Forest Service
U.S. DEPARTMENT OF AGRICULTURE

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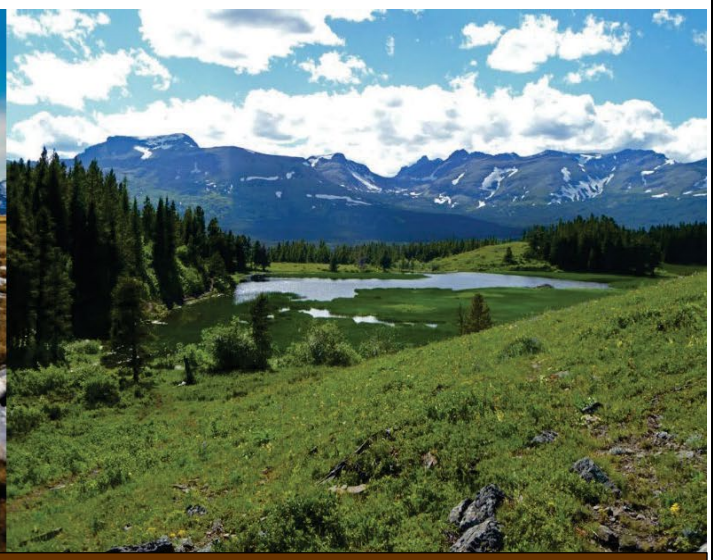
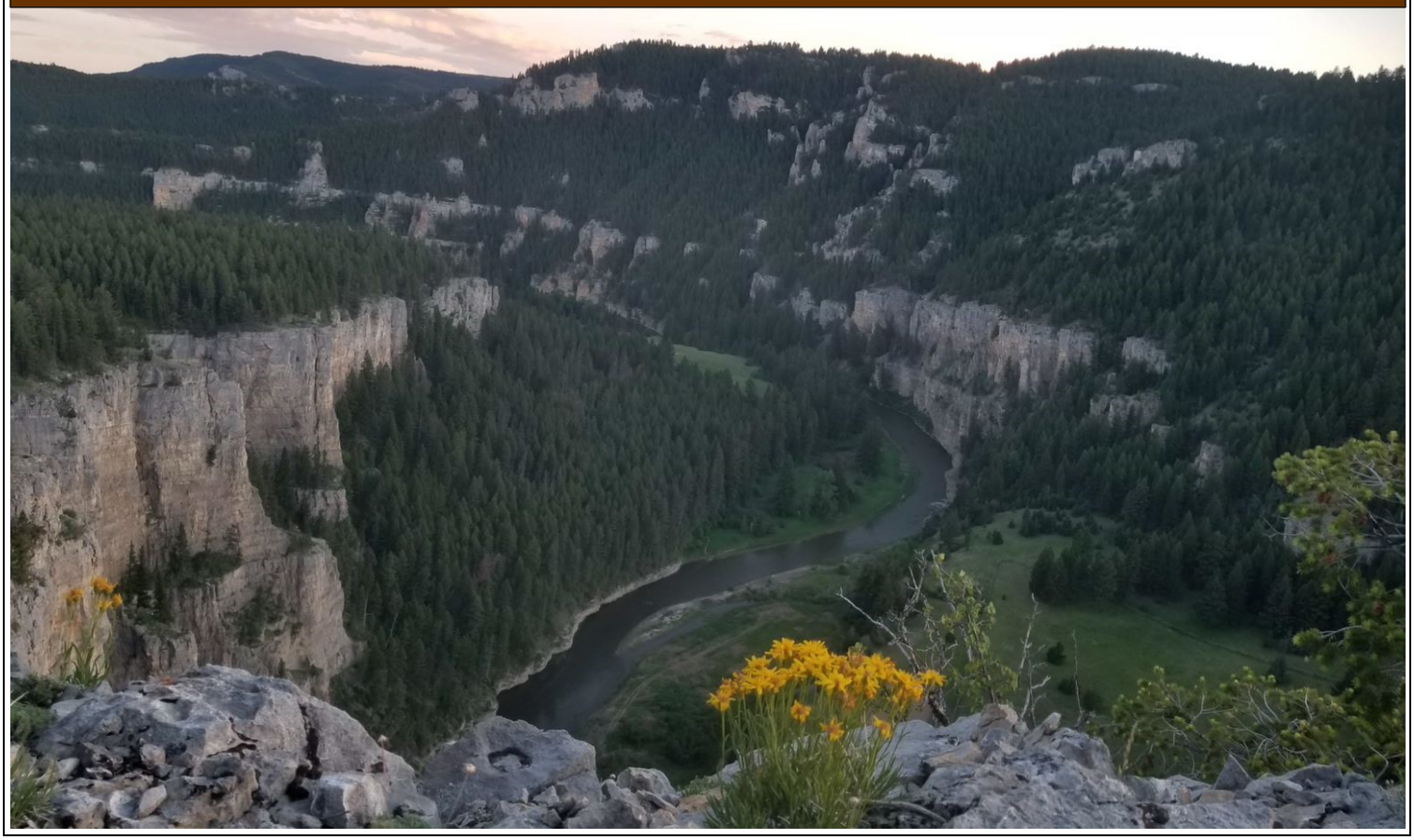


2021 Land Management Plan

Helena - Lewis and Clark National Forest



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Top left: Rocky Mountain Front, by Naoko Otani

Top right: Badger Two Medicine, by Laura Lundquist

Bottom: Smith River canyon, by Brittany Buchholz

2021 Land Mangement Plan

Helena - Lewis and Clark National Forest

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Abstract: The Helena - Lewis and Clark National Forest has developed this 2021 Land Management Plan, in accordance with the 2012 National Forest System land management planning rule (2012 Planning Rule) adopted by the U.S. Department of Agriculture.

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Abbreviations

DC – desired condition (plan component)

FS – Forest Service

FW – forestwide

GA – geographic area

GDL – guideline (plan component)

GO – goal (plan component)

HLC NF – Helena – Lewis and Clark National Forest

NFS – National Forest System

OBJ – objective (plan component)

RMZ – riparian management zone

STD – standard (plan component)

SUIT – suitability (plan component)

USDA – United States Department of Agriculture

USFWS – United States Fish and Wildlife Service

Chapter 1. Introduction

Helena - Lewis and Clark Consolidation

The consolidation of the Helena National Forest and the Lewis and Clark National Forest was approved by the Under Secretary for Natural Resources and the Environment on Dec. 11, 2015. The official name of the combined forests is the Helena - Lewis and Clark National Forest. For the purposes of this document, it will be referred to as the HLC NF.

Prior to the consolidation, each forest had its own land management plan (both dated 1986). In 2010 the Regional Forester decided to combine the programs of the Helena and the Lewis and Clark National Forests. The combination of the two forests programs was consistent with the Northern Region's direction for sharing leadership. Part of implementing this consolidation included a combined forest plan revision effort.

In addition to the consolidated HLC NF, this plan covers the southwest portion of the Elkhorns Geographic Area (GA) that falls within the Beaverhead-Deerlodge National Forest. See map below.

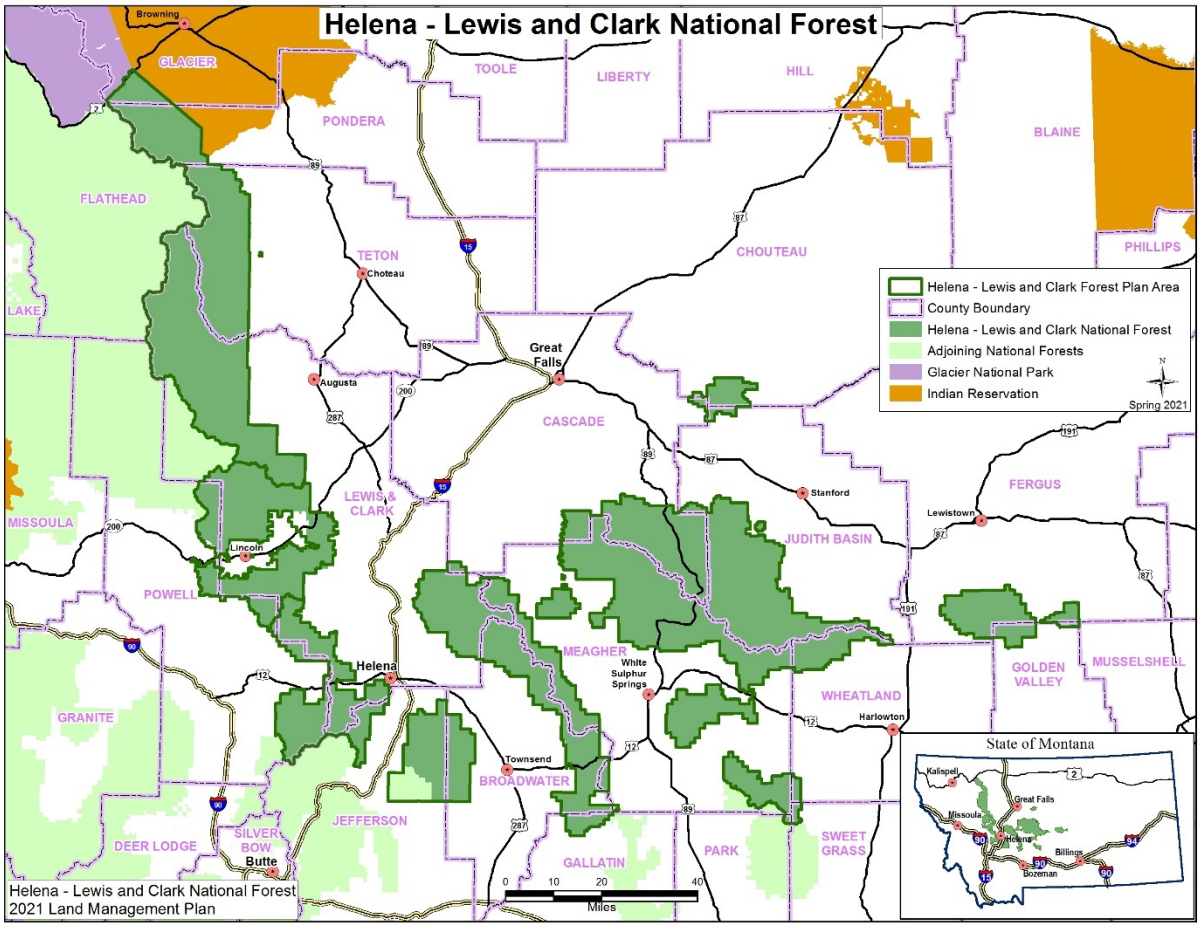

Figure 1. Helena – Lewis and Clark National Forest and vicinity

Purpose of this Land Management Plan

The purpose of the 2021 HLC NF Land Management Plan (hereinafter referred to as the 2021 Land Management Plan or the Plan) is to have an integrated set of plan direction (referred to as plan components) to provide for social, economic, and ecological sustainability and multiple uses of the HLC NFS lands and resources. The 2021 Land Management Plan sets the overall context for informed decision making by evaluating and integrating social, economic, and ecological considerations relevant to management of the forest. In May of 2012, the United States Forest Service (FS) began using new planning regulations (2012 Planning Rule) to guide collaborative and science-based revision of land management plans that promote the ecological integrity of national forests while considering social and economic sustainability. The 2012 Planning Rule specifies the following primary decisions that are to be made in forest plans:

- Forestwide components to provide for integrated social, economic, and ecological sustainability, and ecosystem integrity and diversity, while providing for ecosystem services and multiple uses. Components must be within FS authority and consistent with the inherent capability of the planning area (36 Code of Federal Regulations 219.7 and 219.8–219.10).
- Recommendations to Congress (if any) for lands suitable for inclusion in the National Wilderness Preservation System and/or rivers eligible for inclusion in the National Wild and Scenic Rivers System (36 Code of Federal Regulations 219.7(2)(v) and (vi)).
- The planning area's distinctive roles and contributions within the broader landscape.
- Identification or recommendation (if any) of other designated areas (36 Code of Federal Regulations 219.7 (c)(2)(vii).
- Identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 Code of Federal Regulations 219.7(c)(2)(vii) and 219.11).
- Identification of the maximum quantity of timber that may be removed from the planning area (36 Code of Federal Regulations 219.7 and 219.11 (d)(6)).
- Identification of GA or management area specific components (36 Code of Federal Regulations 219.7 (c)(3)(d).
- Identification of watersheds that are a priority for maintenance or restoration (36 Code of Federal Regulations 219.7 (c)(3)(e)(3)(f).
- Plan monitoring program (36 Code of Federal Regulations 219.7 (c)(2)(x) and 219.12.

It is important to note that this plan does not authorize site-specific prohibitions or activities; rather it establishes broad direction, similar to zoning in a community. Project or activity decisions will need to be made following appropriate procedures. Site-specific analysis in compliance with the National Environmental Policy Act would need to be conducted in order for activities to be in compliance with the broader direction of the land management plan.

The Plan will provide guidance for project and activity-level decision making on the Forest for approximately the next 15 years.

Plan Structure

This Plan is designed to communicate the concepts of strategic guidance and adaptive management for the HLC NF. The Plan is organized as follows:

Chapter 1 describes the purpose of the land management plan, plan content, future project consistency with the plan, rights and interests, and how best available scientific information will be considered.

Chapter 2 contains forestwide plan direction; the plan components related to physical and biological ecosystems; fire; air quality; the economic, cultural and social environment; and human uses and designations of the forest.

Chapter 3 contains GA plan direction and distinctive roles and contributions of each GA. Plan components specified at the GA level are those that are not adequately addressed by forestwide plan components. The HLC NF is divided into ten GAs.

Following chapter 3 is a glossary of terms and appendices as follows:

- Appendix A - Maps
- Appendix B - Monitoring Program
- Appendix C - Potential Management Approaches and Possible Actions
- Appendix D - Vegetation Classifications and Descriptions
- Appendix E - Priority and Conservation Watersheds
- Appendix F - Northern Rockies Lynx Management Direction Record of Decision
- Appendix G - Scenery Management
- Appendix H – 2021 Land Management Plan Readers Guide

Plan Content

This section describes the content of the 2021 Land Management Plan and includes:

- Forestwide and GA desired conditions, goals, objectives, standards, and guidelines
- The suitability of lands for specific multiple uses, including those lands suitable for timber production
- An estimate of the long-term sustained yield and projected timber sale quantity
- A description of the planning area's distinctive roles and contributions within the broader landscape
- The identification of priority restoration watersheds
- Management actions and strategies that may occur on the planning area over the life of the plan
- Areas recommended to Congress for inclusion in the National Wilderness Preservation System
- Rivers identified as eligible for inclusion as part of the Wild and Scenic River System
- Changes to the list of proposed research natural areas
- The plan monitoring program

The Plan does not include information on focal species or specific species of conservation concern. Focal species are addressed in the final environmental impact statement. Wildlife, fish, and plant species of conservation concern for the HLC NF are being identified at the regional level. The list can be reviewed at www.fs.usda.gov/goto/R1/SCC.

Numbers such as acres, miles, and volumes are approximate due to the use of geographic information system data and rounding.

Plan Components

Introduction

Plan components guide future projects and activities and the plan monitoring program. Plan components are not commitments or final decisions approving projects or activities.

The 2021 Land Management Plan contains plan components at both at the forestwide and GA scales. GA components provide additional specificity and address the uniqueness of each landscape, within the broader forestwide context, if and when necessary. Projects or activities must be consistent with the relevant desired conditions at both scales.

In some cases, the plan components at the GA scale address elements that are not common to the Forest as a whole, and therefore the GA plan components are unique and "additive" to the forestwide components. For example, bull trout are not present in all GAs so there is no forestwide plan component specific to that species. There are plan components at the GA scale that address bull trout where it is present. A project or activity that occurs in one of those areas would need to be consistent with the bull trout plan components for that GA, as well as the more general aquatics plan components that apply forestwide.

In other cases, the plan components at the GA scale mirror the forestwide plan components, but the information is quantified specific to each GA. For example, there are an array of quantitative terrestrial vegetation attributes (cover type, tree species presence, size class, and density class) at both scales. In this case, a project that shows consistency with the GA desired condition would inherently also be consistent with the forestwide desired condition, because the GA desired conditions are the building blocks for the broader forestwide desired conditions.

Where plan direction overlaps, generally the most protective plan components take precedence. However, the statutory authority and plan components for wilderness study areas takes precedence over other plan direction such as the primitive recreation opportunity spectrum plan components.

It is important to remember that the Plan in no way changes our obligations under laws, regulations, and policies regarding cultural, historic, and tribal resources and those will be followed regardless of the Land Management Plan decision. This means any desired conditions, objectives, standards, and guidelines in the Plan are in addition to all applicable laws, regulations, and policies.

Desired conditions, goals, objectives, standards, guidelines, monitoring questions, and monitoring indicators (in appendix B) have been given alpha-numeric identifiers for ease in referencing within the forest plan. The identifiers include:

- The level of direction (forestwide = FW, for GA direction the GA abbreviation is used)
- The resource (for example, WTR = watershed)
- The type of direction (where DC = desired condition, GO = goal, OBJ = objective, STD = standard, GDL = guideline, SUIT = suitability, MON=monitoring question, IND=monitoring indicator)
- A unique number (a numerical order starting with "01")

For example, forestwide direction for watershed desired conditions would be identified starting with FW-WTR-DC-01. The Big Belts GA watershed desired conditions would be identified starting with BB-

WTR-DC-01. The identifiers are included as part of the headings in chapters 2 and 3 with the unique number preceding each plan component.

Following are the definitions and where necessary, a description of their context for the required plan components (36 Code of Federal Regulations 219.7(e)).

Desired Conditions

A desired condition (DC) is a description of specific social, economic, and/or ecological characteristics of the planning area, or a portion of the planning 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 Code of Federal Regulations 219.7(e)(1)(i)).

Desired conditions are not commitments or final decisions approving projects and activities. The desired condition for some resources may currently exist, or for other resources may only be achievable over a long time period.

Goals

A plan may include goals (GO) as plan components. Goals are broad statements of intent, other than desired conditions, usually related to process or interaction with the public. Goals are expressed in broad, general terms, but do not include completion dates. (36 Code of Federal Regulations 219.7(e)(2)). Goals may be appropriate to describe a state between current conditions and desired conditions but without specific amounts of indicators. Goals may also be appropriate to describe overall desired conditions of the planning area that are also dependent on conditions beyond the planning area or FS authority.

Objectives

An objective (OBJ) is a concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets (36 Code of Federal Regulations 219.7(e)(1)(ii)). Objectives describe the focus of management in the planning area within the plan period. Objectives will occur over the life of the forest plan, considered to be over the first 15 years of plan implementation, unless otherwise specified. As with desired conditions, objectives can be forestwide or specific to GAs.

It is important to recognize that objectives were developed considering historic and expected budget allocations, as well as professional experience with implementing various resource programs and activities. It is possible that objectives could either exceed or not meet a target based upon a number of factors including budget and staffing increases/decreases, increased/decreased planning efficiencies, unanticipated resource constraints, etc.

Standards

A standard (STD) is a mandatory constraint on project and activity decision making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements (36 Code of Federal Regulations 219.7(e)(1)(iii)). As with desired conditions, standards can be developed for forestwide application or specific to a GA.

Guidelines

A guideline (GDL) is a constraint on project and activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or

maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements (36 Code of Federal Regulations 219.7(e)(1)(iv)). As with desired conditions, guidelines can be forestwide or specific to a GA.

Suitability of Lands

Specific lands within the Forest are identified as suitable (SUIT) for various multiple uses or activities based on the desired conditions applicable to those lands. The plan also identifies lands within the Forest as not suitable for uses that are not compatible with desired conditions for those lands. The suitability of lands need not be identified for every use or activity (36 Code of Federal Regulations 219.7 (e)(1)(v)). Suitability identifications may be made after consideration of historic uses and of issues that have arisen in the planning process.

Identifying suitability of lands for a use in the forest plan indicates that the use may be appropriate but does not make a specific commitment to authorize that use. Final suitability determinations for specific authorizations occur at the project or activity level decision making process. Generally, the lands on the Forest are suitable for all uses and management activities appropriate for national forests, such as outdoor recreation, range, or timber, unless identified as not suitable. Every plan must identify those lands that are not suitable for timber production (§ 219.11). (36 Code of Federal Regulations 219.7(e)(1)(v)). For forestwide suitability determinations, please see chapter 2 and for GA specific suitability determinations, see chapter 3.

Other Required Plan Content

This plan is designed to communicate the concepts of strategic guidance and adaptive management for the HLC NF. In addition to plan components, the plan includes information on priority watersheds, distinctive roles and contributions of the planning area, monitoring, and proposed and possible actions.

Priority Watersheds

The Planning Rule requires land management plans to identify watershed(s) that are a priority for maintenance or restoration (36 Code of Federal Regulations 219.7(f)(1)). The identification of these watersheds is done to focus efforts on the integrated restoration of watershed conditions in these areas. Information about priority watersheds in the planning area can be found in appendix E. See appendix E for list of priority watersheds.

Distinctive Roles and Contributions within the Broader Landscape

The description of the planning area's distinctive roles and contributions within the broader landscape reflects those things that are truly unique and distinctive (36 Code of Federal Regulations 219.2(b)). This description is important because it is a source of motivation or reasons behind desired conditions. It is important to understand the ecological, social/economic, and cultural/historic context of the planning area in order to better gauge the relative importance of each role. Doing so helps to set realistic and achievable desired conditions, which are the basis for management direction over the next 15 years. Each of the ten GAs has its own set of distinctive roles and contributions and can be found in chapter 3. Within the broader landscape, the ecological; social and economic; and cultural and historic characteristics are described as follows.

Ecological characteristics

The HLC NF stretches over 150 miles north to south and 200 miles east to west and encompasses roughly 2.9 million acres of NFS land. The planning area is made up of a series of distinctive landscapes and "island" mountain ranges, identified as GAs. It straddles the Continental Divide in southwestern and

central Montana and is characterized by the topographical transition between western mountainous terrains and eastern prairie grasslands. The elevation ranges from about 3,000 feet along the Missouri, Clark Fork, and Blackfoot rivers to over 9,000 feet on mountain peaks. 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. The Belt Mountain section encompasses most of the planning area east of the Rocky Mountain Front. This area is characterized by high mountains, gravel-capped benches, and intermontane valleys bordered by terraces and fans. 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 lakes. The Rocky Mountain Front section covers the Rocky Mountain Range GA in the northwestern part of the planning area. It is characterized by glaciated mountains with limestone scarps and ridges interspersed with glacial lakes and river valleys.

Bisected by the Missouri River and the Continental Divide, the planning area supports a wide diversity of vegetation due to its geographic extent, topography, natural disturbance regimes, and climate. The diversity of vegetation communities includes grassland prairie at the low elevations, open savannas and forests on dry foothills, dense coniferous forests and higher elevation grassland and shrublands, and alpine communities on cold, rocky sites at the highest elevations. Forests are most commonly dominated by Douglas-fir or lodgepole pine, but many other species are present including Rocky Mountain juniper, limber pine, ponderosa pine, aspen, cottonwood, western larch, Engelmann spruce, subalpine fir, and whitebark pine. There is also a wide diversity of nonforested vegetation types, including grasslands, shrublands, riparian and wetland areas, and alpine ecosystems, which support a wide variety of plant species. Rare habitat features such as cliffs, waterfalls, caves, and fens are present which support equally unique plant communities.

The HLC NF is 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. Several wildlife species are at either the eastern or western edge of their range on the HLC NF, with some (for example, Canada lynx, flammulated owl, Lewis's woodpecker, harlequin duck, westslope cutthroat trout) occurring only in the eastern or western GAs. Several carnivore species occur, including black bear, mountain lion, pine marten, and wolverine. Grizzly bears are known to occur in the westernmost GAs and individuals may be present throughout most of the HLC NF.

The Rocky Mountain Range and Upper Blackfoot GAs are part of the Northern Continental Divide Ecosystem for grizzly bears, and within the Northern Continental Divide Ecosystem 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. 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 NF spans 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 Little Blackfoot and Blackfoot Rivers west of the divide and multiple prominent drainages within each GA east of the divide, including the Judith, Marias, Belt Creek, Sun,

Mussellshell, Smith, Dearborn, and Upper Missouri Rivers. The networks of streams within the GAs are important aquatic ecosystems that support diverse riparian and wetland areas. Several bull trout populations occur on the west side of the divide, and westslope cutthroat trout inhabit multiple streams on both sides of the divide.

The HLC NF also has fourteen research natural areas (12 existing, 2 proposed), which are part of a national network of ecological areas for research, education, and maintenance of biological diversity. Additionally, the HLC NF is home to the Tenderfoot Creek Experimental Forest where research focuses on the sustainable productivity and biodiversity of lodgepole pine forests and watersheds.

Social and economic characteristics

The HLC NF serves as a backdrop, workplace, and playground for not only the small rural communities of central Montana, but also for visitors from around the world. 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. Deeply rooted in the culture and traditions of both Native American and early Euro-American settlers, the Forest's recreation settings and opportunities are enhanced by the many visible and accessible remnants of the past. A network of historic and modern era trails and roads gives visitors a chance to follow in the footsteps of Native Americans, the Lewis and Clark expedition, and early homesteaders and miners in search of silver and gold because of the numerous mineralized areas resulting from the Forests unique geologic landscape. Historic cabins and lookouts continue to serve as overnight destinations for today's visitors. Small family owned ranches and livestock grazing on public lands are important components of the backdrop and culture of the rural communities surrounding the forest areas.

The Forest has numerous instances of private land inholdings within the confines of the Forest boundaries. These private properties, mostly vestiges of the historic mining era in the form of patented mining claims, provide management challenges unique to the area. Additionally, large private land ownership surrounding the island mountain ranges present challenges for forest users wishing to obtain access to their public lands. These issues with private/public land interface provide challenges for all resource areas in trying to keep up with the social demands for power, water, access, and recreational needs.

There is a wide range of recreation opportunities available throughout the HLC NF. These year-round opportunities range from highly developed sites to more primitive and dispersed recreation opportunities. Unique developed recreation opportunities include cabin and lookout rentals, historic lodges, regionally significant ski areas, and a large visitor center that focuses on the journey of Lewis and Clark. Recreation opportunities include a network of motorized and nonmotorized roads and trails that provide access for hunting, fishing, wildlife viewing, 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.

Over 500,000 acres of the 2.9 million-acre HLC NF are 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 Forest is allocated as inventoried roadless areas. These inventoried roadless areas, when combined with designated wilderness, provide for vast landscapes that allow for more primitive recreation experiences. The Forest's recreation program contributes to the economic sustainability of central Montana's rural communities.

The HLC NF has contributed to the forest products industry, which has been a dominant feature of some local economies. Livestock grazing is a prominent use in many areas, owing to the native grass and shrub lands on the HLC NF. The HLC NF also provides hunting opportunities which is an important social and economic activity in Montana.

The Forest is the headwaters of both surface watersheds and groundwater aquifers within the planning area. In addition, the Forest provides abundant water for drinking and downstream uses. The HLC NF has five municipal watersheds within its jurisdictional boundary: Tenmile Creek (Helena); McClellan Creek (East Helena); Shorty and O'Brien Creeks (Neihart); Willow Creek (White Sulphur Springs); and Big Springs Creek groundwater recharge area in the Big Snowies GA (Lewistown).

Cultural and historical characteristics

Historically, the planning 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. Most prominent among these groups found in the planning area were those historically known as the Blackfeet, Gros Ventre, Salish, Shoshone, Kootenai, and Metis. The landscape is significant to archaeological history because it strongly influenced Native American travel and settlement patterns. Most Native American groups within the planning area followed a nomadic lifeway with groups of various sizes moving across the landscape following food sources. However, there are a few examples of groups following a seminomadic lifeway or settlement pattern. One interesting example would be the Metis, whom historically were children of Indian mothers and French fathers (the fathers where typically fur trappers). Several groups of Metis travelled back and forth between Canada and the unspoiled valleys of central Montana, hunting and trapping along the way. Unlike other nomadic groups, the Metis typically built cabins and stayed sometimes for several years in one location. Metis established a permanent settlement on Spring Creek near present day Lewistown in 1879 and other dispersed settlements west of Choteau followed in 1885. These Choteau-area settlements are just east of land now managed by the Rocky Mountain Ranger District.

Native American use of the planning area over the centuries is manifest in hundreds of archaeological sites, sacred sites, and other areas of traditional cultural importance, many of which are listed or eligible to be on the National Register of Historic Places. In addition to the National Register of Historic Places listed sites, one traditional cultural property related to tribal cultural values, and two national historic trails exist. Plus, numerous cultural resources have been formally determined to be eligible for listing on the National Register of Historic Places by the FS and the Montana State Historic Preservation Officer but have not yet been formally nominated to the Register.

The arrival of the Corps of Discovery to the planning area in 1805 marks the beginning of the historic period for central Montana. Following the Corps of Discovery's eastward departure from the planning area in 1806, a slow trickle and then a tide of fur trappers/explorers entered central Montana. A series of expeditions surveyed the people, resources, and travel routes within the planning area. This period in Montana was also characterized by steamboat travel, the fur trade, the arrival of missionaries like Pierre-Jean DeSmet, and the earliest ranching and gold mining discoveries.

Today, thousands of historic mining features can be found throughout the planning area and embody a historic theme complete with ecological, economic, political, and social implications. The discovery of gold in and around Helena ushered in a wave of settlement and land use that transformed the planning area's natural and political landscape. Thousands of miners and businesses sprang up overnight in makeshift towns along with an emerging transportation system. Millions of dollars of gold, silver, and copper were initially extracted from the planning area. This locally produced capital provided an

important source of hard currency for the Union during the Civil War. Thus, the economic impetus for, and political organization of, the Montana Territory at the time of its formation in 1864, and later statehood in 1889, had its initial origins squarely within the planning area. Today, thousands of historic mining features can be found throughout the planning area and embody a historic theme complete with ecological, economic, political, and social implications.

Alongside the mining that developed in and around ore sources, which is typically found in mountainous areas, open-range livestock (cattle or sheep) ruled in the flat open landscapes. The first farming of the planning area began in the fertile river valleys adjacent to the mining camps. Early producers of agricultural products sold their crops to mining communities and nearby military forts, which were in place by the late 1860's. The agricultural industry grew to keep pace with the influx of miners. The entry of the railroads into the area boosted the agricultural industry considerably. Not only did railroad access provide transport for produce, it sought out and attracted farmers to Montana. The railroads portrayed great opportunity for farmers in the planning area and promoted dry land farming, as well as irrigation methods.

Plan Monitoring Program

The monitoring program is designed to test assumptions used in developing plan components and to evaluate relevant changes and management effectiveness of the plan components. Typically, monitoring questions seek additional information to increase knowledge and understanding of changing conditions, uncertainties, and risks identified in the best available scientific information as part of an adaptive management framework. Best available scientific information can identify indicators that address associated monitoring questions. The best available scientific information is also important in the further development of the monitoring program as it may help identify protocols and specific methods for the collection and evaluation of monitoring information (from FS Handbook 1909.12 07.11). See appendix B for the monitoring program and additional information about adaptive management.

Proposed and Possible Actions

The 2012 Planning Rule requires land management plans to "…contain information reflecting proposed and possible actions that may occur on the planning area during the life of the plan, including: the planned timber sale program; timber harvesting levels; and the proportion of probable methods of forest vegetation management practices expected to be used" (16 United States Code 1604(e)(2) and (f)(2)). Such information is not a commitment to take any action and is not a 'proposal' as defined by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (40 Code of Federal Regulations 1508.23, 42 U.S.C. 4322(2)(C)). (36 Code of Federal Regulations 219.7(f)(1)).” Management approaches and strategies presented in this section may include suggestions for on-the-ground implementation, analysis, assessment, inventory or monitoring, and partnership and coordination opportunities the Forest is proposing as helpful to make progress in achieving its desired conditions. The potential approaches and strategies are not intended to be all-inclusive, nor commitments to perform specific actions.

