, and subalpine fir. At the highest elevations, conifer forests give way to alpine habitats. Historically, fire would have been a major influence on plant communities.

Recreation use in the Crazies is dispersed in nature and is concentrated around FS Road 66, which is the primary access to the historic Forest Lake Guard Station and a primitive campground on the edges of Forest Lake. Private land inholdings and checkerboard ownership patterns in this GA make access to other NFS lands within the area more difficult. Hunting is a very popular recreation activity in the GA and outfitter and guides provide unique hunting opportunities and access that is difficult to achieve otherwise.

The Crazies GA is home to a number of wildlife species, including western toads, Clark's nutcrackers, black bears, moose, elk, mule deer, and others. The Crazies supports a population of mountain goats introduced by MTFWP in 1941 and 1943 that currently provide an important hunting and viewing opportunity. The Crazy Mountains may provide some connectivity for certain wildlife species between the Little Belts Mountains to the north, and the mountain ranges of the Greater Yellowstone Ecosystem to the south.

### Unique Characteristics

- Rugged island range that abruptly rises from the surrounding river valleys
- Mountain Crow visited the area for vision quests
- Forest Lake Guard Station
- Existing landforms have been carved by glaciers – resulting in sharp, scoured edges
- Relatively high concentration of mountain goats in introduced population

## Desired Conditions

### Terrestrial Wildlife

- 01 Mountain goat habitat is managed to maintain a huntable population, considering the objectives established by MTFWP, and the habitat needs of native wildlife species.

## Divide Geographic Area

### General Overview

This GA is the scenic backdrop and primary recreational resource for Montana's capital city of Helena. It also includes the smaller communities of Austin, Rimini, Elliston, and Unionville. Portions of the GA are within Lewis and Clark, Powell, and Jefferson counties. The spine of the divide is higher, cooler, wetter, and more exposed, imbuing it with a unique microclimate. The CDNST follows the crest of the divide. Unlike many of the other GAs in the HLC NFs planning area, the Divide is not an island range, but rather a portion of the larger Continental Divide that extends north/south across Montana.

While the GA has a rich history of prehistoric occupation, its signature on the landscape is not obvious. A legacy of mining has left behind a suite of structures, such as cabins and kilns, and over 139 named mines. Many former mining communities were settled and have since vacated, leaving behind interesting clues of their heyday. In addition, the landscape remains host to many active mining claims and inholdings as well as extensive reclamation activities associated with historic mining, including a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) superfund project. Some riparian benches have been converted to pasture on private property, adding a rural setting in areas. A major west/east railroad passes over the divide at Mullan Pass. The historic Moose Creek Ranger Station is located near Rimini.

Historically, fire was the primary disturbance throughout the GA and would determine composition and patterns of vegetation. The Divide GA straddles the Continental Divide, and therefore supports a wide range of vegetation conditions. West of the Continental Divide, much of the area is covered with mature conifer forest, characterized by large expanses of even-aged lodgepole pine, but also including other species such as whitebark pine, Engelmann spruce, and subalpine fir at the highest elevations and ponderosa pine and Douglas-fir at lower elevations. Large parks are distributed at both high and low elevations, including Bullion Parks, Blackfoot Meadows, Blackhall Meadows, and Thompson Flats. Red Mountain is a notable peak visible from many locations, distinguished by its expanses of bare red rock. East of the Continental Divide, this landscape supports rolling foothills where conifer forest is interspersed with extensive grass and shrubland communities. This area includes the dry ponderosa pine and Douglas-fir forests and meadows that abut the city of Helena. The lodgepole pine forests on both sides of the divide in this GA were particularly affected by the mountain pine beetle outbreak that occurred from 2006 to 2010.

Many portions of the Divide landscape are heavily roaded; in these areas, patches of vegetation management are evident. Livestock grazing is also provided as a multiple use in portions of the GA. Several expansive roadless areas are also present in this GA. The Tenmile drainage within the Divide landscape is the primary source of municipal water for the city of Helena. This landscape encompasses a network of associated infrastructure located in and near NFS lands including Chessman Reservoir, Scott Reservoir, the Chessman flume, and five separate intakes distributed along Tenmile Creek.

The Divide landscape hosts a wide variety of recreation opportunities. The South Hills Trail system is located adjacent to the city limits of Helena and includes a combination of Forest Service, BLM, City of

Helena, and private land trails which are maintained through a memorandum of understanding between the managing entities. Several developed campgrounds are located within the GA. Park Lake is one of the most popular campgrounds due to its proximity to Helena. Another unique developed camping opportunity is at the Cromwell Dixon campground, which is located along the Continental Divide National Scenic Trail at the top of MacDonald Pass. MacDonald pass also offer a network of cross country skiing trails that are easily accessed by the community of Helena.

The Divide GA provides some connection for wildlife populations between the expanse of public lands in northern Montana with public lands in the Yellowstone area and southwest Montana. It sits at the southern end of the NCDE, with grizzly bears expanding into the Divide GA as the NCDE population has grown. This GA is not within the Northern Continental Divide (NCDE) Recovery Zone for grizzly bears, but is within Zone 1 (north half of the GA) and Zone 2 (south half of the GA) identified in the Draft NCDE Grizzly Bear Conservation Strategy (USDI 2013) and in the proposed Forest Plan Amendment to incorporate relevant direction from the NCDE Grizzly Bear Conservation Strategy into the Helena, Lewis & Clark, Kootenai, and Lolo National Forest Plans. The northern portion of the Divide GA is within Unit 3 of designated Canada lynx Critical Habitat. Other wildlife species present on this GA include flammulated owl and western toad (potential SCC), Clarks' nutcracker, wolverine, and big game and other species that provide hunting and trapping opportunities.

## Unique Characteristics

- Black Hall Meadows, a unique aspen and grassland community
- Legacy of mining, mining effects, and reclamation efforts, as well as a CERCLA project
- MacDonald Pass cross country ski area
- Mount Helena recreation area, and associated trail system, offers a trailhead that is adjacent to the city limits. These trails offer a primary resource for the capital city of Helena.
- Park Lake recreation area
- CDNST

## Desired Conditions

### Terrestrial Wildlife

- 01** Within the NCDE Zone 2, bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear–human conflicts in the NCDE.
- 02** Potential Canada lynx habitat is managed in a manner that contributes to sustaining recovery of the Rocky Mountain Canada lynx population. Diverse conditions in the cool moist and cold Potential Vegetation Groups contribute to habitat quality and connectivity for Canada lynx at a landscape scale over the long term.
- 03** The GA continues to provide habitat connectivity for wide-ranging species (e.g., grizzly bear, Canada lynx, and wolverine) within the GA, as well as between public lands in northern Montana and those in southern and southwestern Montana, including lands in the Greater Yellowstone Ecosystem.
- 04** National Forest lands adjacent to the Spotted Dog Wildlife Management Area (WMA) are managed considering the goals and objectives established by MTFWP for the WMA. Elk habitat on NFS lands adjacent to the Spotted Dog WMA is managed to provide for elk occupancy throughout most of the year.

## **Watershed and Aquatic ecosystems**

**05** Recovery and delisting of bull trout is the long-term desired condition. Bull trout population trends toward recovery through cooperation and coordination with USFWS, tribes, state agencies, other federal agencies, and interested groups. Recovery is supported through accomplishment of the Bull Trout Conservation Strategy and the Bull Trout Recovery Plan. On NFS lands, spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat and appropriate life history strategies (e.g., resident, fluvial, and adfluvial) are supported.

## **Multiple Uses**

**06** Tenmile watershed provides a reliable and clean water supply for the City of Helena.

## **Recreation Opportunities**

**07** The MacDonald Pass provides an easily accessible winter trailhead that provides access to groomed cross country ski trail and other winter sport activities.

## **Designated Areas**

**08** The CDNST provides for high-quality scenic, primitive hiking and horseback riding opportunities and conserves natural, historic, and cultural resources along its corridor.

## **Minerals**

**09** There is one federal Superfund (CERCLA) site in the Divide GA: the Upper Tenmile Creek Mining Area. This site is relatively large in scale and encompasses an entire watershed. Cleanup work being evaluated and conducted at this site will occur over a period of decades including maintenance and monitoring of cleanup remedies. In addition, the agencies with the lead roles in this cleanup, EPA and MTDEQ, have broad authorities for conducting activities that need to be considered in context of Forest Service management. The desired condition for this site is to manage it within the context of the Superfund designation in coordination with EPA and MTDEQ.

# **Elkhorns Geographic Area**

## **General Overview**

The Elkhorns GA encompasses the Elkhorn Mountains in Broadwater and Jefferson counties and includes the small mining town of Elkhorn. The nearest large population center is Helena, Montana. Many smaller communities also have intimate relationships with the GA: Montana City, Clancy, Alhambra, Jefferson City, Boulder, Radersburg, Townsend, Winston, and East Helena. The Elkhorns are surrounded by the Divide Mountains and Boulder Batholith on the west, and the Missouri and Boulder River valleys on the north, east, and south. The Elkhorns is an island mountain range. High points are prominent from background northwest, west, and southwest perspectives but cryptic from other vantages. Drainages have carved steep gulches and canyons.

The Elkhorns GA can be divided into west and east sections by the predominant underlying geology. The majority of the Elkhorns (north, west, southwest) is a part of a batholith. This geologic history has left the area rich in minerals. Evidence of glaciation is localized as boulder strewn areas of granitic rocks. The remaining approximate quarter (southwest) of the GA is underlain by sedimentary rock that lacks the same mineralization as the batholith but is rich in calcareous rock. The landforms are rugged, low mountains with hogback ridges and dry valleys.

Fire has historically been a major influence to plant communities. The plant communities on the batholith portion are mostly forested with conifers, including ponderosa pine and Douglas-fir at low

elevations that gradate to lodgepole pine, subalpine fir, and whitebark pine at high elevations. Aspen stands and water-loving plants take advantage of riparian areas and wet seeps. Parks, rich with grasses and forbs, are frequent at lower elevations and break up the forest in montane elevations. A large expanse of this GA burned in 1988. The sedimentary geologic area in the east is a gradient of foothill prairie and partially forested low mountains. Grassland is a major component. Limber pine and juniper woodland ebb and flow with the prairie relative to disturbances.

The western side of the GA is generally wetter than the eastern side. The entire landmass is drained by many perennial and intermittent creeks. All flow to the Missouri River, some via the Boulder and Jefferson Rivers. The basins around Elkhorn and Crow Peaks harbor high elevation lakes such as Hidden Lake, Tizer Lakes, Leslie Lake, and Glenwood Lake. Crow Creek plummets over an impressive falls. Springs are important water features in the more arid eastern sections.

The Elkhorn GA has been occupied by human inhabitants for thousands of years. However, prehistoric occupation is less evident than the more recent Euro-American settlement. After the discovery of valuable mineral deposits, mines and associated settlements sprang up in portions of the GA. The ghost town of Elkhorn is a good example of this era. Other communities have all but disappeared, such as Queen, Eagle City, Gold Dust, and Sourdough. Remnant tools and infrastructure of the mining era are found throughout the GA. Eagle and Tizer Guard stations as well as the Strawberry Lookout are living reminders of Forest Service administration in the GA.

The lower elevations of the GA are roaded, and minimal amounts of vegetation management are visible in these areas, most commonly prescribed fire. There is an active range program in the Elkhorns; grazing allotments are present across most of the GA. The interior of the GA is within an IRA, providing an expanse of unroaded and remote country surrounding steep, rugged peaks.

Due to the rich wildlife habitats throughout the mountain range, the Elkhorns were designated a Wildlife Management Unit in 1986, the only one of its kind in the nation. Habitats are managed in this unit to maintain viable populations of species associated with the existing ecosystems, with particular emphasis on those for which seclusion is an important requirement. Elk management in this unit has focused on providing a permit-only hunt for trophy bull elk. Collaborative groups composed of federal, state, and local citizens work toward habitat maintenance and restoration and interpretation of the area's history. Wildlife observed in this GA include elk, mule deer, Clark's nutcracker, river otter, wolverine, and others. The Elkhorns GA has supported bighorn sheep, although the potential for long-term persistence of a herd in the GA has been impacted by disease outbreaks.

There are numerous trailheads and dispersed recreation opportunities throughout the Elkhorns, including a number of dispersed nonmotorized trails and primitive camping areas. The area is utilized primarily by hunters, as the Elkhorns are known for the production of trophy bull elk and MTFWP has made the Elkhorns a permit-only bull elk hunting area.

The Elkhorns Wildlife Management Unit is the only wildlife management unit in the nation encompassing portions of both the Helena and the Beaverhead-Deerlodge National Forests. The Elkhorns Wildlife Management Unit is managed cooperatively as the Elkhorn Cooperative Management Area with the Bureau of Land Management, Montana Fish, Wildlife and Parks and the NRCS.

## Unique Characteristics

- Eagle Guard station is the most visited cabin rental across the HNF.
- Strawberry lookout

- Cooperative management of the Elkhorns.
- Permit-only trophy bull elk hunting opportunity
- History of mining - ghost towns, including Elkhorn, tools, and infrastructure

## Desired Conditions

### Terrestrial Wildlife

- 01 Within the NCDE Zone 2, bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear–human conflicts in the NCDE.
- 02 The area continues to be managed cooperatively with MTFWP, NRCS, and BLM as a wildlife management unit. Management includes a cooperative wildlife monitoring program with specific, measurable objectives.
- 03 Land management prioritizes wildlife habitat values, and other uses are allowed where and when they are compatible with those values.
- 04 Motorized access is restricted as needed to maintain wildlife habitat values, particularly for species with seclusion as a habitat requirement.
- 05 Habitat conditions are maintained or restored to allow for re-establishment of a bighorn sheep population. Separation is established between wild bighorn sheep and domestic sheep, to minimize the risk of disease transmission from domestic to wild sheep.

### Multiple Uses

- 06 McClellan Creek provides a reliable and clean water supply for the City of East Helena.

### Designated Areas

- 07 The Elkhorns Wildlife Management Unit is managed to protect and enhance the unique wildlife habitat for which it has been designated.

## Highwoods Geographic Area

### General Overview

The Highwoods GA is the smallest of the GAs within the plan area and encompasses the Highwood Mountains. This isolated island range is located within Cascade, Chouteau, and Judith Basin counties. This GA is the closest NFS land to Great Falls. The landmass rises up from the confluence of multiple grassland types: foothill grasslands, semi-arid prairie, Missouri Breaks, and unglaciated high plains. All of these types share basic common traits but are slightly different and collectively set the stage for the Highwood's unique setting.

The Highwood Mountain range is a highly dissected mass of volcanic rocks and laccoliths. Laccoliths are a distinctive form of igneous intrusive where the molten lava penetrates horizontal sedimentary layers, bowing them upward in a mushroom-like shape. Striking, dark colored igneous dikes radiate outward from the Highwoods, coursing perpendicular to the flat-lying sedimentary rocks that surround the Highwoods.

The Highwoods have a long history of grazing. The GA provides an abundance of grass and reliable sources of water. Historic Highwood and Shonkin Cow Camps are reminders of this heritage. An active

grazing program comprises the primary multiple use of this landscape and contributes substantially to the economy of Choteau County.

The Highwood Mountain range is of volcanic origin and contains geologic formations that are a mix of igneous and sedimentary rocks. The mountains have been weathered over time by natural processes, rendering them rolling and furrowed in form. The mountains are bisected by Highwood Creek. Slopes are moderately steep. North facing aspects are considerably wetter than less vegetated, rocky, south facing slopes. Here, a characterizing landform is the coulee, which is from the French word meaning “to flow”. Some are predominantly grassy and others harbor woody plants. Some are intermittent and others have perennial flows.

A dense stream network has dissected the mountains, creating numerous folds in the topography. Riparian areas are composed of willow, dogwood, water birch, cottonwood and other water-loving plants. Aspen communities and grasslands are scattered throughout the landscape which is dominated by relatively dense and single-aged conifer forest composed of primarily Douglas-fir and lodgepole pine. The land cover of this GA is a mosaic of conifers, deciduous trees, grass, and rock. Woodland, forest, and prairie ebb and flow into one another. Fire was historically the main determinant of vegetative cover.

Within the GA, there is one small developed campground, Thain Creek Campground, and a developed trailhead in North Fork Highwood Creek. These developed sites provide access points for the many single track trails that traverse the Highwoods. These trails are used extensively by motorcycle users as well as by hikers and horseback riders.

The Highwoods provides habitat for a variety of wildlife species, including a population of mountain goats introduced by MTFWP to an area east of the GA in 1943 and augmented in 1971, but by 1994 had dispersed and established in the Highwoods GA. The mountain goat population provides an important hunting and viewing opportunity. Other species found in the Highwoods include northern leopard frog, Clark’s nutcracker, moose, elk, mule deer, and white-tailed deer.

## Unique Characteristics

- Isolated mountain island range
- Long history of grazing that is important to local economies
- Mountain range is of volcanic origin, containing both igneous and sedimentary rocks

## Desired Conditions

### Terrestrial Vegetation

- 01 Aspen regeneration is promoted and expanded without increasing road density.

### Terrestrial Wildlife

- 02 Mountain goat habitat is managed to maintain a huntable population, considering the objectives established by MTFWP, and the habitat needs of native wildlife species.
- 03 Cooperative relationship with private landowners and other agencies, and use of specific tools such as conservation easements, are prioritized for adjoining lands that provide portions of seasonal habitat for big game and other wildlife species.

## Little Belts Geographic Area

### General Overview

The Little Belts GA is a large isolated mountain range in central Montana. It measures approximately 60 miles southeast to northeast and is 30 miles across. The landmass generally has a rolling curvature. Evidence of glaciation is infrequent and patchy. The geology of the Little Belts is rich in limestone with pockets of metamorphic and igneous rock. Bands of limestone bluffs break up uniform expanses of evergreen forest. Stream courses have carved beautiful exposed escarpments and palisades. The many streams of the Little Belts are picturesque and ecologically rich. Drainages typically flow outward, radially from the center of the range. The limestone nature leads to many caves throughout the GA, including Lick Cave. The GA served as the landscape in much of the work of artist CM Russell, who resided in the area.

Portions of this GA are located in Meagher, Judith Basin, Cascade, and Wheatland counties. It is surrounded by predominantly treeless foothills of prairie and sagebrush steppe. The city of Great Falls is 50 miles to its northwest, Stanford to the east, Harlowton to the southeast, and the town of White Sulphur Springs is on its southern edge. The Little Belts GA is bisected north-south by the Kings Hill scenic byway (US Highway 89), along which the small communities of Niehart and Monarch reside. Most of the Little Belts can be described as remote but accessible by a well-distributed transportation network.

The Little Belts' vegetation reflects the gradient of moisture and elevation. Grasslands, sagebrush steppe, and open woodland circle the outer fringes with trees clinging to drainage bottoms. Thick stands of conifers cloak the interior. Some mountain summits lack vegetation, revealing gently sloping, broad ridges. The GA also supports expansive and productive grasslands that characterize the open flat-topped plateaus. Herbaceous plants help support an active grazing program. Timber harvest has also been a primary multiple use in the roaded portions of the landscape, including historic logging associated with early mining and settlement of the area. While the GA includes a large roadless interior, the roaded portions of the landscape support a relatively high road density. The Tenderfoot Experimental Forest and a Whitebark Pine seed orchard are also located in the GA.

First peoples used the area ever since immigrating into this part of North America. They utilized quarries for tools and weapons, such as projectile points. They created art on rock shelters and overhangs for cultural reasons. They left rings of rock used to secure tepees for shelter. The GA was quickly inhabited by Euro-Americans after Missouri river travel was established and rich deposits of minerals were discovered. Mining infrastructure and tools are frequently encountered throughout the area. Many communities sprang up quickly and then disappeared. A few former community names are Galena, Summit, Silver Dyke, Carbonate, and Hughesville. Homesteading also occurred. The history of timber cutting is evident, and relics such as splash dams and log chutes can be encountered. Forest Service guard stations and fire lookouts, including Porphyry Lookout, remain in various locations and conditions.

The Yogo mining district is located in a relatively remote area east of Neihart and south of Stanford on the east slope of the Little Belt Mountains along Yogo Creek. Miners were initially attracted by placer gold. However, deposits of silver, lead, and iron ore supported small scale lode mining for a number of years. The eventual discovery of sapphires brought fame to the Yogo district.

The Little Belts GA supports a wide variety of wildlife species, including carnivores such as black bear, mountain lion, pine marten and wolverine, and big game such as moose, elk, mule deer, and white-tailed deer. The state-owned and managed Judith River WMA was the first WMA established in Montana, with the goal of securing elk winter range in the Judith River drainage on the east side of the Little Belts mountain range. The Haymaker WMA is also adjacent to NF lands in this GA. NFS lands in the Little

Belts GA include more winter range than is present in most GAs on the HLC NFs, meaning that wintering big game species may be less dependent on adjoining private lands than is the case in other areas. The Little Belt Mountains historically supported bighorn sheep but were extirpated here by the early 1900s. Although occasional individual bighorn sheep have been observed in the Little Belts in recent years, a self-sustaining population does not currently exist in this GA.

The Little Belts GA offers diverse recreation opportunities. This includes developed campgrounds; developed trailheads; recreation residences; Camp Rotary; Showdown ski area; King's Hill winter recreation area that includes Silvercrest groomed cross-country ski area, snowmobile, snow shoe, and dog sled opportunities; cabin rentals; and interpretive panels. The Middle Fork Wilderness Study Act area is located within the center of the Little Belts Mountain range. This primitive area was identified in 1977 as important for its wilderness characteristics. Dispersed recreation activities include motorized and nonmotorized trails, snowmobile trails, caves, and dispersed camping. The Little Belts GA provides permitted access within the Smith River corridor. This GA offers significant hunting opportunities, and is the first area available for general (non-permit-only) elk hunting for hunters arriving by land from eastern Montana and other states to the east.

### Unique Characteristics

- Kings Hill scenic byway (US Highway 89)
- Largest of the isolated island ranges in central Montana
- Smith River access and numerous outfitter guides associated with Smith River (floating and hunting opportunities)
- Kings Hill winter recreation area including the cross country skiing, snowshoeing, and the snowmobiling area.
- Showdown downhill ski area
- Tenderfoot Creek Experimental Forest
- Whitebark pine seed orchard

### Desired Conditions

#### Terrestrial Vegetation

- 01 Maintain, protect, and manage the whitebark pine seed orchard in accordance with the Regional tree improvement program.

#### Terrestrial Wildlife

- 02 Wildlife winter range is maintained within the NRV, where that is known, and forage is available to sustain wildlife on winter range throughout average winter conditions and duration. Winter range adjacent to the state-owned and managed Judith River and Haymaker WMAs is managed, where and when possible, consistent with MTFWP objectives for those WMAs.
- 03 Habitat conditions are maintained or restored to allow for re-establishment of a bighorn sheep population. Separation is established between wild bighorn sheep and domestic sheep, to minimize the risk of disease transmission from domestic to wild sheep.
- 04 The potential for connectivity of wildlife habitats and populations is maintained to the smaller, isolated mountain ranges to the north, east, and south Mountains.

## Multiple Uses

05 O'Brien and Shorty Creeks provide a reliable and clean water supply for the City of Neihart.

## Recreation Opportunities

06 Forest conditions within the Showdown Ski area are conducive to achieving the desired recreational setting and experience for users. Forested landscapes have structure, composition, and densities that are resilient to disturbances such as fire, insects, and disease.

07 The Kings Hill Winter Recreation Area provides an easily accessible winter trailhead that provides access to groomed cross country ski trail and other winter sport activities.

## Designated Areas

08 The Middle Fork Judith Wilderness Study Act area will be managed to preserve opportunities for inclusion in the National Wilderness Preservation System. Maintain and protect the ecological and social characteristics that provide the basis for the suitability for potential designated wilderness.

09 The Tenderfoot Creek Experimental Forest serves as a demonstration and study area for researchers, educators, forest managers, and the public. Areas are provided for research studies to help answer current and future management questions

10 The Kings Hill Scenic Byway offers opportunities to view and interpret unique landscape and cultural features. The scenery along this byway is maintained and enhanced, but management for health and safety also occurs.

## Minerals

11 There are two federal superfund (CERCLA) sites in the Little Belts GA: Barker Hughesville and Carpenter Snow Creek. These sites are relatively large scale encompassing entire watersheds. Cleanup work being evaluated and conducted at these sites will occur over a period of decades including maintenance and monitoring of cleanup remedies. In addition, the agencies with the lead roles in these cleanups, EPA and MTDEQ, have broad authorities for conducting activities that need to be considered in context of Forest Service management. The desired condition for these sites is to manage them within the context of the superfund designation in coordination with EPA and MTDEQ.

# Rocky Mountain Range Geographic Area

## General Overview

The Rocky Mountain Range GA is located in portions of Teton, Pondera, Glacier, and Lewis and Clark counties. The closest communities are Augusta, Choteau, Bynum, Dupuyer, East Glacier, and Heart Butte. Great Falls is the nearest large population center, about an hour drive to the southeast. The GA is bordered by U.S. Highway 2 and Glacier National Park to the north. The Blackfoot Nation lands are to the northeast. The east and southeast are bordered by state, private, and BLM lands. The Upper Blackfoot GA is to the south. The Continental Divide and the Lolo and Flathead National Forests are to the west. Unlike many of the GAs in the HLC NFs planning area, the Rocky Mountain Range is not an island mountain range, but rather a part of the expansive Continental Divide ecosystem that extends across Montana.

The very diverse topography and vegetation of this GA supports a wide array of wildlife species. All of the wildlife species present before Euro-American settlement of the continent, with the exception of bison, are believed to be present on this GA. Two species (grizzly bear and Canada lynx) that are

currently listed as Threatened under the federal Endangered Species Act are present in this GA. The Rocky Mountain Range GA is part of the Northern Continental Divide Ecosystem Recovery Zone for grizzly bears, and is within Unit 1 of federally designated Canada lynx Critical Habitat. Other uncommon species that are present include the white-tailed ptarmigan, harlequin duck, northern bog lemming, and wolverine. The bighorn sheep population in the Sun River area of the Rocky Mountain Range GA has been one of the most robust and resilient herds in Montana, and has been the source for sheep transplanted to other states and areas within Montana to augment or re-establish declining or extirpated herds. The elk herd in the Sun River area was one of the few remaining elk populations in Montana in the early 1900s, and it currently represents a high-value hunting and wildlife viewing opportunity.

A large portion of the Rocky Mountain Range GA is designated wilderness and includes portions of the Scapegoat and Bob Marshall Wilderness Areas. These two wilderness areas are components of a greater wilderness complex that totals well over 1.5 million acres, the 5<sup>th</sup> largest wilderness area in the lower 48 states. With the passing of the National Defense Act of 2015 in December 2014, an additional 67,112 acres were added to these wilderness areas. The GA's proximity to this wilderness complex, Glacier National Park, and adjacent wild areas of Canada make it a critical component of the Northern Continental Divide Ecosystem.

Fire management in the Bob Marshall Wilderness portion of the Rocky Mountain Range GA has emphasized allowing fire to fulfill its natural role in the ecosystem, as envisioned by the Wilderness Act. Starting with the Cigarette Creek Fire in 1981, many wildfires in this GA have been managed to achieve multiple resource objectives, allow fire to operate as an important disturbance, and drive the mosaic and pattern of vegetation. Current federal fire policy updated in 2009 allows a naturally ignited wildfire to be managed for multiple objectives allowing even greater flexibility for fire management in this GA. There are many natural barriers that tend to slow or stop fire spread, including major river drainages and rocky ridges.

This GA is a part of the larger Rocky Mountain Front, which is the abrupt geologic uplift of the first range on the eastern edge of the Rocky Mountains. Here, the Canadian Rockies are represented by the Sawtooth and Lewis & Clark Ranges. Large bands of exposed limestone were upthrust into what is known as the Lewis Overthrust. Two highlights of this upthrust formation are Scapegoat Mountain, a large escarpment in the Scapegoat wilderness; and the Chinese Wall, a limestone escarpment that averages 1,000 feet high and extends for approximately 22 miles. The Continental Divide is located along the top of this long limestone escarpment. The distinct ridges are locally known as reefs.

Water drains from the mountains eastward cutting perpendicularly through the parallel ridges. Roads follow stream corridors providing access to interior valleys. Many of the streams and rivers are noted for their ecological and scenic value. Upon exiting the forest boundary, the majority of water is quickly captured in reservoirs for agricultural use. Most precipitation comes in the form of snow. Fierce Chinook winds frequently create extremely windy days. The Northwest Glaciated Plains are characterized by large open expanses of what was historically short grass prairie. It has been predominantly converted to agricultural purposes. Kettle ponds seasonally dot the rolling foothills. Vegetation within the forest boundary is largely influenced by natural processes. Prairie, limber pine woodland, and aspens cover lower foothills. Prairie vegetation extends into the front ridges and gives way to conifer forests. Exposed rock, aspen stands, and open grassland break up the forest.

The GA is a destination for Montanans as well as visitors from all over. People are drawn to the area because of its remoteness, stunning landscape, recreational opportunities, and because it is one of the significant remaining wild places in the lower 48 states. Many lodges, resorts, cabins, and ranches have intimate relationships with the area. Multiple guard stations, work centers, and lookouts help the Forest Service steward the vast country.

Recreation use within the GA is diverse and ranges from primitive settings found within the wilderness areas to well-established developed sites along open busy roads. Because of the large amount of designated wilderness there is substantial backcountry recreation that relies on traditional skills, solitude, and self-reliance. Backpacking, horseback riding, and commercial outfitting are the primary recreation opportunities present in these remote reaches. Conversely, in the front country, one can find developed campgrounds and trailheads, commercial resorts, recreational residence cabins, cabin rentals, and a downhill ski resort. Throughout the area, there are dispersed camping opportunities.

Portions of the Old North Trail, an ice-free corridor for southward immigration of North America's first peoples, are found here. More recent indigenous cultures revere the area as a sacred landscape with spiritual importance for ceremonial purposes. The use of its cultural and spiritual resources has initiated the process of listing of the Badger-Two Medicine area as an eligible traditional Cultural District. Archeological sites, such as pictographs, dot the entire GA.