The possible actions and potential management approaches and strategies the HLC NF may undertake to make progress in achieving the desired conditions described in this plan can be found in appendix C.

Project and Activity Consistency with the Plan

As required by the National Forest Management Act of 1976, subject to valid existing rights, all projects and activities that would be authorized by the FS, after the record of the decision for the 2021 Land Management Plan, must be consistent with the applicable plan components (16 United States Code 1604

(i)) as described at 36 Code of Federal Regulations 219.15. This is accomplished by a project or activity being consistent with applicable plan components.

When a proposed project or activity would not be consistent with the applicable plan components, the responsible official shall take one of the following steps, subject to valid existing rights:

- Modify the proposed project or activity to make it consistent with the applicable plan components.
- Reject the proposal or terminate the project or activity.
- Amend the plan so that the project or activity will be consistent with the plan as amended.
- Amend the plan contemporaneously with the approval of the project or activity so that the project or activity will be consistent with the plan as amended. This amendment may be limited to apply to the project or activity.

Determining Consistency

Because of the many types of projects and activities that can occur over the life of a plan, it is not likely that a project or activity can maintain or contribute to the attainment of all desired conditions, nor are all desired conditions relevant to every activity (for example, recreation desired conditions may not be relevant to a fuels treatment project). Most projects and activities are developed specifically to maintain or move conditions toward one or more of the desired conditions of the plan.

Every project and activity must be consistent with the applicable plan components. A project or activity approval document must describe how the project or activity is consistent with applicable plan components by meeting the following criteria (36 Code of Federal Regulations 219.15(d)):

1. **Goals, desired conditions, and objectives.** The project or activity contributes to the maintenance or attainment of one or more goals, desired conditions, or objectives, or does not foreclose the opportunity to maintain or achieve any goals, desired conditions, or objectives, over the long term.
2. **Standards.** The project or activity complies with applicable standards.
3. **Guidelines.** The project or activity:

   i. Complies with applicable guidelines as set out in the plan; or

   ii. Is designed in a way that is as effective in achieving the purpose of the applicable guidelines (§ 219.7(e)(1)(iv)).
4. **Suitability.** A project or activity would occur in an area:

   i. That the plan identifies as suitable for that type of project or activity; or

   ii. For which the plan is silent with respect to its suitability for that type of project or activity.

Rights and Interests

The 2021 Land Management Plan provides a strategic framework that guides future management decisions and actions. As such, the plan does not create, authorize, or execute any ground-disturbing activity. The plan does not subject anyone to civil or criminal liability and creates no legal rights. The plan does not change existing permits and authorized uses. When permits are reauthorized or changed, applicable plan components will be implemented.

Use of Best Available Scientific Information

The 2012 Planning Rule requires the responsible official to use the best available scientific information to inform the development of the plan, including plan components and the monitoring program. The foundation from which the plan components were developed for the plan was provided by the *Assessment of the Helena and Lewis and Clark National Forests* and the best available scientific information and analyses therein. From this foundation, resource specialists used many resources that included peer-reviewed and technical literature; databases and data management systems; modeling tools and approaches; information obtained via participation and attendance at scientific conferences; local information; workshops and collaborations; and information received during public participation periods for related planning activities. Resource specialists considered what is most accurate, reliable, and relevant in their use of the best available scientific information. The best available scientific information includes the publications listed in the literature cited sections of the Assessment and final environmental impact statement, as well as any additional information that may have been used, and included, in the literature cited section of the final environmental impact statement or the planning record prior to the record of decision.

Other Planning Efforts

The HLC NF contributes to the accomplishment of national strategic guidance in accordance with its own unique combination of social, economic, and ecological conditions. This plan helps define the Forest's role in advancing the agency's national strategy and reflects the national goals. This plan is reflective of the mission of the Forest Service, "to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations."

The 2021 Land Management Plan considered direction from other applicable tribal, federal, state, county, and city plans and strived to incorporate their goals by considering the broader landscape in which this plan would operate. More information can be found in the final environmental impact statement and the project record.

Chapter 2. Forestwide Direction

Introduction

This chapter contains direction that applies forestwide, unless additional or more restrictive direction is found in chapter 3. Forestwide direction includes desired conditions, goals, objectives, standards, and guidelines. Other FS direction, laws, regulations, policies, executive orders, and FS directives (manual and handbook) are not repeated in the plan.

The HLC NF intends to move toward these forestwide desired conditions over the next 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.

The plan components are organized by resource area, first the ecological resources followed by social, cultural, and economic resources. The benefits to people: multiple uses and ecosystem services section covers additional ecological, social, and economic resources that have direct ties to social and economic sustainability. However, all sections contain plan components that contribute to social and economic sustainability.

Aquatic Ecosystems

Introduction

This introduction provides a brief synopsis of aquatic components on the Forest and the themes used for plan component development, including native fish, aquatic habitat, riparian areas, water quality, water quantity, and conservation watershed network. The conservation watershed network and priority watersheds under the Watershed Condition Framework can be found in appendix E, which goes into more depth regarding strategies to protect and restore native fish and water quality. Appendix C contains a list of possible management approaches or strategies on implementation of plan components.

Lands supply high quality water that supports a variety of uses throughout the HLC NF. The Forest is also the headwaters of many downstream water users including municipal water systems, irrigation districts, and small instream flow rights. Aquatic ecosystems, watersheds, and wetlands have changed from historic conditions. Current conditions and trends indicate:

- A decline in migratory bull trout numbers on the west side of the planning area has occurred during the past several decades due primarily to changes in climate, habitat alterations, and invasive species. However, bull trout are present within some headwater streams in the Divide GA and are part of a functioning population in the Blackfoot GA.
- Across the planning area, threats to westslope cutthroat trout include the presence and expansion of nonnative species (rainbow trout, brown trout, and brook trout) and climate change. East of the continental divide, westslope cutthroat trout are found in isolated populations and occupy roughly 4% of their historic range. They remain strong in small isolated stream reaches though they have a low potential for long-term viability without continued monitoring and habitat restoration.
- Stream flow alterations occur throughout the planning area from both private and federal water diversions and channel modifications. Flow alterations have resulted in habitat degradation leading to dewatering of critical habitats, stream alterations, and low flows during critical times.

- Historic mining has impacted streams throughout the planning area. Water quality has been degraded through delivery of acid mine drainage, sedimentation, and habitat alterations from legacy mine activities remain.
- Multiple inventoried road culverts are confirmed to be partial barriers or total barriers to native trout during some parts of the year, disrupting the natural migration patterns of native fish. In some cases, these barriers may be beneficial for retention of genetically pure native fish populations by creating refugia that excludes nonnative fish.
- As of 2019, 55 stream reaches (617 miles) are listed on the HLC NF as water quality impaired (303d list) by the Montana Department of Environmental Quality (2018) under the Clean Water Act as a result of forest practices, such as road management, grazing, and mining.
- Soil, watershed, and aquatic habitats are being restored through partnerships and in cooperation with other agencies by implementing best management practices, removing excess roads, improving and relocating roads and trails to reduce sedimentation, removing fish migration barriers, reclaiming abandoned and inactive mines, and implementing riparian conservation strategies as well as threatened and endangered species conservation strategies.
- As of 2019, 103 or 35% of watersheds on the HLC NF are in Class 1 condition, functioning appropriately as determined by the Watershed Condition Framework Assessment completed in 2011. There are 159 (54%) watersheds rated as Class 2 (functioning at risk) and 34 (11%) rated as Class 3 (nonfunctioning) on the Forest.

The Forest has highly diverse wetland environments including marshes, swamps, wet meadows, fens, peatlands, glaciated ponds, wooded vernal pools, and riparian areas. Federally recognized species (including proposed, candidate, and recently delisted species), and species of conservation concern are associated with these and other unique habitats. Aquatic species of conservation concern for the HLC NF are being identified at the regional level. The list can be reviewed at www.fs.usda.gov/goto/R1/SCC.

Watershed (WTR)

Introduction

The planning area falls within 296 subwatersheds. Subwatersheds, 6 level-12 digit hydrologic unit code watersheds, range in size from 10,000 to 40,000 acres. According to the 2011 Watershed Condition Framework data, 103 subwatersheds were rated as functioning properly, 159 subwatersheds were rated as functioning at risk, and 34 subwatersheds were rated as impaired. The main impairments to the planning area watersheds were aquatic biota (nonnative species) and water quality. Largely, the impairments have been attributed to grazing and transportation infrastructure impacts. Restoration work is also planned and/or ongoing in other drainages as ‘priority’ under the Watershed Condition Framework (Plan appendix E).

The HLC NF headwaters are important water resources delivering high quality and consistent quanity of water to users on and off forest in support of municipal drinking water, agricultural irrigation, stock growers, and recreation. A large percentage of streams coming off the forest are diverted to supply these uses.

Riparian and wetland vegetation types are currently mapped on over 70,000 acres of the HLC NF’s administrative area, which is less than 3% of the area. This number likely underestimates total wetland/riparian lands within the HLC NF. Riparian areas are important elements of watersheds that provide critical transition zones linking terrestrial and aquatic ecosystems. Riparian management zones

(RMZs), with associated plan components, would be established to protect the ecological integrity of these areas.

Groundwater resources are important components of watershed function and biological integrity. Groundwater is an important storage of water providing base flow to perennial and intermittent streams helping to mitigate possible adverse effects of drought and climate change. Groundwater discharge areas also provide important temperature refugia for aquatic species during drought and high water temperatures. Groundwater dependent ecosystems, which include wetlands, springs, seeps, fens, and wet meadows maintain important biological diversity on the HLC NF. Groundwater also helps to maintain water quality at a level that sustains the biological, physical, and chemical integrity of aquatic systems and the survival, growth, reproduction, and mitigation of native aquatic species.

Properly functioning watersheds provide suitable conditions for sustainable clean water, healthy stable soils, timber growth, forage, aquatic and wildlife habitats, and the ability to withstand high intensity floods. Healthy watersheds contribute to local economies in the planning area including quality lands and water for, but not limited to, hunting, fishing, timber production, irrigation, and ranching. Desired conditions provide a platform for future management actions.

Desired Conditions (FW-WTR-DC)

01 National Forest System subwatersheds provide the distribution, diversity, and complexity of landscape-scale features including natural disturbance regimes and the aquatic, wetland, and riparian ecosystems to which native species, populations, and communities are uniquely adapted within those watersheds. Watersheds and associated ecosystems retain their inherent resilience to respond and adjust to disturbance without long-term adverse changes to the physical or biological integrity.

02 Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, groundwater, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling the requirements of aquatic and riparian-associated plants and animals.

03 The timing, variability, and duration of floodplain inundation is within the natural range of variation. Floodplains are accessible to water flow and sediment deposits. Over-bank floods allow floodplain development and the propagation of flood-associated riparian plant and animal species.

04 In streams and floodplains with highly altered systems, the systems are stable or moving towards stability.

05 Upland areas surrounding wetlands that have the most direct influence on wetland characteristics, as well as stream segments that flow directly into wetlands, sustain the characteristics and diversity of those wetlands. Nonforested areas in and surrounding wetlands are composed of plant and animal communities that support and contribute to wetland ecological and habitat diversity.

06 Water quality, including groundwater, meets or exceeds applicable state water quality standards and fully supports beneficial uses, downstream users, municipal water supplies, and natural resources. Flow and habitat conditions in watersheds, streams, lakes, springs, wetlands, and groundwater aquifers fully support beneficial uses, and meet the ecological needs of native species (including species of conservation concern and threatened and endangered species).

07 The Forest has no documented lands or areas that are delivering water, sediment, nutrients, and/or chemical pollutants that would result in conditions that violate the state of Montana's water quality standards or is permanently above natural or background levels.

08 The sediment regime within water bodies is within the natural range of variation. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

09 Beavers play an important ecological role in wetlands and riparian areas where they benefit and enhance groundwater, surface water, floodplain and riparian habitat complexity, and add resilience to changing climate conditions.

10 In-stream flows are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, and duration of peak, high, and low flows are retained. Stream flow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. Stream channels transport sediment and woody material over time while maintaining reference dimensions (for example, bankfull width, depth, entrenchment ratio, slope, sinuosity, large woody material, percent pools, residual pool depth, median particle size, and percent fines).

11 Groundwater dependent ecosystems, including peatlands, fens, wetlands, wet meadows, 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 variation in order to maintain biodiversity of flora and fauna. Wetland and groundwater dependent ecosystem vegetation communities are resilient to drought, climate change, and other stressors. Also see Threatened, Endangered, Proposed, and Candidate and Plant Species of Conservation Concern (PLANT).

12 Cave ecosystems exhibit natural hydrologic and environmental functions.

13 All stream crossing structures afford capacity for Q100 discharge and are properly aligned with the stream channel.

Goals (FW-WTR-GO)

01 Under Montana Code Annotated 2015, 85-20-1301; the HLC NF works with the USDA-FS-Montana compact to attain water rights to preserve instream flows for nonconsumptive water uses to provide for channel maintenance, water quality, aquatic habitats, and riparian vegetation.

02 Federal, tribal, state, and local governments cooperate to identify and secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

03 Work cooperatively with Montana Department of Environmental Quality on development of watershed restoration plans, total maximum daily load plans, water quality issues, monitoring, wetland characterization, and mapping.

04 Work cooperatively with Montana Fish, Wildlife, and Parks to use beavers to manage aquatic habitat quality.

Objectives (FW-WTR-OBJ)

01 Within at least four priority watersheds, complete essential work as defined by the Watershed Restoration Actions Plans identified in the Watershed Condition Framework.

02 Improve soil and watershed function and resiliency on an average of 500 acres/year with an emphasis on priority watersheds under the Watershed Condition Framework and Conservation Watershed Network.

03 Plan and implement restoration activities on at least two acres of groundwater dependent ecosystems every five years.

Standards (FW-WTR-STD)

01 Projects that withdraw (i.e. pump) water from surface water features or groundwater must ensure that water is maintained at levels that will protect management uses and forest resources, including water quality and aquatic species and their habitat (including groundwater dependent ecosystems - fens, springs).

02 Best management practices (including both federal and the state of Montana Best Management Practices) shall be incorporated in all land use, transportation, infrastructure, and project plans as a principle mechanism for controlling nonpoint pollution sources to meet soil and watershed desired conditions and to protect beneficial uses.

03 Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams.

Guidelines (FW-WTR-GDL)

01 When conducting management activities, in order to support aquatic habitat quality and resiliency, beaver complexes should be enhanced or maintained.

02 Special use permits related to water uses should include provisions to ensure that water quality and beneficial uses are fully protected.

03 In order to protect the ecological functions that beavers provide, management actions to reduce beaver threats to infrastructure should use techniques that sustain beaver presence (refer to appendix C for possible management approaches).

Riparian Management Zones (RMZ)

Introduction

RMZs are portions of watersheds where riparian-associated resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RMZs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, 2) providing root strength for channel stability, 3) shading the stream, and 4) protecting water quality. Another critical function of RMZs is to provide for wildlife habitat use and connectivity.

Desired conditions for RMZs have been expanded to focus on key ecological processes and functions, highlight vegetation structure and composition, and provide suitable connected wildlife habitat rather than being fish-centric under the Inland Native Fish Strategy. Vegetation management within RMZs is allowed but riparian and aquatic conditions must be maintained, restored, or enhanced. Many activities that can cause soil compaction or soil erosion are restricted or minimized. RMZs are not “no management zones” since treatment may be necessary to achieve desired conditions. However, guidance is provided for activities within RMZs.

Desired Conditions (FW-RMZ-DC)

01 RMZs reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance regimes affecting the area. The species composition and structural diversity of native plant communities in RMZs provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. They will supply amounts and distributions of nutrients, coarse woody debris, and fine particulate organic matter sufficient to sustain physical complexity and stability. See Table 1 below for typical width of a RMZ.

02 RMZs feature key riparian processes and conditions that function consistent with local disturbance regimes, including slope stability and associated vegetative root strength, wood delivery to streams and within the RMZs, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality. RMZs also provide an opportunity for riparian and terrestrial connectivity.

Objectives (FW-RMZ-OBJ)

01 Improve at least 500 acres of riparian habitat during the life of the forest plan. Improvement can be actions such as, but are not limited to, road obliteration, riparian planting, and reconstructing floodplains by removing road prisms or berms.

Standards (FW-RMZ-STD)

01 RMZs shall be delineated as follows:

Category 1 Fish-bearing streams: RMZs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.

Category 2 Permanently flowing nonfish bearing streams: RMZs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Category 3 Constructed ponds and reservoirs, and wetlands greater than 1 acre: RMZs consist of the body of water or wetland and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

Lakes and natural ponds - RMZs consist of the body of water and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance, whichever is greatest.

Category 4 Seasonally flowing or intermittent streams, wetlands, seeps and springs less than 1 acre, and unstable and potentially unstable areas: This category applies to features with high variability in size and site-specific characteristics. At a minimum, the RMZs should include:

- The extent of unstable and potentially unstable areas (including earthflows).
- The stream channel and extend to the top of the inner gorge.
- The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation, extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. A site-potential tree height is the average maximum height of the tallest dominant trees for a given site class.
- Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria. Fish-bearing intermittent streams are distinguished from nonfish-bearing intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers, and streams or travel routes for fish emigrating from lakes. In these instances, the guidelines for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.

The RMZ is broken into two areas called the inner and outer zones (see Table 1). As noted in footnotes of the table, the inner RMZ width can be extended beyond the length in the table in some special cases to whatever is greatest of the following: the top of the inner gorge, the outer edges of the 100-year floodplain, to the outer edges of riparian vegetation, or to a distance equal to the height of either one or two site-potential trees. Some activities are prohibited or restricted in the inner zone, whereas more active management can occur in the outer zone. RMZs are not intended to be "no touch zones," but rather "carefully managed zones" with an increase in protections in close proximity to water resources.

Table 1. Typical widths[1] of inner and outer areas within RMZs

Stream type	Inner (ft)	Outer (ft)	Total width (ft)
Category 1 – Fish bearing stream	100[2]	200	300[1]
Category 2 – Perennial, nonfish bearing Stream	100[2]	50	150[1]
Category 3 – Natural Lakes and ponds, Constructed Ponds and Reservoirs, and wetlands greater than 1 acre	100	50	150
Category 4a – Intermittent steep (>35% side slope)	100[3]	0	100
Category 4b – Intermittent flat (<35% side slope) Disconnected intermittent MT State Class 3 and wetland <1 acre.	50	50	100

1. Widths listed are for each side of the stream, total width would be double the numbers listed.
2. Inner Riparian Management Zone widths extend on each side of the stream extending from the edges of the active stream channel either to the distance listed or to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, whichever is greatest.
3. Inner Riparian Management Zone widths extend on each side of the stream extending from the edges of the stream channel either to the distance listed or to the top of the inner gorge, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, whichever is greatest.

02 Vegetation management treatments shall only occur in the inner RMZ in order to restore or enhance aquatic and riparian-associated resources; only nonmechanical treatments shall be authorized.

03 Vegetation management may occur within the outer RMZs to meet desired conditions, so long as project activities within RMZs do not prevent attainment of desired conditions for wildlife and the inner RMZ.

04 Herbicides, pesticides, and other toxicants and chemicals shall only be applied within RMZs if needed to maintain, protect, or enhance aquatic and riparian resources or to restore native plant communities.

05 Storage and refueling sites shall be located outside of RMZs to minimize effects to aquatic resources. If refueling or storage is needed within RMZs, the locations must be approved by the FS and have an approved spill containment plan.

06 Salvage harvest shall not occur in the inner RMZ.

Guidelines (FW-RMZ-GDL)

01 Trees felled inside RMZs should be left onsite to achieve aquatic and riparian desired conditions.

02 To maintain stream channel stability and aquatic habitat, large woody debris should not be cut and/or removed from stream channels unless it threatens critical infrastructure, such as mid-channel bridge piers or fire control breaks.

03 To avoid disturbing or compacting soil or damaging vegetation, management activities should be excluded within a minimum of 100 feet of peatlands, fens, and other groundwater dependent ecosystems.

04 To reduce the likelihood of sediment input to streams, new road and landing construction should be avoided, including temporary roads, in RMZs except where:

- necessary for stream crossings, or
- a road relocation contributes to attainment of aquatic and riparian desired conditions, or
- Forest Service authorities are limited by law or regulation.

05 To minimize sediment delivery and adverse effects to stream channels, construction of machine fireline in RMZs should be avoided, except where needed to cross streams. Following wildfire and prescribed fire operations, fire lines should be rehabilitated to limit the creation of new stream channels.

06 To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, when conducting fire operations, the use of heavy equipment within RMZs should be minimized.

07 New sand and gravel borrow pit development or gravel mining should not occur within RMZs to minimize ground disturbance and sediment inputs.

08 To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, temporary fire facilities (for example, incident bases, camps, staging areas, helispots, and other centers) for incident activities should be located outside RMZs. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian dependent resources should be used.

09 New landings, designated skid trails, staging, and decking should be located outside RMZs to minimize effects to riparian and aquatic resources. If landings are needed inside of RMZs, the disturbance area footprint should be minimized, and the activities should be located outside the active floodplain.

10 Aerial application of chemical retardant, foam, or other fire chemicals and petroleum should be avoided in mapped aerial retardant avoidance areas (refer to latest regional avoidance map) in order to minimize impacts to the RMZ and aquatic resources.

11 To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, clearcut harvest should not occur in RMZs.

12 To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, all management activities in RMZs should protect key riparian features and processes, including maintenance of stream bank stability, input of organic matter, temperature regimes, water quality, and aquatic and terrestrial habitat connectivity.

Suitability (FW-RMZ-SUIT)

01 RMZs are not suitable for timber production, but harvest for other multiple use values is suitable as appropriate under the RMZ plan components.

Fisheries and Aquatic Habitat (FAH)

Introduction

The intent of the following plan components is to maintain or restore watershed conditions so that managed watersheds are moving towards or are in concert with reference watersheds when considered at a national forest scale. Changes between the 1986 plans, as amended, and the 2021 Land Management Plan are captured in the components below.

This section also addresses species that are listed by the USFWS as threatened, endangered, proposed, or candidate under the Endangered Species Act; or those that are identified as species of conservation concern by the Regional Forester of the Forest Service. Species of conservation concern are species other than federally recognized species that are known to occur in the planning 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 planning area (36 Code of Federal Regulations 219.9; FSH 1909.12.52). Species of conservation concern for the HLC NF are identified at the regional level. The list can be reviewed at www.fs.usda.gov/goto/R1/SCC. If additional species are added to the SCC list in the future, the plan components in this section would apply and additional species-specific components may be needed.

Desired Conditions (FW-FAH-DC)

01 Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances and climatic fluctuations without long-term, adverse changes to their biological integrity. Components of this biological integrity include supporting native fish, amphibians, birds, and invertebrates, as well as productive recreational fish populations. Essential characteristics of this resilience are healthy, functioning aquatic, riparian, upland, and wetland ecosystems.

02 Instream habitat conditions for managed watersheds move in concert with or towards those in reference watersheds. Aquatic habitats are diverse, with channel characteristics and water quality reflective of the climate, geology, and natural vegetation of the area. Stream habitat features across the forest, such as large woody material, percent pools, residual pool depth, median particle size, and percent fines are within reference ranges as defined by agency monitoring.

03 Aquatic systems and riparian habitats express physical integrity, including physical integrity of shorelines, banks, and bottom configurations, within their natural range of variation.

04 Connectivity between water bodies provides for movement between habitats associated with species' life stages (for example, fish migration to spawning areas, amphibian migration between seasonal breeding, foraging, and overwintering habitats), and for processes such as recolonization of historic habitats.

05 Habitats favor native aquatic species. Impacts of nonnative fish species on native salmonids, such as hybridization, competition, replacement, and predation are minimal.

06 Aquatic ecosystems are free of invasive species such as zebra mussels, New Zealand mud snails, quagga mussels, and Eurasian milfoil. Non-native plant and amphibian species are not expanding into water bodies that support native amphibian breeding sites (for example, non-native bullfrogs, chytrid fungus, or reed canary grass are not expanding into boreal toad breeding sites).

07 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.

08 Increased availability of quality habitat reduces risk to the genetic diversity and population viability of aquatic threatened, endangered, or species of conservation.

Goals (FW-FAH-GO)

01 Work with Montana Fish, Wildlife, and Parks to contribute to the expansion of core populations of bull trout as outlined in the Bull Trout Conservation Strategy (or the latest guiding document).

02 Work with Montana Fish, Wildlife, and Parks to contribute to the expansion of core populations of westslope cutthroat trout as outlined in the Westslope Cutthroat Trout Conservation Strategy (or the latest guiding document).

03 The Forest Service coordinates with federal agencies, state agencies, tribes, counties, interested groups, and interested private landowners to recover threatened and endangered species.

04 The Forest Service works with federal, state, tribal, and private land managers towards an all-lands approach to management and cooperation, including efforts to mitigate threats or stressors, provide for wildlife and fish habitat connectivity, and to provide social, economic and ecological conditions that contribute to mutual objectives.

05 The Forest Service cooperates with state agencies, federal agencies, tribes and other interested stakeholders to develop actions that lead to progress towards meeting other agencies' objectives for native and desired non-native fish and wildlife species.

06 Work with appropriate agencies including Montana Fish, Wildlife, and Parks to provide information and preventive measures to the public about aquatic invasive species at water-based recreation sites. Also see Public Information, Interpretation, and Education (CONNECT).

Objectives (FW-FAH-OBJ)

01 Improve the habitat quality and hydrologic function of at least 20 miles of aquatic habitat, focusing on streams with listed species or species of conservation concern. Activities include, but are not limited to, berm removal, large woody debris placement, road decommissioning or stormproofing, riparian planting, and channel reconstruction.

02 In streams with recreational fishing populations, improve the habitat quality and hydrologic function of at least 20 linear miles of habitat. Prioritize impacted, highly productive stream segments.

03 Reconnect at least 10 miles of habitat in streams disconnected by roads or culverts where aquatic and riparian-associated species' migratory needs are limiting distribution of those species.

Standards (FW-FAH-STD)

01 New stream diversions and associated ditches shall be screened to prevent capture of fish and other aquatic organisms.

Guidelines (FW-FAH-GDL)

01 Prior to use in a water body or when moving between watersheds, equipment (including boats, rafts, drafting equipment, water tenders, and helicopter buckets) should be inspected and cleaned to reduce the potential for the introduction of aquatic invasive species, including aquatic pathogens.

02 When drafting water from streams, pumps should be screened to prevent capture of fish. During the spawning season for native fish, pumping sites should be located away from spawning gravels.

03 New and revised livestock management plans should be designed to maintain or improve water quality by minimizing impacts caused by livestock grazing in RMZs within active livestock allotments. Also see Benefits to People, Livestock Grazing (GRAZ).

04 Construction activities within the ordinary high-water mark that may result in adverse effects to native or desirable nonnative aquatic species, or have the potential to directly deliver sediment to their habitats, should be limited to times outside of spawning and incubation seasons. Specific time periods should be coordinated through the permitting process with Montana Fish, Wildlife, and Parks.

05 Human created migration barriers to aquatic species should not be created unless they are needed to prevent invasions by nonnative species.

Conservation Watershed Network (CWN)

Introduction

The conservation watershed network is a specific subset of watersheds (10 or 12-digit hydrologic unit codes) where prioritization for long-term conservation and preservation of (1) bull trout, (2) westslope cutthroat trout, and (3) water quality. Restoration projects would be prioritized in bull trout habitat, followed by other watersheds where native fish viability is a concern. Additional restoration in municipal watersheds and watersheds with 303d listed segments or total maximum daily load listed stream segments will occur as a third priority due to potential impacts in connectivity if there is poor water quality/quantity anywhere between habitats. Evaluation of management activities in conservation watershed networks will follow appropriate levels of review prior to resource management (i.e., multiscale analysis). See appendix E for more information and tables listing the conservation watersheds (summarized in Table 2).

Table 2. Appendix E Conservation Watershed Network Tables

CWN	Table number	Page number
Prioritization Table	3	6
CWN watersheds west of Continental Divide	4	7
CWN east of Continental Divide	5	7-11

Desired Conditions (FW-CWN-DC)

01 Conservation watershed networks have functionally intact ecosystems that provide high-quality water and contribute to and enhance the conservation and recovery of threatened or endangered fish species and aquatic species of conservation concern.

Objectives (FW-CWN-OBJ)

01 Repair at least two road/stream crossings every five years at locations where chronic sediment sources are found (for example, up-size culverts, reduce sediment delivery to waterways from roads, realign stream constraining road segments, improve livestock stream crossings and trailing, etc.). Give precedence to bull trout watersheds.

02 Stormproof at least 15% percent of the roads in the conservation watershed network. Restoration to benefit threatened, endangered, proposed, and candidate aquatic species is the first priority, followed by restoration for aquatic species of conservation concern, and municipal watersheds. See appendices C and E for specific strategies for discussion of treatment options and for prioritization.

Guidelines (FW-CWN-GDL)

01 For subwatersheds included in the conservation watershed network, net increases in stream crossings and road lengths should be avoided in RMZs, unless the net increase would improve ecological function in aquatic ecosystems. The net increase is measured from beginning to end of each project.

02 Roads in conservation watershed networks should be prioritized for road decommissioning, closure, relocation or other strategies to reduce sediment delivery to benefit aquatic species (for example, bull trout). See appendices C and E for specific strategies for discussion of treatment options and for prioritization.

03 During project planning, conservation watershed networks should be the highest priority for restoration actions for the aquatic environment.

Soil (SOIL)

Introduction

The National Forest Management Act states that management activities on NFS lands will not produce substantial and permanent impairment of soil productivity. Productivity is maintained by establishing soil quality standards. During the last planning cycle, physical soil disturbance has been the focus of soil management on the HLC NF managed lands. In 2010, FS Manual Chapter 2550 Soil Management was revised at the national level. The emphasis of soil management was changed to include long-term soil quality and ecological function. The manual defines six soil functions: soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering. The objectives of

the national direction on NFS lands are 1) to maintain or restore soil quality, and 2) to manage resource uses and soil resources to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity. To provide for multiple uses and ecosystem services in perpetuity, these six soil functions need to be active. In addition to the plan components in this section, also see the Livestock Grazing, Timber, and Infrastructure sections.

Desired Conditions (FW-SOIL-DC)

01 Soil quality and productivity are not impaired and support desired conditions for terrestrial and aquatic ecosystems. See Table 3.

Table 3. Soil ecological functions with attributes, indicators, and desired conditions

Soil function[1]	Selected attributes	Soil quality indicator	Desired condition
Soil biology	Roots and aeration	Root growth	Root growth, both vertically and laterally, is unimpeded by compaction.
	Flora and fauna	Community composition	The soil is capable of supporting a distribution of desirable plant species by vegetative layer (trees, shrubs, herbaceous) as identified in the potential plant community (based on ecological site descriptions or equivalent). The site has not transitioned to an undesirable state.
		Canopy cover and ground cover	Soil temperature and moisture regimes are maintained in conditions to support desired plant communities.
Soil hydrology	Infiltration	Surfaces	Surface structure is as expected for the site (for example, granular, subangular blocky, single grain). Surface crusting and pore space are as expected for the site.
Nutrient cycling	Organic matter composition	Forest or rangeland floor	Forest and rangeland floor are appropriate for vegetation type and successional stage. Rangeland to be determined by field analysis and USDA-NRCS Soil Survey descriptions specific to soil type.
		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 FW-DC-VEGF-07 and FW-GDL-VEGF-05.
	Nutrient availability	Surface (A) horizon or mollic layer	“A” horizon is present, well distributed, not fragmented.
Support and stability	Stability	Surface erosion (wind, rill, or sheet)	Erosion is occurring at natural rates or not evident. Bare ground is within expected ranges base on USDA-NRCS Soil Survey descriptions for soil type.
		Site stability (mass erosion, landslide prone)	Site stability potential is unchanged or stability has been improved.