### Unique Characteristics

- All native species, except bison, that existed in this GA prior to Euro-American settlement are present
- Sun River Game Preserve established in 1913 to protect the dwindling elk population. One of the only remaining Game Preserves in Montana.
- Entirely within the NCDE Grizzly Bear Recovery Zone, and area of grizzly population expansion eastward into historic prairie habitat
- Supports threatened Canada lynx, and is within Unit 3 of Designated Canada Lynx Critical Habitat
- Strong, frequent Chinook winds in this GA provide open winter range habitat key to many wildlife species, including big game. These wind-maintained winter ranges provide carrion used by grizzly bears in spring, before more nutritious foods become available. The strong winds also affect plant communities, such as dry limber pine, krummholz, savannah, and snow that's pushed and drifted into coulees that melt and irrigate snow-bank riparian areas.
- Large portion is designated wilderness and includes parts of the Scapegoat and Bob Marshall Wilderness Areas.
- Proximity to wilderness complex, Glacier National Park, and adjacent wild areas of Canada make it a critical component of the Northern Continental Divide Ecosystem.
- Badger-Two Medicine area has important cultural and spiritual resources.
- Destination for Montanans as well as visitors from all over. People are drawn to the area because of its remoteness, stunning landscape, and recreational opportunities.
- Teton Pass ski resort
- Benchmark airstrip
- CDNST
- High proportion of recreation residences in comparison to other GAs on the HLC NFs
- There is an extensive outfitter and guides program that offers unique outfitted backcountry recreation experiences to the public.
- Conservation Management Area uniquely designated

## Desired Conditions

### Terrestrial Vegetation

- 01 Vegetation conditions and fire management strategies move the landscape towards a condition where natural fires are self-limiting with resultant fire severities and smoke outputs that are within the natural range of variability.
- 02 Within the NCDE PCA, the number, capacity of, and improvements on cattle and sheep grazing allotments support ecologically sustainable grazing, and temporary grazing permits are used effectively for management of noxious weeds, while minimizing the risk of human-bear conflicts on NFS lands.
- 03 Within the NCDE PCA, the amount, type and distribution of vegetation provides for ecological, social and economic sustainability of NFS lands, while providing habitat components that contribute to sustaining a recovered grizzly bear population in the NCDE, supporting delisting.

### Terrestrial Wildlife

- 04 Within the NCDE primary conservation area (PCA) bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear–human conflicts in the NCDE.
- 05 Within the NCDE PCA, grizzly bear habitat on NFS lands contributes to sustaining a recovered grizzly bear population in the NCDE and contributes to connectivity with neighboring grizzly bear recovery zones.
- 06 Potential Canada lynx habitat is managed in a manner that contributes to sustaining recovery of the Rocky Mountain Canada lynx population. Diverse conditions in the cool moist and cold Potential Vegetation Groups contribute to habitat quality and connectivity for Canada lynx at a landscape scale over the long term.
- 07 Wildlife winter range is maintained within the NRV, where that is known. Winter range adjacent to the state-owned and managed Blackleaf, Ear Mountain, and Sun River WMAs is managed, where and when possible, consistent with MTFWP objectives for those WMAs.
- 08 The potential for connectivity of wildlife habitats and populations is maintained to the north across U.S. Highway 2 with Glacier National Park, and to the east with seasonal habitats and some historic wildlife ranges.
- 09 Separation is maintained between the wild bighorn sheep population and domestic sheep, to minimize the risk of disease transmission from domestic to wild sheep.

### Recreation Opportunities and Access

- 10 Commercial resorts are managed within the standards set by the term special use permit. Historic buildings are managed to protect the identified historic value while still providing for operations of the permit holder.
- 11 Forest conditions within the Teton Pass Ski Resort are conducive to achieving the desired recreational setting and experience for users. Forested landscapes have structure, composition, and densities that are resilient to disturbances such as fire, insects, and disease.
- 12 Within the NCDE PCA, motorized access provides for multiple uses (such as harvesting of timber and non-timber forest products, hunting, fishing, and recreation opportunities) on NFS lands while

providing open motorized route density (OMRD), total motorized route density (TMRD), and secure core levels that contribute to sustaining a recovered grizzly bear population in the NCDE.

- 13 Within the NCDE PCA, the number, capacity, and improvements of developed recreation sites provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on National Forest System lands.

### **Designated Areas**

- 14 Forest Service System lands within the Conservation Management Area are managed to conserve, protect, and enhance for the benefit and enjoyment of present and future generations the recreational, scenic, historic, cultural, fish, wildlife, roadless, and ecological values present.
- 15 The CDNST provides for high-quality scenic, primitive hiking and horseback riding opportunities and conserves natural, historic, and cultural resources along its corridor.
- 16 Land management activities within the Sun River Game Preserve are prioritized wildlife habitat values.

### **Infrastructure**

- 17 Within the NCDE PCA, motorized access provides for multiple uses (such as harvesting of timber and nontimber forest products; hunting, fishing, and recreation opportunities) on NFS lands while providing open motorized route density (OMRD), total motorized route density (TMRD) and secure core levels that contribute to sustaining a recovered grizzly bear population in the NCDE.
- 18 Outside the NCDE PCA, provide quality motorized and nonmotorized access for multiple uses (such as harvesting of timber and nontimber forest products; hunting, fishing, and recreation opportunities) on NFS lands.

### **Cultural**

- 19 The Badger Two Medicine area is managed in a way that enhances traditional cultural use.

## **Snowies Geographic Area**

### **General Overview**

The Snowies is the farthest east GA within the HLC NFs plan area. This remote GA is primarily in Fergus County with smaller portions in Golden Valley County. Lewistown is the largest nearby population center. The GA includes both the Big and Little Snowy Mountain ranges, which constitute portions of a more extensive series of low, rolling hills. The Big Snowy range is the largest and most prominent landform within this setting. The Snowies GA displays prominent changes in elevation accentuated by the surrounding grassland, high plains, and conifer timbered foothills.

The Little Snowy Mountain range has a rich cultural history, beginning with first peoples then homesteading. Today, large ranches maintain the open character of the area. Pine Grove Cemetery continues to be the final resting place for early Euro-American occupants. The Little Snowies are separated from the Big Snowies by a subtle break in topography. It is characterized by foothills that are partially forested with an extensive and unique ponderosa pine-dominated forest community. Due to its position in the rain shadow created by the Big Snowies, the country is semi-arid and more dominated by grassy vegetation. Landform is rolling with slopes that are gentle to flat, except where creeks have dissected them. The area lacks prominent high points. The major drainages are Willow Creek and the North Fork of Pole Creek, both of which drain south to the Musselshell River.

Snow in the Big Snowy Mountains is a primary source of water that feeds the underlying Madison limestone formation and Big Spring, which is a first-magnitude artesian spring (and primary water source of Big Spring Creek) that surfaces approximately 6 miles south of Lewistown. Big Spring (approximately 50,000 to 64,000 US gallons per minute) provides Lewistown's water supply, which requires no treatment for use by consumers.

There are primitively developed camp sites within the Little Snowies but the area is not considered to be a destination camping area. Most of the area is used for dispersed recreation opportunities, such as hunting and camping. The area is known for its wild turkey populations and so wildlife viewing is also a popular activity

The Big Snowy Mountains have long been a unique and revered destination. Early first people visited its basins and summits. Their artifacts and art still sporadically adorn the range. Lower slopes and foothills were homesteaded and have become large, iconic ranches. Unique, biophysical phenomena, such as ice caves, continue to attract intrepid visitors.

The Big Snowy Mountains are higher in elevation and larger in size than the Little Snowy range. The spine of this dominant landform runs east-west for approximately 25 miles, and 10 miles north-south. Middle elevations are clad with coniferous trees. At the highest elevations, the forest transitions into a tree-less plateau of alpine that is characterized by rock and tundra. Slopes vary from steep rocky canyons to gentle benches. The northern portion of the GA receives abundant moisture and supports extensive dense forests of late successional Douglas-fir, lodgepole pine, subalpine fir, and Engelmann spruce. These moist forests create a unique setting not found in the more arid GAs nearby. The southern portion of the GA supports a notably expansive aspen complex. Floristically, the Big Snowies are unique with many vegetation types compressed into the same area. Fire was the historic driver of plant communities.

Streams flowing out of the north side of the Big Snowy Mountains flow into the Judith River. Those flowing out of the south side flow into the Musselshell River. Many streams originate in steep-walled, amphitheater-like basins and emerge out through canyons.

Crystal Lake is one of the Big Snowy Mountain's crown jewels. It is a shallow lake of natural origin, roughly 15 feet at its deepest and underlain by a bed of limestone. There are a number of developed recreation sites along Crystal Lake including a campground, day use areas, boat launch, trailhead, and a national recreation trail. Crystal Lake Guard station still actively facilitates Forest Service stewardship and is available as a cabin rental. Several dispersed trails take off from this location and provide access to interesting interpretive points such as the Ice Caves, which are located within the GA. The GA's karst topography conceals many caves.

The Big Snowies Wilderness Study Act area is approximately 87,968 acres and is located within the center of the Big Snowy mountain range. This undeveloped area is managed to preserve opportunities for inclusion in the National Wilderness Preservation System and includes opportunities for a more primitive recreation experience.

The Snowies GA includes habitat for big game species such as, moose, elk, mule deer, and white-tailed deer, black bear, and mountain lion. These mountain ranges historically supported bighorn sheep, as well as a transplanted mountain goat population that is now extinct or nearly so.

## Unique Characteristics

- Rich cultural history
- Pine Grove Cemetery

- Ice caves
- Crystal Lake
- Extensive ponderosa pine-dominated forests
- Big Spring artesian spring provides Lewistown's water supply.

## Desired Conditions

### Terrestrial Vegetation

- 01 The ponderosa pine forests in the Little Snowies are maintained and enhanced.
- 02 Aspen are promoted, especially on the south side of the GA.
- 03 Native grassland openings are promoted and maintained on the north side of the GA and conifer encroachment is limited.

### Terrestrial Wildlife

- 04 Potential habitat and habitat conditions are maintained or restored to allow for possible re-establishment of a bighorn sheep population.
- 05 The potential for connectivity of wildlife habitats and populations is maintained between the Big Snowy Mountain Range and the Little Belt Mountains to the west, east between the Big and Little Snowy Mountains, and north into the timbered foothills that connect with the Judith Mountain Range. is maintained between the Big Snowy and Little Snowy Mountain Ranges.

### Designated Areas

- 06 The Big Snowies Wilderness Study Act area will be managed to preserve opportunities for inclusion in the National Wilderness Preservation System.

## Upper Blackfoot Geographic Area

### General Overview

The Upper Blackfoot GA spans Lewis & Clark and Powell counties. The towns of Lincoln and Helmville are the nearest communities. The Upper Blackfoot is the only GA in the HLC NFs planning area that lies primarily west of the Continental Divide and is therefore influenced by a more maritime climate than the other GAs. It is not an island mountain range, but rather a portion of the greater Continental Divide landscape that extends across Montana. The Rocky Mountain Range GA and Flathead National Forest are directly north and the Divide GA is to the south. To the east, mountains become grassy foothills with isolated buttes. Montana Highway 200 cuts east-west through the center of the GA, crossing over Rogers Pass to follow the Blackfoot River. Missoula is approximately 70 miles to the west and the city of Great Falls is approximately 70 miles to the east. The northwest corner is a part of the Scapegoat Wilderness and the greater Bob Marshall Wilderness complex. This GA is a critical component of the Southern Crown of the Continent ecosystem.

The landform west of the divide is characterized by mostly rolling hills and mountains that are underlain by various types of rock. High peaks are topped with volcanic rocks with areas of exposed rock. The effects of glaciation are present. The landforms east of the divide are characterized by rounded mountains that are underlain by volcanic rocks and sedimentary rocks that have changed through geologic processes. Summits lack much exposed rock and the effects of glaciation are absent. Another characterizing

landform that helps define the GA is the mountain pass. There are a few notable passes, some allowing for easy automotive travel over the Continental Divide: Roger, Stemple, and Flesher.

Most of the area is heavily forested with conifers, including lodgepole pine, Douglas-fir, ponderosa pine, subalpine fir, spruce, and whitebark pine. Notably, western larch occurs also in low amounts in this GA, at the far eastern edge of its range. This species is not present on any other GA within the HLC NFs planning area. Aspen stands are intermittent. Grasslands are frequent, especially along valley bottoms and sun exposed aspects. Wetland complexes, fens, and other groundwater dependent ecosystems harbor rich assemblages of plants such as Indian Meadows. Fire is a major driver in the structure and composition of plant communities.

The Blackfoot River finds its headwaters here in the GA. The highly valued recreational and scenic river clips other portions of the GA. The Continental Divide National Scenic Trail transects the GA, north to south. This GA has many important headwater streams emanating from the high country's snow melt. All streams west of the divide feed into the Blackfoot River on its way to the Clark Fork of the Columbia River. Major drainages east of the divide flow towards the Missouri River. Many natural lakes occur throughout.

Evidence of prehistoric settlement is present on the landscape but inconspicuous. Euro-American settlement is more apparent but many elements are also fading to time. Portions of the Lewis & Clark Trail traverse the Blackfoot River and Alice Creek. The trail passes over the Continental Divide at Lewis and Clark Pass. Remnant buildings of former communities are in various states of disrepair if not gone completely, such as the post offices and dwellings of McClellan Gulch, Rochester, Gould, Stemple Pass, and Mike Horse to name a few. Relics of historic mining infrastructure and tools are frequent. Two historic buildings, Webb Lake Guard Station, Stonewall Lookout, and Granite Butte Lookout, stand testament to the Forest Service's administration. Additionally, there is visible evidence of vegetation management visible across the GA in in roaded areas. The GA also hosts several large expansive roadless areas.

Recreation use in the Upper Blackfoot GA varies by location. The northern area includes the south part of the Scapegoat Wilderness, and recreation activities such as backpacking, horseback riding, and outfitter guiding take place across these landscape. There are a few developed recreation sites within the GA including a couple of campgrounds and a few larger developed trailheads. Additionally, there is dispersed recreation use with both motorized and nonmotorized trails and dispersed camping in many of the stream bottoms. Snowmobiling and dog sledding are the primary winter activities.

The species and habitats on the Upper Blackfoot GA differ from most of the planning area due to its location predominantly west of the Continental Divide. Two species (grizzly bear and Canada lynx) that are currently listed as Threatened under the federal Endangered Species Act are present in this GA. The north half of the Upper Blackfoot GA is part of the Northern Continental Divide Ecosystem Recovery Zone for grizzly bears. This GA is also within Unit 3 of federally designated Canada lynx Critical Habitat. Other uncommon species that are present include the harlequin duck, and wolverine, and occasionally fisher may be present. The Upper Blackfoot GA also provides habitat for moose, white-tailed deer, elk, and mule deer. Mountain goats may occasionally be present in higher elevations near the boundary with the Rocky Mountain Range GA.