[1] For the purposes of repeatablility and reliability in measurement of the soil quality indicators in the field, 4 of the 6 functions listed in the FS manual were chosen that best represent conditions.

02 Biological soil crusts (mosses, lichens, algae, liverworts) occurring on very dry sites are stable.

Standards (FW-SOIL-STD)

01 Land management activities shall be designed and implemented in a manner that conserves soil physical, chemical, and biological functions, improves these functions, and maintains site productivity.

02 Land management activities shall not create detrimental soil conditions on more than 15 percent of an activity area. In activity areas where less than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15 percent. In areas where more than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration must not exceed the conditions prior to the planned activity and rehabilitation must address the current impaired soil functions to improve the long-term soil condition.

03 Project specific best management practices and design features shall be incorporated into land management activities as a principal mechanism for protecting soil resources.

Guidelines (FW-SOIL-GDL)

01 Ground-based equipment used for vegetation management should only operate on slopes less than 45 percent to protect soil quality. On sensitive soils ground based equipment should only operate on slopes less than 35 percent. Log skidding equipment should only operate on slopes less than 35 percent to limit detrimental soil disturbance. Exceptions may be authorized where soil, slope, and equipment are determined appropriate to maintain soil functions.

02 To maintain soil quality and stability, ground-disturbing management activities should not occur on soils prone to mass wasting. Exceptions may be considered after site-specific soils analysis.

03 To minimize soil disturbance, during management actions, existing or past disturbed areas should be used before creating new disturbances for temporary roads, landings, skid trails, or other activity areas (such as burn piles or mining sites) unless new disturbances would be less impactful.

04 Project activities should provide sufficient effective ground cover with a post-implementation target of 85 percent to provide nutrients and reduce soil erosion. Exceptions to the target may be considered based on site potential.

05 To maintain organic matter for soil function, management activities (including prescribed fire) should conserve coarse woody debris at levels that correspond to soil and habitat type. Management activities should either retain forest floor at half the current thickness or no less than one centimeter thick on average across activity areas. Also see FW-VEGF-GDL-05.

06 After a road is decommissioned or after cessation of management activities on temporary roads, soil function appropriate to the site potential should be restored, using demonstrably effective methods.

07 To restore soil quality, when reclaiming skid trails, landings, burn pile scars, and nonsystem roads, demonstrated effective treatment methods should be used.

08 To protect identified areas of volcanic ash and granitic soils, erosion control measures should be planned prior to any ground disturbing activities.

Air Quality (AQ)

Introduction

Clean air is an important environmental benefit provided by forests. Clean air is necessary for all life on Earth, and air pollution has been associated with a range of adverse health and environmental effects. Trees absorb and sequester greenhouse gases through photosynthesis and produce oxygen for people and animals to breathe. Trees also play an important role in capturing air pollutants deemed hazardous to human health: ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide. The pollutants come from dust, pollen, smoke, ash, motor vehicles, and industrial sources such as power plants. There are two primary types of air quality effects concerning the Forest and forest operations: 1) the effects of regional air pollution on forest natural resources and human health, and 2) the effects of forest emissions on forest natural resources, human health, and regional air sheds.

Air pollution affects the natural quality of forest lands, particularly wilderness areas or air quality related values or wilderness air quality values. High ozone concentrations can injure sensitive vegetation. Fossil fuel burning emits sulfur dioxide and nitrogen oxides into the atmosphere. Certain types of agricultural activities, such as livestock grazing and dairy production, emit ammonia to the atmosphere. Such emissions can lead to atmospheric deposition of sulfuric acids, nitric acids, and ammonium to national forest ecosystems above critical load thresholds. Atmospheric deposition can cause lake body acidification, eutrophication, and hypoxia, soil nutrient changes, and vegetation impacts. Deposition of toxic metals such as mercury and lead can be harmful to both aquatic and terrestrial ecosystems. Visibility in most national forests is obscured some portion of the year by anthropogenic haze of fine pollutant particles. In addition, the Clean Air Act requires FS operations and permitted operations such as prescribed burning, fossil fuels development and production, and mining to comply with National Ambient Air Quality Standards and protection of air quality related values/wilderness air quality values.

The EPA establishes National Ambient Air Quality Standards as directed by the Clean Air Act, and the Montana Department of Environmental Quality manages these standards within the state of Montana. The Montana Department of Environmental Quality, along with select counties, monitor for air pollution and provide reports summarizing air quality data. The National Ambient Air Quality Standards focus on six criteria pollutants including: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter –including both particulate matter 10 and particulate matter 2.5 as defined by the aerodynamic diameter of the particulate in microns.

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

The air quality in and around the HLC NF is generally good and the state of Montana forecasts improving air quality conditions across the state and improving visibility in wilderness areas. However, air quality is compromised during winter months in communities where wood smoke causes health standard exceedances, and during fire season months when wildfires causes exceedances across broad portions of the state. Prescribed fires, agricultural burning, and agriculture dust can adversely impact air quality, although the pollutants do not generally reach unhealthy levels. The Montana Department of Environmental Quality regulates 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 (FW-AQ-DC)

01 Good air quality contributes to visibility, human health, quality of life, economic opportunities, quality recreation, and wilderness values.

Goals (FW-AQ-GO)

01 In order to minimize air quality impacts, FS management activities affecting air quality are done in compliance with regulations enforced by the Montana Department of Environmental Quality. The Forest coordinates prescribed fire operations and wildfires managed for resource benefit purposes through participation in the Montana/Idaho Airshed Group.

Fire and Fuels Management (FIRE)

Introduction

Fire is a natural and essential ecological disturbance process that occurs along a spectrum of differing intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner. Fire is a necessary disturbance process within the HLC NF. It has shaped the structure and composition of forested and nonforested ecosystems. Fire influences the pattern of vegetation across the landscape and is a critical part of the life cycle for many plant and wildlife species. Over the past 150 years, facilities and infrastructure to support economic activities such as recreation, outfitting, mining, timber extraction, farming and ranching have been established on lands surrounding and within the HLC NF. In addition, the development of residences has occurred on private lands on the borders of National Forest, as well as on private inholdings within the Forest. While wildfire plays an essential role in maintaining the health and function of the Forest's plant and animal communities, it can also threaten human safety, health, livelihoods, homes, and property. In some cases, wildfire may also pose an unacceptable threat to specific ecosystem components.

Fire management strives to balance the natural role of fire while minimizing the impacts from fire on values to be protected, especially in the wildland urban interface. 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.

Treatment of vegetation for fuels mitigation is typically designed to change predicted fire intensity and duration and/or mitigate the rate of fire spread. Treatments focus on restoring and maintaining essential ecological disturbance process that occur along a spectrum of differing intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner. Additionally, the emphasis of fuel treatments is to restore and/or maintain fire regimes, reduce negative impacts of wildfires to watershed health, wildlife habitat, and to community values at risk.

Fire management is achieved through prescribed fire, which includes management-ignited fire and naturally ignited wildfire (ignited by lightning as opposed to humans), and mechanical methods. In many cases, natural ignitions - primarily resulting from lightning - can be managed without a full suppression response. Management can range from limiting human activity within the vicinity of the fire, monitoring fire behavior, to aggressive suppression of those areas of the fire at times and places where the fire may affect human values or ecosystem components. Full suppression of a fire is a management choice that should be utilized when fire poses an unacceptable risk to human values, ecosystem components, or when a fire is caused by human agency and is unplanned (e.g. abandoned campfire, arson, or equipment

operation). Full suppression responses will vary depending on the individual fire and can include strategies to confine the fire. It is possible for a fire to be managed using multiple strategies including resource-benefit. All wildfire management decisions will be made with primary consideration given to both the health and safety of the public and of fire personnel. All decisions to manage wildfire will be made and documented through a decision support process and will emphasize public and fire personnel safety. With all wildland fire management actions, it is critical to only implement actions that can be successful while considering actual values at risk with the least exposure necessary.

Please see the glossary for definitions related to fire and fuels management.

Desired Conditions (FW-FIRE-DC)

01 Wildfire maintains and enhances resources and, as nearly as possible, is allowed to function in its natural ecological role across the landscape, including wilderness. Under favorable conditions, wildfires and prescribed fires are managed to ensure highest probability of success, minimum exposure to responders, and to meet resource objectives.

02 Within the wildland-urban interface and around high value resources, surface fuel loading and crown spacing provide conditions for low severity surface fire that minimizes threats to values.

03 Treated fuel management areas (management actions or wildfire) allow opportunities over time for natural fire occurrence and provide fuel conditions that benefit fire management operations.

Goals (FW-FIRE-GO)

01 The HLC NF coordinates with state, county, and local cooperators to meet goals identified in community wildfire protection plans.

02 The HLC NF works with adjacent communities, landowners, permittees and state, local, and other federal agencies to promote a collective understanding about wildfire risk and that wildland fire is an ecological process.

03 The HLC NF works with the state and other partners as needed when designing fuels reduction projects to identify areas and resources of value for fuel treatments.

Objectives (FW-FIRE-OBJ)

01 Hazardous fuels treatments occur on a minimum of 15,000 acres per decade within the wildland urban interface. Use any available wildland fire management opportunity to reduce fire intensity and severity. Treatment includes initial entry and maintenance to ensure desired fuel conditions are achieved. Achieving this would also contribute to FW-VEGT-OBJ-01.

Standards (FW-FIRE-STD)

01 Suppression of wildfires will be at the lowest risk to fire personnel and public, taking into consideration costs and effects to resources and values at risk.

Guidelines (FW-FIRE-GDL)

01 To create (and/or minimize threats to) resilient, healthy ecosystems, vegetation treatment projects should allow opportunities for naturally ignited wildfire to occur and provide fuel conditions that benefit fire management operations.

02 To create (and/or minimize threats to) resilient, healthy ecosystems, wildland fire management strategies should promote desired vegetation conditions where wildfires result in fire severities that are "self-regulating" and reduce future risk.

03 To ensure shared stewardship when wildfires affect identified areas of tribal importance, the FS should communicate and collaborate with tribal leadership during fire incident management to identify and, to the extent practical, protect tribal values and minimize impacts to resources or areas of tribal importance.

04 To maintain the character of designated areas, minimum impact strategies and tactics should be applied if fire management actions are required to manage wildland fire, unless more direct attack is needed to protect life or adjacent property or mitigate risks to responders.

Vegetation

Introduction

The vegetation section is broken into several subsections. The "All Terrestrial Vegetation" section includes concepts and plan components that apply to all types of vegetation found on the HLC NF. Then, there is a section each for; Forested Vegetation; Nonforested Vegetation; and Threatened, Endangered, Proposed, and Candidate Plant Species and Plant Species of Conservation Concern. Pollinators are also included, due to interconnectedness with vegetation. Finally, Invasive Plants are addressed.

All Terrestrial Vegetation (VEGT)

Introduction

This section addresses forestwide plan components for terrestrial vegetation. The HLC NF supports a wide diversity of plant communities growing on sites that include warm, dry foothills; productive mesic slopes; and cold, steep timberline areas. Plant associations found include coniferous forests, grasslands, shrubland/woodlands, riparian and wetland vegetation, hardwood forests, and alpine plant communities. Vegetation characteristics 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, floods, droughts, and human uses and developments. Vegetation conditions are subject to continual change; these changes can be rapid or gradual. Wildfires are a primary ecosystem driver. Please refer to the glossary for a description of the fire regimes found on the HLC NF.

The 2012 Planning Rule adopts a complementary ecosystem and species-specific approach, known as "coarse-filter/fine-filter", to provide the natural diversity of plant and animal communities and ensure long-term persistence of native species in the planning area. Coarse-filter plan components are designed to maintain or restore ecological conditions for ecosystem integrity and diversity within agency authority and the inherent capability of the land. Fine filter plan components provide additional specific habitat needs, when those needs are not met through the coarse filter. Although many influences on vegetation are not easily controlled, the intent of plan components is to collectively provide for the full suite of native biodiversity across the planning area. Plan components that address composition, structure, and function of vegetation communities represent the coarse filter. The fine filter is addressed by components such as those specific to 1) threatened, endangered, proposed, and candidate species which are designated by the United States Fish and Wildlife Service; 2) species of conservation concern, which are identified by the Regional Forester; and 3) specific structural components of interest such as old growth, downed wood, and snags.

Broad potential vegetation types serve as a basis to describe ecological conditions in this plan; these types are defined in appendix D. A consistent hierarchy of broad potential vegetation types developed for the Northern Region is used which is appropriate for broad level analysis and monitoring. These types are aggregations of habitat type that classify ecosystems based on potential productivity, biodiversity, and natural processes. They represent like biophysical environments that produce plant communities of similar composition, structure, and function. The vegetation community that would develop over time, given no major disturbances (the "climax"), would be similar within a potential vegetation type. However, existing vegetation may vary widely, reflecting each site's unique history and point in time along the successional pathway. Attributes such as cover type, size class, and density class change through time whereas potential vegetation types generally remain constant. By necessity, potential vegetation types were mapped at the broad scale to facilitate analysis. However, this map cannot be expected to be accurate at the project or stand level where management decisions will be made. Further, it is expected that potential vegetation maps will continually be developed and improved over time. Projects should use the best available potential vegetation identification and mapping and validate the information at the project and/or treatment unit scale to implement the plan.

Terrestrial vegetation desired conditions are designed to maintain and enhance ecological integrity, diversity, function, and resiliency while contributing to social and economic sustainability as required by the 2012 Planning Rule. Desired conditions are based on an analysis of the natural range of variation for key ecosystem characteristics which provides an understanding of how ecosystems are dynamic and change over time in a manner that is resilient to perturbations and disturbance. As such, the natural range of variation is a guide to understanding how to maintain or restore a resilient ecosystem with structural and functional properties that will enable it to persist into the future. Although the natural range of variation is the underpinning, desired conditions also represent an integration of additional factors such as wildlife habitat needs, existing or anticipated human use patterns, potential future climate conditions, resiliency to future disturbances, and ecosystem services that may be desired (such as reduction of fire hazard or production of forest products).

The percentages shown in desired conditions represent the desired percentage of that attribute across the entire scale of interest. Forested attributes (such as tree species distribution, size class, density class, old growth, and snags) should be applied on forested potential vegetation types. Nonforested desired conditions should be promoted on nonforested potential vegetation types, and on the hottest driest forested types that were historically maintained in a nonforested or savanna condition by disturbance. Project-level determination of potential vegetation type would inform where to apply desired conditions. For example, if a desired condition calls for an increase in the seedling/sapling size class, this condition could be promoted on forested lands through stand replacing fire or harvest; it would not be appropriate to promote the expansion of conifer seedlings into grassland or shrublands. The use of proportions of the landscape to describe desired conditions, rather than an acreage value, allows for the possibility that the mapping of potential vegetation could be improved through time, and/or that a changing climate could cause changes in moisture regimes such that potential vegetation types shift in location and abundance.

Desired conditions for vegetation should be interpreted in the short-term (for example, the "life of the plan," which is 15 years) and the long-term because ecological, social, and economic sustainability require a long-term perspective. To provide context for the desired trend during the initial phases of plan implementation, an "existing condition" value is included in some desired conditions. This reflects conditions that exist at the writing of this plan. The "existing condition" will change through time as reported by monitoring.

Some desired conditions use numeric ranges which are to be applied at the forestwide scale (as shown in this chapter), or at the GA scale (chapter 3). The goal is to provide a suite of components that represent

the broad-scale planning unit, while also capturing the unique condition of each GA. Project-level activities are not required to apply the same numeric ranges at smaller analysis scales. Rather, projects and activities must either contribute towards or not preclude the achievement of the desired conditions at the larger scales. Standards and guidelines are designed to ensure that activities are conducted in a manner that move the Forest towards desired conditions. Appendix C provides descriptions of potential management approaches and actions that are expected to be used in the planning area, as well as further information to explain plan components. Desired conditions may be achieved through both natural processes and management activities. Vegetation conditions anywhere within the specified range at the scale specified would meet the desired condition. Fluctuations in vegetation conditions over time are expected. Managing a particular vegetation characteristic at the upper, lower, or mid-point of the desired range may be appropriate, as influenced by other ecological, social, or economic objectives. Monitoring assists in evaluation of vegetation change over time and supports an adaptive management approach to forest management (36 CFR 219.12). See appendix B for the monitoring plan.

Desired Conditions (FW-VEGT-DC)

01 Vegetation occurs across the landscape in a diverse pattern of compositions and structures within the natural range of variation that are resilient to future climates and disturbances such as fire, insects, disease, invasive species, floods, and droughts. Conditions are such that effective recovery of vegetation is possible following disturbances. These conditions are described in Table 4 and further quantified under desired conditions in the VEGF and VEGNF sections.

Table 4. Forestwide terrestrial vegetation desired conditions by broad potential vegetation types

Broad potential vegetation type	Terrestrial vegetation desired conditions
Warm dry	Forest resilience is achieved by emphasizing fire adapted species and structures. An increase in the extent and dominance of ponderosa pine, limber pine, and aspen occurs relative to the existing condition, while Douglas-fir decreases (but remains common). Rocky mountain juniper occurs but its abundance is limited on historically nonforested areas. Other species such as Engelmann spruce and lodgepole pine may thrive where moisture is less limiting. The quantity and extent of large and very large trees increases relative to the existing condition. Savannas occur on the driest sites, and some sites may be maintained in a nonforested condition by frequent disturbance or restoration. Seedling/sapling and small forest size classes occur but are limited, because large tree remnants are retained as is characteristic of a high frequency, low intensity disturbance regime. Stands in the large and very large tree size classes are often open or clumpy, with the large tree component comprised of long-lived fire-resistant species (ponderosa pine and Douglas-fir). Complex landscape patterns of size class and density occur, with open, uneven-aged forests and high within-stand variability common. Forests with low to medium density increase relative to the existing condition, while forests with high density decrease. Stands with higher densities occur on more mesic sites and are interspersed with open forests and meadows. Early successional forest patches are relatively small. Plant understories include rough fescue, Idaho fescue, bluebunch wheatgrass, sagebrush, common juniper, and bitterbrush on the driest sites and Oregon grape, snowberry, pinegrass, kinnickinnick, white spiraea, heartleaf arnica, elk sedge, and ninebark on more mesic sites. Snags are scattered as individuals or small groups. Coarse woody debris is fairly low.

Broad potential vegetation type	Terrestrial vegetation desired conditions
Cool moist	Forest resilience is achieved through diversity of species and age/size class. The extent and dominance of aspen, Engelmann spruce, and whitebark pine increase relative to the existing condition, with lodgepole pine and Douglas-fir remaining abundant and subalpine fir also common. Minor amounts of ponderosa pine may also occur, on the warmest/driest sites. The spruce/fir cover type includes dense, multistoried stands that provide high quality multistory lynx habitat. Small size classes are common due to preponderance of lodgepole pine; but a decrease in the small size class with increases in large and very large classes still occurs relative to the existing condition. There is wide variability in size class because of the high severity, low frequency disturbance regime. Most especially, high diversity in size class occurs in lodgepole pine to ensure insect and fire disturbances occur at a scope and scale within their natural range of variation. The amount of low/medium and medium/high density classes increase while the high-density class decreases relative to the existing condition primarily in lodgepole pine and Douglas-fir forests. Large and very large trees, primarily Douglas-fir, are clumpy but scattered across the landscape to provide seed. Single-storied and single-aged conditions are common in lodgepole pine. Early successional forest patches tend to be fairly large. Understory plant species present may include twinflower, beargrass, huckleberry, grouse whortleberry, pinegrass, heartleaf arnica, elk sedge, and western meadowrue. Other species such as menziesia and alder may be found on the wettest sites. Snags occur in pulses and in clumpy distribution. Coarse woody debris levels vary widely.
Cold	Forest resilience is achieved by emphasizing the presence of whitebark pine where possible. Increases in whitebark pine occur relative to the existing condition, focusing on open ridges and harsher aspects. On these sites, there is a decrease in subalpine fir and Engelmann spruce relative to the existing condition. Subalpine fir and Engelmann spruce remain common and dominate northerly and easterly aspects, swales, moist basins, and riparian areas. Lodgepole pine is present as well, on warmer sites. The abundance of the small forest size class is decreased relative to the existing condition, with an increase in the large size class. Whitebark pine is maintained across its natural range to the degree possible within the context of climate changes and increasing disturbance, with large trees present that are tolerant of moderate or low severity fires. Large subalpine fir and Engelmann spruce are also promoted on productive sites. The proportion of forests in the low/medium density class is increased with decreases in the high cover class relative to the existing condition, focusing on restoration of resilient, open multi-aged whitebark pine forests where dense multistoried spruce/fir or single-storied lodgepole pine dominate. Natural patch sizes reflect a mixed fire regime. Understory plant species present, such as grouse whortleberry and beargrass, may be sparse at the highest elevations where alpine vegetation is interspersed with bare ground and rock. Snags occur in pulses. Coarse woody debris levels vary widely.
Xeric grassland	Xeric grassland plant communities are dominated by native species, and have high diversity of tall and medium height, cool and warm season grasses (for example, bluebunch wheatgrass, western needlegrass, needle-and-thread, blue grama), and short grasses (for example, Sandberg bluegrass, pine junegrass). Sub-shrubs and shrubs are present at less than 10% canopy cover. There is a variety of native forbs in varying amounts. The diversity of native plant species present allows for drought tolerance. Individual species can vary greatly in the amount of production depending on growing conditions. Vegetation typically has 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 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. Encroachment by conifers and juniper is limited, since these grasslands are either maintained by a natural high frequency low severity fire regime, or are maintained by site conditions (i.e., they do not require fire to maintain the grassland vegetation). These vegetation types are generally tolerant of fire when fire frequency is in the range of 5 -15 years, although recovery is dependent on fire intensity and species. Maintenance of grasslands is dependent, in part, on periodic fires to remove residual litter and encroaching shrubs and trees, which may increase the burn intensity and possibly damage the dominant grassland species. Microphytic crust is maintained as a key feature.

Broad potential vegetation type	Terrestrial vegetation desired conditions
Mesic grassland	Mesic grassland communities are dominated by native species, and have greater amounts of mesic forbs, denser cover, and more species richness than xeric grasslands. The functional plant groups are characterized by long lived, moderately deep-rooted cool grass species (for example, rough fescue, Idaho fescue, timber oatgrass, upland sedges, tufted hairgrass, etc.) with a wide variety of mesic forbs present in varying amounts. Shrubs may be present with minor cover. Introduced species are rare. Bare ground is typically low (less than 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. These vegetation types are generally tolerant of moderate intensity wildfire. Common dominant grasses, such as rough fescue and Idaho fescue, may be topkilled, but the root crowns and associated growing points are protected and they respond favorably with vigorous regrowth. Within just a few years these species usually recover to pre-fire levels. Frequent burning maintains diversity in these vegetation types. Microphytic crust is maintained as a key feature.
Xeric shrubland /woodland	Xeric shrubland plant communities support shrub species such as Wyoming big sagebrush, basin big sagebrush, rabbitbrush, horsebrush, broom snakeweed, low sagebrush and black sagebrush. Overstory species vary by location and site type. For example, low sagebrush tends to occupy the lower, drier and hotter sites with shallow soils whereas basin big sagebrush typically dominates sites with deeper soils and more plant available moisture. The understory is typically dominated by graminoid species such as needle-and-thread, Sandberg bluegrass and bluebunch wheatgrass. Canopy cover varies depending on the site and growing conditions but is typically low to moderate. Bare ground is present in higher amounts relative to mesic shrubland sites. Xeric woodlands are typically hot and dry or are steep, with shallow, skeletal soil. The dominant overstory species varies but includes Rocky Mountain juniper and mountain mahogany. Mountain mahogany is restricted to steep rocky soils and rock outcrops. Encroachment by conifers is limited, as it is maintained by a natural high frequency low severity fire regime. While sagebrush and mountain mahogany are often killed by fire, nonlethal or mixed severity fires that burn in a mosaic pattern leave live individuals and promote age class diversity while promoting the sprouting of other shrub (e.g. rabbitbrush, horsebrush) and grass species. The natural fire regime of this vegetation type maintains a patchy distribution of shrubs, so the general aspect of the vegetation is shrub-steppe grassland. Periodic low intensity burns can reduce sagebrush cover and increase herbaceous abundance of herbaceous species, creating a mosaic of burned and unburned patches. Microphytic crust is maintained.
Mesic shrubland	Mesic shrubland plant communities are generally more moist and productive than xeric sites. Shrub species such as mountain big sagebrush and mesic deciduous shrubs (for example, bitterbrush, snowberry, ninebark, serviceberry) are the dominant over story species with grass species (such as rough fescue, Idaho fescue, mountain brome) and various mesic forbs (for example, cinquefoil, prairie smoke) typically dominating the understory. Canopy cover varies depending on the site and growing conditions (for example, temperature, timing and amount of precipitation), but is typically moderate to high, and may result in lower cover of understory species. Encroachment by conifers is limited. Most shrub species respond well to light and mixed severity fire. With the exception of mountain big sagebrush, most of the mesic shrub species are vigorous root crown sprouters and respond favorably to fire, typically sprouting immediately following fire. However, extremely hot and intense fires that occur during summer months can cause damage to these shrublands and seed banks. Periodic burns can maintain this system. Microphytic crust is maintained as a key feature.
Riparian/ wetland	Riparian systems are comprised of a mosaic of communities dominated by species which tolerate and are adapted to periodic flooding and an associated seasonally high water table. Deciduous trees, particularly cottonwood, may be present along with riparian shrubs and herbaceous species. In wide valley bottoms, the vegetation typically is a mosaic of all lifeforms with patterns reflecting the meander patterns of the stream/river. Black cottonwood is the dominant tree species although other tree species may include aspen, narrowleaf cottonwood, Engelmann spruce and subalpine fir; on drier sites, Douglas fir and Rocky Mountain juniper may be present with low cover and scattered distribution. Dominant shrubs may include mountain alder, various species of willows, river birch, dogwood, hawthorn, chokecherry, rose, silver buffaloberry, Rocky Mountain maple and/or snowberry, among others. A wide variety of herbaceous species, including, grasses, sedges, rushes, spikerushes, bulrushes and forbs, are present in the understory in varying amounts. Wetlands are characterized by dominant vegetation adapted to saturated (anaerobic) soil

Broad potential vegetation type	Terrestrial vegetation desired conditions
	conditions. The vegetation complex is usually represented by a mosaic of herbaceous and woody plant communities that armor streambanks and create floodplain roughness, slowing flows and facilitating bank and floodplain development. Low willow species (e.g., wolf willow), bog birch and bog blueberry are typically present in subalpine wetlands. Herbaceous species may be dominated by sedges, rushes, spikerushes cattails, and/or bulrushes. Bryophytes, including sphagnum, are often well represented in fens. Also see forestwide components for RMZs. Rare species, such as sundew, may also be present in peatlands. Typically, with the exception of conifers, species in riparian/wetland systems respond favorably to fire. The growing points of the vegetation are usually protected in the moist to saturated soil. Regrowth typically occurs within the same growing season. Microphytic crust is maintained.
Alpine	Alpine ecosystems occupy harsh high elevation sites, resulting in short stature and relatively slow growth for both shrubs and herbaceous species. Wetland communities are present in snowloaded depressions, and support various willow species (e.g., planeleaf willow), along with wetland herbaceous species (e.g., tufted hairgrass, marsh marigold). Alpine ecosystems are mostly treeless, although some conifers (e.g., subalpine fir, whitebark pine) may be present with minor cover as krummholtz patches. Vegetation cover is typically low to moderate, depending on site characteristics. The plant communities are dominated by a number of shrubs, forbs and graminoids including: arctic willow (turf community), mountain avens, (cushion plant community), mountain heather and moss-heather (snow bed communities). Many of these areas experience only patchy fire due to the low amounts and patchiness of fuels. The fire return interval is typically very long (500 years or greater) in alpine ecosystems. Historically, stand-replacing fires occur infrequently in adjacent associated subalpine woodlands. Fire severity and spread is usually variable due to the short duration without snow cover. In addition, limited fuel loading and rock scree fields preclude fires from spreading if lightning strikes do occur. Microphytic crust is maintained as a key feature.

02 The planning area supports a distribution of cover types shown in Table 5. Nonforested cover types can occur on forested broad potential vegetation types and be perpetuated by natural disturbances or restoration activities.

Table 5. Forestwide existing and desired conditions for cover types (percent of area)

Cover type[1]	Forestwide		Warm dry, Region 1 broad potential vegetation type		Cool moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[3]	Desired	Existing[3]	Desired	Existing[3]	Desired	Existing[3]	Desired
Nonforested[2]	14 (11-16)	15-25	13 (10-17)	5-20	10 (6-14)	5-10	11 (7-16)	1-10
Aspen/hardwood	1 (0.4-2)	2-5	1 (0.3-2)	2-5	2 (0.2-3)	2-5	Trace	Trace
Ponderosa pine	8 (6-10)	15-25	16 (12-20)	40-60	2 (0.6-4)	1-5	Trace	Trace
Douglas-fir	29 (25-35)	15-25	52 (42-61)	30-40	23 (17-28)	5-15	5 (2-8)	2-5
Lodgepole pine	27 (24-30)	15-25	16 (12-21)	2-7	35 (29-42)	25-35	37 (29-44)	40-50
Spruce/Fir	12 (10-15)	10-20	Trace	Trace	19 (14-24)	35-45	27 (21-34)	40-45
Whitebark pine	4 (2-5)	2-5	Trace	Trace	2 (0.6-4)	2-5	12 (7-16)	10-20

[1] Cover types are broad groups of vegetation based on the dominant species. A cover type often contains multiple species (see appendix D for a more detailed description).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

03 Vegetation conditions provide habitat requirements to support populations of species of conservation concern, threatened or endangered species, and other native and desired non-native species based upon the inherent capability of lands.

04 Vegetation patterns provide connectivity and allow for potential genetic interchange to occur to support ecosystem functions, including potential species range shifts that may occur in response to climate change.

05 Vegetation conditions in permitted special use areas, developed or designated recreation areas, administrative sites, infrastructure, utility corridors, mine repositories and reclamation sites, and specific designated or special areas meet the unique desired conditions for those sites. Refer to plan components found in those sections.

06 Bryophytes, algae, lichen, and fungi are present in their natural extent and abundance.

Objectives (FW-VEGT-OBJ)

01 Vegetation management occurs on at least 130,000 acres per decade to maintain, restore, or move vegetation towards desired conditions. Control of invasive species and livestock grazing also may contribute to the achievement of desired conditions; however, these activities are addressed in the Invasive Plants and Livestock Grazing sections. Also see FW-FIRE-OBJ-01. Treatments to achieve this objective may occur on forested or nonforested vegetation communities and include, but are not limited to, the following activities:

- Planned or unplanned fire ignitions
- Fuel reduction treatments such as thinning, piling, chipping, and mastication
- Removal of encroaching trees in nonforested ecosystems
- Timber harvest
- Tree planting and revegetation of native plants
- Noncommercial thinning of forests

Guidelines (FW-VEGT-GDL)

01 Removal of native vegetation during nonvegetation management activities (for example, road maintenance) should be limited to the extent needed to achieve the project purpose and need.

02 Livestock grazing practices should be modified as necessary to ensure that revegetation and/or reforestation is successful after management activities or natural disturbances, as defined in site-specific prescriptions.

03 To maintain the diversity of native tree species, when artificial reforestation is prescribed locally, adapted tree stock should be used unless nonlocal stock is deemed appropriate based on an assisted migration strategy.