## Unique Characteristics

- Northwest corner is part of the Scapegoat Wilderness and the greater Bob Marshall Wilderness complex, contains the tallest peak in the Bob Marshall Wilderness.
- Part of the Southern Crown of the Continent ecosystem

- Headwaters of the highly valued recreational and scenic Blackfoot River
- CDNST transects the GA, north to south
- The only portion of the historic Lewis & Clark trail where grizzly bears, a species observed numerous times in many areas along the expedition's journey, still exist.
- Only GA with Western larch present
- Numerous snowmobile trails that lead from the community of Lincoln onto National Forest.
- Southernmost extent of the NCDE Grizzly Bear Recovery Zone, and area of grizzly bear population expansion southward
- Supports threatened Canada lynx, and is within Unit 3 of Designated Canada Lynx Critical Habitat
- Lincoln Airstrip

## Desired Conditions

### Terrestrial Vegetation

- 01** Western larch and aspen are maintained and promoted.
- 02** Within the NCDE PCA, the amount, type and distribution of vegetation provides for ecological, social and economic sustainability of NFS lands, while providing habitat components that contribute to sustaining a recovered grizzly bear population in the NCDE. Forest patterns and the mosaic of successional stages at a Bear Management Subunit scale provide for grizzly bear habitat needs over the long term.
- 03** Within the NCDE PCA, the number, capacity of, and improvements on cattle and sheep grazing allotments support ecologically sustainable grazing, and temporary grazing permits are used effectively for management of noxious weeds, while minimizing the risk of human-bear conflicts on NFS lands.

### Terrestrial Wildlife

- 04** Within the NCDE primary conservation area (PCA) and Zone 1, bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear–human conflicts in the NCDE.
- 05** Within the NCDE PCA and Zone 1, grizzly bear habitat on NFS lands contributes to sustaining a recovered grizzly bear population in the NCDE and contributes to connectivity with neighboring grizzly bear recovery zones.
- 06** Within the Helena NF portion of NCDE Zone 1 (see figure 2), roads provide for public and administrative access to NFS lands while contributing to sustaining the grizzly bear population in the NCDE and providing the opportunity for movement of bears to the Greater Yellowstone Ecosystem.
- 07** Potential Canada lynx habitat is managed in a manner that contributes to sustaining recovery of the Rocky Mountain Canada lynx population. Diverse conditions in the cool moist and cold Potential Vegetation Groups contribute to habitat quality and connectivity for Canada lynx at a landscape scale over the long term.
- 08** The potential for connectivity of wildlife habitats and populations is maintained across MT Highway 200.
- 09** Habitat characteristics and conditions are maintained that provide for occasional use by fisher.

## **Watershed**

- 10 Recovery and delisting of bull trout is the long-term desired condition. Bull trout population trends toward recovery through cooperation and coordination with USFWS, tribes, state agencies, other federal agencies, and interested groups. Recovery is supported through accomplishment of the Bull Trout Conservation Strategy and the Bull Trout Recovery Plan. On NFS lands spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat and appropriate life history strategies (e.g., resident, fluvial, and adfluvial) are supported.

## **Recreation Opportunities and Access**

- 11 Within the NCDE PCA, the number, capacity, and improvements of developed recreation sites provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on National Forest System lands.

## **Designated Areas**

- 12 The CDNST provides for high-quality scenic, primitive hiking and horseback riding opportunities and conserves natural, historic, and cultural resources along its corridor.
- 13 The Lewis and Clark National Historic Trail (LCNHT) provides for high-quality interpretation of the epic journey by Lewis and Clark in 1805 and 1806. Trail segments located on NFS lands within the planning area will be protected and enhanced.

## **Minerals**

- 14 There is one State CECRA site in the Upper Blackfoot GA. The Upper Blackfoot Mine Complex encompasses numerous mines. This site is relatively large in scale and is at the headwaters of the Blackfoot River. Cleanup work being evaluated and conducted at this site will occur over a period of decades including maintenance and monitoring of cleanup remedies. In addition, the agency with the lead role in this cleanup, MTDEQ, has broad authorities for conducting activities that need to be considered in context of Forest Service management. The desired condition for this site is to manage within the context of the Superfund designation in coordination with MTDEQ.

## **Infrastructure**

- 15 Within the NCDE PCA, motorized access provides for multiple uses (such as harvesting of timber and nontimber forest products; hunting, fishing, and recreation opportunities) on NFS lands while providing open motorized route density (OMRD), total motorized route density (TMRD) and secure core levels that contribute to sustaining a recovered grizzly bear population in the NCDE.
- 16 Outside the NCDE PCA, provide quality motorized and nonmotorized access for multiple uses (such as harvesting of timber and nontimber forest products; hunting, fishing, and recreation opportunities) on NFS lands.

## **Cultural**

- 17 Manage Alice Creek Historic District as outlined in its Historic Preservation Plan.

DRAFT

## List of Acronyms/Abbreviations

AQRV	air quality related values
BASI	best available scientific information
BMP	best management practice
BMU	bear management unit
BMWC	Bob Marshall Wilderness Complex
CDNST	Continental Divide National Scenic Trail
CECRA	State Superfund or Comprehensive Environmental Cleanup and Responsibility Act (MTDEQ)
CERCLA	Superfund or Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR	Code of Federal Regulations
CNREP	Center for Natural Resources and Environmental Policy
d.b.h.	diameter at breast height
DC	desired condition
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological site descriptions
FIA	forest inventory and analysis
FSH	Forest Service Handbook
FSM	Forest Service Manual
GA	geographic area
GBCS	grizzly bear conservation strategy
GDE	groundwater dependent ecosystem
GDL	guideline
GIS	geographic information system
HFRA	Healthy Forest Restoration Act (of 2003)
HLC NFs	Helena and Lewis & Clark National Forests
HUC	hydrologic unit code
INFISH	Inland Native Fish Strategy
IRA	inventoried roadless area
LAU	lynx analysis unit
LCAS	lynx conservation and assessment strategy
LCIC	Lewis and Clark National Historic Trail Interpretive Center
MA	management area
MCA	Montana code annotated
mi	mile
MMBF	million board feet
MMCF	million cubic feet
MOU	memorandum of understanding
MTDEQ	Montana Department of Environmental Quality
MTFWP	Montana Department of Fish, Wildlife, and Parks

NAAQS	National Ambient Air Quality Standards
NCDE	Northern Continental Divide Ecosystem
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NP	National Park
NRLA	Northern Rockies Lynx Amendment
NRLMD	Northern Rockies Lynx Management Direction
NRV	natural range of variation
OBJ	objective
OHV	off-highway vehicle
OMRD	open motorized route density
ORV	outstanding remarkable value
PCA	primary conservation area
PM	particulate matter
PTSQ	projected timber sale quantity
PWSQ	projected wood sale quantity
RACR	Roadless Area Conservation Rule
RHCA	riparian habitat conservation area
RNA	research natural area
ROI	return on investment
ROS	recreational opportunity spectrum
SCC	species of conservation concern
SIMPPLE	Simulating Patterns and Processes at Landscape Scales
SIO	scenic integrity objective
STD	standard
TE	threatened and endangered
TMDL	total maximum daily load
TMO	trail management objective
TMRD	total motorized route density
TSRC	total soil resource commitment
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WCF	watershed condition framework
WMA	wildlife management area
WUI	wildland-urban interface
WSR	wild and scenic river

## Glossary

The glossary defines terms used throughout the document. If a term's definition(s) is associated with a particular species, management direction, or originates from a specific source, the source is cited or applicable direction is referenced with the following bracketed abbreviations:

- [GBCS] Grizzly Bear Conservation Strategy for the Northern Continental Divide Ecosystem (draft 2013, final in progress).
- [NCDE Food/Wildlife Attractant Storage Orders] one or more special orders related to occupancy and use restrictions for the Northern Continental Divide Ecosystem for grizzly bears
- [NRLMD] Northern Rockies Lynx Management Direction 2007
- [LCAS] Lynx Conservation and Assessment Strategy 2013
- [NWCG] National Wildfire Coordinating Group 2013.

**activity area** a land area affected by a management activity to which soil quality standards are applied. An activity area must be feasible to monitor and includes harvest units within timber sale areas, prescribed burn areas, grazing areas or pastures within range allotments, riparian areas, recreation areas, and alpine areas. Temporary roads, skid trails, and landings are considered to be part of an activity area.

**adaptive management** the general framework encompassing the three phases of planning: assessment, plan development, and monitoring (36 Code of Federal Regulations (CFR) 219.5). This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

**administrative site** a location or facility constructed for use primarily by government employees to facilitate the administration and management of public lands. Examples on National Forest Service lands include, but are not limited to, ranger stations, warehouses, and guard stations. [GBCS]

**administrative use** a generic term for authorized agency activity. Specifically, in the portion of the Northern Continental Divide Ecosystem (NCDE) for grizzly bears mapped as the primary conservation area, motorized use of roads closed to the public is permitted for federal agency personnel or personnel authorized to perform duties by appropriate agency officials, as long as it does not exceed either 6 trips (3 round trips) per week OR one 30-day unlimited use period during the nondenning season (see also **nondenning season**). [GBCS]

**animal unit month** the amount of dry forage required by one mature cow of approximately 1,000 pounds or its equivalent, for one month, based on a forage allowance of 26 pounds per day.

**attractant** a nourishing substance, which includes human food or drink (canned, solid or liquid), livestock feed (except baled or cubed hay without additives), pet food, and garbage. [NCDE Food/Wildlife Attractant Storage Order]

**baseline** the environmental conditions at a specific point in time. The baseline is defined as December 31, 2011, as modified by exceptions specified in the standards or guidelines. The baseline will be updated to reflect exceptions allowed under the standards and guidelines.

**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<sup>2</sup> (Mace and Roberts 2012)). [GBCS]

**bear management unit** an area about 400 m<sup>2</sup>, in the portion of the NCDE for grizzly bears mapped as the primary conservation area, that meets yearlong habitat needs of both male and female grizzly bears. [GBCS]

**best management practice (BMP)** the method(s), measure(s), or practice(s) selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

**biological assessment** a document prepared by a federal agency for the purpose of identifying any endangered or threatened species that is likely to be affected by an agency action. A biological assessment document facilitates compliance with the Endangered Species Act. The federal agency, in consultation with the Secretary of Interior, must ensure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of its habitat.

**biological evaluation** a document, or portion of a document, prepared by the Forest Service to review programs or activities to determine how an action might affect a species listed by the U.S. Fish and Wildlife Service as a threatened, endangered, proposed, or candidate species; or a species listed by the Regional Forester as a species of conservation concern on a particular national forest. If the threatened, endangered, or proposed species will be addressed in a biological assessment then the species would not be addressed in a biological evaluation.

**biophysical settings** a grouping of potential vegetation types based on broad climatic and site conditions, such as temperature and moisture gradients. See also **potential vegetation types**.

**board foot** a unit of measurement represented by a board one foot square and one inch thick.

**bone yard** an established site that is used repeatedly by a grazing permittee for disposing of entire animal carcasses.

**boreal forest (lynx)** a forest type to which lynx and snowshoe hares are strongly associated. The predominant vegetation of boreal forest is conifer trees, primarily species of spruce (*Picea* spp.) and fir (*Abies* spp.). At the landscape scale within each region, natural and human-caused disturbance processes (e.g., fire, wind, insect infestations and forest management) influence the spatial and temporal distribution of lynx populations by affecting the distribution of good habitat for snowshoe hares. (USFWS Critical Habitat Final Rule 2009)

**broad scale assessment** a synthesis of current scientific knowledge, including a description of uncertainties and assumptions, to provide an understanding of past and present conditions and future trends, and a characterization of the ecological, social, and economic components of an area. [NRLMD]

**broadcast burn** a management treatment where a prescribed fire is allowed to burn over a designated area within well-defined boundaries. A broadcast burn is used for reduction of fuel hazard, as a resource management treatment, or both.

**candidate species** a status (1) for U.S. Fish and Wildlife Service candidate species, a species for which the U.S. Fish and Wildlife Service possesses sufficient information on vulnerability and threats to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published by the U.S. Fish and Wildlife Service; (2) for National Marine Fisheries Service candidate species, a species that is: (i) the subject of a petition to list and for which the National Marine Fisheries Service has determined that listing may be warranted, pursuant to section 4(b)(3)(A) of the Endangered Species Act (16 United States Code (U.S.C.) 1533(b)(3)(A)), or (ii) not the subject of a petition but for which the National Marine Fisheries Service has announced in the Federal Register the initiation of a status review

**canopy** the forest cover of branches and foliage formed by tree crowns.

**canopy base height** the lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy; canopy base height is an effective value that incorporates ladder fuels such as shrubs and understory trees.

**canopy fuel** the live and dead foliage, live and dead branches, and lichen of trees and tall shrubs that lie above the surface fuels.

**capability** the potential of an area of land and/or water to produce resources, supply goods and services, and allow resource uses under a specified set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions (climate, slope, landform, soils, and geology), as well as the application of management practices (silviculture systems, or protection from fires, insects, and disease).

**capacity** the number of people that an overnight developed recreation site is designed to accommodate. [GBCS]

**carbon pool** an area that contains an accumulation of carbon or carbon-bearing compounds or having the potential to accumulate such substances. May include live and dead material, soil material, and harvested wood products.

**carbon stock** the amount or quantity contained in the inventory of a carbon pool.

**clearcut** a harvest technique: 1) a stand in which essentially all trees have been removed in one operation. *Note:* depending on management objectives, a clearcut may or may not have reserve trees left to attain goals other than regeneration. 2). A regeneration or harvest method that removes essentially all trees in a stand (synonym is clearcutting). See also **regeneration method**.

**climax** the final stage of succession in a plant community. A relatively stable condition where plant species on the site are able to perpetuate themselves indefinitely.

**closed canopy structural stage** see **stem exclusion structural stage**

**coarse woody debris** a piece or pieces of larger sized dead woody material (e.g., dead boles, limbs, and large root masses) on the ground or in streams. Minimum size to be defined as “coarse” is generally 3 inches diameter.

**commercial thinning** a treatment that selectively removes trees large enough to be sold as products, such as sawlogs, poles or fence posts, from an overstocked stand. This treatment is usually carried out to improve the health and growth rate of the remaining crop trees, or to reduce fire hazard.

**commercial use/activity** a use or activity on National Forest System lands (a) where an entry or participation fee is charged, or (b) where the primary purpose is the sale of a good or service, and in either case, regardless of whether the use or activity is intended to produce a profit (36 CFR 251.51).

**climate change adaptation** an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. This adaptation includes initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Adaptation strategies include the following: building resistance to climate-related stressors; increasing ecosystem resilience by minimizing the severity of climate change impacts, reducing the vulnerability and/or increasing the adaptive capacity of ecosystem elements; facilitating ecological transitions in response to changing environmental conditions.

**cohort** a group of trees developing after a single disturbance, commonly consisting of trees of similar age, although it can include a considerable range of tree ages of seedling origin and trees that predate the disturbance

**condition class** a function of the degree of departure of an area from historical fire regimes, resulting from alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure.

**connectivity** the ecological conditions that exist at several spatial and temporal scales that provides landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long distance range shifts of species, such as in response to climate change (36 CFR 219.19). Connectivity needs vary by species. For example, bull trout are able to move upstream to spawn as long as there is not a barrier to connectivity, such as a dam.

**conservation** the protection, preservation, management, or restoration of natural environments, ecological communities, and species.

**consumptive water use** the act of removing water from an available supply and utilizing it in a manner that it is not returned to a waterbody.

**cover** the elements of the environment used by an animal for hiding. 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.

**cover type** the vegetation composition of an area, described by the dominant plant species. See also **forest type**.

**critical habitat** (for a threatened or endangered species) (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA) (16 United States Code (USC) 1533), on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the ESA (16 USC 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species. ESA, sec. 3 (5)(A), (16 USC 1532 (3)(5)(A)). Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce. ESA, sec. 4 (a)(3) and (b)(2) (16 USC 1533 (a)(3) and (b)(2)).

**crown** the part of a tree or other woody plant bearing live branches and foliage.

**culmination of mean annual increment of growth** see **mean annual increment of growth**

**d.b.h.** see **diameter breast height**

**daylight thinning** a form of precommercial thinning that removes the trees and brush inside a given radius around a tree. [NRLMD]

**decision document** a record of decision, decision notice, or decision memo (36 CFR 220.3).

**dedicated skid trail** a pathway used repeated, and only, to move logs or trees from the stump to a landing, where they are processed and loaded onto trucks.

**deferred trail maintenance** the backlog of trails in need of maintenance.

**demographic connectivity area** an area intended to allow female grizzly bear occupancy and potential dispersal beyond the NCDE to other recovery areas. [GBCS]

**denning habitat** (lynx) the environment lynx use when giving birth and rearing kittens until they are mobile. The most common component is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Denning habitat must be within daily travel distance of winter snowshoe hare habitat. The typical maximum daily distance for females is about three to six miles. Denning habitat includes mature and old growth forests with plenty of coarse woody debris. It can also include young regenerating forests with piles of coarse woody debris, or areas where down trees are jack-strawed (piled one on top of the other). [LCAS]

**denning season** the typical time period, within the NCDE, during which most grizzly bears are hibernating in dens. There are no restrictions on motorized use related to grizzly bears during the denning season, which occurs [GBCS]:

- West side of the Continental Divide: from 1 December through 31 March.
- East of the Continental Divide: from 1 December through 15 April.

**density** (stand) the number of trees growing in a given area usually expressed in terms of trees per acre.

**designated area** an area or feature identified and managed to maintain its unique special character or purpose; some categories of designated areas may be designated only by statute and some categories may be established administratively in the land management planning process or by other administrative processes of the federal executive branch; examples of statutorily designated areas are national heritage areas, national recreational areas, national scenic trails, wild and scenic rivers, wilderness areas, and wilderness study areas; examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves.

**designated over-the-snow route** a course managed under permit or agreement or by the agency, where use is encouraged, either by on-the ground marking or by publication in brochures, recreation opportunity guides or maps (other than travel maps), or in electronic media produced or approved by the agency. The routes identified in outfitter and guide permits are designated by definition; groomed routes also are designated by definition.

**diameter breast height/d.b.h.** the diameter of a tree measured 4.5 feet above the ground on the uphill side of the tree, or diameter of a log measured 4.5 feet from the large end of the log.

**disturbance** an event that alters the structure, composition, or function of terrestrial or aquatic habitats; any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and/or function and changes resources, substrate availability, or the physical environment. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and pathogens; human-caused disturbances include actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

**disturbance regime** a description of the characteristic types of disturbance on a given landscape; the frequency, severity, size, and distribution of these characteristic disturbance types, and their interactions. The natural pattern of periodic disturbances, such as fire or flooding

**disturbance/displacement** the repeated avoidance of humans by a species by shifting its habitat use in space or time.

**driver** (ecology) see **ecosystem driver**.

**duff** the partially decayed organic matter on the forest floor.

**early-seral/successional stage (forest)** the earliest stage in the sequence of plant communities that develop after a stand replacing disturbance, such as fire or regeneration harvest. On the forested communities of the HLC NFs, this stage typically occurs in the period from 1 to 30 or 40 years after the disturbance, and is dominated by grass, forbs, shrubs, and seedling/sapling sized trees.

**ecological condition** the biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems; ecological conditions include habitat and other influences on species and the environment; examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species.

**ecological integrity** the quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence. The quality of a natural unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species and ecosystem diversity assured for the future.

**ecological site** an ecological site is a distinctive kind of land with specific soil and physical characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation, and in its ability to respond similarly to management actions and natural disturbances. (NRCS, National Range and Pasture Handbook, December 2003)

**ecological sustainability** see **sustainability**.

**ecosystem** (36 CFR 219.19) a spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its:

- composition: The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.

- **structure:** The organization and physical arrangement of biological elements such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.
- **function:** Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.
- **connectivity:** See **connectivity**.

**ecosystem driver** a natural or human-induced factor that directly or indirectly causes a change in an ecosystem. Examples include climate change, fire events, invasive species and flooding.

**ecosystem resilience** see **resilience**

**ecosystem service** the benefit(s) people obtain from an ecosystem, including: (1) provisioning services, such as clean air and fresh water, energy, fuel, forage, fiber, and minerals; (2) regulating services, such as long-term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood control; and disease regulation; (3) supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and (4) cultural services, such as educational, aesthetic, spiritual and cultural heritage values, recreational experiences and tourism opportunities.

**ecosystem stressor** a factor that may directly or indirectly degrade or impair ecosystem composition, structure or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime.

**ecozone** a zone of transition between two distinctly different plant communities, where they meet and integrate. It may be narrow or wide; local (between a field and forest) or regional (between forest and grassland ecosystems); gradual or manifested as a sharp boundary line. This zone usually exhibits competition between organisms common to both communities.

**emergency situation** a circumstance on National Forest System (NFS) lands for which immediate implementation of all or part of a decision is necessary for relief from hazards threatening human health and safety or natural resources on those NFS or adjacent lands; or that would result in substantial loss of economic value to the Federal Government if implementation of the decision were delayed. (36 CFR 215.2)[GBCS]

**endangered species** a species that the Secretary of the Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act. Endangered species are listed at 50 CFR sections 17.11, 17.12, and 224.101.

**environmental document** a written analysis that provides sufficient information for a responsible official to undertake an environmental review. Examples include: a categorical exclusion, an environmental assessment, and an environmental impact statement.

**epidemic (outbreak)** the rapid spread, growth, and development of pathogen or insect populations that affect large numbers of a host population throughout an area at the same time.

**even-aged stand** a stand of trees composed of a single age class (cohort). Usually trees in a single age class are within + 20 years of each other.

**fine fuel** the fast-drying dead or live materials, generally characterized by a comparatively high surface area-to-volume ratio, which is defined as less than 0.25 inches in diameter and having a timelag of 1 hour or less. Fine fuels (grass, leaves, needles, etc.) ignite readily and are consumed rapidly by fire when dry. [NWCG]

**fire control** see **fire suppression**

**fire exclusion** the disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

**fire hazard** the potential fire behavior for a fuel type, regardless of the fuel type’s weather-influenced fuel moisture content or its resistance to fireline construction. Fire behavior assessment is based on physical fuel characteristics, such as fuel arrangement, fuel load, condition of herbaceous vegetation, and presence of elevated fuels.

**fire regime** a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention but including the influence of aboriginal burning (Agee 1993; Brown 1995; Hann and Bunnell 2001). The five natural fire regimes are classified based on the average number of years between fires combined with the severity of the fire (the amount of vegetation replacement), and its effect on the dominant overstory vegetation (Hann 2005). The five natural fire regimes on the HLC NFs are as follows:

Fire Regime Group	Frequency (Fire Return Interval)	Severity	Representative Vegetation Types / Habitats
I	0 to 35 years	Non-lethal, low intensity to mixed severity (less than 75 percent of the dominant overstory vegetation replaced)	Ponderosa pine, dry-site Douglas-fir <i>Open forest, woodland, shrub and savannah structures maintained by frequent non-lethal fire; also includes mixed severity forest that create a mosaic of different age classes, post-fire open forests; mean fire return interval can be greater than 35 years in systems with high temporal variation.</i>
I	0 to 35 years	Stand-replacing (greater than 75 percent of the dominant overstory vegetation replaced)	Drier grasslands; cool-site sagebrush (such as Mountain big sagebrush) <i>Shrub or grasslands maintained or cycled by frequent fire; fire typically remove non-sprouting shrubs, tops of sprouting shrubs and most tree regeneration.</i>
III	35 to 100+ years	Non-lethal and mixed severity (less than 75 percent of the dominant overstory vegetation replaced)	Interior dry-site shrub communities (such as warm-site sagebrush - Big sage, basin big sagebrush); moist-site Douglas-fir/lodgepole pine forests <i>Mosaic of different age post fire open forest, early to mid-seral forest structure stages, and shrub and herb dominated patches, maintained by infrequent fire events.</i>
IV	35 to 100+ years	Stand-replacing, high intensity (greater than 75 percent of the dominant overstory vegetation replaced)	Lodgepole pine <i>Large patches of similar age, post-fire structures; early to mid-seral forests cycled by infrequent fire events.</i>
V	200+ year	Stand-replacing, high intensity.	Boreal forest and high elevation conifer forest; lodgepole pine/subalpine fir; subalpine fir; whitebark pine <i>Variable size patches of shrub and herb dominated structures, or early to mid to late</i>

Fire Regime Group	Frequency (Fire Return Interval)	Severity	Representative Vegetation Types / Habitats
			<i>seral forest depending on the type of biophysical environment. Cycled by rare fire or other disturbance events. Often have complex structures influenced by small gap disturbances and understory regeneration.</i>

**fire risk** the probability or chance of fire starting determined by the presence and activities of causative agents.

**fire severity** for this effort, it is the effect of fire within the fire perimeter in terms of replacement/removal of the upper layer vegetation and surface burning. Replacement/removal may or may not cause a lethal effect on understory vegetation or surface duff/litter and mineral soil. For example, replacement fire in grassland may remove the leaves, but leaves resprout from the undamaged basal crown, while replacement fire in most conifers cause mortality of the overstory trees.

**fire suppression** the work and activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

**fire-adapted species** a plant type that has evolutionary adaptations to survive and thrive in an ecosystem where fire is a primary driver, including tree species that are termed fire-tolerant as well as trees and other plant species that have a myriad of other types of adaptations. Some examples of adaptations are the serotinous cones of lodgepole pine (which open only when heated in a fire); fast early tree growth for rapid site domination; rhizomatous (below ground) root systems or root crowns; seeds with hard, fire resistant seed-coats; or very lightweight, wind-dispersed seed (see also **fire-tolerant species**).

**fire-intolerant tree species** a tree type that is susceptible to severe damage or mortality in a fire event. Characteristics typically include thin bark at maturity, crowns that retain lower branches (close to the ground), less protected buds and needles. For example, subalpine fir, grand fir and spruce are fire-intolerant species in the HLC NFs.

**fire-tolerant tree species** a tree type resistant to severe damage or mortality in a fire event. Characteristics include thick bark at maturity, readily self-pruning (i.e., lower branches are shed as the tree grows), and protected buds. Examples of fire-tolerant species on the HLC NFs are western larch, ponderosa pine and, to a lesser extent, Douglas-fir.

**fish passage** a clear access for migrating fish through a potential barrier.

**flame length** the distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface), an indicator of fire intensity. [NWCG]

**focal species** a small subset of species whose status permits inference to the integrity of the larger ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area. Focal species would be commonly selected on the basis of their functional role in ecosystems (36 CFR 219.19).

**food/wildlife attractant special order** a legal notice regarding the use and storage of wildlife attractants on National Forest Service lands. An example is the “Occupancy and Use Restrictions for National Forest System lands in the Primary Conservation Area, Zone 1 (including the demographic connectivity areas)

and Zone 2 of the NCDE on the Flathead, Kootenai, Lewis and Clark, Lolo, and Helena National Forests in Montana, pursuant to 36 CFR 261.50 (a) and (b).”

**forage** the browse and nonwoody plants available to livestock or wildlife for feed.

**foraging habitat** (lynx) an area that supports the primary prey (snowshoe hare) of lynx and has the vegetation structure suitable for lynx to capture prey. These conditions may occur in early successional stands following some type of disturbance, or in older forests with a substantial understory of shrubs and young conifer trees. Coarse woody debris, especially in early successional stages (created by harvest regeneration units and large fires), provides important cover for snowshoe hares and other prey. [LCAS]

**forb** a herbaceous (herb-like) plant other than grass or grass-like plants.

**forest connectivity** an area for wildlife species that prefer to remain within or close to forested cover.

**forest dominance type** a classification that reflects the most common tree species within a forest stand. The dominant species comprises at least 40 percent of the stocking, as measured by canopy cover, basal area, or trees per acre, depending on available information and stand characteristics.

**forest health** the perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance. A useful way to communicate about the current condition of the forest, especially with regard to the ability of the ecosystem to respond to disturbances. *Note:* perception and interpretation of forest health are influenced by individual and cultural viewpoints, land management objectives, spatial and temporal scales, the relative health of the stands that comprise the forest, and the appearance of the forest at a point in time.

**forest highway** a forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (U.S.C. Title 23, Section 101(a)), designated by an agreement with the Forest Service, state transportation agency, and Federal Highway Administration. [NRLMD]

**forest land** an area at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest uses. Lands developed for nonforest use include areas for crops, improved pasture, residential or administrative sites, improved roads of any width and adjoining road clearing, and power line clearings of any width.

**forest management** the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest. *Note:* forest management includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource values. Forest management varies in intensity from leaving the forest alone, to a highly intensive regime composed of periodic silvicultural treatments.

**forest plan** a document that guides sustainable, integrated resource management of the resources within a plan area and within the context of the broader landscape, giving due consideration to the relative values of the various resources in particular areas (36 CFR 219.1(b)). Consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 United States Code (U.S.C.) 528–531), the Forest Service manages National Forest Service lands to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the land. Resources are managed through a combination of approaches and concepts for the benefit of human communities and natural resources.

**forest structure** a complex three-dimensional construct consisting of the various horizontal and vertical physical elements of the forest, including tree diameters, tree heights, tree ages, stand density, canopy layers, quantity/quality of deadwood, herbaceous species, and the clumpiness of the stand. There is no one measure to quantify or describe structure. Often individual forest attributes are described and integrated to evaluate forest structure, such as tree sizes or ages or number of canopy layers.

**forest system road** see **National Forest System road**.

**forest type** a category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees, e.g., subalpine fir/spruce; lodgepole pine.

**fuel management** an act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological or manual means, or by fire, in support of land management objectives. [NWCG]

**fuel model** a set of surface plant material characteristics (e.g., load and surface-area-to-volume-ratio by size class, heat content, and depth) organized for input to a fire model. Standard fuel models (e.g., Anderson 1982) have been stylized to represent specific fuel conditions.

**fuel treatment** the manipulation or removal of dead or live plant materials to reduce the likelihood of ignition and/or lessen potential damage and resistance to fire control (example treatments include, lopping, chipping, crushing, piling and burning). [NWCG]

**fuelwood** a term for wood that is used for conversion to a form of energy (e.g., firewood, biomass).

**fuels reduction zone** an area in which continuous high hazard fuels are broken up. These zones are designed to increase firefighter safety and reduce resistance to fire control efforts. Fuels reduction zones may be of any size or shape. They may have a higher number of snags, down logs, and canopy closure than other fuels treatment zones. They are recognized as being a significant portion of a complete fuels management program.

**geographic area** a spatially contiguous land area identified within the planning area. A geographic area may overlap with a management area (36 CFR 219.19).

**geographic information system (GIS)** a computer process that links database software to graphics (spatially explicit) software and provides database and analytic capabilities.