04 To ensure the re-establishment of desirable vegetation and limit the spread of invasive plants following management activities which disturb or expose soil, reseeding with native plants should occur promptly. Seeding should occur during optimal seeding windows for germination and survival and should utilize blue-tag certified seed and weed-free native seed. Seed mixes should be approved by a botanist. Genetically appropriate native plant materials should be given primary consideration during revegetation. Techniques which promote establishment of native species should be incorporated into revegetation planning. Nonnative plant species may only be used when consistent with national policy and direction.

Forested Vegetation (VEGF)

Introduction

This section deals exclusively with lands that have the potential of being forested, not areas such as grasslands, shrublands or alpine environments. By definition, these lands are found on one of the three forested Region 1 Broad Potential Vegetation Types found on the HLC NF: cold, cool moist, and warm dry. Forested desired conditions vary by broad potential vegetation types due to important differences in climatic conditions, productivity, biodiversity and disturbance regimes. Refer to appendix D for more detailed descriptions of the vegetation attributes in this section, which include the following:

- Composition is described by the distribution of individual tree species.
- Structure is represented by size and density classes. Size classes are based on average tree size. Density classes are defined by average canopy cover.
- Large-tree structure.
- Old growth.
- Snags.
- Coarse woody debris.
- Landscape patch and pattern.
- Expected function of forest insects.

Desired Conditions (FW-VEGF-DC)

01 The planning area supports a distribution of individual tree species as described in Table 6. This distribution supports the natural species diversity across the landscape and allows for recruitment following disturbances.

Table 6. Forestwide existing and desired conditions for tree species presence (percent of area[1])

Tree species	Forestwide[3]		Warm dry, Region 1 broad potential vegetation type		Cool moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired
Limber pine	11 (9-13)	10-15	16 (12-20)	15-25	9 (6-13)	5-15	5 (2-9)	5-15
Rocky Mountain juniper	5 (4-7)	2-5	12 (9-15)	5-15	1 (1-2)	0-5	0.2 (0.2-1)	0-5
Ponderosa pine	7 (5-9)	15-25	17 (13-21)	55-65	0.4 (0.4-1)	1-10	Trace	Trace

Tree species	Forestwide[3]		Warm dry, Region 1 broad potential vegetation type		Cool moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired
Douglas-fir	46 (43-50)	35-45	70 (65-75)	65-75	43 (37-49)	25-35	15 (9-20)	10-20
Aspen and cottonwood	2 (1-3)	2-5	2 (1-4)	5-10	3 (1-5)	2-10	Trace	Trace
Engelmann spruce	23 (20-26)	15-25	5 (3-7)	1-5	42 (36-49)	30-40	32 (25-39)	30-40
Lodgepole pine	38 (35-42)	20-30	24 (19-29)	5-15	52 (46-58)	30-40	51 (43-59)	45-55
Subalpine fir	27 (24-31)	15-25	Trace	Trace	46 (39-52)	45-55	54 (47-61)	40-50
Whitebark pine	11 (9-14)	10-20	Trace	Trace	10 (6-14)	5-15	31 (24-38)	35-45

[1] Percent of area where at least one tree of the species is present.
[2] Total may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Forestwide distributions include trees that occur on nonforested potential vegetation type.

02 The planning area supports a natural diversity of forest size classes as shown in Table 7, which represents the diversity of successional stages across the landscape. The location and precise abundance of size classes fluctuate over time as forests develop, are influenced by disturbances, and may be limited by site productivity and species composition.

Table 7. Forestwide existing and desired conditions of size class (percent of area[2])

Forest size class[1]	Forestwide		Warm dry, Region 1 broad potential vegetation type		Cool Moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[3]	Desired	Existing[3]	Desired	Existing[3]	Desired	Existing[3]	Desired
Seedling/sapling (0-4.9”)	13 (10-17)	1-15	11 (7-15)	1-10	12 (7-18)	1-20	22 (14-30)	1-35
Small (5-9.9”)	39 (36-42)	5-20	36 (31-41)	1-10	42 (36-48)	5-30	44 (37-51)	5-40
Medium (10-14.9”)	21 (19-24)	5-20	25 (21-29)	1-10	24 (20-29)	5-35	14 (9-18)	5-45
Large (15.0-19.9”)	5 (4-7)	20-30	9 (6-12)	20-40	4 (2-7)	20-30	1 (0.1-3)	25-40
Very large (20”+)	2 (0.8-3)	5-25	4 (2-6)	15-40	0.2 (0.2-0.7)	10-25	0.2 (0.2-1)	1-5

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 The planning area supports a natural diversity of forest density classes as shown in Table 8. A wide range of densities and associated vertical structures (canopy layers) occur, contributing to resiliency, wildlife habitat, and timber productivity.

Table 8. Forestwide existing and desired conditions of density class (percent of area)

Forest density class[1]	Forestwide		Warm dry, Region 1 broad potential vegetation ype		Cool Moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired
Low/med (< 39.9)	26	25-50	26	25-55	22	20-40	14	20-50
Med/high (40-59.9)	27	30-50	29	20-45	20	30-50	21	45-65
High (60+)	48	10-35	45	10-50	58	15-40	65	5-25

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

04 Forest conditions support an increasing trend in the distribution of large-tree structure as shown in Table 9 to provide ecosystem functions such as structural diversity, seed sources for post-disturbance resilience, and wildlife habitat.

Table 9. Forestwide existing and desired conditions of large-tree structure (percent of area)

Large tree structure[1]	Forestwide		Warm dry, Region 1 broad potential vegetation type		Cool moist, Region 1 broad potential vegetation type		Cold, Region 1 broad potential vegetation type	
	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired	Existing[2]	Desired
Large (>15" d.b.h.)	14 (12-16)	35-50	16 (13-19)	35-65	16 (12-20)	35-45	9 (6-13)	40-70
Very large (>20" + d.b.h.)	7 (6-9)	10-35	13 (9-16)	20-60	5 (3-7)	15-35	2 (0.5-3)	2-10

[1]Large-tree structure depicts where minimum numbers of large trees are found and can occur in any size class. The minimum tree criteria for large tree structure are described in the glossary and appendix D.
[2] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

05 Forest conditions support an abundance and distribution of old growth that is dynamic over time. All vegetation desired conditions help ensure that an appropriate array of conditions is present to provide old growth. The amount of old growth is similar to or greater than that of the 2018 existing condition. The desired condition of old growth is further described in Table 10.

Table 10. Forestwide existing and desired conditions of old growth[1]

Region 1 broad potential vegetation types[2]	Existing condition[3]	Desired condition
Forestwide	11% (9-13)	Old growth is distributed widely across the forest and in every GA, and levels vary depending on available compositions and structures, disturbance levels, and management objectives. Old growth may be subject to wider pulses of availability than in the past due to the likelihood of increased extent and/or severity of wildfire disturbances. Old growth distribution that complements habitat connectivity is desired. Old growth contains components that contribute to high quality habitat, including large and/or very large live trees with rot or broken tops, snags, downed woody material, and a diversity of tree size classes and canopy layers. A variety of old growth types are present, representing the natural species diversity of the HLC NF.
Warm dry	8% (6-11)	Old growth is dominated by ponderosa pine, Douglas-fir, and/or limber pine, often in large patches with an uneven-aged and irregular tree distribution. Ponderosa pine-dominated old growth is particularly desirable, because it is currently rare. Stands are resilient to low severity disturbance. Other old growth types such as spruce/fir occur in riparian areas. Species such as juniper and aspen are valuable habitat components.

Region 1 broad potential vegetation types[2]	Existing condition[3]	Desired condition
Cool moist	14% (10-19)	Old growth is subject to wider pulses of availability relative to the other potential vegetation types, due to the higher severity disturbance regimes in this type. Old growth includes spruce/fir or Douglas-fir dominated stands, often with dense canopy layers, as well as lodgepole pine. Landscape-level resiliency is provided by a mosaic of younger forests that grow to replace old growth when it is killed by stand-replacing events.
Cold	15% (11-20)	Old growth generally consists of whitebark pine, Engelmann spruce, and/or subalpine fir. Stand-level resiliency and open structures is desired in whitebark pine types versus spruce/fir types which may be denser and more layered.

[1] See glossary and appendix D for definitions of old growth.
[2] Region 1 broad forested potential vegetation type. Also see appendix D.
[3] Existing condition (2018) is the mean percent of old growth with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

06 Forest conditions support natural quantities and distributions of snags. Snags are unevenly distributed and dynamic over time, with a range of decay classes represented. The highest densities of snags occur in burned areas and in areas infested by insects; the lowest densities occur along roads, in areas where the concern for human safety is elevated, and in stands where active management is occurring. Individual stands may have no snags, or many, depending upon site-specific conditions. Table 11 displays the desired minimum number of snags per acre by size class and snag analysis group.

Table 11. Forestwide existing condition and desired minimum snags per acre

Snag analysis group[1]	Medium (>10" d.b.h[4])		Large (>15" d.b.h.[4])		Very large (>20" d.b.h.[4])	
	Existing condition[2]	Desired minimum[3]	Existing condition[2]	Desired minimum[3]	Existing condition[2]	Desired minimum[3]
Lodgepole pine	12 (9-15)	12.9	1 (1-2)	2.0	0.1 (0-0.3)	0.2
Warm dry	7 (5-9)	4.3	2 (1-3)	1.1	1 (0.4-1)	0.2
Cool moist	15 (11-19)	12.3	3 (2-5)	2.4	1 (0.3-2)	0.4
Cold	17 (12-24)	13.4	4 (2-6)	2.3	1 (0.2-2)	0.9

[1] Snag analysis groups are from Bollenbacher (2008). See appendix D.
[2] Existing condition is the mean snags per acre, with the 90% confidence intervals shown in parenthesis. Source is R1 Summary Database, FIA data, Hybrid 2011.
[3] Desired is derived from Bollenbacher (2008) supplemental data tables (2017), where the natural range is represented by the mean of snags found in wilderness and roadless areas on the HLC NF measured on periodic forest inventory and analysis plots.
[4] Diameter at breast height (4.5' above the ground). The classes are not mutually exclusive; e.g. the numbers for the 10"+ medium class include the large/very large classes and the 15"+ large class includes the very large class.

Table 12 displays the desired minimum distribution of snags, in terms of the percent area of the snag analysis group that contains at least 1 snag of the indicated size class.

Table 12. Forestwide existing condition and desired minimum snag distribution (percent of area)

Snag analysis group[1]	Medium (>10" d.b.h[4])		Large (>15" d.b.h.[4])		Very large (>20" d.b.h.[4])	
	Existing condition[2]	Desired condition[3]	Existing condition[2]	Desired condition[3]	Existing condition[2]	Desired condition[3]
Lodgepole pine	22 (18-27)	15	4 (2-7)	5	0 (0.4-1)	2
Warm dry	17 (13-21)	8	7 (5-10)	4	4 (2-5)	2
Cool moist	31 (24-38)	20	9 (5-14)	10	3 (1-5)	3
Cold	30 (22-38)	20	11 (6-17)	10	3 (1-7)	5

[1, 2, 3, 4] Refer to the foot notes for Table 11.

07 Coarse woody debris (downed wood greater than or equal to 3 inches diameter) is present across forested vegetation communities in quantities consistent with the natural range of variation as shown in Table 13 to provide wildlife habitat, long-term nutrient cycling, and other ecosystem functions.

Table 13. Forestwide desired and existing tons/acre of coarse woody debris

Region 1 broad potential vegetation type	Existing[1]	Average desired[2]	Appropriate distribution
Warm dry	3.38 (2.66-4.19)	3-20	Coarse woody debris is variable in amount, size, species and stages of decay across space and time, emphasizing pieces 10" in diameter and 10' in length or greater, which are higher value for wildlife. Individual stands may have little or no coarse woody debris, or a higher amount. Very minimal or no coarse woody debris occurs in nonforested potential vegetation types. It may be appropriate for 30 to 50 percent of a forested potential vegetation type area to have little to no coarse woody debris at a given time. Amounts below the desired average are found on hot dry sites, in developed recreation areas, and where the concern for fire impacts to values at risk is elevated. Higher amounts may be found on moist sites and riparian areas, areas with low direct human influence, areas that have burned, and those with insect/disease infestations. Pulses of coarse woody debris occur following disturbances. Downed wood in pine-dominated forests may be expected to increase during the first decade of the Plan due to a mountain pine beetle outbreak.
Cool moist	7.22 (5.81-8.76)	10-30	
Cold	7.04 (5.33-8.91)	10-30	

[1] Existing condition shown is the mean tons per acre with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[2] Desired tons/acre is derived from Brown et al 2003 and the tons/acre found in wilderness and roadless areas on the HLC NF, R1 Summary Database, FIA data.

08 Forest patches of different compositional and structural conditions form a landscape pattern that contributes to resilience and habitat connectivity. Early successional forest patches provide edge habitat and functional openings that contrast sharply with adjacent forests. Patches of different size classes vary in extent, and are generally bounded by ridges, streams, and other topographic or biophysical features. Landscape and within-patch patterns reflect natural fire regimes to the extent possible given changing climate conditions.

- In the warm dry broad potential vegetation type, forest patches are indicative of low severity underburns as well as mixed severity and occasional stand replacing events. Early successional forest patches tend to be smaller than the other potential vegetation types, due to the more frequent disturbance regimes which tend to cause a complex mosaic of within-stand structures and small gap openings with mature tree remnants as opposed to patches dominated by seedlings.
- In the cool moist and cold potential vegetation types, patches reflect more mixed severity and stand replacing disturbance regimes. Early successional forest patches in these potential vegetation types tend to be larger than in the warm dry potential vegetation type, due to high severity disturbances.

09 Forest composition, structure, and pattern allow for native forest insect and diseases to occur across their native extent and affect vegetation at a scope and scale consistent with their natural endemic role. Forests impacted by insects and disease provide structural features including snags, downed wood, and decaying live trees.

10 Native forest insect and/or disease activity and associated tree mortality are at the lower end of the natural range of variation in areas where fire hazard or human safety is of concern.

11 Understory vegetation (grasses, forbs, shrubs, lichens, bryophytes, fungi) beneath the forest canopy occurs in distribution and densities consistent with the natural disturbance regime. This vegetation is resilient in response to disturbance such as fire and resistant to nonnative plant invasion.

Guidelines (FW-VEGF-GDL)

01 Vegetation management projects should be designed to retain at least the minimum number of large live trees listed below to provide future seed, structural diversity, wildlife habitat, future snags and downed wood. This guideline applies as an average across all treatment units in a project. Large live trees need not be present on every acre or in every treatment unit.

- Lodgepole pine snag analysis group: 1 tree >15" dbh per 10 acres
- Warm dry snag analysis group: 2 trees >15" dbh per 10 acres
- Cool moist snag analysis group: 9 trees >15" dbh per 10 acres
- Cold snag analysis group: 3 trees >15 per 10 acres

If the minimum number of large trees are not present, leave all that are available. Trees preferred for retention are the longest lived, healthiest, windfirm, most fire adapted species. Exceptions may occur when there are fewer than the minimum desirable trees available due to insects, disease, lack of wind firmness, or unavoidable operational limitations. Large trees may also function as replacement snags, and/or be mixed in clumps with snags, to meet FW-VEGF-GDL-02. Exceptions may occur where there are issues of human safety, especially in designated campgrounds and developed recreation sites, permitted ski areas, and utility lines. See FW-RSUP-DC-05, LB-SHOWSKI-DC-02, and RM-TETONSKI-DC-02.

02 When conducting timber harvest or other activities that involve mechanically cutting trees over 10" diameter, projects should retain the following minimum snags per acre[1] ≥ 10" diameter averaged across the snag analysis groups[2] in the project area to provide snag habitat at the project level.

- Across the warm dry snag analysis group, retain an average of at least 2 snags/acre[3].
- Across all other snag analysis groups, retain an average of at least 8 snags/acre[3].

Snags retained on the landscape should include a variety of size classes and species available. Preference should be given to the largest snags available, with snags >20" diameter being highest priority. Snag species preference from highest to lowest is ponderosa pine, western larch, whitebark pine, limber pine, Douglas-fir, hardwoods (aspen or cottonwood), Engelmann spruce, subalpine fir, lodgepole pine. Snags should be 300' or farther from a road that is open to firewood cutters when possible. Snags should be distributed in a clumpy manner; they need not be present on every acre. If fewer than the minimum required snags are present outside of treatment units, or the number of snags outside of treatment units is unknown, retain snags if available where it is safe and operationally feasible to do so within treatment units to achieve the project area averages; or to achieve the average across treatment units, whichever is less. Snags that are created by activities such as prescribed burning may be counted toward the desired averages. If fewer than the minimum snags are present across the project area and in treatment units, retain those that are available as well as live snag replacements to achieve the desired numbers, averaged across treatment units. When selecting snag replacement trees, retain the largest and most decadent trees; those with rot or wildlife use are preferred. Replacement snags may be used to meet FW-VEGF-GDL-01. In the event that snags intended for retention are cut or toppled by fire, they should be left onsite as woody debris.

Snag retention does not apply where there are issues of human safety in designated campgrounds and developed recreation sites, permitted ski areas, utility lines, prescribed burn control lines, and

immediately adjacent to open roadways or private infrastructures. See FW-RSUP-DC-05, LB-SHOWSKI-DC-02, and RM-TETONSKI-DC-02.

[1] Snags per acre is the average of snags per acre across the entire snag analysis group within the project area.
[2] See appendix D.
[3] The minimum numbers to leave are based on the lower bound of the 90% confidence interval of the mean desired snags per acre displayed in FW-VEGF-DC-06.

03 Vegetation management activities in tree improvement areas (such as seed orchards, test plantations, and seed production areas) should be conducted according to regional office assignments, and so as not to impair tree improvement activities.

04 To promote the retention of old growth (see glossary) and contribute to biodiversity, vegetation management activities in old growth stands should only occur for one or both of the following purposes. Management activities conducted for these purposes should retain all minimum quantitative old growth characteristics as well as qualitative attributes to the extent possible.

- Maintain or restore old growth habitat characteristics and ecosystem processes.
- Increase resistance and resilience to disturbances or stressors that may have negative impacts on old growth characteristics or abundance (such as drought, wildfire, and bark beetles).

Exceptions to this guideline are allowed for the following purposes:

- Where needed to mitigate imminent hazards to: (1) public safety in campgrounds, other designated recreation sites, administrative sites, and permitted special use areas; or (2) infrastructure that is essential to community welfare (e.g., utilities, communications, and where fire modeling shows a risk to evacuation routes).
- Where project analysis has identified a need to remove a proportion of lodgepole pine old growth to achieve a diversity of age classes.

05 Vegetation management projects should retain at least the minimum amount of coarse woody debris (greater than or equal to 3” in diameter) displayed below, averaged for each treatment unit on forested sites, to provide for well-distributed coarse woody debris that contributes to nutrient cycling, structural diversity, and habitat. The requirement should be met immediately following completion of all project activities. Also see FW-SOIL-GDL-05.

- Warm dry R1 broad potential vegetation type: 5 tons/acre
- Cool moist and cold R1 broad potential vegetation types: 10 tons/acre

The guideline applies to any vegetation treatment in forested communities, including timber harvest and prescribed fire. This guideline does not apply in nonforested vegetation communities or in open forest savannas that may occur in the warm dry potential vegetation type. The guideline applies as an average across each vegetation treatment unit; the downed wood may be irregularly distributed. Downed wood should consist of intact pieces of a variety of species, sizes and stages of decay, depending on site conditions. Prescriptions should emphasize retaining larger debris (pieces 10” diameter and 10’ in length or greater) where possible, which are higher value to wildlife.

Exceptions to the guideline may occur where there is elevated concern with fire risk (recreation sites, areas adjacent to infrastructure or private ownerships, wildland urban interface areas, utility lines, etc.), as supported by site-specific analysis.

Nonforested Vegetation (VEGNF)

Introduction

This section deals primarily with lands found on one of the six nonforested Region 1 broad potential vegetation types on the HLC NF: xeric grassland, mesic grassland, xeric shrubland /woodland, mesic shrubland, riparian/wetland, and alpine. There are also areas on the landscape categorized as "sparse", where vegetation is limited, such as rocky scree slopes. In addition, dry sites in forested broad potential vegetation type that would naturally be maintained in a nonforested condition (e.g., ecotone areas) or support only sparse tree cover (e.g., forest savannas) are included. Shifts in plant composition can occur by natural forces or as a result of human actions. Healthy ecosystems are resilient or able to recover if external disturbances occur, thereby allowing various combinations of plant species and seral states to fluctuate over time. Invasive plant species establishment and conifer encroachment can pose threats to grassland, shrubland, woodland, and riparian ecosystem resilience.

Refer to the GRAZ components for additional guidance for nonforested plant communities that are utilized for livestock grazing. Also see the Aquatic Ecosystem sections for more additional guidance specific to riparian and wetland areas.

Desired Conditions (FW-VEGNF-DC)

01 Native plant communities support diverse age classes of shrubs and a vigorous, diverse, self-sustaining understory of grasses and forbs relative to site potential (based on ecological classification) and consistent with the natural range of variation.

02 Native plant species dominate, and invasive plant species are at low abundance or nonexistent. Naturalized non-native species (such as Kentucky bluegrass and timothy) may be present but do not increase in extent.

03 Nonforested vegetation dominates sites on dry forested potential vegetation types that were historically maintained without trees by frequent fire. This includes fire-maintained grass and shrublands where tree comprise 0-5% canopy cover as well as savannas characterized by a dominance of grass or shrub understories with widely spaced fire-resilient trees at 5-10% canopy cover. In such areas, encroachment of conifer species is minimal.

Guidelines (FW-VEGNF-GDL)

01 Treatments to restore savannas, grasslands, or shrublands on sites in the warm dry forest broad potential vegetation group should focus on sites with living or dead remnants of mountain big sagebrush or other key indicators that the community was historically dominated by nonforested vegetation.

Threatened, Endangered, Proposed and Candidate and Plant Species of Conservation Concern (PLANT)

Introduction

This section addresses plant species that are listed by the USFWS as threatened, endangered, proposed, or candidate under the Endangered Species Act; or those that are identified as species of conservation concern by the Regional Forester of the Forest Service. At the time of the preparation of this forest plan, only whitebark pine (*Pinus albicaulis)* falls under the Endangered Species Act, as a proposed species. If

additional plants are added to the SCC list in the future, the plan components in this section would apply and additional species-specific components may be needed.

Species of conservation concern are species other than federally recognized species that are known to occur in the planning 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 planning area (36 Code of Federal Regulations 219.9; FSH 1909.12.52). Plant species of conservation concern for the HLC NF are identified at the regional level. The list can be reviewed at www.fs.usda.gov/goto/R1/SCC.

Desired Conditions (FW-PLANT-DC)

01 Habitat conditions support the recovery and persistence of plant species that are recognized as threatened, endangered, proposed, or candidate under the Endangered Species Act, and those that are identified as species of conservation concern. Ecological conditions and processes that sustain the habitats currently or potentially occupied by these plant species are maintained or restored.

02 Key whitebark pine areas such as cone collection sites, resistant seed-bearing trees, and seed orchards persist on the landscape.

Goals (FW-PLANT-GO)

01 Recovery and long-term persistence of plants that are threatened, endangered, proposed, or candidate under the Endangered Species Act or species of conservation concern is supported by cooperation with other agencies and landowners to expand inventories, identify potential habitat for these species, and promote protection and/or restoration of associated habitats.

Objectives (FW-PLANT-OBJ)

01 Treat at least 4,500 acres for the purpose of sustaining or restoring whitebark pine and contribute to achieving desired conditions as described in the forested vegetation section. Achieving this would also contribute to FW-VEGT-DC-01. Refer to appendix C for information on possible restoration strategies and activities.

Guideline (FW-PLANT-GDL)

01 Activities affecting vegetation in known occurrences or suspected habitat of plants listed as threatened, endangered, proposed, or candidate under the Endangered Species Act, and those that are identified as species of conservation concern should be designed to provide for their long-term persistence.

Pollinators (POLL)

Introduction

This section addresses invertebrate pollinator species that occur on the HLC NF and their respective habitat requirements. At the time of the preparation of this forest plan, no pollinator species known on the forest have any additional designation under the Endangered Species Act or Region 1 species of conservation concern designation.

Desired Conditions (FW-POLL-DC)

01 Plant communities composed of an abundant and diverse mix of native grass, forb, shrub, and tree species are present across the landscape to provide foraging habitat for native pollinators. Pollinator

nesting and hiding cover are also provided through graminoid and herbaceous structural diversity in nonforested habitats as well as snags and large downed woody material in forested habitats.

Goals (FW-POLL-GO)

01 Collection of data about pollinators and improvement of the best available information on local species' diversity, ecological requirements, and threats is supported by cooperation with other agencies and partners.

Guidelines (FW-POLL-GDL)

01 When issuing special use permits for beehives in the planning area, the placement of hives should not displace native pollinators with a limited habitat distribution.

Invasive Plants (INV)

Introduction

A species is considered invasive if it meets two criteria: (1) it is non-native to the ecosystem under consideration, and (2) its introduction causes, or is likely to cause economic, or environmental harm or harm to human, animal, and plant health (Executive Order 13751, 2016). This section covers only invasive plant species. Refer to the Aquatic Ecosystems section for components related to invasive aquatic species.

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. Impacts from invasive plants can be exacerbated by fire, native pests, weather events, human actions, and environmental change.

The intent of the invasive species components in this plan are to ensure that all FS management activities are designed to minimize or eliminate establishment or spread of invasive species on NFS lands, or to adjacent areas. The following desired conditions are complementary to other sections that provide for healthy resilient and resistant plant communities. Management actions intended to prevent and respond to invasive plants will be dynamic and designed in a manner that allows for an adaptive management approach. The desired conditions describe conditions associated with invasive species and articulate the platform on which future management actions should be designed to address them. These conditions will be addressed within the bounds of resource constraints. Future actions will be balanced by considering cost as well as potential gains to biodiversity, native species, and native soil biota.

Desired Conditions (FW-INV-DC)

01 Intact native plant communities dominate the landscape, while non-native invasive species are in low abundance and do not disrupt ecological function and resilience. Noninfested rangeland and forested areas remain free of invasive plant species.

02 No new nonnative invasive plant species become established in terrestrial or aquatic plant communities on the forest.

03 Terrestrial communities at risk of negative impacts from nonnative invasive plants are able to retain or regain function, process, and structure after disturbance.

Goals (FW-INV-GO)

01 A coordinated invasive species management, awareness, and education approach is used internally and externally so that invasive species awareness is maintained and/or improved.

02 Opportunities are provided to cooperators, organizations, partners, and members of the public to contribute to an integrated species management strategy. This could include survey, inventory, monitoring, and/or treatment.

03 Landscape scale weed treatments are coordinated with weed treatments occurring on adjacent lands.

Objectives (FW-INV-OBJ)

01 Prevent invasive species establishment and reduce existing infestations through annual invasive species management actions on at least 3,000 inventoried acres.

Standards (FW-INV-STD)

01 For all proposed projects or activities, the risk of noxious weed introduction or spread shall be determined and appropriate mitigation measures shall be implemented. Activities shall be designed to minimize the risk of spreading invasive species and meet multiple use and ecological objectives.

02 Domestic sheep or goat grazing used as part of an integrated pest management weed control program shall maintain effective separation of bighorn sheep from domestic sheep or goats. Scientific information and the most current recommendations made through agency or interagency efforts shall be used to define effective separation and to establish the means to achieve it (refer to appendix C for information on recommendations and strategies).

Guidelines (FW-INV-GDL)

01 During management activities, integrated pest management tools should be used to prevent the spread of and/or decrease existing infestations of state of Montana listed noxious weeds and other priority invasive species.

02 Weed management activities should consider potential effects to native pollinators and develop measures to reduce nontarget impacts. Also see Vegetation, Pollinators (POLL).

03 Treatments that are most effective in the long-term and compatible with other resources should be emphasized when feasible in order to maintain native plant diversity and prevent expansion of existing infestations.

04 When conducting invasive plant treatments in areas with threatened, endangered, proposed, and candidate plants or plant species of conservation, integrated treatment methods that are not detrimental to those species should be used to reduce impacts to desired plant species or communities.

05 Native plant species with natural abilities to compete with or persist amongst invasive species should be used in restoration efforts when feasible to maintain desirable plant composition. Also see FW-VEGT-GDL-04.

Wildlife

Introduction

This section provides direction designed to maintain the diversity of animal communities and "support the persistence of native wildlife species within the planning area, subject to the extent of FS authority and the inherent capability of the planning area" (FS Handbook 1909.12, Chapter 20, Section 23.1). The 2012 Planning Rule adopts a complementary ecosystem and species-specific approach, known as a "coarse-filter or fine-filter approach," to provide the natural diversity of plant and animal communities and ensure long-term persistence of native species in the planning area. Ecosystem plan components are designed to maintain or restore the integrity and resilience of ecosystems and are therefore expected to maintain the species that are dependent on those ecosystems. Species-specific plan components are included where specific habitat needs are not met by ecosystem components.

Wildlife habitats depend largely on terrestrial vegetation. Therefore, the plan components for terrestrial vegetation represent most of the ecosystem components that will support the persistence of native species within the planning area. General references to wildlife habitats are included where appropriate in the description of desired conditions for terrestrial vegetation in order to help clarify that relationship. Plan components for wildlife are described below where needs exist separately from vegetation-related components, and where a specific-species component is needed. Additional plan components that address wildlife needs or management concerns may also be found in sections that address other resources.

The HLC NF supports a diversity of plant communities across a wide range of physical environments. This diversity of communities and ecosystems supports a great diversity of wildlife species, many of which occur only in portions of the planning area. Therefore, plan components are provided only in the appropriate GAs for species whose distribution encompasses only one or a few GAs, or for species whose presence may be desired in only one or a few GAs. As an example, flammulated owls have been documented only in the Big Belts, Divide, Elkhorns, and Upper Blackfoot GAs, which corresponds to their known distribution in Montana. Therefore, species-specific plan components for flammulated owl are found only in the sections for those GAs.

Native ungulates, also referred to as big game, are an important component of wildlife diversity on the HLC NF. General plan components in this section address the potential for management and other activities to affect native ungulates. Plan components that address viewing, harvest, and other recreational opportunities associated with wildlife presence on public lands are included in the forestwide and GA level "Benefits to People" sections of the plan.

Some plan components in this section are relatively broad statements describing desired conditions and goals for wildlife habitats and species in general, and therefore apply to all wildlife species or habitats in the planning area. Some plan components are specific to individual species or groups of species for whom plan components may be necessary to address specific risks presented by management or other activities. Some plan components are specific to species listed as threatened, endangered, proposed, or candidate species under the Endangered Species Act at the time the plan was written, or to those identified by the Regional Forester as species of conservation concern.

Threatened, endangered, proposed, and candidate species are identified by the USFWS, which maintains up-to-date information regarding which of those species may be found on the HLC NF. At the time of preparation of this forest plan, three species found on the HLC NF fall into categories identified under the Endangered Species Act (U.S. Fish and Wildlife Service list dated 25 January 2021):

- Grizzly bear (*Ursus arctos*) – threatened; resident /transient west of Interstate Highway 15, and east of Interstate Highway 15 may be present in Elkhorn Mountains, Big Belt Mountains, Little Belt Mountains, and Highwood Mountains
- Canada lynx (*Lynx Canadensis*) – threatened; resident (core habitat)/transient (secondary/peripheral habitat) west of Interstate Highway 15; transient (secondary/peripheral habitat) east of Interstate Highway 15

The status of these and other species may change during the life of the forest plan. If species are removed from listing or consideration under the Endangered Species Act, or if recovery plans or conservation strategies for listed, candidate, or proposed species change, plan components for those species could be changed through amendment(s) to this plan.