**gradient (stream)** the slope of a streambed.

**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. Allotments may be (Forest Service Manual (FSM) 2205):

- active: Livestock grazing allotments, 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.

**grazing permit in non-use status** a term that applies to livestock numbers. 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 (FSM 2231.7).

**Grizzly Bear Conservation Strategy** a document published by the U.S. Fish and Wildlife Service that describes the regulatory framework for management of the NCDE grizzly bear population and its habitat upon recovery and subsequent removal from the Federal list of Threatened and Endangered Species.

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

**ground fire** a term used to describe organic material, such as duff, organic soils, roots, and rotten buried logs, burning beneath the surface. [NWCG]

**ground-based logging system** a log skidding method using tracked or wheeled tractors. These tractors or “skidders” typically operate on gentle slopes (e.g., <40%). Steeper slopes may require cable logging systems.

**groundwater-dependent ecosystem** a community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include many wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, springs, and seeps.

**group selection method** a cutting method to develop and maintain uneven-aged stands by the removal of small groups of trees (generally up to 0.5 acre in size) at periodic intervals to meet a predetermined goal of size distribution and species composition in remaining stands.

**group use** an activity conducted on National Forest System lands that involves a group of 75 or more people, either as participants or spectators (36 CFR 251.51).

**guide** to provide services or assistance (such as supervision, protection, education, training, packing, touring, subsistence, transporting people, or interpretation) for pecuniary remuneration or other gain to individuals or groups on National Forest System lands (36 CFR 251.51).

**habitat type** an aggregation of plant communities of similar biophysical characteristics, and similar function and response to disturbances. A habitat type will produce similar plant communities at climax. On the HLC NFs, habitat types are based upon Pfister et al. 1977. See also **potential vegetation type**.

**hazard tree** a tree that has the potential to cause property damage, personal injury or fatality in the event of a failure, where failure is the mechanical breakage of a tree or tree part. Failures often result from the interaction of defects, weather factors, ice or snow loading or exposure to wind. Tree hazards may include dead or dying trees, dead parts of live trees, or unstable live trees (due to structural defects or other factors) that are within striking distance of people or property (a target). Defects are flaws in a tree that reduce its structural strength. Trees may have single or multiple defects, which may or may not be detectable. Failures result in accidents only if they strike a target.

**Healthy Forests Restoration Act** the public law (108-148), passed in December 2003, which provides statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System and Bureau of Land Management managed public lands. The Healthy Forests Restoration Act also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. [NRLMD]

**highway** a term that includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

**historic climax plant community** the plant community that existed at the time of European immigration and settlement in North America. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site. The historic climax plant community was in dynamic equilibrium with its environment. It is the plant community that was able to avoid displacement by the suite of disturbances and disturbance patterns (magnitude and frequency) that naturally occurred within the area occupied by the site.

**historical range of variability** the variation in ecological conditions resulting from disturbance regimes and other natural influences under which the ecosystem and forests evolved. Typically refers to the period prior to the dramatic changes in human land uses and patterns beginning with the influx of European-Americans about the mid-1800s. Historical range of variability is considered valuable for providing a context or frame of reference to evaluate current ecosystem conditions and understanding what an ecologically healthy and sustainable condition might look like. See also **natural range of variation**.

**home range** an area, from which intruders may or may not be excluded, to which an individual animal restricts most of its usual activities.

**horizontal cover** the visual obscurity or cover provided by habitat structures that extend to the ground or snow surface primarily provided by tree stems and tree boughs, but also includes herbaceous vegetation, snow, and landscape topography. [NRLMD]

**inherent capability of the plan area** the ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances.

**initial attack** a planned response to a wildfire given the wildfire's potential fire behavior. The objective of initial attack is to stop the fire and put it out in a manner consistent with firefighter and public safety and values to be protected.

**integrated resource management** a means to realize many benefits from a forest or other natural area and assure the renewable benefits are there for future generations. [NWCG]

**integrity** (ecology) see **ecological integrity**

**interagency consultation** a process required by Section 7 of the Endangered Species Act whereby federal agencies proposing activities in a listed species habitat confer with the U.S. Fish and Wildlife Service about the impacts of the activity on the species.

**intermediate harvest** a removal of trees from a stand between the time of its formation and a regeneration harvest. Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage.

**intermittent stream** a stream that flows only at certain times of the year when it receives water, usually from springs or a surface source such as melting snow.

**invasive species** an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. A species that causes, or is likely to cause, harm and that is exotic to the ecosystem it has infested. Invasive species infest both aquatic and terrestrial areas and can be

identified within any of the following four taxonomic categories: plants, vertebrates, invertebrates, and pathogens (Executive Order 13112).

**key ecosystem characteristic** the dominant ecological characteristic(s) that describes the composition, structure, function and connectivity of terrestrial, aquatic and riparian ecosystems that are relevant to addressing important concerns about a land management plan. Key ecosystem characteristics are important to establishing or evaluating plan components that would support ecological conditions to maintain or restore the ecological integrity of ecosystems in the plan area.

**lacustrine** of, relating to, or associated with lakes

**ladder fuel** a term to describe plant materials that provide vertical continuity between forest strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease

**land management plan** see **forest plan**

**landscape** a defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area (36 CFR 219.19).

**landtype** a unit shown on an inventory map with relatively uniform potential for a defined set of land uses. Properties of soils landform, natural vegetation, and bedrock are commonly components of landtype delineation used to evaluate potentials and limitations for land use.

**late-seral/successional stage (forest)** a late stage in the sequence of plant communities that develops after a disturbance, such as fire or harvest. On the forested communities of the HLC NFs, this stage may begin to develop 140 years or more after the disturbance. Forest structures can be very diverse, with wide range in densities, number of canopy layers and trees sizes. Usually larger trees are dominant (>16 inches diameter breast height).

**linkage** (also **linkage habitat**, **linkage area**, or **linkage zone**) an area that will support a low density population of a species during certain parts of the year, and that facilitates demographic and genetic connectivity between geographically separate patches of habitat suitable for that species. Linkage areas facilitate movements of an animal (e.g., dispersal, breeding season movements, exploratory movements) beyond its home range. Linkage areas may include sizeable areas of non-habitat and areas influenced by human actions.

**livestock** a type of domestic animal raised for commercial production purposes, e.g., cattle. Small livestock includes animals such as sheep, goats, and llamas.

**lynx analysis unit** an area that approximates the size of a female lynx's annual home range and encompasses its seasonal habitats. Lynx analysis units (LAUs) may also include areas of non-lynx habitat, such as open meadows, especially in mountainous regions. An LAU is the unit for which the effects of a project (including direct, indirect and cumulative effects) would be analyzed; its boundaries should remain constant. [LCAS]

**lynx critical habitat** an area designated by the USFWS that provides the primary constituent element of lynx habitat, defined as boreal forest landscapes supporting a mosaic of differing successional forest stages and containing:

- a) presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multi-story stands with conifer boughs touching the snow surface;
- b) winter snow conditions that are generally deep and fluffy for extended periods of time;
- c) sites for denning that have abundant coarse woody debris, such as downed trees and root wads;
- d) matrix habitat (e.g., hardwood forest, dry forest, nonforest) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range (Federal Register, Vol. 74, No. 36, February 25, 2009, pp. 8635–8641).

**lynx habitat** an area within a boreal forest with gentle rolling topography, dense horizontal cover, deep snow, and moderate to high snowshoe hare densities (i.e., more than 1 hare/2 ha (0.4 hares/2 ac)). In the western United States, forest cover types dominated by Engelmann spruce, subalpine fir and lodgepole pine provide habitat for lynx. [LCAS]

**lynx habitat currently in unsuitable condition** an area within the boreal forest that is in the early stand initiation stage (typically less 30 years old) or has been silviculturally treated to remove cover, in which the vegetation has not developed sufficiently to support snowshoe hare populations during all seasons. Stand-replacing (moderate to high intensity) fire, insect epidemics or wind events can create stand initiation structural stage. Vegetation management projects that may create unsuitable conditions for a period of time include clearcuts, seed tree harvest, precommercial thinning, or understory removal. [LCAS]

**lynx habitat in suitable condition** an area within the boreal forest that provides lynx habitat in all seasons. Forest stands may be in various ages or structural stages (i.e., young saplings in stand initiation structural stage, pole-size stands in stem exclusion structural stage, mature multi-story forest) provided that, following a stand-replacing disturbance or treatment that reduced the dense horizontal cover required by snowshoe hares, trees have grown tall enough and dense enough to protrude above the snow and provide food and cover for snowshoe hares and lynx in winter. [LCAS]

**maintain** to keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending upon the circumstance, ecological conditions may be maintained by active or passive management or both.

**management area** a land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR 219.19).

**management system** (timber) an administrative method that includes even-aged stand and uneven-aged stand protocols.

**mature multi-story structural stage (forest)** a phase characterized by understory reinitiation, resulting in several tree age classes and vegetation layers. Fallen trees may be present, creating gaps in the overstory canopy. In lynx habitat, these stands typically have high horizontal cover from young understory trees and lower limbs of mature trees that reach the ground or snow level. [LCAS]

**mature tree** a tree which has achieved its maximum or near-maximum mean annual rate of growth in height or diameter.

**MBF/MMBF** (thousand board feet and million board feet, respectively) a specialized unit of measure for the volume of lumber in the United States and Canada. One board foot is the volume of a 1-foot length of a board 1 foot wide and 1 inch thick.

**mean annual increment of growth** the total increment of increase in volume of a stand (standing crop plus thinning removals) up to a given age divided by that age. Culmination of mean annual increment of growth is the age in the growth cycle of an even-aged stand at which the average annual rate of increase of volume is at a maximum. In land management plans, mean annual increment is expressed in cubic measure and is based on the expected growth of stands, according to intensities and utilization guidelines in the plan.

**mechanized travel/mechanical transport** a contrivance for moving people or material in or over land, water, or air, having moving parts, that provides a mechanical advantage to the user, and that is powered by a living or nonliving power source. This includes, but is not limited to, sailboats, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. It does not include wheelchairs when used as necessary medical appliances. It also does not include skis, snowshoes, rafts, canoes, sleds, travois, or similar primitive devices without moving parts (36 CFR 2320.5(3)).

**mesic** a type of habitat that is moderately moist.

**mid-seral/successional stage (forest)** a mid-stage in the sequence of plant communities that develop after a disturbance, such as fire or harvest. On the forested communities of the HLC NFs, stands may be considered in this stage from about 40 to 140 years after the disturbance. Stand structure, such as density and number of canopy layers, can vary widely. Dominant tree sizes are typically from 5 to 15 inches diameter breast height.

**mine reclamation** the process of restoring land that has been mined to a natural or economically usable state. Although the process of mine reclamation occurs once mining is completed, the preparation and planning of mine reclamation activities occur prior to a mine being permitted or started.

**minerals** the Forest Service defines three types of mineral (and energy) resources:

- Locatable minerals: Commodities such as gold, silver, copper, zinc, nickel, lead, platinum, etc. and some nonmetallic minerals such as asbestos, gypsum, and gemstones.
- Salable minerals: Common varieties of sand, stone, gravel, cinders, clay, pumice and pumicite.
- Leasable minerals: Commodities such as oil, gas, coal, geothermal, potassium, sodium phosphates, oil shale, sulfur, and solid leasable minerals on acquired lands.

**mitigate** to avoid, minimize, rectify, reduce, or compensate the adverse environmental impacts associated with an action.

**mixed-severity fire/mixed-severity fire regime** a combination of non-lethal, low-intensity to stand-replacing fire effects within the perimeter of a single fire, or across consecutive events. Mixed-severity fire regimes give rise to unique patch dynamics and ecosystem responses.

**modified thinning technique** a precommercial thin prescription for a stand dominated by seedling or sapling size trees specifying use of techniques designed to develop multiple tree canopy layers over time, enhancing long-term species and structural diversity within forest stands, and contributing to forest conditions more resilient to future disturbance and climate change (also see Appendix B, potential management strategies, Canada lynx habitat section).

**monitoring** a systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships.

**motorized equipment** a machine that uses a motor, engine, or other nonliving power sources. This includes, but is not limited to, such machines as chain saws, aircraft, snowmobiles, generators, motorboats, and motor vehicles. It does not include small battery or gas powered hand carried devices such as shavers, wristwatches, flashlights, cameras, stoves, or other similar small equipment.

**motorized route** a National Forest System (NFS) road or NFS trail that is designated for motorized use on a motor vehicle use map pursuant to 36 CFR 212.51

**motorized use** the designation of roads, trails, and areas that are open to motor vehicle use as specified in Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005 /36 CFR Parts 212, 251, 261, Travel Management; Designated Routes and Areas for Motor Vehicle Use; Final Rule [GBCS].

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

**multiple use** the management of the various renewable surface resources of the National Forest Service lands so that they are utilized in the combination that will best meet the needs of the American people; making 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; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531).

**National Forest System** the National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

**native knowledge** a way of knowing or understanding the world, including traditional ecological and social knowledge of the environment derived from multiple generations of indigenous peoples' interactions, observations, and experiences with their ecological systems. Native knowledge is place-based and culture-based knowledge in which people learn to live in and adapt to their own environment through interactions, observations, and experiences with their ecological system. This knowledge is generally not solely gained, developed by, or retained by individuals, but is rather accumulated over successive generations and is expressed through oral traditions, ceremonies, stories, dances, songs, art, and other means within a cultural context.

**native species** an organism that was historically or is present in a particular ecosystem as a result of natural migratory or evolutionary processes; and not as a result of an accidental or deliberate introduction into that ecosystem. An organism's presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors.

**natural range of variation (NRV)** the variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application. See also historical range of

variation (HRV). The NRV (or HRV) is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition. The NRV can help identify key structural, functional, compositional, and connectivity characteristics, for which plan components may be important for either maintenance or restoration of such ecological conditions.

**natural regeneration** a renewal of a tree crop by natural seeding, sprouting, suckering, or layering.

**net change** the difference in a measurement (such as road density) after on-the-ground changes are accounted for pre- and post-project; allows for temporary changes during a project. [GBCS]

**non-attainment area** an area within a State that exceeds the national ambient air quality standards.

**nonconsumptive water use** the act of removing water from an available supply and utilizing it in a manner that it returns to a waterbody.

**nondenning season** the time period when grizzly bears typically are not hibernating [GBCS]:

- West side of the Continental Divide: from 1 April through 30 November.
- East side of the Continental Divide: from 16 April through 30 November.

**nonpoint source pollution** a discharge from a diffuse source, such as polluted runoff from an agricultural area or precipitation, to a water body.

**Northern Continental Divide Ecosystem** a region identified in the GBCS encompassing about 110,636 sq. km. of western and central Montana, that is one of five areas in the lower 48 states where grizzly bear populations occur.

**Northern Continental Divide Ecosystem (NCDE) Coordinating Committee** an interagency group that evaluates implementation of the NCDE GBCS, promotes the exchange of data and information about the NCDE grizzly bear population among agencies and the public, and makes recommendations to the management agencies regarding implementation of the NCDE GBCS. Member of the interagency group may include Montana Fish, Wildlife & Parks; U.S. Fish & Wildlife Service; U.S. Park Service; Forest Service; APHIS-Wildlife Services; U.S. Geological Survey; U.S. Bureau of Land Management; Blackfoot Tribe, and the Confederated Salish and Kootenai Tribes. [GBCS]

**noxious weed** an exotic plant species established, or that may be introduced in the area, which may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses.

**off-highway vehicle** a motor vehicle designed for, or capable of, cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212.1).

**old growth forest** an ecosystem that is distinguished by old trees and related structural attributes. This term is deliberately defined generically, as the use of the term old growth and definitions for old growth vary substantially by ecological regions, forest types, local conditions, literature source, and a host of other factors. In the context of the HLC NFs ecosystem the definitions for old growth are those provided within the document titled "Old Growth Forest Types of the Northern Region (Green et al. 1992, and errata 12/11).

**old-growth associated species** the group of wildlife species that is associated with old-growth forest plant communities on the HLC NFs.

**old-growth habitat** a community of forest vegetation characterized by a diverse stand structure and composition along with a significant showing of decadence. The stand structure will typically have multi-storied crown heights and variable crown densities. There is a variety of tree sizes and ages ranging from small groups of seedlings and saplings to trees of large diameters exhibiting a wide range of defect and breakage both live and dead, standing and down. The time it takes for a forest stand to develop into an old-growth habitat condition depends on many local variables such as forest type, habitat type, and climate. Natural chance events involving forces of nature such as weather, insect, disease, fire, and the actions of man also affects the rate of development of old-growth stand conditions. Old-growth habitat may or may not meet the definition for old growth forest (Green et al 1992).

**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 nondenning season. *Note:* Motorized routes closed only by sign or order are considered to be open for purposes of this calculation. [GBCS] See also **moving window analysis**.

**opening** (as pertaining to maximum opening size standard for timber harvest) a forest patch in a seedling/sapling size class (average stand diameter breast height is less than 5 inches) created as a result of one even-aged harvest operation (i.e., clearcut, seedtree or shelterwood seed cutting). Legacy or reserve trees left to meet other desired conditions are not counted in the calculation of size class for determining the seedling/sapling classification. Adjacent seedling/sapling stands created as a result of an earlier harvest operation are not considered part of an opening.

**outfitting** to rent on, or deliver to, National Forest Service lands for pecuniary remuneration or other gain any saddle or pack animal, vehicle, boat, camping gear, or similar supplies or equipment (36 CFR 251.51).

**over snow motorized use** an activity involving a motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (36 CFR 212.1, Definitions).

**over snow standard season** the time period for over snow motorized use. Generally, the season is defined as December 1 to March 31 of each year; however exceptions apply in specific areas and are noted at the applicable locations as well as in Over Snow Vehicle Use Maps for the HLC NFs.

**overstory** the portion of the trees that form the uppermost canopy layer in a forest of more than one story.

**passive crown fire** a type of fire in which individual or small groups of trees torch out, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior from the occasional torching of an isolated tree to a nearly active crown fire. Also called torching and candling.

**patch** an area distinguished from its surroundings by environmental discontinuities, such as a small area of early seral/successional forest (seedling/sapling size class) surrounded by mid-seral and late-seral/successional forest (small to large tree size classes).

**perennial** a stream that flows continuously throughout most years and whose upper surface generally stands lower than the water table in the region adjoining the stream.

**permit** a special use authorization which provides permission, without conveying an interest in land, to occupy and use National Forest Service land or facilities for specified purposes, and which is both revocable and terminable (36 CFR 251.51).

**plan** a document, or set of documents, that provides management direction for an administrative unit of the National Forest System developed under the requirements of the 2012 Planning Rule or a prior planning rule. See also **forest plan**.

**plan area** the National Forest System lands covered by a forest plan.

**point source pollution** a discharge from a known pollutant source, such as a sewage treatment plant, to a water body from a single location.

**pole** a tree at least 5 inches diameter breast height (d.b.h.) and smaller than 8 inches d.b.h.

**potential vegetation type/potential vegetation group** an assemblage of habitat types on the basis of similar biophysical environments, such as climate, slope and soil characteristics. This biophysical environment influences the vegetation characteristics and ecosystem processes that occur. The vegetation communities and conditions that would develop over time given no major natural or human disturbances (i.e., the climax plant community) would be similar within a particular potential vegetation type classification.

**precommercial thinning** the selective felling, deadening, or removal of trees in a young stand dominated by trees less than 5 inches diameter breast height. Primary purposes for thinning include to accelerate diameter increment on the remaining stems, to maintain a specific stocking or stand density range, to develop desired tree species composition, and/or to improve the vigor and quality of the trees that remain.

**prescribed burning or prescribed fire** a fire ignited via management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and National Environmental Policy Act requirements (where applicable) must be met, prior to ignition. [NWCG]

**primary conservation area (PCA)** an area identified in the NCDE GBCS to be managed as a source area for the grizzly bear population, where continuous occupancy by grizzly bears would be maintained. Habitat within the PCA would receive the most stringent protection. The PCA is the same area as the NCDE Grizzly Bear Recovery Zone identified in the Grizzly Bear Recovery Plan (<http://www.fws.gov/mountain-prairie/species/mammals/grizzly/>) (U.S. Fish and Wildlife Service 1993)

**productivity** the capacity of National Forest Service lands and their ecological systems to provide the various renewable resources (such as timber) in certain amounts in perpetuity. In land management, productivity is an ecological term, not an economic term.

**projected timber sale quantity (PTSQ)** the estimated quantity of timber meeting applicable utilization standards that is expected to be sold during the plan period. As a subset of the projected wood sale quantity (PWSQ), the projected timber sale quantity includes volume from timber harvest for any purpose from lands in the plan area based on expected harvests that would be consistent with the plan components. The PTSQ is also based on the planning unit's fiscal capability and organizational capacity. PTSQ is not a target nor a limitation on harvest, and is not an objective unless the responsible official chooses to make it an objective in the plan.

**projected wood sale quantity (PWSQ)** the estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. The PWSQ consists of the projected timber sale quantity as well as other woody material such as fuelwood, firewood, or biomass that is also expected to be available for sale. The PWSQ includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. The PWSQ is also based on the

planning unit's fiscal capability and organizational capacity. PWSQ is not a target nor a limitation on harvest, and is not an objective unless the responsible official chooses to make it an objective in the plan.

**project** an organized effort to achieve an outcome on National Forest Service lands identified by location, tasks, outputs, effects, times, and responsibilities for execution (36 CFR 219.19).

**project** (in grizzly bear habitat in the NCDE) a project in grizzly bear habitat in the NCDE, for purposes of the motorized access standards and guidelines in the primary conservation area of the NCDE, refers to any temporary activity requiring construction of new roads, temporary roads, reconstruction or opening of restricted roads during the nondenning season, if such use exceeds administrative use levels, as defined elsewhere in this glossary. Activities involving recurring helicopter use (as defined in this glossary) are also considered to be a project. [GBCS]

**proposed action** a project, activity, or action that a federal agency aims to implement or undertake, and which is the subject of an environmental analysis. Proposed action is a specific term defined under the National Environmental Policy Act.

**proposed species** a type of animal or plant that is proposed by the U.S. Fish and Wildlife Service, or the National Marine Fisheries Service, through the Federal Register to be listed for protection under Section 4 of the Endangered Species Act.

**public involvement** a process designed to broaden the information base upon which agency decisions are made. The process involves informing the public about Forest Service activities, plans, and decisions, and participation in the planning processes which lead to final decision making.

**rangeland health** the degree to which the integrity of the soil and ecological processes are sustained.

**rate of spread** see **spread rate**

**reach** a length of stream channel, lake, or inlet exhibiting, on average, uniform hydraulic properties and morphology.

**rearing habitat** a stable and protected micro-environment for a species to birth and rear their young. For example, for juvenile westslope cutthroat trout, rearing habitat is primarily the pool environment found in streams.

**recovery** the improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate (36 CFR 219.19). This definition is for the purposes of the land management planning regulation at 36 CFR part 219 and Land Management Planning Handbook 1909.12, and with respect to threatened or endangered species.

**recovery plan** a document that details actions or conditions necessary to promote improvement in the status of a species listed under the Endangered Species Act, to the point at which listing is no longer appropriate.

**recreation** the set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations. See also **sustainable recreation**.

**recreation event** a recreational activity conducted on National Forest System lands for which an entry or participation fee is charged, such as animal, vehicle, or boat races; dog trials; fishing contests; rodeos; adventure games; and fairs.

**Recreation Opportunity Spectrum (ROS)** the opportunity to participate in a specific recreation activity in a particular recreation setting to enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include nonmotorized, motorized, developed, and dispersed recreation on land, water, and in the air. The six classes are the following:

- **primitive** the primitive recreational opportunity spectrum (ROS) setting is large, remote, wild, and predominately unmodified landscapes. There is no motorized activity and little probability of seeing other people. Primitive ROS settings are managed for quiet solitude away from roads, people, and development. There few, if any facilities or developments. Most of the primitive ROS settings coincide with designated wilderness boundaries.
- **semi-primitive nonmotorized** the semi-primitive nonmotorized ROS settings include areas of the forest managed for nonmotorized use. Mountain bikes and other mechanized equipment are often present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area. These settings are not as vast or remote as the primitive ROS settings, but offer opportunities for exploration, challenge, and self-reliance.
- **semi-primitive motorized** the semi-primitive motorized ROS settings area(s) of the forests are managed for backcountry motorized use on designated routes. Routes are designed for off highway vehicles and other high clearance vehicles. This setting offers visitors motorized opportunities for exploration, challenge, and self-reliance. Mountain bikes and other mechanized equipment are also sometimes present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area or providing portals to adjacent areas of primitive, or semi-primitive, nonmotorized areas.
- **roaded natural** the roaded natural setting is managed as natural appearing with nodes and corridors of development that support higher concentrations of use, user comfort, and social interaction. The road system is well defined and can typically accommodate sedan travel. System roads also provide easy access to adjacent in semi-primitive motorize, semi-primitive nonmotorized and primitive areas.
- **rural** the rural settings represent the most developed recreation sites and modified natural settings. Facilities are designed primarily for user comfort and convenience.
- **urban** the urban setting is characterized by a substantially developed environment although the background may have natural appearing elements. Highly developed ski areas and resorts are examples of an urban setting on National Forest Service lands.

**recreation setting** the social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and urban. See also **recreation opportunity**.

**recreation site** a defined, public recreation area. The Forest Service uses two categories for recreation sites: dispersed and developed. Both types may have improvements needed to protect resources such as signs, road closure devices, bear resistant food storage devices, and/or sanitation facilities.

- Developed sites have agency improvements made out of manmade materials that are intended to provide for public recreation and user comfort/convenience (see 36 CFR 261.2). Examples include, but are not limited to: ski areas, campgrounds, sites with cabins, huts, lodges, summer homes, restaurants, visitor centers, and trailheads. [GBCS]

- Dispersed 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. [GBCS]

**recurring helicopter use** a type of helicopter flight that involves multiple trips/passes each day consisting of low-altitude (< 500 m above-ground-level) flights that continues for a duration longer than 48 consecutive hours. [GBCS]

**reforestation** the renewal of forest cover by planting, seeding, and natural means (such as seed from existing trees on the site).

**refugia** location and habitats that support populations of organisms that are limited to small fragments of their geographic range

**regeneration** the renewal of a forest, whether by natural or artificial means. This term may also refer to a tree crop itself.

**regeneration harvest** the cutting of trees and creation of an entirely new age class; an even-age or uneven-aged harvest. The primary methods used for regeneration harvest are clearcutting, seed tree, shelterwood, and group selective cuts. [NRLMD]

**regeneration method** the cutting approach used to regenerate a stand. Example methods include clearcut, seedtree and shelterwood cutting methods.

**resilience (ecology)** the capacity of a (plant) community or ecosystem to maintain or regain normal function and development following disturbance.

**resource selection function** the relative probability of an animal using a unique set of habitat (landscape) characteristics. For studies involving radio-collared animals, “use” of landscape combinations is compared to the “availability” of those combinations in a designated study area.

**restoration** the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed; ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions (36 CFR 219.19).

**riffle** a shallow rapid where the water flows swiftly over completely or partially submerged obstructions (rocks, etc.) to produce surface agitation, but standing waves are absent.

**riparian area** a three-dimensional ecotone of interaction that include terrestrial and aquatic ecosystems that extend into the groundwater, above the canopy, and outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths.

**riparian ecosystem** a transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. A riparian ecosystem is identified by soil characteristics and by distinctive vegetative communities that require free or unbounded water.

**riparian habitat conservation area (RHCA)** a portion, or portions, of the watershed where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. RHCAs widths are defined as follows:

- category 1, Fish-bearing streams: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the 100 year floodplain, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.
- category 2, Permanently flowing nonfish bearing streams: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the riparian vegetation, or to a distance equal to the height on one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.
- category 3, Ponds, lakes, reservoirs, and wetlands greater than 1 acre: RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the distance of the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs, or from the edge of the wetland, pond, or lake, whichever is greatest.
- category 4, Seasonally flowing or intermittent streams, wetlands less than 1 acre, and lands identified as landslide prone: This category includes features with high variability in size and site-specific characteristics. At a minimum, the RHCA must include: (1) the intermittent stream channel and the area to the top of the inner gorge; (2) the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation; (3) for Priority watersheds as identified in Appendix E, the area from the edges of the stream channel, wetland, or landslide prone terrain to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest; or (4) for watersheds not identified as Priority watersheds, the area from the edges of the stream channel, wetland, or landslide prone terrain to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greater.

**riparian wildlife habitat** an environment that occurs along lakes, rivers, streams, springs, and seeps where the vegetation and microclimate are influenced by year-round or seasonal water and associated high water tables. Plant and animal species in these areas are more productive and diverse than on nearby uplands, making these areas very important to many wildlife species.

**road** a motor vehicle route more than 50 inches wide, unless identified and managed as a trail. (36 CFR 212.1, FSM 7705):

- decommissioned: The stabilization and restoration of an unneeded road to a more natural state (36 CFR 212.1). Decommissioned roads do not count towards Total Motorized Route Density as long as they meet the definition of impassable.
- forest road or trail: A route wholly or partly within or adjacent to and serving the National Forest Service (NFS) that is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 CFR 212.1 – Definitions)
- 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 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 nondenning 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. Some, but not all, roads placed in intermittent stored service may be impassable. [GBCS]

- intermittent stored service/intermittent service road, closed to traffic: The road is in a condition that there is little resource risk if maintenance is not performed.
- maintenance level: A term for the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (Forest Service Handbook 7709.59, 62.32)

Level 1: These are roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns.

Level 2: Assigned to roads open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations.

Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities

Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds

Level 5: Assigned to roads that provide a high degree of user comfort and convenience.

- National Forest System: A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority (36 CFR 212.1)
- 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. [GBCS]

**rotation** the number of years (including the regeneration period) required to establish and grow timber under an even-aged management system to a specified condition or maturity for regeneration harvest.

**running average** a method for computing the average of a stream of numbers for a specified period. A 10-year running average computes the mean for the values in the current year plus the previous 9 years. A running average is commonly used with time series data to smooth out short-term fluctuations and highlight longer-term trends or cycles. [GBCS]

**salvage harvest** a commercial timber sale of dead, damaged, or dying trees. The harvest recovers economic value that would otherwise be lost. Collecting firewood for personal use is not considered salvage harvest. [NRLMD]

**sapling** a young tree that is larger than a seedling but smaller than a pole or small tree; typically 5 to about 25 feet tall and 1 to 5 inches diameter breast height.