This plan retains the decision for managing Canada lynx habitat from the March 2007 Record of Decision for the Northern Rockies Lynx Management Direction (see appendix F). Note that the Northern Rockies Lynx Management Direction includes standards, guidelines, and objectives that direct management of a variety of resources, including vegetation management activities and practices, livestock management, human use projects, and linkage areas, along with required monitoring. If habitat management requirements are changed through changes in the status of Canada lynx, through changes made to the Northern Rockies Lynx Management Direction, development of a recovery plan, or other guidance, plan components for lynx could change through amendment(s) to this plan.

This plan also retains the decision for managing grizzly bear habitat from the Record of Decision for the 2021 Land Management Plan Amendments to Incorporate Habitat Management Direction for the Northern Continental Divide Ecosystem Grizzly Bear Population (U.S. Department of Agriculture, 2018). The plan components for the grizzly bear amendment ROD have been incorporated at the end of this wildlife section as their own subsection titled “Northern Continental Divide Ecosystem Grizzly Bear Habitat Management Direction (NCDE)” and are identified with the letters NCDE in the component. The retained grizzly bear management direction includes components related to management of motorized access, recreational developments, livestock, energy and minerals exploration and development largely in the Rocky Mountain Range and Upper Blackfoot GAs. Other forestwide and GA-specific plan vegetation and wildlife plan components address some elements of grizzly bear habitat management as well.

Wildlife (WL)

Desired Conditions (FW-WL-DC)

01 Habitats for native wildlife species are available throughout those species’ potential natural ranges on NFS lands. Habitats for desired nonnative wildlife species are available on NFS lands where they can be supported by healthy, functioning ecosystems, as described in the vegetation section.

02 Vegetation composition, structure, and distribution, including live vegetation and such things as fire or insect-killed trees, provide for the life/natural history requirements of native and desired nonnative wildlife species, for the portion of those species’ life cycles that occur on NFS lands. Also see Vegetation section.

03 Vegetation composition, structure, and distribution allow wildlife to move within and between NFS parcels in response to seasonal habitat needs, dispersal needs, vegetation disturbances (such as, fire, insect infestations), and long-term changes (such as climate change). Also see Vegetation sections.

04 Large, unroaded areas are distributed and connected forestwide, providing for species with large home ranges that also require seclusion or low level of disturbance by humans.

05 Conflicts between humans and wildlife are rare.

06 Key seasonal habitat where wildlife are sensitive to human disturbance, such as ungulate winter range, nest and den sites, and other birthing and rearing sites are relatively free of human disturbance during the period in which those species are active in these areas.

07 Areas of nonforested vegetation at lower elevations provide forage species for wintering big game and are intermixed with areas of forest that provide hiding and thermal cover for wintering big game.

08 Caves, mines, and other underground habitats and known above-ground roost sites, particularly those used as hibernacula or maternity roosts that may be used by native bat species, are relatively free of human disturbance during the period bats are active in those sites (Also see FW-WTR-DC-12).

09 In lynx habitat (see glossary), boreal forest and associated matrix habitat provide the mosaic of structural stages necessary (as defined by scientific information and the most current recommendations made through agency or interagency efforts) to support the denning, foraging, resting, and travel habitat needs of Canada lynx.

10 There is low or no risk of disease transmission between domestic animals and wildlife.

Goals (FW-WL-GO)

01 Coordination with Montana Fish, Wildlife, and Parks and other agencies occurs during project planning, in order to allow consideration of the goals and objectives of these agencies regarding wildlife and wildlife habitats.

02 Cooperative meetings among Forest Service and Montana Fish, Wildlife, and Parks biologists occur annually, in order to evaluate management direction for wildlife and habitats on NFS and adjoining lands, and to recommend potential adjustments to management for the purposes of maintaining or improving habitats.

03 The FS works with community leaders, youth and schools, homeowners, businesses, private organizations, and other agencies to develop and disseminate information about how to live, work, and recreate where wildlife species are present. Also see Public Information, Interpretation and Education section (CONNECT).

04 Linkage areas identified through interagency coordination facilitate the movement of wildlife between NFS parcels separated by other ownerships.

05 Forest biologists and managers cooperate with other agencies and collaborate on conservation strategies, recovery plans and management of habitat, to achieve recovery of federally listed wildlife species occurring on NFS lands.

06 Through cooperation with other agencies, collaboration on conservation strategies and other management plans, and management of habitat, the need for listing of additional wildlife species under the Endangered Species Act is prevented.

07 The FS works with the caving community to educate the public about the cave environment and the spread of disease(s) within that environment.

Standards (FW-WL-STD)

01 Herbicides, fertilizers, and spray-application type pesticides shall not be applied to vegetation or substrates within 100 meters of known western toad breeding sites.

Guidelines (FW-WL-GDL)

01 When managing livestock use, forage should be retained in the quantity, quality, and location to support wildlife needs. Also see FW-GRAZ-DC-02; FW-GRAZ-GDL-04; PCA-Z1-NCDE-STD-02; 03, 04; PCA-NCDE-DC-06; PCA-NCDE-STD-10, 11; and PCA-NCDE-GDL-09, 10.

02 In order to provide for human safety and minimize risk of impacts to wildlife, particularly threatened, endangered, candidate, proposed, and species of conservation concern (such as grizzly bears), actions should be taken during all management activities to reduce the risk of wildlife becoming habituated to humans or becoming food conditioned. See also FW-REC-GDL-07; FW-NCDE-DC-01, 02; FW-NCDE-STD-02; PCAZ1Z2-NCDE-DC-01; PCAZ1Z2-NCDE-STD-01; PCAZ1Z2-NCDE-GDL-01, 02; PCAZ1-NCDE-STD-01, 06, 08, 11; PCAZ1-NCDE-GDL-01, 06; PCA-NCDE-DC-02; PCA-NCDE-STD-07, 08; and PCA-NCDE-GDL-03, 07, 08.

03 New and revised livestock management plans should protect known western toad breeding sites from trampling by livestock. Emergent vegetation should be retained at these sites to provide habitat for breeding activities and cover for tadpoles.

04 Management actions (e.g., decontamination measures, public education) should be used to help prevent the spread of pathogens to and among known and potential western toad breeding sites.

05 To avoid potential disturbance or displacement of ungulates from key seasonal ranges, management actions should not be carried out in or immediately adjacent to winter ranges during the winter use period, or known calving, lambing, fawning, or kidding areas during the reproductive season. Exceptions may occur when needed for protection of other resources. In such cases, human activities should be concentrated in time and/or space to reduce impacts to native ungulates.

06 Vegetation management activities on identified big game winter range should occur only when they will maintain or improve future forage quantity and quality, and should retain intermixed areas of forest, where possible, to provide hiding and thermal cover.

07 New fencing installation or reconstruction should be sited and designed to minimize hazards to wildlife and barriers to wildlife movements.

08 New or reconstructed water developments or impoundments should be designed to prevent animal entrapment and to facilitate animal escape.

09 Management actions should avoid disturbance at known active raptor nests and fledging areas during the breeding season.

10 Management actions should avoid disturbance to known roosting, hibernating, or breeding/pup-rearing bats in caves, mines, roost trees, or other features known to be used by bats. Buildings should be inspected prior to removal to identify bat use. If bats are present, the structure should be retained unless human safety is at risk. Removal should not occur until bats are no longer using the structure.

11 In order to prevent introduction or spread of disease (e.g. white-nose syndrome) Forest Service employees and agency-authorized personnel such as researchers, contractors, etc. should use

precautionary measures (e.g., decontamination procedures, timing restrictions for cave entry, and others) before entering bat roosts or hibernacula.

12 To minimize risk of disturbance to bat roosting, hibernating, or breeding/pup-rearing sites, road or trail designs should not visually open new views of a cave entrance. Pull-outs or parking areas near caves that are not managed for public access should not be established, and the use of existing trails that may lead to such caves should not be encouraged. See also FW-ACCESS-DC-04 and FW-REC-DC-04.

13 To prevent mortality of both adult and larval amphibians, areas to be treated with piscicides for the removal of unwanted fish species should first be surveyed for the presence of amphibians. Use of piscicides should be avoided during times of the season when amphibian larvae are present, and measures should be taken to avoid exposure of adult amphibians to piscicides.

14 Management of habitat for native ungulates (elk, deer, pronghorn, moose, bighorn sheep, and mountain goat) should be consistent with management of similar habitat on adjoining state or federal land where the adjoining habitat is managed to maintain wildlife values. The scale for application of this guideline is dependent on the extent of identified seasonal habitat on NFS land that directly adjoins state or other federal lands with similar identified habitat.

Northern Continental Divide Ecosystem Grizzly Bear Habitat Management Direction (NCDE)

Introduction

In December 2018 the Record of Decision for the Forest Plan Amendments to Incorporate Habitat Management Direction for the Northern Continental Divide Ecosystem Grizzly Bear Population was signed and became part of the existing (1986) Helena National Forest and Lewis and Clark National Forest plans. The purpose of the amendments was to "provide consistent direction that will support the continued recovery of the NCDE grizzly population", and provide a regulatory mechanism for management that will sustain a recovered population (U.S. Department of Agriculture, 2018). The plan components in the amendments are therefore included in their entirety in this forest plan. The original component identifier from the grizzly bear amendment ROD is *italicized* at the end of each component to make it easier for the reader to go back and forth between that ROD and this plan.

The NCDE and adjoining area, including the HLC NF, has been divided into management zones (primary, conservation area, or PCA, and zones 1, 2 and 3 - please refer to the map in appendix A.) with specific plan components that apply to one or more of those zones. The PCA is the same as the existing NCDE Recovery Zone, including all of the Rocky Mountain Range GA and the northern portion of the Upper Blackfoot GA. The PCA expected to function as a source population with continual occupancy by grizzly bears. Zone 1 includes the remainder of the Upper Blackfoot GA and a very small portion of the Divide GA, where continual occupancy by grizzly bears is expected but at lower densities than in the PCA. Zone 2 comprises the Divide, Elkhorns, Big Belts, and a few acres of the Upper Blackfoot GAs, with an objective of continuing existing types of recreation and resource management while maintaining the opportunity for grizzly bears to move between the NCDE and other ecosystems. Zone 3 comprises the Highwoods, Little Belts, Castles, and Crazies GAs; long-term survival and occupancy of grizzly bears is not expected to occur in Zone 3 due to lack of sufficient suitable habitat.

The components are arranged by the following management zones (and include those abbreviations in their components identifiers):

FW – forestwide

PCAZ1Z2 – Primary conservation area plus zones 1 and 2

PCAZ1 – Primary conservation area plus zone 1

Z2 – Zone 2 (DI, EH, and BB GAs)

Z1 – Zone 1 (south half of the UB GA)

PCA – Primary Conservtion Area

NCDE Forestwide Plan Components

Desired Conditions (FW-NCDE-DC)

01 The risk of grizzly bear-human conflict is reduced by information, education, and design features or criteria for management activities. *NCDE-DC-WL-03*

02 National forest system lands provide a variety of public services and special forest products (such as mushrooms, huckleberries, firewood) while minimizing the risk of grizzly bear-human conflicts on NFS lands in the NCDE. *NCDE-DC-SFP-01*

03 Mineral materials are available based upon public interest, in-service needs, material availability, and valid existing rights, where consistent with desired conditions for other resources. *NCDE-DC-MIN-01*

Standards (FW-NCDE-STD)

01 Grizzly bear habitat on NFS lands in the NCDE shall be delineated and managed as primary conservation area, zone 1, zone 2, or zone 3 (see appendix A, map FW-3). *NCDE-STD-WL-01*

02 Special-use permits for apiaries (beehives) located on NFS lands shall incorporate measures including electric fencing to reduce the risk of grizzly bear-human conflicts, as specified in the food/wildlife attractant storage special order. *NCDE-STD-SFP-01*

NCDE PCAZ1Z2 Plan Components

Desired Conditions (PCAZ1Z2-NCDE-DC)

01 Within the NCDE primary conservation area, zone 1, and zone 2, bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear-human conflicts in the NCDE. *NCDE-DC-WL-01*

Standards (PCAZ1Z2-NCDE-STD)

01 Within the NCDE primary conservation area, zone 1, and zone 2, food/wildlife attractant storage special order(s) shall apply to NFS lands. *NCDE-STD-WL-02*

Guidelines (PCAZ1Z2-NCDE-GDL)

01 Within the NCDE primary conservation area, zone 1, and zone 2, contractors, permittees, lessees, operators, and their employees should be informed of food/wildlife attractant storage special order(s) and procedures for safely working and recreating in grizzly bear country, prior to turnout of livestock or beginning work and annually thereafter, in order to reduce the risk of grizzly bear-human conflicts. *NCDE-GDL-WL-01*

02 Within the NCDE primary conservation area, zone 1, and zone 2, if a contractor, permittee, lessee, or operator or their employees elect to camp on NFS lands other than in a developed recreation site, the site should be evaluated and written authorization (i.e., a campsite agreement that includes the food/wildlife attractant storage special order) should be provided before the campsite is established. The purpose is to reduce the risk of grizzly bear-human conflicts. *NCDE-GDL-WL-02*

NCDE PCAZ1 Plan Components

Desired Conditions (PCAZ1-NCDE-DC)

01 Within the NCDE primary conservation area and zone 1, grizzly bear habitat on NFS lands contributes to sustaining the recovery of the grizzly bear population in the NCDE and contributes to connectivity with neighboring grizzly bear recovery zones. *NCDE-DC-WL-02*

Standards (PCAZ1-NCDE-STD)

01 Within the NCDE primary conservation area and zone 1, new or reauthorized livestock grazing permits and annual operating plans shall incorporate requirements to reduce the risk of grizzly bear-human conflicts (e.g., a food/wildlife attractant storage special order). New or reauthorized permits shall include a clause providing for modification, cancellation, suspension, or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation. *NCDE-STD-GRZ-01*

02 Within the NCDE primary conservation area and zone 1, permits for livestock grazing shall include a provision that requires the reporting of livestock carcasses within 24 hours of discovery, which shall be followed by proper disposal of the carcass. Boneyards shall not be established on NFS lands. *NCDE-STD-GRZ-03*

03 Within the NCDE primary conservation area and zone 1, there shall be no increase in the number of active sheep allotments or in permitted sheep animal unit months above the baseline (see glossary) on NFS lands. Allowable animal unit months shall not be increased for inactive allotments.

Note: Existing allotments may be combined or divided as long as doing so does not result in grazing allotments in currently unallotted lands or an increase in animal unit months. *NCDE-STD-GRZ-04*

04 Within the NCDE primary conservation area and zone 1, temporary permits for grazing by small livestock for purposes such as controlling invasive plants, reducing fire risk, or trailing of small livestock across NFS lands shall not result in an increase in bear-small livestock conflicts. *NCDE-STD-GRZ-06*

05 Within the NCDE primary conservation area and zone 1, mining activities (as authorized under the Mining Law of 1872) and oil and gas activities (as authorized under the Federal Onshore Oil and Gas Leasing Reform Act of 1987) occurring on NFS lands, where feasible shall avoid, minimize, and/or mitigate environmental impacts to grizzly bears or their habitat, subject to valid existing rights. Stipulations or mitigation measures already included in existing leases, permits, or plans of operation on NFS lands shall not be changed, nor will additional stipulations or mitigation measures be added, without the lease, permit, or plan of operation holder's agreement. *NCDE-STD-MIN-01*

06 Within the NCDE primary conservation area and zone 1, new or reauthorized permits, leases, and/or plans of operation shall include a provision for modification or temporary cessation of activities if needed to resolve a grizzly bear-human conflict situation. *NCDE-STD-MIN-02*

07 Within the NCDE primary conservation area and zone 1, new plans of operation, permits, and/or leases for mineral activities shall include measures to reasonably mitigate potential impacts of mineral development for the following:

- land surface and vegetation disturbance;
- water table alterations that affect bear foods on the surface; and
- construction, operation, and reclamation of mine-related facilities such as impoundments, rights of way, motorized routes, pipelines, canals, transmission lines, or other structures.

NCDE-STD-MIN-03

08 Within the NCDE primary conservation area and zone 1, in addition to measures included in the food/wildlife attractant special order(s), new plans of operation, permits, and/or leases for mineral activities shall include the following measures regarding grizzly bear attractants:

- bear-resistant food storage and garbage containers shall be used at development sites and at any campgrounds or dispersed sites where exploration or production-related human occupancy is anticipated;
- garbage shall be removed in a timely manner;
- road kills shall be removed daily during active operating periods to a designated location determined in close coordination with Montana Fish, Wildlife and Parks;
- feeding of wildlife shall not be allowed; and
- locations of work camps shall be approved in advance of operations. Food storage requirements shall be strictly adhered to in any work camps.

NCDE-STD-MIN-04

09 Within the NCDE primary conservation area and zone 1, if minerals activities have the potential to adversely affect grizzly bears or their habitat as determined by a site-specific analysis, new plans of operation, permits, and/or leases for mineral activities shall include the following mitigation measures, stipulations, or surface use criteria regarding grizzly bear habitat:

- ground-disturbing activities in identified grizzly bear spring habitat (as identified in a site-specific biological evaluation or other environmental document) shall be avoided between April 1 and June 30. If timing restrictions are not practicable, other measures shall be taken to reasonably mitigate negative impacts of mineral activity to grizzly bears;
- seismic activity in identified grizzly bear denning habitat (as identified in a site-specific biological evaluation or other environmental document) shall be avoided during the denning season (see glossary). If timing restrictions are not practicable, other measures shall be taken to reasonably mitigate negative impacts to the grizzly bear;
- cumulative impacts of multiple concurrent seismic and/or drilling operations shall be limited by timing restrictions. If timing restrictions are not practicable, reasonable and appropriate measures shall be taken to mitigate negative impacts to the grizzly bear;
- reasonable and appropriate measures regarding the maintenance, rehabilitation, restoration, or mitigation of functioning aquatic systems and riparian habitat conservation areas shall identify how reclamation will occur, plant species to be used in reclamation, a timeframe of when reclamation will be completed, and monitoring criteria; and

- reclamation and revegetation of motorized routes, drilling pads, and other areas disturbed by mineral activities shall be completed as soon as practicable by the operator.

NCDE-STD-MIN-05

10 Within the NCDE primary conservation area and zone 1, if mineral activities have the potential to adversely affect grizzly bears or their habitat as determined by a site-specific analysis, new plans of operation, permits, and/or leases shall include the following mitigation measures regarding motorized access:

- public motorized use that is not associated with minerals activities shall be prohibited on motorized routes constructed for exploration and/or development;
- a traffic management plan shall be developed as part of the proposed activity to identify when and how motorized routes will be used, maintained, and monitored (if required) and how motorized route standards and guidelines will be implemented after activities have ended;
- helicopter use associated with seismic activity, exploration, drilling, or development must follow an approved plan or permit; and
- speed limits shall be adopted on motorized routes if needed to prevent or reduce collisions with grizzly bears.

NCDE-STD-MIN-06

11 Within the NCDE primary conservation area and zone 1, minerals contractors and lessees shall require employees to attend training related to safely living near and working in grizzly bear habitat prior to starting work and on an annual basis thereafter. *NCDE-STD-MIN-07*

Guidelines (PCAZ1-NCDE-GDL)

01 Within the NCDE primary conservation area and zone 1, clover should not be used in seed mixes on NFS lands. Native seed mixes or those that are less palatable to grizzly bears should be used so that seeded areas do not become an attractant. *NCDE-GDL-WL-03*

02 Within the NCDE primary conservation area and zone 1, in addition to forestwide guidelines, the following guidelines apply to new leasable minerals activities, including leases, surface use plans for proposed wells or operations, and permits to conduct seismic exploration or drilling. To reduce potential grizzly bear disturbance or displacement, helicopter use plans should:

- avoid establishing recurring helicopter use (see glossary), especially in spring habitats or other known important grizzly bear habitats or use areas; and
- avoid establishing landing zones, especially in spring habitats or other known important grizzly bear habitats or use areas. If a landing zone is deemed necessary for safe implementation of the seismic or surface use plan or permit to drill, the landing zone should be constructed only in an area that has had site-specific analysis and approval.

NCDE-GDL-MIN-01

03 Within the NCDE primary conservation area and zone 1, leasable energy activities should use the best available noise-reduction technology on equipment and motorized vehicles to reduce potential disturbance or displacement of grizzly bears, whenever possible. *NCDE-GDL-MIN-02*

04 Within the NCDE primary conservation area and zone 1, along motorized routes, seismic corridors, and pipelines constructed for leasable energy activities, wildlife cover should be maintained at regular

intervals where present (this varies on a site-specific basis) in order to provide habitat connectivity for grizzly bears. *NCDE-GDL-MIN-03*

05 Within the NCDE primary conservation area and zone 1, for locatable and nonenergy leasable minerals activities with the potential to adversely affect the grizzly bear or its habitat (this varies on a site-specific basis), the following tiered measures should be considered to mitigate impacts to grizzly bear habitat. Beginning at step 1, any subsequent steps would be implemented only if the prior steps are not possible or achievable.

- Step 1: The operator should reclaim the affected area back to suitable bear habitat that has similar or improved characteristics and qualities compared to the original habitat (such as the same native vegetation).
- Step 2: If step 1 is not attainable, operators should either acquire a perpetual conservation easement (or easements) or purchase comparable or better replacement grizzly bear habitat within the primary conservation area. Acquisition of habitat within connectivity corridors could also be considered for mitigation, when appropriate. Habitat acquired for mitigation may require a purchase rate of > 1:1 on an acreage basis, depending on the quality of habitat degraded and habitat available for acquisition.
- Step 3: If steps 1 and 2 are not achievable, the next option is to offset negative effects to bears and grizzly bear habitat with other appropriate types of actions.

NCDE-GDL-MIN-04

06 Within the NCDE primary conservation area and zone 1, carrying bear deterrent spray should be recommended to mineral permittees, lessees and operators to reduce the risk of grizzly bear-human conflicts. *NCDE-GDL-MIN-05*

07 Within the NCDE primary conservation area and zone 1, available resources at existing gravel pits should be used before constructing new pits to reduce the risk of grizzly bear disturbance or displacement associated with blasting of rock or crushing of gravel. *NCDE-GDL-MIN-06*

NCDE Z1 Plan Components

Desired Conditions (Z1-NCDE-DC)

01 Within zone 1 on the Helena-Lewis and Clark National Forest (see appendix A, map FW-3), roads and trails provide for public and administrative access to NFS lands. Grizzly bear habitat in zone 1 contributes to sustaining the recovery of the grizzly bear population in the NCDE and providing the opportunity for movement of male bears to provide genetic connectivity with the Greater Yellowstone Ecosystem. *NCDE-HNF Zone 1-DC-01*

02 On the Helena-Lewis and Clark National Forest, within zone 1 and the portion of zone 2 west of Interstate 15, NFS lands adjacent to highways are consolidated and other efforts to reduce barriers to genetic connectivity of grizzly bear populations are supported. *NCDE-HNF Zone 1&2-DC-02*

Standards (Z1-NCDE-STD)

01 Within zone 1 on the Helena-Lewis and Clark National Forest (see appendix A, map FW-3), there shall be no net increase above the baseline in density of motorized routes (roads and trails) open to public motorized use during the nondenning season on NFS lands. Open motorized route density is calculated by dividing the total miles of open motorized routes on NFS lands in zone 1 by the total

square miles of NFS land area in that same area (see figure 1-2). This standard does not apply to the following:

- motorized use by agency personnel or others authorized by the appropriate agency personnel;
- temporarily opening a road for a short period of time to allow for public firewood gathering and other authorized use;
- updated or improved road data without an actual change on the ground;
- changes in technology or projections that result in changed calculations without actual change on the ground (e.g., a switch in geodetic systems from the North American Datum of 1927 to the North American Datum of 1983);
- a road closure location is moved a short distance to a better location (e.g., to the nearest intersection or turnout) to allow a turn-around providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
- the agency exchanges, acquires, buys, or sells lands with motorized routes;
- a change in an open road necessary to comply with federal laws;
- motorized use for mining activities (as authorized under the Mining Law of 1872) and oil and gas activities (as authorized under the Federal Onshore Oil and Gas Leasing Reform Act of 1987) conducted in accordance with valid existing rights and applicable standards and guidelines;
- a change in a motorized route necessary to address grizzly bear-human conflicts, resource damage, or human safety concerns;
- use of motorized routes in emergency situations as defined by 36 CFR 218.21; and
- temporary roads (see glossary).

NCDE-HNF Zone 1-STD-01

NCDE PCA Plan Components

Desired Condition (PCA-NCDE-DC)

01 Within the NCDE primary conservation area, 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, total motorized route density, and secure core levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE. *NCDE-DC-AR-01*

02 Within the NCDE primary conservation area, 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 NFS lands. *NCDE-DC-AR-02*

03 Within each bear management unit in the primary conservation area, increases in the number and capacity of developed recreation sites on NFS lands that are designed and managed for overnight use during the nondenning season are at levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE. *NCDE-DC-AR-03*

04 Within the NCDE primary conservation area, the amount, type, and distribution of vegetation provide for the ecological, social, and economic sustainability of NFS lands while providing habitat

components that contribute to sustaining the recovery of the grizzly bear population in the NCDE. *NCDE-DC-VEG-01*

05 Within the NCDE primary conservation area, there is a mosaic of successional stages to provide for grizzly bear habitat needs over the long term. *NCDE-DC-VEG-02*

06 Within the NCDE primary conservation area, 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 grizzly bear-human conflicts on NFS lands. *NCDE-DC-GRAZ-01*

Standards (PCA-NCDE-STD)

01 In each bear management subunit within the NCDE primary conservation area, temporary changes in the open motorized route density, total motorized route density, and secure core shall be calculated for roads used for projects (as defined by "project (in grizzly bear habitat in the NCDE)") during the nondenning season (see glossary). Calculations will include estimated changes for each year of the anticipated duration of the project and shall be incorporated into the 10-year running average required by standard PCA-NCDE-STD-04. *NCDE-STD-WL-03*

02 Within the NCDE primary conservation area, motorized use of roads with public restrictions shall be permitted for administrative use (see glossary) as long as doing so does not exceed either six trips (three round trips) per week or one 30-day unlimited use period during the nondenning season (see glossary). The exception to this standard is:

- emergency situations as defined by 36 Code of Federal Regulations (CFR) 218.21.

Note: Administrative use is not included in baseline calculations and is not included in calculations of net increases or decreases. If the level of administrative use exceeds this standard, the use is counted as a project (see "project (in grizzly bear habitat in the NCDE)" in the glossary). *NCDE-STD-AR-01*

03 In each bear management subunit within the NCDE primary conservation area, there shall be no net decrease to the baseline (see glossary) for secure core and no net increase to the baseline for open motorized route density or total motorized route density on NFS lands during the nondenning season (see glossary). The following conditions are not considered a net increase/decrease from the baseline:

- administrative use (see glossary);
- temporary use of a motorized route for a project (see "project (in grizzly bear habitat in the NCDE)" in the glossary) that meets the conditions stipulated in PCA-NCDE-STD-04;
- mining activities (as authorized under the Mining Law of 1872) and oil and gas activities (as authorized under the Federal Onshore Oil and Gas Leasing Reform Act of 1987) conducted in accordance with valid existing rights and with all applicable standards and guidelines listed in this section and elsewhere in the Plan;
- updated or improved data on a motorized route without an actual change on the ground;
- changes in technology or projections that result in changed open motorized route density, total motorized route density, or secure core values without actual change on the ground (e.g., a switch from the North American Datum of 1927 to the North American Datum of 1983 geodetic reference system);

- a road closure location is moved a short distance to a better location (e.g., to the nearest intersection or turnout) to allow a turn-around providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
- the agency exchanges, acquires, buys, or sells lands with motorized routes;
- a change in a motorized route necessary to comply with federal laws;
- a change in a motorized route necessary to address grizzly bear-human conflicts, human safety concerns, or resource damage or concerns (e.g., a road paralleling a stream may be decommissioned and replaced by a new upslope road to reduce water quality impacts);
- a change made by an adjacent landowner that decreases the percentage of secure core or increases open motorized route density or total motorized route density values on an adjacent national forest;
- use of a motorized route for emergency situations as defined by 36 CFR 218.21;
- temporary roads (see glossary).

NCDE-STD-AR-02

04 In each bear management subunit within the NCDE primary conservation area, temporary changes in open motorized route density, total motorized route density, and secure core shall be allowed for projects (as defined by "project (in grizzly bear habitat in the NCDE)" in the glossary). The 10-year running average for open motorized route density, total motorized route density, and secure core shall not exceed the following limits during the nondenning season (see glossary):

- 5 percent temporary increase in open motorized route density in each bear management subunit (i.e., open motorized route density baseline plus 5 percent);
- 3 percent temporary increase in total motorized route density in each bear management subunit (i.e., total motorized route density baseline plus 3 percent); and
- 2 percent temporary decrease in secure core in each bear management subunit (i.e., secure core baseline minus 2 percent).

Exceptions to this standard include

- temporary changes for emergency situations as defined by 36 CFR 218.21
- temporary changes for actions where valid existing rights preclude or constrain agency discretion (e.g., certain contracts, permits, leases).

NCDE-STD-AR-03

05 Within the NCDE primary conservation area, a restricted road may be temporarily opened for public motorized use to allow authorized uses (such as firewood gathering), provided the period of use does not exceed 30 consecutive days during one nondenning season and occurs outside of spring and fall bear hunting seasons. However, temporary public use of a restricted road shall not be authorized in secure core (see glossary). *NCDE-STD-AR-04*

06 Within the NCDE primary conservation area, the number and capacity of developed recreation sites on NFS lands that are designed and managed for overnight use by the public during the nondenning season (e.g., campgrounds, cabin rentals, huts, guest lodges, recreation residences) shall be limited to one increase above the baseline (see glossary) in the number or capacity per decade per bear management unit. The following conditions are not considered an increase from the baseline:

- the agency obtains better information or updated information in its database(s);

- the agency acquires land that contains developed recreation sites;
- the agency increases the number or capacity of a developed recreation site in order to comply with federal laws;
- the agency maintains or modifies an existing overnight developed or dispersed recreation site in such a way that does not increase the number or capacity of the site (e.g., installing a pit toilet to avoid damage to water resources or installing a bear-resistant food storage structure to reduce grizzly bear-human conflicts);
- the agency modifies an existing developed recreation site to enhance human safety (e.g., enlarging a road pullout to allow trailers to safely turn around);
- the agency operates a developed recreation site to allow overnight use only during the denning season (see glossary); and
- the agency makes a corresponding reduction in the number or capacity of overnight developed recreation sites in the same bear management unit through any of the following means: (1) equal reduction in capacity at another site; (2) closure of a developed site(s); or (3) consolidation and/or elimination of dispersed camping, when and where it can be enforced effectively and it is reasonably assured that new dispersed sites will not develop nearby. If these measures are used to offset an increase in number or capacity, they must be in place before the initiation of the increase. If the agency reduces the number or capacity of developed sites below baseline levels, these reductions may be used at a future date to mitigate equivalent impacts of an increase, expansion, or change of use in developed sites within that bear management unit.