**sawtimber** a collection of logs cut from trees with minimum diameter (typically greater than 6 or 7 inches diameter breast height) or trees of the same minimum diameter and of sufficient length and stem quality suitable for conversion to lumber.

**scarification** the removal of the surface organic material (duff) of an area, typically to prepare the site for reforestation.

**scenery management system** describes the existing and desired conditions of scenic character within a planning area

**scenic character** a combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place; scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

**scenic integrity objectives** a measure of the degree to which a landscape is visually perceived to be complete when compared to the scenic character of that area.

- **Very high** scenic integrity areas are found in the forest's wilderness areas and primitive ROS settings. These rugged and remote landscapes contain little to no evidence of management and evolve through natural processes and disturbance regimes.
- **High** scenic integrity areas coincide with landscapes in which landscape character attributes "appear" intact. They often interface with rural landscapes, residential areas, small towns, travel routes, scenic byways, recreation destinations, and other private lands. Although some management activities have altered or influenced natural processes and disturbance regimes, the management activities do not dominate the landscape.
- **Moderate** scenic integrity settings occur across the forest and reflect areas in which management activities have, and continue to be visible. The deviations created on the landscape, although visible, are not dominant. The management activities are subordinate to the attributes described within the described scenic character of the area.
- **Low** scenic integrity landscapes are typically limited to those landscapes containing active and repeated management to extract forest products. Management activities, although visible and sometimes a dominant feature on the landscape, employ techniques that repeat lines, forms, colors, and textures found in the natural landscape and within the described scenic character.

**scion** a detached living portion of a plant, such as a bud or shoot, often a branch tip, that is grafted onto the root-bearing part of another plant.

**secure core** (grizzly bear) an area of the NCDE primary conservation area more than 500 meters from a route open to wheeled motorized use during the grizzly bear nondenning season and that is greater than or equal to 2,500 acres in size. Roads restricted with physical barriers (not gates), decommissioned roads, impassable roads, temporary roads, over-the-snow motorized routes/areas, and nonmotorized trails are allowed within secure core, unless otherwise restricted (e.g., by other national forest plan direction). [GBCS]

**security habitat** an area with low levels of human disturbance or habitat that allows a wildlife species to remain in a defined area despite an increase in stress or disturbance. The components of security habitat can include vegetation, topography, the size of the patches of vegetation, road density, distance from roads, intensity of the disturbance, and seasonal timing of the disturbance. This general definition covers most uses of the term security habitat, except for elk and grizzly bear, which have specific definitions.

**security habitat** (elk) the forested stands on National Forest Service lands at least 250 acres in size greater than 0.5 mile away from open motorized routes during the hunting season. Elk security habitat is calculated at the project level. Roads that are not open to the public for motorized use during the hunting season are not included in this calculation. The effects of nonmotorized use and/or administrative motorized use of closed or temporary roads during the hunting season are not included in this calculation and would instead be analyzed separately at the project level.

**sediment** solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site of origin by air, water, gravity, or ice.

**seedling** a young tree that has just germinated but has not yet reached sapling size, typically 1 to 5 feet tall.

**seedling/sapling** a size category for forest stands in which trees less than 5 inches in diameter and less than about 25 feet tall are the predominant vegetation.

**seedtree method** a cutting technique used to regenerate a stand in which nearly all trees are removed from an area, except for a small number of trees that are left singly or in small groups.

**seedtree with reserves** the application of the seedtree method with the intention of retaining or reserving all or a portion of the seed trees for future stand structure.

**selection method** a cutting technique used to regenerate a forest stand and maintain an uneven-aged structure, by periodically removing some trees within multiple size classes either singly or in small groups or strips.

**seral** a biotic community that is developmental; a transitory stage in an ecologic succession.

**seral/structural stage** a phase of development of an ecosystem in ecological succession from a disturbed, relatively unvegetated state to a complex, mature plant community.

**shade-intolerant** a plant species that does not grow well or dies from the effects of too much shade.

**shade-tolerant** a plant species that can develop and grow successfully in the shade of other plants.

**shelterwood method** a cutting technique used to regenerate an even-aged stand in which some of the mature trees are left to provide protection for regeneration species (greater numbers of trees are left in this method than with the seedtree method). This technique may be performed uniformly throughout the stand, in strips, or in groups. Regeneration may be natural or artificial (planting).

**shelterwood with reserves** the application of the shelterwood cutting technique with the intention of retaining or reserving all or a portion of the shelterwood trees for future stand structure.

**silvicultural diagnosis** the compiling, summarizing, evaluation and analyzing of forest stand and/or landscape data. Includes describing desired conditions, interpreting management direction and determining feasible alternative silvicultural systems and initial treatments. Integrates other resource conditions and considerations, such as soils, wildlife habitat and visual sensitivity.

**silvicultural prescription** a written document that describes management activities needed to implement one or more silvicultural treatments, or a treatment sequence. The prescription documents the results of the analysis during the diagnosis phase.

**silvicultural system** a management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. It includes cultural management practices performed during the life of the stand, such as regeneration cutting, thinning, and use of genetically improved tree seeds and seedlings to achieve multiple resource benefits.

**silviculture** the theory and practice of controlling the establishment, composition, growth, and quality of forest stands in order to achieve the objectives of management.

**site preparation** a general term for a variety of activities that remove competing vegetation, slash, and other debris that may inhibit the reforestation effort.

**site productivity** the combined effect of physical and climate properties, soil depth, texture, nutrient load, precipitation, temperature, slope, elevation, and aspect, on tree growth of a specific area of land.

**ski area** a site and attendant facilities expressly developed to accommodate alpine or Nordic skiing and from which the preponderance of revenue is generated by the sale of lift tickets and fees for ski rentals, for skiing instruction and trail passes for the use of permittee-maintained ski trails. A ski area may also include ancillary facilities directly related to the operation and support of skiing activities (36 CFR 251.51).

**slash** the residue left on the ground after felling and other silvicultural operations, or that has accumulated there as a result of storms, fire, or natural pruning.

**snag** a standing dead tree usually greater than 5 feet in height and 6 inches in diameter breast height.

**snow intercept cover** a forest canopy which lessens the snow depths for wintering big game animals so that they can forage and travel about.

**snowshoe hare habitat** an area within boreal and upper montane forest in North America with cold, moderately deep winter snowpack and dense horizontal cover in the understory. During the winter, hares are restricted to areas where young trees or shrubs grow densely (thousands of woody stems per hectare) and are tall enough to protrude above the snow during winter, or where numerous overhanging boughs of mature conifer trees touch the snow surface, providing cover and browse. Winter snowshoe hare habitat develops primarily in the later phase (15 to 40 years post-disturbance) of stand initiation structural stage and in multi-story mature stands. [LCAS] Snowshoe hare habitat is defined at the scale of a forest stand which is a minimum of 5 acres, consistent with the minimum home range size of a snowshoe hare in northwest Montana.

**spread rate/rate of spread** a measure of the final headfire extent (in the direction of maximum spread).

**stand** a community of trees occupying a specific area and sufficiently uniform in canopy composition, age, and size class to be a distinguishable unit, forming a single management entity.

**stand initiation structural stage** the phase following a stand-replacing disturbance or regeneration timber harvest, a new single-story layer of shrubs, tree seedlings, and saplings establish and develop, reoccupying the site. Trees that need full sun are likely to dominate these even-aged stands. (In the years immediately following the disturbance, tree seedlings are too small to provide food and cover for snowshoe hares and lynx, particularly during the winter. (See also **lynx habitat currently in unsuitable condition**.) As time progresses, the trees grow tall and dense enough to provide food and cover for snowshoe hares and lynx during all seasons (see also the definition for lynx habitat in suitable condition). [LCAS]

**stand-replacing disturbance** an agent such as fire, blowdown, insect or disease epidemic, or timber harvest, which kills or removes enough trees (usually considered 80% or more of the tree component) to result in an early seral/successional forest.

**stem exclusion structural stage (or closed canopy structural stage)** a phase when trees initially grow fast and quickly occupy the growing space, creating a closed canopy. Because the trees are tall, little light reaches the forest floor so understory plants (including smaller trees) are shaded and grow more slowly. Species that need full sunlight usually die; shrubs and herbs may become dormant. New trees are precluded by a lack of sunlight or moisture. (Oliver and Larson, 1996) [NRLMD]

**stocking** a measure of timber stand density as it relates to the optimum or desired density to achieve a given management objective.

**stressor** (ecology) see **ecosystem stressor**

**structural stage** a particular forest condition, characterized by a set of forest structural characteristics (such as tree diameters, tree heights, tree densities, canopy layers) that is representative of a particular period of stand development. See also **stand initiation structural stage**, **stem exclusion structural stage**, and **understory reinitiation structural stage**.

**structure** see **forest structure**

**substrate** a mineral and/or organic material that forms the streambed (i.e., stream bottom).

**subwatershed** a 6<sup>th</sup> code hydrologic unit, as defined in the U.S. Geological Survey hierarchical system of watersheds.

**succession/successional stage** a predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as “seral,” or “successional” stages.

**suitability of lands** a determination made regarding the appropriateness of various lands within a plan area for various uses or activities, based on the desired conditions applicable to those lands. The terms suitable and suited and not suitable and not suited can be considered the same.

**summer range** a part of the overall range of a species where the majority of individuals are located between spring green-up and the first heavy snowfall; in some areas winter range and summer range may overlap.

**sustainability** the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For purposes of this part, “ecological sustainability” refers to the capability of ecosystems to maintain ecological integrity; “economic sustainability” refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and “social sustainability” refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities (36 CFR 219.19).

**sustainable recreation** the set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations.

**sustained yield limit (SYL)** the amount of timber, meeting applicable utilization standards, “which can be removed from [a] forest annually in perpetuity on a sustained-yield basis” (NFMA at section 11, 16 USC 1611; 36 CFR 219.11(d)(6)). It is the volume that could be produced in perpetuity on lands that *may be suitable* for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of the SYL is not limited by land management plan desired condition, other plan components, or the planning unit's fiscal capability and organizational capacity. The SYL is not a target but is a limitation on harvest, except when the plan allows for a departure.

**system road** see **National Forest System road**.

**threatened species** a species that the Secretary of the Interior or the Secretary of Commerce has determined is likely to become an endangered species within the foreseeable future throughout all, or a significant portion, of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act. Threatened species are listed at 50 CFR sections 17.11, 17.12, and 223.102.

**timber harvest** the removal of trees for wood fiber use and other multiple-use purposes (36 CFR 219.19).

**timber management** the growing of, tending to, commercial harvesting of, and regeneration of crops of trees. [NRLMD]

**timber production** the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use (36 CFR 219.19).

**torching index** the open wind speed (measured or forecasted for a standard height (6.1-m) above the tallest vegetation) at which crown fire activity can initiate for the specified fire environment.

**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 road. [GBCS] See also **moving window analysis**.

**trail** a route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212.1).

**trail class** the prescribed scale of development for a trail, representing its intended design and management standards.

**transitory range** forested lands that are suitable for grazing for a limited time following a complete or partial forest removal

**transportation livestock** livestock used as pack and saddle stock for travel on the National Forest System.

**underburning** a fire that consumes surface fuels but not trees and some large shrubs.

**understory** the trees and other woody species which grow under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

**understory re-initiation structural stage** understory re-initiation structural stage – Establishment of a new age class of trees after overstory trees begin to die, are removed, or no longer fully occupy their growing space. The stand of trees begins to stratify into vertical layers, with some small shade-tolerant trees in the understory. [LCAS]

**untrammelled** a term defined in the context of the Wilderness Act as an area where human influence does not impede the free play of natural forces or interfere with natural processes in the ecosystem.

**Unique Ecological Sites** for the purposes of this plan, unique and/or limited ecological sites are defined as those sites present in relatively low acres and/or distribution across the HLC NF's. One example is mountain mahogany sites which have low distribution and abundance (# of acres) on the HLC NF's.

**utilization standards** utilization standards are specifications for merchantable forest products offered in a timber sale.

**vegetation management** a process that changes the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire or timber harvest. For the purposes of this decision, the term does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like, and does not apply to fire suppression or to wildland fire use. [NRLMD]

**viable population** a population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments. (36 CFR 219.19)

**viewshed** the visible portion of the landscape seen from viewpoints. Viewpoints can include residences, recreational facilities, and travelways.

**water quality** the physical, chemical, and biological properties of water.

**water yield** the runoff from a watershed, including groundwater outflow.

**watershed** a region or land area drained by a single stream, river, or drainage network; a drainage basin.

**watershed condition** the state of a watershed based on physical and biogeochemical characteristics and processes.

**weighted average/weighted mean** similar to an arithmetic mean or average, where instead of all data points contributing equally to the final average, some data points contribute more than others. In the example of patch sizes of early successional seedling/sapling forests, the data point is the patch. Patches are “weighted” by their acreage, and thus larger patches will contribute more to the determination of average than the smaller patches. This statistic gives insight into how large the largest patches really are, and how the individual patches are distributed along the range from smallest to largest patch size.

**wetland** an area that under normal circumstances has hydrophytic vegetation, hydric soils, and wetland hydrology.

**wild and scenic river** a waterway designated by Congress as part of the National Wild and Scenic Rivers System, which was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271, 1271–1287).

**wilderness** an area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131–1136).

**wildland fire** a nonstructure fire, other than prescribed fire, that occurs in the wildland. Any fire originating from an unplanned ignition.

**wildland-urban interface** a term is defined by the Healthy Forest Restoration Act § 101:

(A) an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or

(B) in the case of any area for which a community wildfire protection plan is not in effect—

(i) an area extending 1/2-mile from the boundary of an at-risk community;

(ii) an area within 1 1/2 miles of the boundary of an at-risk community, including any land that—

(I) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community;

(II) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or

(III) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; and

(iii) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at-risk community.

**wind-dominated fire** a state where the power of the wind is greater than the power of the fire in influencing its behavior.

**windthrow** a tree or stand of trees that have been blown over by the wind.

**winter range** the portion of the overall area a species inhabits where the majority of individuals are found from the first heavy snowfall to spring green-up, or during a site-specific period of winter. In the Rocky Mountains, winter range areas tend to have a relatively low amount of snow cover.

**yarding** the operation of hauling timber from the stump to a collecting point.

**zone 1** an area surrounding the grizzly bear primary conservation area (PCA) in the NCDE, where the intent is to maintain occupancy by grizzly bears, but at expected lower densities than inside the PCA. Zone 1 also includes two demographic connectivity areas. [GBCS]

**zone 2** an area adjacent to the grizzly bear zone 1 and/or zone 3 in the NCDE, where grizzly bears, particularly males, would have the opportunity to move between the NCDE and adjacent ecosystems. The intent of the zone 2 area is to allow for resource management and recreational opportunities while responding to grizzly bear-human conflicts with appropriate management actions.

**zone 3** the area that primarily consists of areas where grizzly bears do not have enough suitable habitat to support population growth. Grizzly bear occupancy will not be actively discouraged in zone 3 and the management emphasis will be on conflict response. [GBCS]