Note: This standard does not apply to dispersed recreation sites or to developed recreation sites managed for day use only (e.g., outfitter camps, roadside trail crossings, or interpretive pullouts; trailheads, picnic areas, or boat launches that are closed at night; ski areas that do not have overnight lodging). *NCDE-STD-AR-05*

07 Within the NCDE primary conservation area, new or reauthorized recreation permits shall include a clause providing for modification, cancellation, suspension, or temporary cessation of activities if needed to resolve a grizzly bear-human conflict situation. *NCDE-STD-AR-06*

08 Within the NCDE primary conservation area, new or reauthorized permits for ski areas on NFS lands that operate during the nondenning season shall include requirements to limit the risk of grizzly bear-human conflicts (e.g., to store garbage in a bear-resistant manner). *NCDE-STD-AR-07*

09 Within modeled grizzly bear denning habitat in the NCDE primary conservation area, there shall be no net increase in the percentage of area or miles of routes designated for motorized over-snow vehicle use on NFS lands during the den emergence time period (see glossary). *NCDE-STD-AR-08*

10 Within the NCDE primary conservation area, a sheep grazing permit in nonuse status shall not be allowed to increase allowable animal unit months beyond what was previously permitted prior to being in nonuse when it is returned to use. *NCDE-STD-GRZ-02*

11 Within the NCDE primary conservation area, there shall be no net increase in the number of active cattle grazing allotments above the baseline (see glossary) on NFS lands. Note: Existing allotments may be combined or divided as long as doing so does not result in grazing allotments in currently unallotted lands. *NCDE-STD-GRZ-05*

12 Within the NCDE primary conservation area, new leases for leasable minerals shall include a no surface occupancy stipulation (see glossary). *NCDE-STD-MIN-08*

Guidelines (PCA-NCDE-GDL)

01 In each bear management subunit within the NCDE primary conservation area, each project (as defined by "project (in grizzly bear habitat in the NCDE)" in the glossary) should be designed so that on-the-ground implementation does not exceed 5 years to reduce the potential for grizzly bear disturbance or displacement. Exceptions may be made where necessary, for example to accommodate:

- actions where existing rights preclude or constrain agency discretion (e.g., certain contracts, permits, leases);
- prescribed burning (including slash disposal), best management practices to protect water quality, or required reforestation activities; or
- emergency situations as defined by 36 CFR 218.21.

If an extension to the five-year time limitation is required (e.g., to meet contractual obligations or to complete on-the-ground treatments), the reasons should be documented in writing prior to authorization of the extension. *NCDE-GDL-AR-01*

02 Within the NCDE primary conservation area, secure core, open motorized route density, and total motorized route density should be restored to pre-project levels (as defined by "project (in grizzly bear habitat in the NCDE)" in the glossary) within 1 year after completion of the project to reduce the potential duration of grizzly bear disturbance due to project-related activities. Exceptions may be made where necessary, for example to accommodate:

- actions where existing rights preclude or constrain agency discretion (e.g., certain contracts, permits, leases);
- prescribed burning (including slash disposal), best management practices to protect water quality, or required reforestation activities; or
- emergency situations as defined by 36 CFR 218.21.

If an extension to the 1-year time limitation is made (e.g., to meet contractual obligations or to complete on-the-ground treatments), the reasons should be documented in writing prior to authorization of the extension. *NCDE-GDL-AR-02*

03 Within the NCDE primary conservation area, if the number or capacity of day-use or overnight developed recreation sites is increased, the project should include one or more measures to reduce the risk of grizzly-bear human conflicts in that bear management unit. The measure(s) should be in place prior to completion of the project or be included as one of the design criteria. Measures can include but are not limited to additional public information and education; providing backcountry food-hanging poles or bear-resistant food or garbage storage devices; project design criteria that would limit capacity increases to those needed for public health and safety; and increasing law enforcement and patrols. *NCDE-GDL-AR-03*

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

other measures should be used to reduce the risk of disturbance (e.g., limiting the duration of the activity or limiting the use of closed roads). *NCDE-GDL-VEG-01*

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

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

07 Within the NCDE primary conservation area, vegetation management projects (including timber sales and other noncommercial vegetation management contracts) should include a provision for modification, cancellation, suspension, or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation. *NCDE-GDL-VEG-04*

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

09 On NFS lands within the NCDE primary conservation area, the number of open or active sheep grazing allotments should be reduced if an opportunity exists with a willing permittee, to reduce the risk of conflicts with grizzly bears. *NCDE-GDL-GRZ-01*

10 Within the NCDE primary conservation area, an allotment management plan and plan of operation should specify any needed measures to protect key grizzly bear food production areas (e.g., wet meadows, stream bottoms, aspen groves, and other riparian wildlife habitats) from conflicting and competing use by livestock (this varies on a site-specific basis). *NCDE-GDL-GRZ-02*

Recreation Settings, Opportunities, Special Uses, Access, and Scenery

Introduction

Recreation is recognized as a critical resource on the HLC NF due to its contributions to the local economy, its influence in connecting people to the land, its impact on public understanding of natural and cultural resources, and its role as a catalyst for public stewardship.

The FS strives to provide a set of recreation settings, opportunities, and benefits that are sustainable over time. Sustainable recreation is defined as the set of recreation settings and opportunities on the NF that are ecologically, economically, and socially sustainable for present and future generations. For best effect, all aspects of recreation should include the principles of sustainability.

The following plan components are aimed at providing direction for a sustainable recreation program. Included is direction for Recreation Settings, Recreation Opportunities, Recreation Special Uses, Recreation Access, and Scenic Character. Plan components for other activities, including public information, interpretation, education, and hunting and fishing can be found in the Benefits to People section.

Recreation Settings (ROS)

Introduction

Recreation settings are the social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities and access options. These settings provide the framework where specific recreation opportunities, activities, and expected experiences are integrated to ensure compatibility with the landscape's natural, social, and cultural resource values. By identifying recreation settings, the Forest 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 experience they want.

The FS uses the recreation opportunity spectrum to define recreation settings. The recreation opportunity spectrum is categorized into six distinct classes: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban (36 CFR 219.19). See the glossary for detailed definitions of each recreation opportunity class. The plan components for ROS are grouped below for ease of understanding.

ROS Plan Components (FW-ROS-DC, FW-ROS-OBJ, FW-ROS-STD, FW-ROS-GDL, and FW-ROS-SUIT)

01 (**FW-ROS-DC-01**) Outdoor recreation opportunities and experiences are available year-round in a range of settings as described by the desired recreation opportunity spectrum. These settings reflect the integration of other resource values with the desired recreation opportunities, access, facilities, and infrastructure provided within those settings.

The desired distribution of forestwide recreation opportunity settings are described in Table 14. Specific locations and distribution of desired recreation opportunity spectrum settings are mapped for each GA and are in appendix A.

Table 14. Desired recreation opportunity spectrum settings

Desired recreation opportunity spectrum settings	ROS		Winter ROS	
	Acres	Percent of total forest[1]	Acres	Percent of total forest[1]
Primitive	1,034,715	36	1,017,244	35
Semiprimitive nonmotorized	758,488	26	856,799	30
Semiprimitive motorized	368,338	13	726,772	25
Roaded natural	692,704	24	253,980	9
Rural	28,982	1	28,432	1
Urban	0	0	0	0

[1] Percentage of the total NFS lands, rounded to the nearest whole number.

Table 15 describes desired conditions, objectives, standards, guidelines, and suitability for each of the recreation opportunity spectrum settings.

Table 15. Recreation opportunity spectrum plan components

Desired conditions	Associated plan components to achieve desired recreation opportunity spectrum settings	
(FW-ROS-DC-02) Primitive ROS settings encompass large, wild, remote, and predominately unmodified landscapes. These settings often coincide with designated wilderness. Additional primitive ROS settings are scattered across the forest, often surrounded by SPNM settings. Primitive ROS settings contain no motorized recreation and little probability of seeing other people. They provide quiet solitude away from roads and people, are generally free of human development, and facilitate self-reliance and discovery. Historic structures such as log ranger stations and fire lookouts are occasionally present. Signing and other infrastructure is minimal and constructed of rustic, native materials. **(FW-ROS-DC-03) Primitive ROS settings (winter)** are large, remote, wild, and predominately unmodified. Winter primitive ROS settings provide quiet solitude away from roads, and people. There is no motorized activity and little probability of seeing other people. Constructed trails that are evident in the summer months are covered by snow, making these settings appear even more natural and untouched by human management.	**Objective**	**NA**
	Standards	**(FW-ROS-STD-01)** Motorized routes (road, trails, and waterways) and motorized play areas shall not be constructed or authorized in desired primitive settings. Exceptions may be granted for administrative access needs. **(FW-ROS-STD-02)** Airstrips shall not be constructed in desired Primitive settings.
	Guidelines	**(FW-ROS-GDL-01)** To maintain the unmodified character of the area, permanent structures should not be constructed in desired primitive ROS settings. Exceptions may be granted for administrative uses, including those needed for safety of employees and the public. **(FW-ROS-GDL-02)** To maintain the scenic quality of these wild and remote landscapes, scenery should be managed for very high scenic integrity objectives. Also see FW-SCENERY-GDL-01. **(FW-ROS-GDL-03)** Vegetation management practices should maintain the natural vegetation, ecosystem processes, and functions of these areas.
	ROS suitability	**(FW-ROS-SUIT-01)** Nonmotorized trails and cross-country nonmotorized travel are suitable in desired primitive settings. **(FW-ROS-SUIT-02)** Mechanized means of transportation and mechanized equipment are suitable on designated trails in desired primitive settings, unless prohibited by law, forest plan direction, or forest closure order. **(FW-ROS-SUIT-03)** Motorized recreation travel is not suitable in desired primitive settings. **(FW-ROS-SUIT-04)** Airstrips are not suitable in primitive ROS settings.
	Winter ROS suitability	**(FW-ROS-SUIT-05)** Motorized over snow vehicle travel is not suitable in desired primitive settings.
(FW-ROS-DC-04) Semiprimitive Nonmotorized settings provide opportunities for exploration, challenge, and self-reliance. Rustic structures such as signs and foot bridges are occasionally present to direct use and/or protect the setting's natural and cultural resources. These rustic constructed features are built from native materials or those that mimic native materials. Historic structures such as log ranger stations and fire lookouts are occasionally present. Closed roads may be present but do not dominate the landscape or detract from the SPNM experience of visitors.	**Objective**	NA
	Standards	**(FW-ROS-STD-03)** Motorized routes (road, trails, and waterways) and motorized play areas shall not be constructed or authorized in desired semiprimitive nonmotorized settings. Temporary roads may be allowed if fully rehabilitated after use. **(FW-ROS-STD-04)** Airstrips shall not be constructed in desired semiprimitive nonmotorized settings.
	Guidelines	**(FW-ROS-GDL-04)** To maintain the scenic quality of these wild and semiremote landscapes, scenery should be managed for high scenic integrity objectives in semiprimitive nonmotorized settings. Also see FW-SCENERY-GDL-01.

Desired conditions	Associated plan components to achieve desired recreation opportunity spectrum settings	
These settings are free of motorized recreation travel, but mechanized travel may be present. **(FW-ROS-DC-05) Semiprimitive Nonmotorized settings (winter)** provide backcountry skiing, snowboarding, and snowshoeing opportunities. Trails are ungroomed and often not marked. Rustic facilities, such as historic cabins and yurts may exist but are rare.		**(FW-ROS-GDL-05)** Where vegetation management occurs in this setting, treatments should promote natural resilient vegetation.
	ROS suitability	**(FW-ROS-SUIT-06)** Nonmotorized trails and cross-country nonmotorized travel are suitable in desired semiprimitive nonmotorized settings. **(FW-ROS-SUIT-07)** Mechanized means of transportation and mechanized equipment are suitable on FS authorized routes and areas in desired semiprimitive nonmotorized settings, unless prohibited by law, forest plan direction, or forest closure order. **(FW-ROS-SUIT-08)** Motorized recreation travel is not suitable in desired semiprimitive nonmotorized settings. **(FW-ROS-SUIT-09)** Airstrips are not suitable in semiprimitive ROS settings.
	Winter ROS suitability	**(FW-ROS-SUIT-10)** In winter, motorized recreation travel is not suitable in desired semiprimitive nonmotorized settings.
(FW-ROS-DC-06) Semiprimitive Motorized ROS settings provide motorized recreation opportunities in backcountry settings. Routes are designed for off highway vehicles (OHVs) and high clearance vehicles that connect to local communities, access key destinations and vantage points, provide short day trips on scenic loops or facilitate longer and even overnight, expeditions. Visitors challenge themselves as they explore vast, rugged landscapes. Mountain bikes and other mechanized equipment may also be present. Facilities are rustic and are used for the purpose of protecting the setting's natural and cultural resources. Bridges are sometimes present to accommodate foot, horse and ATV traffic but are built from native or natural appearing materials that blend with the surrounding landscape and maintain the semiprimitive character of the setting. There may also be nodes that function as portals for visitors to park their ATVs and explore adjacent semiprimitive nonmotorized and Primitive settings on foot. **(FW-ROS-DC-07) Semiprimitive Motorized settings (winter)** provide backcountry skiing and snowmobiling opportunities. Snowmobile trails are groomed but trails for backcountry skiing opportunities are ungroomed. Trails are often signed and marked. There are vast areas to travel cross-country, offering visitors an opportunity for exploration and challenge. Occasionally,	**Objective**	NA
	Standard	**(FW-ROS-STD--05)** Permanent roads shall not be constructed in desired semiprimitive motorized settings. Temporary roads may be allowed if fully rehabilitated after use.
	Guideline	**(FW-ROS-GDL-06)** To maintain the scenic quality of these wild and semiremote landscapes, scenery should be managed for high to moderate scenic integrity objectives in semiprimitive motorized settings. Also see FW-GDL-SCENERY-01. **(FW-ROS-GDL-07)** Where vegetation management occurs in this setting, treatments should promote natural resilient vegetation.
	ROS suitability	**(FW-ROS-SUIT-11)** Motorized use is suitable on designated roads, trails, and areas in desired semiprimitive motorized settings. **(FW-ROS-SUIT-12)** Airstrips are suitable in desired semiprimitive motorized settings. **(FW-ROS-SUIT-13)** Nonmotorized trails and cross-country nonmotorized travel are suitable in desired semiprimitive motorized settings. **(FW-ROS-SUIT-14)** Mechanized means of transportation is suitable on designated routes and areas in desired semiprimitive motorized settings.
	Winter ROS suitability	**(FW-ROS-SUIT-15)** Ungroomed but marked over snow vehicle routes and areas and ungroomed ski trails are suitable in desired semiprimitive motorized settings. **(FW-ROS-SUIT-16)** Motorized vehicles, other than those designed for over-snow use, are not suitable in desired semiprimitive motorized settings.

Desired conditions	Associated plan components to achieve desired recreation opportunity spectrum settings	
historic cabins or warming huts are available for short breaks or overnight use.		
(FW-ROS-DC-08) Roaded Natural ROS settings are often referred to as front country recreation areas. This 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. Sanitation, potable water, interpretive signing, and other amenities are strategically placed to serve as destination points and/or portals to adjacent backcountry settings. Signing, facilities, bridges and other infrastructure are constructed of native materials or natural appearing materials that blend with and complement the surrounding natural setting. **(FW-ROS-DC-09) Roaded Natural ROS settings (winter)** support higher concentrations of use, user comfort, and social interaction. The road system is plowed and accommodates sedan travel. Winter trails are routinely groomed and may have ancillary facilities such as warming huts and restrooms. System roads and trails often provide staging to adjacent backcountry settings (primitive, SPNM and SPM). Guided snowmobiling, dog sledding, skiing, and snowshoeing may also be present.	**Objective**	NA
	Standard	NA
	Guideline	**(FW-ROS-GDL-08)** To maintain the scenic quality of natural appearing landscapes, scenery should be managed for high, moderate and low scenic integrity objectives. Also see FW-SCENERY-GDL-01.
	ROS suitability	**(FW-ROS-SUIT-17)** Motorized use is suitable on designated roads, trails, and areas in desired roaded natural ROS settings. **(FW-ROS-SUIT-18)** Mechanized means of transportation is suitable on designated routes and areas in desired roaded natural settings. **(FW-ROS-SUIT-19)** Airstrips are suitable in desired roaded natural settings.
	Winter ROS suitability	**(FW-ROS-SUIT-20)** Plowed roads, groomed trails and motorized snow play areas are suitable in desired roaded natural settings. **(FW-ROS-SUIT-21)** In winter, motorized vehicles, other than those designed for over-snow use, are not suitable in desired roaded natural ROS settings.
(FW-ROS-DC-10) Rural ROS settings often serve as a recreation destination and sometimes provide access to adjacent roaded natural and semiprimitive settings and opportunities. These areas are accessed from paved roads and are generally close to communities. Developed recreation facilities are designed for large groups and provide opportunities to socialize in both day-use and overnight sites. **(FW-ROS-DC-11) Rural ROS settings (winter)** provide staging to adjacent winter settings and opportunities. These areas are accessed from paved and plowed roads and are generally close to population centers. Warming huts or other shelters, sanitation, and information and education are commonly present. Parking areas are large and plowed. Entry points and routes are	**Objective**	NA
	Standard	NA
	Guideline	**(FW-ROS-GDL-9)** To maintain the scenic quality of natural appearing landscapes, scenery should be managed for High, Moderate and Low scenic integrity objectives. Also see FW-SCENERY-GDL-01.
	ROS suitability	**(FW-ROS-SUIT-22)** Motorized use is suitable on designated roads, trails, and areas in desired rural ROS settings. **(FW-ROS-SUIT-23)** Mechanized means of transportation is suitable on designated routes and areas in desired rural settings. **(FW-ROS-SUIT-24)** Airstrips are suitable in desired rural ROS settings.
	Winter ROS suitability	**(FW-ROS-SUIT-25)** In winter, motorized vehicles, other than those designed for over-snow use, are not suitable in desired rural ROS settings.

Desired conditions	Associated plan components to achieve desired recreation opportunity spectrum settings	
signed and lead snowmobiles to adjacent RN and SPM settings. Nonmotorized trails are also typically groomed for skate skiing, and x-country skiing. Rural winter settings provide quick and convenient access for communities and families to celebrate holidays, conduct racing events, walk the dog, and more.		**(FW-ROS-SUIT-26)** Plowed roads, groomed trails and motorized snow play areas are suitable in desired rural settings.
(FW-ROS-DC-12) Urban ROS settings These highly developed areas are accessed from paved roads and highways. They are typically close to communities. Developed recreation facilities are designed for large groups and provide opportunities to gather and socialize. Recreation sites are often destinations for day use. Visitor centers and interpretive exhibits are often present. Resorts may be present and offer overnight accommodations. **(FW-ROS-DC-13) Urban ROS settings (winter)** These areas are accessed from plowed roads and are generally close to population centers. Warming huts or other shelters, restrooms, and I&E (information and education) are commonly present. Parking areas are large and plowed. Entry points and routes are signed and lead snowmobiles to adjacent RN and SPM settings. Nonmotorized trails are also typically groomed for skate skiing, and x-country skiing. Winter Urban settings may also contain ski resorts with groomed down-hill skiing and snowboarding opportunities.	**Objective**	NA
	Standard	NA
	Guideline	**(FW-ROS-GDL-10)** To maintain the scenic quality of these wild and semiremote landscapes, scenery should be managed for High, Moderate and Low scenic integrity objectives in urban settings. Also see FW-SCENERY-GDL-01.
	ROS suitability	**(FW-ROS-SUIT-27)** Highly developed recreation sites and highly structured interpretation, education, and recreation activities are suitable in urban ROS settings. **(FW-ROS-SUIT-28)** Motorized use is suitable on designated roads, trails, and areas in desired urban ROS settings. **(FW-ROS-SUIT-29)** Mechanized means of transportation is suitable on designated routes and areas in desired urban settings. **(FW-ROS-SUIT-30)** Airstrips are suitable in desired urban ROS settings.
	Winter ROS suitability	**(FS-ROS-SUIT-31)** Developed recreation sites, including visitor centers, ski areas, and other resorts are open and suitable in desired winter urban settings. **(FW-ROS-SUIT-32)** In winter, motorized vehicles, other than those designed for over-snow use, are not suitable in desired urban ROS settings. **(FW-ROS-SUIT-33)** Plowed roads, groomed trails, and motorized snow play areasare suitable in desired winter urban ROS settings. **(FW-ROS-SUIT-34)** Groomed ski trails are suitable in desired urban ROS settings.

Recreation Opportunities (REC)

Introduction

Recreation is recognized as a critical resource due to: its contributions to economic and social sustainability, its influence in connecting people to the land, its impact on public understanding of natural and cultural resources, and its role as a catalyst for public stewardship. Increased recreational use of the forest has generated the need to incorporate flexible management strategies to address emerging technologies and potential future uses. To address both the challenges and opportunities in recreation management, the FS strives to provide a set of recreation settings, opportunities, and benefits that are sustainable over time.

Recreation sites are generally managed on a continuum based on a development scale ranging from 1 to 5. Recreation sites with minimum to low or few site modifications are lower on the development scale (1-2) and are considered "dispersed" recreation sites. Recreation sites with higher site modification and infrastructure on the development scale (3-5) are considered "developed" recreation sites. Table 16 explains the development scale and provides a definition of each.

Table 16. Recreation site development scales

Development scale	Definition	Developed or dispersed
1	***Recreation sites with minimum site modification.*** Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation. Spacing informal and extended to minimize contacts between users. Access primarily by nonmotorized trails.	Dispersed
2	***Recreation sites with little site modification.*** Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. Use of synthetic materials avoided. Minimum controls are subtle. Little obvious regimentation. Spacing informal and extended to minimize contacts between users. Primary access over primitive roads and both primitive and formalized trail systems. Interpretive services informal.	Dispersed
3	***Recreation sites with moderate modification.*** Facilities about equal for protection of natural site and comfort of users. Contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls usually provided. Roads may be hard surfaced and trails formalized. Development density about three family units per acre. Primary access may be over high standard roads. Interpretive services informal, but generally direct.	Developed
4	***Recreation sites that are heavily modified***. Some facilities designed strictly for comfort and convenience of users. Luxury facilities not provided. Facility design may incorporate synthetic materials. Extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually obvious. Primary access usually over paved roads. Development density about three to five family units per acre. Plant materials usually native. Interpretive services often formal or structured.	Developed
5	***Recreation sites with a high degree of site modification.*** Facilities mostly designed for comfort and convenience of users and usually include flush toilets; may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density about five or more family units per acre. Plant materials may be foreign to the environment. Formal interpretive services usually available. Designs formalized and	Developed

Development scale	Definition	Developed or dispersed
	architecture may be contemporary. Mowed lawns and clipped shrubs not unusual.	

Desired Conditions (FW-REC-DC)

01 Recreation opportunities enable visitors to connect with the unique natural environments and historic and cultural occurrences that have taken place throughout the area and instill a culture of stewardship and appreciation.

02 Activities associated with recreational opportunities contribute to jobs and income in the local economy, community stability or growth, and the quality of lifestyles.

03 Sustainable levels of developed recreation sites and facilities exist at key locations to accommodate concentrations of recreation use and enhance visitor experiences.

04 Recreation facilities, including trails and dispersed sites, and their uses have minimal impacts on resources including wildlife, heritage and cultural sites, water quality, and aquatic species.

05 Recreation rental cabins and rental lookouts provide unique and/or historic overnight facilities.

06 Vegetation within developed recreation sites is healthy and resilient and provides for the health and safety of the public. Also see FW-VEGT-DC-05.

07 Dispersed recreation camping sites (development scale 1-2) provide undeveloped camping opportunities while considering cultural and natural resource concerns, activity and recreation user conflicts, and over-use.

08 Environmental and cultural resources at dispersed recreation sites (development scale level 1 and 2) are protected by infrastructure such as trails, barriers, and minimal signage when necessary.

Goals (FW-REC-GO)

01 The operation, maintenance, and delivery of recreation facilities and programs, and information, education, and visitor services are supported by partnerships and volunteer programs.

Objectives (FW-REC-OBJ)

01 Rehabilitate at least five dispersed recreation sites (development scale 1-2) which have erosion or sanitation issues.

02 Rehabilitate or relocate at least five existing recreation facilities, including dispersed sites, if they are degrading surface or riparian resources.

03 Improve accessibility of facilities or programs at at least five developed recreation sites (development scale 3-5), such as campgrounds, trailheads, cabin rentals, or the Lewis and Clark National Historic Trail Interpretive Center.

04 Rehabilitate or refurbish at least five developed recreation sites (development scale 3-5) to meet current and future projected demands.

Guidelines (FW-REC-GDL)

01 Management of developed recreation facilities should be responsive to environmental changes such as but not limited to changes in water flows, snow levels, snow elevation, fish and wildlife habitats, vegetative conditions, and seasonal recreation use.

02 To promote scenic values within and adjacent to developed recreation sites, vegetation management activities should be consistent with the scenic integrity objectives of moderate to high.

03 To maintain quality and quantity of water flows to, within, or between groundwater dependent ecosystems, groundwater use facilities at recreation and administrative sites should not: a) be developed in RMZs (unless no alternatives exist); b) measurably lower river flows, lake levels, or flows to wetlands or springs (for example change springs from perennial to intermittent, or eliminate springs altogether); and/or c) discharge pollutants directly to groundwater.

04 To reduce potential impact to fishery resources, avoid placing new facilities or infrastructure within expected long-term channel migration zone. Where new activities inherently must occur in RMZs (for example road stream crossings, boat ramps, docks, and interpretive trails), locate them to minimize impacts on riparian associated resource conditions.

05 Where existing recreation facilities are located within RMZs and degrading aquatic or riparian resources, consider removing or relocating such facilities outside of RMZs or use other means practicable to reduce effects. In RMZs, areas where developed recreation facilities have been removed should be rehabilitated to a natural state.

06 To protect resources, new and reconstructed solid and sanitary waste facilities should not be located within inner RMZs.

07 To reduce the potential for bear/human conflicts, plantings and seed mixes near roads and developed recreation facilities should not contain plant species that may attract bears. Also see FW-NCDE-DC-01, PCAZ1-NCDE-GDL-01, PCA-NCDE-GDL-08, and NCDE-GDL-VEG-05.

08 To preserve the recreation settings of the area, the development scale of new or updated recreation facilities should be consistent with the desired recreation opportunity spectrum settings and with recreation area, river corridor, and/or trail management plans.

09 To preserve the recreation settings of the area, dispersed recreation activities should be compatible with desired recreation opportunity spectrum settings.

Suitability (FW-REC-SUIT)

01 Developed recreation sites are not suitable for timber production. However, timber harvest or other vegetation management may occur to address safety concerns or to provide for other multiple use values.

02 Developed recreation sites are not suitable for saleable mineral activities, unless the material is used onsite for administrative purposes.

03 Developed recreation sites that have been administratively withdrawn from mineral entry are not available for leasable or locatable mineral activity.

04 Developed recreation sites are not suitable for livestock grazing, with the general exception of recreational pack animal use such as horses, goats, or llamas.

Recreation Special Uses (RSUP)

Introduction

Recreation special use permits provide for occupancy and use of national forests through issuance of permits. Permitted recreation uses provide specific recreational opportunities to the public and deliver economic benefits to rural economics. There are both commercial and noncommercial recreation special use permits. Commercial special use permits include opportunities such as ski resorts, outfitter and guiding services, lodging resorts, and organizational camps. Noncommercial special use permits are used by individuals and single families, such as permits issued for recreation residences.

Desired Conditions (FW-RSUP-DC)

01 Recreation special uses provide unique opportunities, services, and experiences for the recreating public and/or attend to a demonstrated demand for a specific recreation opportunity.

02 Services provided by recreation special uses enhance the recreation experiences of forest visitors, while ensuring public health and safety and protecting natural and cultural resources. Also see FW-CR-DC-03.

03 Recreation special uses contribute to jobs and income in the local economy, community stability or growth, and the quality of lifestyles throughout the forest while remaining compatible with ecological and social capacity thresholds.

04 Historic buildings associated with recreation special use permits reflect identified historic values while providing for functional use by permit holders. Also see FW-CR-DC-02.

05 The vegetation within and nearby recreation special use facilities is healthy and resilient and provides for the health and safety of the public. Also see FW-VEGT-DC-05.

Guidelines (FW-RSUP-GDL)

01 To mitigate conflicts with other users, recreation operations, under (or being considered for) special use authorizations, should include permit measures that address potential conflicts such as, but not limited to: location of the event, timing of the event, party size, and education on the reduction of human-wildlife conflict.

Recreation Access (ACCESS)

Introduction

Recreation access to and through the Forest is facilitated in many ways. Most often, main access is provided via public roads and right of ways and through easements with private land holders. Once on forest, direction for recreation access is provided through travel management plans. Roads, motorized trails, nonmotorized trails, rivers, and airstrips provide access for visitors to walk, bike, ride, drive, boat, or fly to their destinations. Recreation through roads and access to the Forest through airstrips generally occurs in motorized ROS settings. Trails occur across all ROS settings, depending upon the mode of transport used for the trail use and whether an area is designated for motorized or nonmotorized uses. Also see Infrastructure, Roads and Trails.

Desired Conditions (FW-ACCESS-DC)

01 Forest system roads and trails provide a variety of motorized, nonmotorized, and mechanized means of transportation access to the Forest, during summer and winter seasons. Routes provide access to key destinations on the forest. Unauthorized recreation routes are not present on the landscape.

02 Airstrips provide opportunities for motorized recreation aviation access.

03 Forest visitors use the designated system of roads, trails, and airstrips to access recreation activities appropriate within identified recreation opportunity setting locations.

04 The facilities associated with forest system roads, trails, trailheads and airstrips enhance the recreation experiences of forest visitors, attend to public health and safety, and protect natural and cultural resources.

Goals (FW-ACCESS-GO)

01 The Forest Service works in cooperation with landowners, other agencies, and partners to provide legal access to public lands.

Guidelines (FW-ACCESS-GDL)

01 To protect natural and cultural resources, projects and other management activities should be designed to prevent the creation and/or use of unauthorized recreation routes, and to rehabilitate existing ones to the extent practicable.

02 New trailheads, for both motorized and nonmotorized recreation uses, and airstrips should be strategically located to provide safe and convenient staging for recreation opportunities.

Scenic Character (SCENERY)

Introduction

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. The HLC NF's scenery serves as the backdrop to adjacent communities. Historic cabins and fire lookouts and remnants of historic mining districts contribute to the unique scenic character of the GAs of the Forest. Natural disturbance processes such as wildfire, insects, and diseases are dynamic and part of the natural appearing landscape and the described landscape character. Human impacts on the scenic character such as timber removal, prescribed fire, grazing, and special uses such as utility corridors, may or may not create impacts to the natural appearance of the landscape.

Desired scenic integrity objectives are mapped and described for each GA and are in appendix A. Desired scenic integrity objectives 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. There are five distinct scenic integrity objectives: 1) very high, 2) high, 3) moderate, 4) low, and 5) very low. The desired scenic integrity objective is the minimum level of integrity to be achieved. Table 17 and the glossary provide definitions for each of the five scenic integrity objectives.

Scenic character descriptions and important viewpoints for each GA may be found in appendix G.

Table 17. Scenic integrity objectives and definitions

Scenic integrity objective	Definition
Very high	Landscapes where the valued landscape character "is" intact with minute if any deviations.
High	Landscapes in which the valued landscape character "appear intact."
Moderate	Landscapes in which the valued landscape character "appears slightly altered".
Low	Landscapes in which the valued landscape character "appears altered."
Very low	Landscape where the valued landscape character "appears heavily altered."

The overall scenic integrity objective distribution for the HLC NF is identified in Table 18.

Table 18. Desired scenic integrity objective percentages for the HLC NF

Scenic integrity objective	%
Very high	36
High	45
Moderate	12
Low	7
Very low	0

Desired Conditions (FW-SCENERY-DC)

01 The natural and cultural attributes of the Forest's scenery are described in the scenic character descriptions; see appendix G.

02 Scenery integrity objectives contribute to and establish the sense of place of local communities.

03 Scenic integrity objectives are in harmony with and contribute to desired recreation settings and experiences. See FW-ROS-Table 15.

Guidelines (FW-SCENERY-GDL)

01 To achieve or maintain the identified scenic integrity objectives on the forest:

- Vegetative management activities should reflect natural disturbance regimes and processes.
- Desired scenic integrity objectives should be met during management activities to ensure scenery continues to contribute to the sense of place of the Forest's landscapes.
- The construction or reconstruction of FS facilities should harmonize with or complement the character of the landscape settings. Also see FW-ROS-DC-01.

Designated Areas

Introduction

A designated area is defined as an area or feature identified and managed to maintain its unique special character or purpose. Some categories of designated areas may be congressionally designated or designated through presidential proclamation, and some may be established administratively. Examples of congressionally designated areas include, but are not limited to, designated wilderness areas, national

scenic trails, and wilderness study areas. Examples of administratively designated areas include, but are not limited to, recommended wilderness areas, eligible wild and scenic rivers, research natural areas, scenic byways, experimental forests, recreation areas, and cultural areas. Typically, these areas are not suitable for timber production, but in some cases timber harvest may be appropriate to achieve desired conditions that address recreational values, public safety, or ecological restoration.

Where multiple designations overlap, the plan components associated with the most restrictive designation apply.

Designated Wilderness (WILD)

Introduction

The Wilderness Act of 1964 set up a system of wilderness areas across the United States to assure that an increasing population, accompanied by expanding settlement and growing mechanization, did not occupy and modify all areas within the United States and its possessions. These areas are to be administered for the use and enjoyment of the American people and for the preservation of their wilderness character. In addition to the Wilderness Act, the FS provides direction for the management of wilderness through Forest Service Manual 2320, as well as through wilderness management plans which provide wilderness-specific management direction and guidance.

Three designated wilderness areas are located within the Forest either in part or in whole. These wilderness areas are portions of the Bob Marshall and the Scapegoat wilderness' and the entire Gates of the Mountains wilderness. These designated wilderness areas comprise roughly 565,158 acres, which is approximately 20% of the entire forest. Table 19 displays each of these wilderness areas, the GAs each is located within, and the approximate number of acres of each wilderness within the HLC NF.

Table 19. Designated wilderness areas

Wilderness	Geographic area	Total wilderness acres within the planning area[1]
Gates of the Mountains	Big Belts	28,440
Bob Marshall	Rocky Mountain Range	351,621
Scapegoat	Upper Blackfoot and Rocky Mountain Range	184,054
Total acres of wilderness in the planning area		564,115

1.Acres include new additional acres from the National Defense Authorization Act of 2015.

Desired Conditions (FW-WILD-DC)

01 Designated wilderness areas provide for wilderness character as defined by the Wilderness Act and the wilderness areas' enabling legislation.

02 Natural ecological processes (e.g., plant succession) and disturbances (e.g., wildfire, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation. Fire plays a role as a natural disturbance agent within designated wilderness areas.

03 The large remote areas within designated wilderness areas contribute habitats for species with large home ranges such as wide-ranging carnivores (e.g., grizzly bear) and species found primarily in these habitats (e.g., mountain goats). Habitat conditions in designated wilderness contribute to wildlife movement within and across the Forest.

04 Water bodies and riparian areas provide undisturbed quality habitat for fish, amphibians, and other aquatic-associated species.

05 Facilities within designated wilderness provide for the management, protection, and use of the wilderness. Facilities and structures with significant historic values contribute to the wilderness character. Facilities, trails, and signage within wilderness areas are minimal and constructed of rustic, native, or natural-appearing materials.

06 Outfitter and guide opportunities provide services that respond to relevant public need.

07 The Bob Marshall, Scapegoat, and Gates of the Mountains Wilderness Areas are maintained as Class I Air Quality areas. See also FW-AQ-DC-01.

Goals (FW-WILD-GO)

01 The HLC NF works in collaboration with adjacent national forests to manage the Bob Marshall Wilderness Complex, which includes the Great Bear, Bob Marshall, and Scapegoat Wilderness Areas.

Guidelines (FW-WILD-GDL)

01 To protect water quality and aquatic habitats, grazing of recreational livestock should not be permitted within 100 feet of water sources.

02 To protect cave resources, known caves and new cave discoveries should not be signed, disclosed on maps, mentioned in brochures, or have permanent reference marking except when necessary for resource protection.

Suitability (FW-WILD-SUIT)

01 Designated wilderness areas are suitable for existing livestock grazing allotments, but they are not suitable for new or expanded livestock grazing allotments.

02 Designated wilderness areas are not suitable for motorized uses or mechanized means of transportation (including bicycles) except as allowed by enabling legislation.

03 Designated wilderness areas are not suitable for timber production or timber harvest.

04 Designated wilderness areas are not suitable for commercial use of nontimber forest products (e.g., firewood, mushrooms, huckleberries), but are suitable for personal and agency use.

05 Designated wilderness areas are not suitable for permanent structures unless they are necessary to meet minimum requirement for the administration of the area.

Recommended Wilderness Areas (RECWILD)

Introduction

During plan development or revision, the responsible official is required to “identify and evaluate lands that may be suitable for inclusion in the National Wilderness Preservation System and determine whether to recommend to the Chief of the Forest Service any such lands for wilderness designation” (36 CFR Part 219 and Forest Service Land Management Planning Handbook 1909.12). The process by which lands are recommended for inclusion in the National Wilderness Preservation System is described in 2012 Forest Service Planning Rule and Chapter 70 of the Forest Service Land Management Planning Handbook

1909.12. For detailed information regarding the inventory and evaluation steps the HLC NF followed during this process, including maps and documentation, please see appendix E of the FEIS.

Recommended wilderness areas are only preliminary administrative recommendations; Congress has reserved the authority to make final decisions on wilderness designation. Until such time that Congress designates these areas by law, the following plan components will apply to the identified recommended wilderness areas on the HLC NF.

Increased recreational use of the forest has generated the need to incorporate flexible management strategies to address emerging technologies and potential future uses within recommended wilderness areas.

Table 20 identifies the seven recommended wilderness areas in the Plan, the GAs they are located within, and the acreage associate with each.

Table 20. Recommended wilderness acres[1]

Recommended wilderness area	Geographic area	Acres	Percent of forestwide total
Big Log	Big Belts	7,035	<1
Mount Baldy	Big Belts	8,141	<1
Electric Peak	Divide	18,239	<1
Big Snowies	Snowies	66,894	2
Silver King	Upper Blackfoot	18,568	1
Red Mountain	Upper Blackfoot	2,500	<1
Nevada Mountain[2]	Divide and Upper Blackfoot	31,571	1
Total		152,948	5

[1]Acres are approximate

[2]Portions of the Nevada Mountain RWA are located within both the Divide and Upper Blackfoot GA's.

Desired Conditions (FW-RECWILD-DC)

01 Recommended wilderness areas preserve opportunities for inclusion in the National Wilderness Preservation System. The ecological and social characteristics that provided the basis for each area's suitability for wilderness recommendation are protected and maintained.

02 Recommended wilderness areas are characterized by a natural environment where ecological processes such as natural succession, wildfire, avalanches, insects, and disease function as the primary forces affecting the environment.

03 Recommended wilderness areas provide outstanding opportunities for solitude or primitive and unconfined recreation.

Standards (FW-RECWILD-STD)

01 Within recommended wilderness areas new leases for leasable minerals shall include a no surface occupancy stipulation.

Suitability (FW-RECWILD-SUIT)

01 Motorized and mechanized means of transportation are not suitable in recommended wilderness areas. Exceptions may be made for authorized permitted uses, valid existing uses, or in emergencies involving public health and safety that are determined on a case by case basis.

02 Recommended wilderness areas are suitable for restoration activities (such as management ignited fires, active weed management) to protect and/or enhance the wilderness characteristics of these areas.

03 Motorized and mechanized equipment (such as chain saws to clear trails) are suitable for accomplishing restoration activities and/or administrative work.

04 Recommended wilderness areas are not suitable for timber production or timber harvest.

05 Recommended wilderness areas are not suitable for new commercial communication sites and new utility corridors.

06 Recommended wilderness areas are not suitable for road construction or reconstruction.

07 Recommended wilderness areas are not suitable for new developed recreation sites and/or facilities.

08 Recommended wilderness areas are suitable for existing livestock grazing allotments, but they are not suitable for new or expanded livestock grazing allotments.

Wilderness Study Areas (WSA)

Introduction

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 "suitability for preservation as wilderness" of nine separate areas within the national forests in Montana. The Middle Fork Judith and the Big Snowies are two of the areas identified in this legislation that lie within the HLC NF. Wilderness study areas are to be administered by the Secretary of Agriculture "so as to maintain their presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System".

Until Congress makes a final decision on wilderness or nonwilderness designation, these areas will be managed per the plan direction identified for wilderness study areas in this section. If Congress acts to designate one or both areas as wilderness, the wilderness study area direction would no longer apply and Designated Wilderness plan direction would apply. Where plan direction overlaps, generally the most protective plan components take precedence. However, the statutory authority and plan components for wilderness study areas takes precedence over other plan direction such as the primitive recreation opportunity spectrum plan components.

If Congress acts to release one or both areas from the Act, the wilderness study area direction will no longer apply and management of the released areas would continue under forestwide, and applicable GA and designated area plan direction. See Table 21 for a description of the primary management direction for these areas should Congress act to release these areas without designating as wilderness.

Table 21. Montana wilderness study areas

Wilderness study area	GA	Acres[1]	Primary management direction[2] if Congress releases WSAs
Middle Fork Judith	Little Belts	82,127	IRA
Big Snowies	Snowies	87,968	IRA/RWA
Total acres		170,095	

[1]Acres are approximate
[2]Additional forestwide and GA direction would apply

Desired Conditions (FW-WSA-DC)

01 Wilderness study areas are characterized by a natural environment where ecological processes such as natural succession, wildfire, avalanches, insects and disease function as the primary forces affecting the environment.

02 Wilderness study areas primarily offer opportunities for primitive recreation, although uses established and allowed prior to the enabling legislation are retained if they maintain the wilderness character and the potential for inclusion in the National Wilderness Preservation System that existed in 1977.

Standards (FW-WSA-STD)

01 Within the wilderness study areas new leases for leasable minerals shall include a no surface occupancy stipulation.

Suitability (FW-WSA-SUIT)

01 Wilderness study areas are not suitable for timber production or timber harvest.

02 Wilderness study areas are not suitable for new commercial communication sites or new utility corridors.

03 Wilderness study areas are suitable for restoration activities (such as management ignited fires, active weed management) to protect and/or enhance the wilderness characteristics of these areas.

04 Motorized and mechanized equipment (such as chain saws to clear trails) is suitable for accomplishing restoration activities and/or administrative work.

05 New road construction or reconstruction is not suitable in wilderness study areas. However, reconstruction or rerouting existing roads to eliminate impacts to natural or cultural resources is suitable provided abandoned routes are fully rehabilitated.

06 Wilderness study areas are not suitable for new developed recreation facilities.

07 Wilderness study areas are suitable for existing livestock grazing allotments, but they are not suitable for new or expanded livestock grazing allotments.

08 Wilderness study areas are suitable for motorized and mechanized means of transportation so long as these uses maintain the wilderness character as it existed prior to 1977 and retain the potential for future consideration as wilderness.

Inventoried Roadless Areas (IRA)

Introduction

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 across the United States. This includes approximately 1.5 million acres of inventoried roadless areas on the HLC NF. 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. Specifically, the Roadless Rule prohibits activities that have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of roadless area values and characteristics, eliminates permanent road construction and reconstruction, thereby reducing fiscal demands and responsibilities, and reduces controversy over management of roadless areas. The unique contribution of inventoried roadless areas is important in maintaining habitats, natural processes, and remote recreation opportunities in the regional and national network of protected lands. Management activities shall follow direction found in the 2001 Roadless Rule (36 CFR 294 Subpart B, published at 66 Fed Reg. 3244-3273).

Inventoried roadless areas are identified in a set of inventoried roadless area maps, contained in the Forest Service Roadless Area Conservation Rule, Volume 2, dated November 2000, or any subsequent update or revisions of those maps (36 CFR 294 Subpart B, published at 66 Fed Reg. 3244-3273). They are held at the national headquarters office of the FS.

Currently, there are approximately 1,499,181 acres of lands within inventoried roadless areas on the HLC NF. Maps of the inventoried roadless areas can be found in appendix A. These inventoried roadless areas constitute approximately 50 percent of the entire land administered by the Forest. Table 22 identifies each inventoried roadless area, its location within the planning area, and the number of acres of the inventoried roadless area.

Table 22. Inventoried roadless areas within the planning area

Inventoried roadless area by GA	Acres[1]
Big Belts GA	
Big Log	8,948
Camas Creek	29,168
Cayuse Mountain	20,131
Devils Tower	7,139
Ellis Canyon	5,574
Grassy Mountain	6,734
Hellgate Gulch	16,809
Holter	1,964
Irish Gulch	7,315
Middleman Mtn./Hedges Mtn.	32,282
Mount Baldy	16,349
Total acres in the Big Belts GA	**152,413**
Castles GA	
Castle Mountains	29,386
Total acres in the Castles GA	**29,386**
Crazies GA	

Inventoried roadless area by GA	Acres[1]
Box Canyon	12,574
Crazy Mountains	24,924
Total acres in the Crazies GA	**37,498**
Divide GA	
Electric Peak[3]	27,858
Jericho Mountain	8,440
Lazyman Gulch	11,608
Nevada Mountain[2]	16,085
Total acres in the Divide GA	**63,991**
Elkhorns GA	
Elkhorns	75,415
Total acres in the Elkhorns GA	**75,415**
Highwoods GA	
Highwood Baldy	15,293
Highwoods	24,360
Total acres in the Highwoods GA	**39,653**
Little Belts GA	
Big Baldy	43,102
Bluff Mountain	38,033
Calf Creek	10,100
Eagle Park	5,908
Granite Mountain	10,330
Middle Fork Judith	9,707
Middle Fork Judith WSA	81,069
Mount High	33,461
North Fork Smith	8,438
Paine Gulch	7,869
Pilgrim Creek	44,572
Sawmill Creek	11,578
Spring Creek	17,827
Tenderfoot-Deep Creek	85,546
Tollgate-Sheep	24,026
TW Mountain	8,381
Total acres in the Little Belts GA	**439,947**
Rocky Mountain Range GA	
Bear-Marshall-Scapegoat-Swan[2]	395,248
Sawtooth	15,687
Total acres in the Rocky Mountain Range GA	**359,596**
SnowiesGA	
Big Snowies	9,254

Inventoried roadless area by GA	Acres[1]
Big Snowy Mountains WSA	87,965
Total acres in the Snowies GA	**97,219**
Upper Blackfoot GA	
Anaconda Hill	18,536
Bear-Marshall-Scapegoat-Swan[2]	51,339
Crater Mountain	9,261
Lincoln Gulch	8,247
Nevada Mountain[2]	34,027
Ogden Mountain	12,144
Silver King-Falls Creek	6,808
Specimen Creek	12,362
Total acres in the Upper Blackfoot GA	**152,724**
Total inventoried roadless area acres in the HLC NF planning area	**1,499,181**

[1]All acreages are approximate
[2]Located in more than one GA; acres reflected are what are in that particular GA.

Desired Conditions (FW-IRA-DC)

01 Inventoried roadless areas provide large, undisturbed, and unfragmented areas of land. These large land areas sustain high quality or undisturbed soil, water, and air and a diversity of plant and animal communities. They also provide for secure habitats for a variety of fish and wildlife species that are dependent upon large, undisturbed, unfragmented areas of land.

02 Within inventoried roadless areas, natural, ecological processes and disturbances (such as wildfire, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation. Inventoried roadless areas contribute to reference landscapes for future study and understanding of natural ecological processes.

03 Landscapes in inventoried roadless areas are naturally appearing with high scenic quality.

04 Inventoried roadless areas provide remote primitive and semiprimitive recreation opportunities in natural settings.

05 Inventoried roadless areas protect sources of public drinking water, traditional cultural properties and sacred sites, and locally identified unique characteristics, where they exist.

Suitability (FW-IRA-SUIT)

01 Inventoried roadless areas are unsuitable for timber production. However, timber harvest is suitable within inventoried roadless areas outside of wilderness study areas and recommended wilderness areas to provide for other multiple use values when consistent with the 2001 Roadless Area Conservation Rule.

02 Forest system roads (that are managed as part of the forest transportation system) in inventoried roadless areas are suitable for motorized and mechanized means of transportation.

03 Inventoried roadless areas are suitable for restoration activities (such as management ignited fires, active weed management) to protect and/or enhance the roadless area values and characteristics of these areas.

Eligible Wild and Scenic Rivers (WSR)

Introduction

Congress passed the Wild and Scenic Rivers Act in 1968 for the purpose of preserving rivers with outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar 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. Eligible and/or suitable wild, scenic, or recreational rivers retain their free-flowing status, their preliminary classification, and the outstandingly remarkable values for which they have been identified. Eligible river segments are classified as wild, scenic, or recreational.

The designation of eligible wild and scenic rivers pertains only to federally owned lands. Rivers and segments of rivers that pass through private lands were not considered in the eligibility study. Wild and scenic river eligibility is only a preliminary administrative recommendation; Congress has reserved the authority to make final decisions on wild and scenic river designation. A wild and scenic river suitability study has not been conducted on these rivers, so all eligible rivers will be protected until such time as a suitability study is completed, or until such time that Congress makes a designation decision. The plan components are based off FSH 1909.12 Chapter 80 which provides guidance on the protection of eligible wild and scenic rivers.

Based on the eligibility study, the HLC NF identified 45 rivers as eligible for inclusion as Wild and Scenic Rivers. Table 23 identifies those rivers, the GAs they are located within, and the mileage associate with each river. For detailed information about the eligibility study, including maps and documentation, please see appendix F of the FEIS. The list of streams in the table is organized geographically by watershed from north to south, east to west, in most cases.

Table 23. Eligible river segments by GA

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
Big Belts GA					
Beaver Creek	Segment 1: From mouth to private land boundary.	3.4	Recreational	Recreation Geology Cultural	Eligible in 1989 for Fish.
	Segment 2: From private boundary to private boundary.	0.7	Recreational		
	Segment 3: From private boundary to confluence with Bridge Creek, west of Nelson.	1.4	Recreational		
	Segment 4: From confluence with Sheep Gulch to confluence with Pike Creek.	3.7	Recreational		

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
White Creek	From where stream crosses section line between T20N R2E Sections 19 and 20 west to the private boundary.	3.0	Recreational	Fish	
Missouri River	From Hauser Dam to the confluence with Cochran Gulch.	2.2	Recreational	Recreation (Fishing) Geology Wildlife	Eligible in 1989 for Rec, Geology, Fish, Wildlife, and Natural.
Ray Creek	From FS boundary to headwaters.	3.4	Scenic	Fish	
Divide GA					
Little Blackfoot River	Segment 1: From private boundary to private boundary near Charter Oaks. Segment 2: From private land boundary south to the next private land boundary. Segment 3: From private land boundary south and west to the private land boundary northeast of Kading campground. Segment 4: From private land boundary south to the confluence with a no name stream near the intersection of Trail 329 and Trail 326. Segment 5: From the confluence with a no name stream near the intersection of Trail 329 and Trail 326 to the headwaters.	0.8 0.5 4.4 1.3 7.7	Recreational Recreational Recreational Recreational Wild	Fish Cultural	Eligible in 1989 for Fish.
High Ore Creek	From FS boundary to headwaters.	1.0	Scenic	Fish	
Kady Gulch	From FS boundary to the private land boundary.	1.1	Recreational	Fish	
South Fork Quartz Creek	From mouth to the private land boundary.	2.2	Recreational	Fish	
Skelly Gulch	From FS boundary to headwaters.	2.5	Scenic	Fish	
Elkhorns GA					
Staubach Creek	From private land boundary to the headwaters.	2.4	Scenic	Fish	
Highwoods GA					
North Fork Highwood Creek	From fish barrier to headwaters.	3.3	Scenic	Fish	

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
Big Coulee Creek	Segment 1: From the fish barrier to the confluence with a no name stream from the east. Segment 2: From the confluence with the no name creek to the upper tributary fork.	0.3 1.6	Scenic Wild	Fish Fish	
Cottonwood Creek	From FS boundary to the headwaters.	2.5	Scenic	Fish	
North Fork Little Belt Creek	From FS boundary to the headwaters.	2.1	Wild	Fish	
Little Belts GA					
Pilgrim Creek	Segment 1: From fish barrier south to the private land boundary. Segment 2: From private land boundary to the headwaters.	7.2 3.7	Scenic Scenic	Fish Fish	
Middle Fork Judith River	Segment 1: From FS boundary to private land boundary. Segment 2: From private land boundary to the confluence with Big Arch Coulee.	1.6 3.0	Recreational Recreational	Cultural	Eligible in 1989 for Cultural.
South Fork Judith River	Segment 1: From the confluence with Bower Creek to the confluence with Dry Pole Creek. Segment 2: From the confluence with Bluff Mountain Creek to the confluence with a no name creek. Segment 3: From the confluence with a no name creek to the headwaters.	3.6 7.4 3.9	Recreational Scenic Recreational	Fish Cultural	
Smith River *(NFS lands only)*	The Smith River is comprised of 17 small segments of Forest Service lands interspersed with private lands. Only Forest Service lands are considered for eligibility. To view individual segments, see detail maps located in the summary.	17.8	Scenic	Scenic Recreation Geology Wildlife Cultural	Eligible in 1989 for Rec, Scenery, Geology, Fish, Wildlife and Cultural.

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
Tenderfoot Creek	Segment 1: From private land boundary to private land boundary. Segment 2: From private land boundary to private land boundary Segment 3: From private land boundary to private land boundary. Segment 4: From private land boundary to the confluence with Iron Mines Creek.	14.6 0.7 0.1 4.9	Scenic Scenic Scenic Scenic	Recreation Fish	Eligible in 1989 for Fish.
Rocky Mountain Range GA					
South Fork Two Medicine River	Segment 1: From FS boundary to the confluence with Box Creek. Segment 2: From private land boundary to headwaters.	3.4 9.5	Wild Wild	Scenery Cultural	
Badger Creek	From FS boundary to the confluence with North and South Badger Creeks.	7.3	Wild	Cultural Scenery	
North Badger Creek	From the mouth to the headwaters.	10.4	Wild	Fish Cultural	Eligible in 1989 for Fish.
South Badger Creek	From the mouth to the headwaters.	10.9	Wild	Cultural	
Lee Creek	From the mouth to the headwaters.	4.6	Wild	Fish	
Badger Cabin Creek	From the mouth to the headwaters.	3.2	Wild	Fish	
Red Poacher Creek	From the mouth to the headwaters.	3.1	Wild	Fish	
North Fork Birch Creek	From FS boundary to headwaters.	7.8	Wild	Cultural Scenery	Eligible in 1989 for Scenery and Geology.
Middle Fork Birch Creek	From the mouth to the headwaters.	5.2	Wild	Scenery Cultural	
South Fork Birch Creek	From the entrance into Swift Reservoir to the headwaters.	9.8	Wild	Scenery Recreation Fish Wildlife Cultural	
North Fork Deep Creek	From FS boundary to headwaters.	5.5	Wild	Scenery	

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
North Fork Teton River	Segment 1: From FS Boundary to FSR #114 road crossing north of Elko Campground (bottom of the box canyon). Segment 2: From FSR# 114 road crossing north of Elko Campground to the Bob Marshall Wilderness boundary Segment 3: From the Bob Marshall Wilderness boundary to the headwaters.	5.5 5.3 6.4	Recreation Scenic Wild	Recreation Scenery Wildlife Fish	
Middle Fork North Fork Teton River	From the mouth to the headwaters.	6.8	Scenic	Fish	
Waldron Creek	From the mouth to the headwaters.	4.3	Recreational	Fish	
North Fork Sun River	From the Bob Marshall Wilderness boundary to the headwaters.	26.1	Wild	Scenery Recreation	
South Fork Sun River	From the Bob Marshall Wilderness boundary to the headwaters.	26.2	Wild	Recreation Wildlife	
West Fork South Fork Sun River	From the mouth to the confluence with Ahorn Creek.	8.4	Wild	Recreation Wildlife	
Green Fork Straight Creek	From the mouth to the headwaters.	5.9	Wild	Scenery Geology	Eligible in 1989 for Scenery and Geology.
Wood Creek	From the dam on Wood Lake northwest to the confluence with Straight Creek.	7.1	Recreational	Wildlife	
Dearborn River	From FS boundary to the confluence with Whitetail Creek.	6.5	Wild	Scenery	Eligible in 1989 for Scenery.
Snowies GA					
Swimming Woman Creek	From private land boundary to headwaters.	3.9	Scenic	Scenery Geology	
East Fork Big Spring Creek	From the confluence with a no name stream in T13N R19E Section 33 to the headwaters.	5.3	Wild	Fish	
Upper Blackfoot GA					
Alice Creek	From private land boundary to the headwaters.	6.5	Recreational	Cultural	

River name	Segment description	Miles	Classification	Outstanding remarkable values	Past eligibility notes
Copper Creek	Segment 1: From FS boundary to FSboundary. Segment 2: From FS boundary to the headwaters.	1.1 12.0	Recreational Recreational	Fish	Eligible in 1989 for Fish.
Landers Fork	Segment 1: From FS boundary to the confluence with Byrne Creek. Segment 2: From the confluence with Byrne Creek to the headwaters.	0.3 18.5	Scenic Wild	Fish	
Snowbank Creek	From the mouth to the headwaters.	4.4	Scenic	Fish	
Total miles of eligible sections of wild and scenic rivers					**360.7 miles**

Desired Conditions (FW-WSR-DC)

01 Eligible river segments retain their free-flowing characters and the outstandingly remarkable values for which they have been identified.

02 Eligible river segments retain their preliminary classifications of wild, scenic, or recreational unless they are changed through an act of Congress or determined not suitable through a suitability study.

Guidelines (FW-WSR-GDL)

01 To protect the eligibility of river segments, interim protection measures should be implemented within ¼ mile of either side of identified eligible river segment. These interim protective measures apply to the future use and management along the eligible river until they are changed through an act of Congress or unless a river is determined not suitable for designation through a suitability study.

Table 24 describes the interim protection measures applied to the management of eligible wild, scenic, or recreational river segments. For additional information on river segments please see appendix F of the FEIS.

Table 24. Interim protection measures for eligible river segments

Project/activity	Interim protection measures		
	Wild	**Scenic**	**Recreational**
Water resource projects: Dams Diversions Flood control Activities that affect free-flow	Wild, Scenic, and Recreational: Water resource projects on eligible rivers should be analyzed as to their effects on a rivers free-flow, water quality, and identified outstanding remarkable values, with adverse effects to be prevented to the extent of the existing agency authority (such as special use authority).		
Hydroelectric power facilities	Wild, Scenic, and Recreational: FS-identified eligible rivers should be protected pending a suitability determination.		
Minerals: Locatable	Wild, Scenic, and Recreational: Subject to valid existing rights, existing or new mining activity on an identified eligible river are subject to regulations in 36 Code of Federal		

Project/activity	Interim protection measures		
	Wild	**Scenic**	**Recreational**
Leasable	Regulations Part 228, subpart A and should be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment. Leases, licenses, and permits under mineral leasing laws should include conditions necessary to protect the values of the river corridor that make it eligible for inclusion in the national system.		
Saleable	Disposal of saleable mineral material is prohibited.	Disposal of saleable mineral material is allowed if the values of the river corridor that make it eligible for inclusion in the national system are protected.	
Transportation system	Roads and railroads are generally not compatible. Prevent actions related to the road system that would preclude protection of the river as wild. Do not plan roads outside of the corridor that would adversely affect the wild classification. New trail construction should generally be designed for nonmotorized users. New airfields may not be developed.	Roads and railroads may parallel the river for short segments or bridge the river if such construction protects the river values, including the free-flowing character. Bridge crossings and access points are allowed. New trail construction and airfield development should be compatible and fully protect river outstanding remarkable values.	Roads and railroads are permitted to parallel the river if such construction fully protects river outstanding remarkable values, including the free-flowing character. Bridge crossings and access points are allowed. New trail construction and airfield development should be compatible and fully protect river outstanding remarkable values.
Utility proposals	Wild, Scenic, and Recreational: New transmission lines such as gas lines, water lines, and similar linear features are not compatible with eligible wild and scenic rivers and are discouraged. Any portion of a utility proposal that has the potential to affect the river's free-flowing character must be evaluated as a water resources project.		
Recreation developments	Major public use areas such as large campgrounds, interpretive centers, or administrative headquarters must be located outside of the river corridor. Minimum facilities such as toiles and refuse containers may be provided to protect and enhance water quality and other river values. Facilities must be located and designed to harmonize with the primitive character, must protect river values, and must be screened from	Public facilities, such as moderate sized campgrounds, simple sanitation and convenience facilities, public information centers, administration sites, and river access developments are allowed. Facilities must be located and designed to harmonize with the natural and cultural settings, must protect river values, including water quality, and must be screened from view to the extent possible.	Recreation, administration, and river access facilities may be in close proximity to the river. However, recreational classification does not require recreation development. Facilities must be located and designed to harmonize with the natural and cultural settings, must protect river values, including water quality, and must be screened from view to the extent possible.

Project/activity	Interim protection measures		
	Wild	Scenic	Recreational
	view to the extent possible.		
Motorized travel	Motorized travel on land or water may be permitted but is generally not compatible. Where motorized travel is deemed necessary, uses should be carefully defined and impacts mitigated.	Motorized travel on land or water may be permitted, prohibited, or restricted to protect river outstanding remarkable values.	
Wildlife and fish projects	Construction of minor structures and vegetation management to protect and enhance wildlife and fish habitat should harmonize with the area's primitive character and protect river outstanding remarkable values. Proposed wildlife or fisheries restoration or enhancement projects that have potential to affect the rivers free-flowing character must be evaluated as a water resources project.	Construction of structures and vegetation management designed to protect and enhance wildlife and fish habitat should harmonize with the area's largely undeveloped character and protect river outstanding remarkable values. Any portion of a wildlife or fisheries restoration or enhancement projects that have potential to affect the rivers free-flowing character must be evaluated as a water resources project.	Construction of structures and vegetation management designed to protect and enhance wildlife and fish habitat should fully protect river outstanding remarkable values. Any portion of a wildlife or fisheries restoration or enhancement projects that have potential to affect the rivers free-flowing character must be evaluated as a water resources project.
Vegetation management	Cutting of trees and other vegetation is not permitted except when needed in association with a primitive recreation experience, to protect users, or to protect identified outstanding remarkable values.	A range of vegetation management and timber harvest practices are allowed, if these practices are designed to protect users, or protect, restore, or enhance the river environment, including the long-term scenic character.	
Domestic livestock grazing	Domestic livestock grazing should be managed to protect outstanding remarkable values. Existing structures may be maintained. New facilities may be developed so long as they maintain the outstanding remarkable values and the area's primitive character.	Domestic livestock grazing should be managed to protect outstanding remarkable values. Existing structures may be maintained. New facilities may be developed so long as they maintain the outstanding remarkable values and the area's largely undeveloped character.	Domestic livestock grazing should be managed to protect outstanding remarkable values. Existing structures may be maintained. New facilities may be developed so long as they maintain the outstanding remarkable values for which the river was found eligible.

National Recreation Trails (NRT)

Introduction

National recreation trails are a network of scenic, historic, and recreational trails created by the National Trails System Act (Public Law 90-543) which was signed into law by President Lyndon B. Johnson on October 2, 1968. The purpose of the act was "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation." This act authorized three types of trails: 1) national scenic trails, 2) national recreation trails, and 3) connecting-and-side trails. In 1978 National Historic Trails were also added to the national trail system.

While national scenic trails and national historic trails may only be designated by Congress, national recreation trails may be designated by the Secretary of Interior or the Secretary of Agriculture to recognize exemplary trails of local and regional significance in response to an application from the trails managing agency or organization. Through designation, these trails are recognized as part of America's National Trail System. 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.

The national recreation trails on the HLC NF 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. Table 25 displays the national recreation trails on the HLC NF.

Table 25. National recreation trails

Geographic area	Trail name	Trail number	Miles[1]
Big Belts	Hanging Valley	247	6
Divide	Mt. Helena	373	6
Little Belts	North Fork Deep Creek	303	6
	Ming Coulee	307	3
	South Fork Deep Creek	316	5
	Blankenbaker	320	4
	Deep Creek Ridge	338	6
	Monument Ridge	339	2
Snowies	Crystal Lake	404	2

[1]Miles are approximate and rounded to the nearest mile

Desired Conditions (FW-NRT-DC)

01 National recreation trails enhance and/or protect the nature and purposes for which the trails were established.

02 National recreation 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.

03 Access to national recreation trails allows for public uses, such as interpretation and education, in a manner that does not impair the feature(s) or values for which the individual trail was established.

Guidelines (FW-NRT-GDL)

01 To protect the resource values along national recreation trails, management activities adjacent to the trails should maintain or enhance the valued attributes for which the trails were established.

Continental Divide National Scenic Trail (CDNST)

The Continental Divide National Scenic Trail (CDNST) is a nationally recognized scenic route located along or near the Continental Divide of the Rocky Mountains. The CDNST was established by the National Parks and Recreation Act of 1978 (Public Law 95-625), which amended the National Trails System Act of 1968. Additionally, the 2009 Continental Divide National Scenic Trail Comprehensive Plan amendment sets forth direction to guide the development and management along the trail and within the corridor of the Continental Divide National Scenic Trail. The nature and purposes of the trail are to provide for high-quality scenic primitive hiking and horseback riding opportunities and to conserve the natural, historic, and cultural resources along the trail corridor.

The CDNST and trail corridor crosses portions of 25 National Forests, 3 National Parks, 4 Bureau of Land Management Districts, and various private lands in the states of Montana, Idaho, Wyoming, Colorado, and New Mexico. The total distance from the Canada-United States border on the north and the United States-Mexico border on the south is approximately 3100 miles. Of this distance, approximately 750 miles of the trail are in Montana and 273 of those miles are in the HLC NF. An estimated 65 miles of the trail is located within the Upper Blackfoot GA, approximately 68 miles are located within the Divide GA, and approximately 140 miles are located within the Rocky Mountain GA. See Table 26 for more information.

In addition to the trail tread itself, the HLC NF manages the trail corridor which includes NFS land ½ mile to ether side of the trail tread. This broad corridor protects the natural, scenic, historic, and cultural features along the trail as displayed on appendix A maps [Divide GA (D-7), Rocky Mountain Range GA (RM-7), and the Upper Blackfoot GA (UB-7)]. Forest plan direction includes not only the Continental Divide trail tread but also the trail corridor and is designed to protect the nature and purposes of the trail and trail corridor.

Table 26. Continental Divide National Scenic Trail

Geographic area	Trail name	Trail #	Miles[1]
Divide	Continental Divide	337	68
Rocky Mountain Range	Two-Med-Heart Butte	101	4
	North Fork Badger	103	1
	North Fork Sun	110	4
	Rock Creek	111	12
	Open Fork	116	6
	North Fork Red Shale	130	7
	Summit Campground Cutoff	133	2
	Elk Calf Mountain	137	10
	Lee Creek-Sidney Creek	141	5
	Kip Creek	142	3
	Elbow Creek	145	4
	Muskrat Creek	147	7
	North Wall	174	11
	Wall Trail	175	6
	My Lake	194	4
	South Fork Sun	202	13
	West Fork Sun	203	16
	Dearborn River	206	9

Geographic area	Trail name	Trail #	Miles[1]
	Blacktail-Landers Fork	207	3
	Straight Creek	212	10
	Elbow Pass	248	3
Upper Blackfoot	Continental Divide National Scenic Trail	440	65

[1]Miles are approximate and rounded to the nearest tenth

Desired Conditions (FW-CDNST-DC)

01 The Continental Divide National Scenic Trail is a well-defined trail that provides for high-quality, primitive and/or semiprimitive hiking and horseback riding opportunities, and other compatible nonmotorized trail activities, in a highly scenic setting along the Continental Divide. The notable scenic, natural, historic, and cultural resources along the trail's corridor are conserved. Where possible, the trail provides visitors with expansive views of the natural landscapes along the Continental Divide.

02 View sheds from the Continental Divide National Scenic Trail have high scenic values. The foreground of the trail (up to 0.5 mile on either side) is naturally appearing, and generally appears unaltered by human activities. The potential to view wildlife is high and evidence of ecological processes such as fire, insects, and diseases exist.

03 The Continental Divide National Scenic Trail corridor's setting is consistent with or complements a primitive or semiprimitive nonmotorized setting. The trail may intermittently pass through more developed settings in order to provide for a continuous route. Side trails to the Continental Divide National Scenic Trail enhance the experience along the main trail.

04 The Continental Divide National Scenic Trail is accessible from access points that provide various opportunities to select the type of terrain, scenery, and trail length (ranging from long-distance to day use) that best provide for the compatible outdoor recreation experiences being sought. Wild, remote, backcountry segments of the route provide opportunities for solitude, immersion in natural landscapes, and primitive outdoor recreation. Front-country and more easily accessible trail segments complement local community interests and needs and help contribute to their sense of place.

05 User conflicts among Continental Divide National Scenic Trail users are infrequent.

06 The Continental Divide National Scenic Trail is well maintained, signed, and passable. Alternate routes provide access to the trail in the case of temporary closures resulting from natural events, such as fire or flood, or land management activities.

07 Trailside interpretation at key locations and visitor information enhance visitor appreciation of the outdoors and increase awareness of the cultural and historical importance of the lands along the Continental Divide.

Goals (FW-CDNST-GO)

01 Active partnerships and cooperative relationships are emphasized to engage a wide range of people, partner organizations, communities, volunteers, federal, tribal, and state land and wildlife managers in the conservation of valuable natural, wild land, scenic, historic, and cultural resources and programs along the Continental Divide.

Objectives (FW-CDNST-OBJ)

01 Reroute at least one mile of the Continental Divide National Scenic Trail to: improve scenic viewing opportunities, reconstruct trail to standard, and/or provide for a nonmotorized experience.

Standards (FW-CDNST-STD)

01 No surface occupancy for oil and gas or geothermal energy leasing activities shall be permitted within the Continental Divide National Scenic Trail corridor (0.5 miles either side of the trail tread).

02 No common variety mineral extraction shall occur within the Continental Divide National Scenic Trail corridor.

Guidelines (FW-CDNST-GDL)

01 To retain or promote the character for which the trail was designated, new or relocated trail segments should be located primarily within settings consistent with or complementing primitive or semiprimitive nonmotorized recreation opportunity spectrum classes. Road and motorized trail crossings and other signs of modern development should be avoided to the extent practicable.

02 To protect or enhance the scenic qualities of the Continental Divide National Scenic Trail, management activities should be consistent with, or make progress toward achieving scenic integrity objectives of high or very high within the foreground of the trail (up to 0.5 mile either side). In planning activities outside the foreground, managers should consider the mid ground and background and the effects on scenic integrity and trail experience given the seen area from the trail segments.

03 If forest health projects result in impacts to the scenic integrity of the trail, mitigation measures should be included, such as screening, feathering, and other scenery management techniques to minimize visual impacts within and adjacent to the trail corridor (within visible foreground of the Continental Divide National Scenic Trail at a minimum).

04 To promote a nonmotorized setting, the Continental Divide National Scenic Trail should not be permanently relocated onto routes open to motor vehicle use.

05 The minimum trail facilities necessary to accommodate the amount and types of use anticipated on any given segment should be provided in order to protect resource values and for health and safety, not for the purpose of promoting user comfort. The purpose is to preserve or promote a naturally appearing setting.

06 To protect the Continental Divide National Scenic Trail's scenic values, special use authorizations for new communication sites, utility corridors, and renewable energy sites should not be allowed within the seen area of the visible foreground (up to 0.5 mile) and middle ground (up to 4 miles) view sheds. Exceptions may be allowed where needed for safety of the public or employees associated with maintenance, management, or use of those sites.

07 To preserve and/or promote a naturally appearing setting, new linear utilities and rights-of-way should be limited to a single crossing of the trail unless additional crossings are documented as the only prudent and feasible alternative.

08 To promote a naturally-appearing setting along the Continental Divide National Scenic Trail, the development of any new roads and trails administratively designated via travel management decision within or across the trail corridor should minimize impacts to the scenic, natural, and experiential values of the trail. Exceptions may be allowed if new routes are: (a) required by law to provide access

to private lands, (b) necessary for emergency protections of life and property, or (c) determined to be the only prudent and feasible option.

09 Using the Continental Divide National Scenic Trail for landings or as a temporary road for any purpose should not be allowed unless no other safe route is available for the implementation of the project. Hauling or skidding along the Continental Divide National Scenic Trail itself should be allowed only: 1) where the Continental Divide National Scenic Trail is currently located on an open road or to address hazard tree removal, and 2) no other haul route or skid trail options are available. Design criteria should be used to minimize impacts to the trail infrastructure, and any necessary post-activity trail restoration should be a priority for the project's rehabilitation plan. The purpose is to provide for a naturally appearing setting and to avoid visual, aural, and resource impacts.

10 To preserve and/or promote a naturally appearing setting, unplanned fires in the foreground (up to 0.5 mile) of the Continental Divide National Scenic Trail should be managed using minimum impact suppression tactics or other tactics appropriate for the protection of Continental Divide National Scenic Trail values, if they can safely be implemented at the discretion of the incident commander. Heavy equipment line construction within the Continental Divide National Scenic Trail corridor should not be allowed unless necessary for protection of life and property.

Lewis and Clark National Historic Trail (LCNHT)

In 1968, the National Trails System Act (Public Law 90-543) directed that the Lewis and Clark Trail be "studied in accordance with the objectives outlined in that law". After 10 years of study, in 1978 National Historic Trails were added to the National Trails Act and it was at this time that the Lewis and Clark National Historic Trail was added to the system. The purpose of the Lewis and Clark National Historic Trail is to commemorate the 1804 to 1806 Lewis and Clark expedition through the identification; protection; interpretation; public use and enjoyment; and preservation of historic, cultural, and natural resources associated with the expedition and its place in United States and tribal history.

The entire route is 3,700 miles long and extends from Wood River, Illinois, to the mouth of the Columbia River in Oregon. The overall trail is administered by the National Park Service, but individual sites along the trail are managed by different federal, state, local, tribal, and private organizations and agencies. This historic trail is not a traditional hiking-only trail and can also be traveled by car, boat, and/or horseback.

Many interpretive centers, signs, and recreation facilities are located along the entire length of the trail. Within the planning area, the Lewis and Clark National Historic Trail Interpretive Center, located in Great Falls, Montana, and numerous interpretive signs and sites interpret the overall journey and site-specific events along the trail. Recreation sites on the HLC NF that specifically tie to the Lewis and Clark National Historic Trail include the interpretive center in Great Falls, Lewis and Clark Pass in the Alice Creek area in the Upper Blackfoot GA, and the Meriwether Day Use Site within the Big Belts GA. The Lewis and Clark National Historic Trail is located on the Designated Areas maps in appendix A.

Desired Conditions (FW-LCNHT-DC)

01 The Lewis and Clark National Historic Trail provides visitors the opportunity to learn about the 1805-1806 Lewis and Clark Expedition and to experience and appreciate the natural environment that the Corps of Discovery experienced in their travels.

02 The Lewis and Clark National Historic Trail is clearly marked and identified, especially at trail termini and junctions with side trails.

03 Trailside interpretation and related visitor information services enhance visitor appreciation of the outdoors and the natural resources, history, and scenic values along the Lewis and Clark National Historic Trail. Interpretation provides multiple perspectives and accurate information.

Goals (FW-LCNHT-GO)

01 The operation, maintenance, and delivery of interpretation along the Lewis and Clark National Historic Trail is supported by partnerships and volunteer programs. Partners and volunteers also assist the FS in providing accurate historic and natural resources education and interpretation about the Lewis and Clark National Historic Trail, as well as relationship with the Continental Divide National Scenic Trail.

Guidelines (FW-LCNHT-GDL)

01 To protect the historically relevant natural and cultural resources along the trail, effects to the trail (including user capacity issues) should be identified and considered in project level planning.

02 Vegetation management activities should only occur when consistent with the enhancement, protection, and/or interpretation of the Lewis and Clark National Historic Trail (up to 0.25 mile either side of the trail), to protect the historically relevant natural and cultural resources along the trail.

Lewis and Clark National Historic Trail Interpretive Center (LCIC)

Introduction

On October 28, 1988 Congress passed Public Law 100-552, establishing the Lewis and Clark National Historic Trail Interpretive Center, 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 6,000 square foot exhibit hall, and a 1,500 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 students annually. Approximately 20 percent of the visitors to the center come from foreign countries, primarily Canada.

Desired Conditions (FW-LCIC-DC)

01 Interpretation and education programming at the Lewis and Clark National Historic Trail Interpretive Center enhance 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 Lewis and Clark National Historic Trail 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 include natural resources management and history within the surrounding national forest.

Goals (FW-LCIC-GO)

01 The Lewis and Clark National Historic Trail Interpretive Center is located on the Lewis and Clark National Historic Trail and has active partnerships both nationally and within the local community. Volunteerism is a valued resource and provides strong connections to the local community while providing a service to the FS in the management of the interpretive center.

02 The Lewis and Clark National Historic Trail Interpretive Center contributes to the economic sustainability of the local community as well as to the state of Montana.

Research Natural Areas (RNA)

Introduction

The HLC NF has 12 existing and two proposed research natural areas, which total approximately 18,447 acres. See Table 27. These research natural areas 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 nonmanipulative research, observation, and study. Research natural areas are cooperatively managed with the Rocky Mountain Research Station. Additional guidance for the protection and management of RNAs is provided in FSM 4063.

The proposed research natural areas are Granite Butte and Poe-Manley. If approved, these areas would be additions to the national network. Other additions to the network may be identified in the future.

Table 27. Currently designated and proposed research natural areas

Research natural area	GA	Purpose for establishment	Designated	Proposed	Acres[1]
Cabin Gulch	Big Belts	Douglas-fir with bunchgrass understory.	X		2,418
Poe Manley	Elkhorns	Montane grassland dominated by rough fescue		X	1,578
Bartleson Peak	Little Belts	Spruce/cleft leaf groundsel and cinquefoil/Idaho fescue habitat types	X		1,603
O'Brien Creek	Little Belts	A variety of riparian vegetation types, an un-entrenched, moderate to gentle gradient stream.	X		697
Onion Park	Little Belts	Tufted hairgrass-sedge, subalpine fir/grouse whortleberry and subalpine fir/bluejoint reedgrass; mesic meadow	X		1,207
Paine Gulch	Little Belts	Long-lived seral Douglas-fir on subalpine fir series sites, seral ponderosa pine and limber pine communities on Douglas-fir series sites.	X		2,402
Wagner Basin	Rocky Mountain Range	Unique wetland complexes containing large populations of Giant helleborine and yellow lady's-slipper.	X		940
Walling Reef	Rocky Mountain Range	High-elevation forest, shrubland, grassland, wetland, and alpine ecosystems.	X		833
Big Snowy-Greathouse Peak	Snowies	Alpine tundra plant communities on an alpine plateau composed of calcareous (limestone) substrate.	X		1,280
Big Snowy – Old Baldy	Snowies	Alpine tundra plant communities on an alpine plateau composed of calcareous (limestone) substrate.	X		1,866
Minerva Creek	Snowies	Ponderosa pine/snowberry interspersed with meadows.	X		340
Granite Butte	Upper Blackfoot	Subalpine fir and white bark pine habitat types, high alpine nonforest habitat types and wet meadows.		X	394

Research natural area	GA	Purpose for establishment	Designated	Proposed	Acres[1]
Indian Meadows	Upper Blackfoot	Douglas fir/blue huckleberry, Douglas fir/pine grass, Douglas fir/elk sedge, Subalpine fir/beargrass, Subalpine fir/bluejoint, Subalpine fir/menziesia and wet meadows.	X		992
Red Mountain	Upper Blackfoot	Subalpine fir and whitebark pine habitat types, high alpine nonforest habitat types, scree and type I and II streams.	X		1,897
Total RNA acres					18,447

[1]All acreages are approximate.

Desired Conditions (FW-RNA-DC)

01 Ecological processes such as plant succession, fire, and native insect and disease activity function in research natural areas with limited human influences.

Guideline (FW-RNA-GDL)

01 To maintain the integrity of the research natural area, management activities should be consistent with establishment records.

Suitability (FW-RNA-SUIT)

01 Research natural areas are unsuitable for timber production. Timber harvest to provide for other multiple use values and other vegetation management (such as prescribed fire) is suitable when in accordance with establishment records or management plans for individual research natural areas.

02 Winter motorized travel (over snow) is suitable within research natural areas so long as those uses do not threaten or interfere with the objectives or purposes for which the research natural area is established.

03 Summer motorized travel is not suitable within research natural areas except on routes that existed at the time the research natural area was established. New motorized routes are not suitable within research natural areas.

04 Livestock grazing is suitable where needed to establish or maintain desired conditions for vegetative communities and/or where it is within the level defined by establishment records or management plans for individual research natural areas.

Cultural, Historic, and Tribal Resources

Introduction

The term “cultural resource” refers to an object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence (FS Manual 2360). Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties (FS Manual 2360). Cultural resources include the entire spectrum of resources for which the Heritage Program is responsible for from artifacts to cultural landscapes without regard to eligibility for listing in the National Register of Historic Places (FS Manual 2360).

Cultural resources provide educational opportunities that connect people, past and present, to the land and its history. Interpretation of the human history of the planning area promotes greater public understanding of the communities that have depended on this landscape for their livelihood, recreation, and spiritual wellbeing. Through positive heritage experiences provided by interpretive sites, historic standing structures, and other materials the public has an appreciation for the region's history and develops an awareness of preservation efforts.

In the centuries preceding Lewis and Clark and the Corps of Discovery's journey, central Montana was home to several indigenous American Indian cultures. Most prominent among these groups found in the planning area were those historically known as the Blackfeet, Gros Ventre, Salish, Shoshone, Kootenai, and Metis. Today these groups retain an active culture with an unbroken tie to the greater planning area.

Cultural and Historic Resources (CR)

Introduction

Numerous laws, regulations, and policies govern the use and administration of cultural resources on NFS lands. Some are more commonly used regulations, such as the Archaeological Resource Protection Act and the National Historic Preservation Act. National laws and regulations are also interpreted in FS Manuals, FS Handbooks, and Regional Guides.

Approximately 2,803 cultural resource sites reflecting the broad spectrum of prehistory and history are currently identified in the planning area. According to criteria outlined in 36 Code of Federal Regulations 60.4, some sites (344) have been determined to be historically insignificant. A total of 1,507 sites are not yet evaluated and therefore are considered to be significant and eligible to be listed on the National Register and require management consideration by the Forest.

Eight historic properties are listed on the National Register of Historic Places, including one historic district with eight contributing properties and features, one historic landscape, and one historic landmark with two contributing properties. In addition to the National Register of Historic Places sites, the planning area has one traditional cultural property. An additional 944 historic properties have been determined eligible for listing in the National Register of Historic Places but have not been fully researched and submitted for listing.

Desired Conditions (FW-CR-DC)

01 Cultural resource-based recreation opportunities (visits to cultural sites, historic tourism) are connected, where practical, with other recreation opportunities.

02 Historic administrative buildings and historic buildings associated with special use permits reflect local and FS history and identity and provide for functional use. See also FW-RSUP-DC-04.

03 Cultural resource programs, interpretive presentations, and publications provide the public with opportunities to learn about, understand, and experience the Forest's past.

04 Opportunities exist for volunteers to participate in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation.

Goals (FW-CR-GO)

01 Cooperative agreements with other agencies and partners support the development of cultural resource inventories, the exchange of information on local and regional interests and knowledge.

02 Consultation with Native American tribes, traditional cultural practitioners, consulting parties, adjacent landowners, and project designers aid the FS in protecting and enhancing traditional cultural properties, cultural landscapes, sacred sites, and other culturally significant areas that provide tangible links to historically rooted beliefs, customs, and practices.

Guidelines (FW-CR-GDL)

01 To conserve and preserve cultural resources, efforts should be made during management activities to maintain significant sites for future generations.

Areas of Tribal Importance (TRIBAL)

Introduction

The HLC NF recognizes that Native Americans are indigenous to this landscape and have accumulated spiritual and ecological knowledge over thousands of years. Sacred sites and traditional cultural properties have religious and/or traditional importance to individuals or cultural groups. Both may be difficult to identify using standard field survey methods and both require consultation with cultural groups. The difference is not in their importance, but rather under which authority they are managed and how they are identified. Traditional cultural properties are managed under the authority of the National Historic Preservation Act. They are, by definition, eligible for listing on the National Register and must be a tangible property, that is, a district site, building, structure, or object as defined in 36 Code of Federal Regulations 64.4.

Sacred sites important to Native Americans are managed under the authority of Executive Order 13007-Indian Sacred Sites. It is the responsibility of a Native American tribe or Native American individual to identify sacred sites. Executive Order 13007 defines a Native American/Indian sacred site as "any specific, discrete, narrowly delineated location on federal land that is…determined by an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Indian tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Desired Conditions (FW-TRIBAL-DC)

01 Healthy, sustainable, and harvestable populations of culturally significant flora and fauna are available to ensure the rights reserved by Native Americans. See FW-OFP-DC-01 and 02.

02 Tribal members' access to the Forest for the exercise of treaty rights is recognized and accommodated. Opportunities exist to practice traditional, cultural, and religious activities, such as plant gathering and ceremonial activities, which are essential to sustaining their way of life, cultural integrity, social cohesion, and economic well-being.

Goals (FW-TRIBAL-GO)

01 Opportunities exist to help develop community capacity for participation in various management activities through projects that enhance landscape scale conservation efforts, increase environmental literacy, and strengthen collaborative relationships among Native American populations.

02 Acquire knowledge about native and ecological resources through consultation with tribal members.

Land Status and Ownership, and Land Uses

Introduction

Management of NFS lands on the HLC NF is important to protect the public's estate interest in its national forest. Land status is the zoning for private lands and formal management status of public lands. Land ownership is the basic pattern of public and private ownership. Land ownership is defined as the condition of title of land or interest in land under the jurisdiction of the Forest Service. The following conditions are also included under this definition: the manner in which these lands came into federal ownership; encumberances and restrictions that affect the administration of the land; interest owned by the government in private lands; and the interest in government lands held by others.

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.

The HLC NF has many instances of inholdings or near inholdings found within the confines of the forest boundaries. These private properties, vestiges of the gold rush era in the form of patented mining claims, railroad reservations, and the Homestead Act provide management challenges unique to the area.

Public lands are generally retained in federal ownership in order to provide long-term values. The vision for the planning area is to retain in public ownership all lands currently under its administration that meet the long-term needs of maintaining the integrity of contiguous natural ecosystems, river frontage, riparian areas and wetland ecosystems, recreation and open space, scenery, clean air and water, and habitat for plant and animal populations. Through the methods available to the agency, the FS would acquire lands and/or mineral estates that enhance this vision. Lands and/or mineral estates that do not meet these needs would be disposed of. In all such cases, the primary guiding principle would be the greater public benefit.

Some uses of NFS lands are covered by special use authorizations, including permits, leases, and easements that allow occupancy, use, rights, or privileges within the planning area. Special use authorizations are legal instruments whose terms and conditions are fully enforceable when reasonable and consistent with law, regulations, and policy. The mission of the Forest Service special use program is to manage the use and occupancy of NFS lands in a manner that protects natural resources, promotes public health and safety, and is consistent with forest land and resource management plans. Special use permits authorize the occupancy and use of NFS lands by private individuals, companies or other agencies for a wide variety of uses such as roads, utility corridors, communications sites, and other private or commercial uses that cannot be accommodated on private lands.

All authorized uses on public lands are required, by law, to meet all applicable environmental protection measures. For all proposed activities that have the potential for disturbance to lands and resources, a project design is required and is subject to environmental analysis, review, and monitoring.

Land Status and Ownership (LAND)

Desired Conditions (FW-LAND-DC)

01 Surface and mineral ownership land patterns facilitate land management. Surface and mineral estates are consolidated.

02 Road and trail easements provide adequate, reasonable access to NFS lands now and in the future.

03 Land adjustments and acquisitions enhance or protect recreation, open space, scenery, clean air and water, riparian habitat, wetland ecosystems, and habitat for wildlife species.

04 Conservation easements protect and enhance the resource values for which they were acquired.

05 National Forest System property lines adjacent to private land and boundaries of special areas such as designated wilderness lands are clearly marked where inadvertent trespass and encroachment is most likely.

Goals (FW-LAND-GO)

01 To reduce the number of inholdings and move toward consolidation, acquisition of private lands within the planning area occurs when the opportunities arise. The Forest works with adjacent landowners to acquire private lands within/adjacent to the forest boundary.

Objectives (FW-LAND-OBJ)

01 Every decade acquire at least five new road or trail right-of-ways that are needed as high-priority access or would fill a gap in existing access to public lands. Also see FW-ACCESS-GO-01.

02 Survey and clearly mark at least 150 miles of previously unmarked FS land ownership boundaries.

Guidelines (FW-LAND-GDL)

01 To provide access to NFS lands, land adjustment proposals should consider reciprocal right-of-way acquisitions.

02 When new lands are acquired, the ROS, SIO, timber suitability, and other administrative designations within the scope of the forest plan should be consistent with adjacent land parcels.

Land Uses (LAND USE)

Desired Conditions (FW-LAND USE-DC)

01 Energy corridors throughout the planning area improve the delivery of electricity, oil, and gas and enhance the western electric transmission grid by improving reliability, reducing congestion, and contributing to the national electrical grid.

02 Opportunities are available for a variety of lands special uses that include energy transmission rights of way, communication uses, roads, research activities, and other public services, on lands that are suitable for these activities.

03 Utility corridors and communication sites provide for their intended uses. Obsolete or unused facilities are not present on the landscape.

Goals (FW-LAND USE-GO)

01 Encourage road user associations in areas where multiple landowners' access is prevalent.

02 The Forest Service works with local county road authorities to grant public road easements (under the Forest Road and Trails Act) to provide access on routes that serve predominantly non-NFS purposes.

03 The Forest Service coordinates with proponents to co-locate emerging technology, communication sites, energy corridors, and other permitted infrastructure to minimize environmental and visual impacts.

Guidelines (FW-LAND USE-GDL)

01 To provide access to NFS lands, the Forest Service should grant qualified applicants reasonable access across NFS lands, contingent upon receiving reciprocal access across private land when feasible and the Forest Service determines access is needed.

02 Vegetation treatment within corridors and along linear transmission facilities should meet facility safety requirements, provide for control of invasive species, and provide for revegetation in accordance with vegetation management standards identified operating plans, in order to reduce visual impacts. Also see FW-VEGT-DC-05.

03 When authorizing new lands special uses or reauthorizing existing uses, pre-approved clauses that contain terms and conditions to avoid or minimize adverse effects to resources should be included.

04 If adverse effects to inland native fish, species of conservation concern, impaired water bodies, or stream habitat conditions are unavoidable, land use authorizations should require actions that result in re-establishment, restoration, mitigation, or improvement of conditions and processes to ensure that projects that degrade conditions also include measures to incrementally improve conditions. At the time of reauthorization, existing authorizations should be adjusted to mitigate adverse effects to fish, water, and riparian resources as practicable.

05 New hydropower support facilities should be located outside of riparian management zones (RMZs) to reduce effects to fish, water, and riparian resources. Support facilities include any facilities or improvements (e.g., workshops, housing, switchyards, staging areas, transmission lines) not directly integral to its operation or necessary for the implementation of prescribed protection, mitigation, or enhancement measures.

06 If existing support facilities are located within the RMZs, at time of permit reissuance, pre-approved clauses that contain terms and conditions to reduce impacts on aquatic and riparian resources should be included. Also consider moving support facilities outside of RMZs or further from water bodies where feasible.

07 During project activities, energy distribution lines, communication lines and pipelines should be located within existing road systems or other previously disturbed areas, where feasible, in order to minimize the impacts to forest lands. They should be located underground when feasible.

Infrastructure – Roads and Trails, Bridges, and Facilities

Roads and Trails (RT)

Introduction

There are approximately 3,600 miles of NFS roads under FS jurisdiction within the planning area. See the associated FEIS and Assessment for more information about the roads. Some roads are kept in the system for the purpose of future resource management but remain closed until they are needed. Other roads are open seasonally or year-round. Approximately 1,100 miles of the 3,600 miles are closed to motorized use. Continuing with on going compliance with 36 CFR 212, these roads will be analyzed as opportunities for change that included decommissioning, placing into intermittent stored service, or converting to other uses.

There are approximately 2,600 miles of existing NFS motorized and nonmotorized trails within the ten GAs in the planning area. There are approximately 2,000 miles of trails located outside of wilderness areas and approximately 600 miles within designated wilderness.

There are three air strips within the planning area: 1) one in the Little Belts GA, 2) one in the Rocky Mountain Range GA, and 3) one air strip under special use permit (Lincoln Air Strip) located within the Upper Blackfoot GA.

Desired Conditions (FW-RT-DC)

01 A safe and cost-effective transportation system provides public and administrative access to FS lands while protecting natural and cultural resources.

02 Roads that are not needed to serve administrative and public needs are not present.

03 Forest system trails provide a variety of low maintenance and sustainable motorized and nonmotorized summer and winter public access opportunities that connect people to NFS lands.

04 The transportation system has minimal impacts on resources including all wildlife, heritage and cultural sites, water quality, and aquatic species.

Goals (FW-RT-GO)

01 Partnerships are developed with various interest and user groups for the evaluation, planning, and maintenance programs for roads, trails, and airstrips.

02 Pursue grants, cost-sharing, and partnerships to contribute to maintenance and improvement work.

03 The HLC NF cooperates with highway managers and other landowners to implement wildlife crossings that contribute to wildlife and public safety where needed.

04 Continue to partner with the Department of Natural Resources and Conservation to acquire permanent access under the Master Cost-Share Agreement or the Easement Exchange process.

Objectives (FW-RT-OBJ)

01 Decommission or place into storage (maintenance level 1) at least 50 miles of roads. Priorities shall include roads causing resource damage in priority watersheds and/or where roads chronically fail.

02 Complete at least 100 miles of reconstruction or road improvement projects. Priorities shall include reducing effects on desired aquatic and riparian conditions from chronic sediment delivery or potential future road prism failures, and conservation watershed networks that have westslope cutthroat or bull trout habitats.

03 Maintain at least 100 miles of NFS roads annually.

04 Maintain at least 100 miles of NFS trails annually.

05 Reconstruct or improve at least 10 miles of trail every five years.

06 Reduce deferred trail maintenance backlog by at least 15 percent.

Standards (FW-RT-STD)

01 During dust abatement applications on roads, chemicals shall not be applied directly to watercourses, water bodies (for example, ponds and lakes), nor wetlands.

02 To maintain free-flowing streams, new, replacement, and reconstructed stream crossing sites (culverts, bridges and other stream crossings) shall accommodate at least the 100-year flow, including associated bedload and debris.

03 For new road construction and reconstruction of existing road segments within or adjacent to RMZs, fill material shall not be side-cast.

04 When installing new crossing structures on streams that have no fish, the structures shall accommodate a 1 percent probability (100-year) or higher flow, including associated bedload and debris. If site-specific conditions preclude that design, size the structure to the largest size the location will accommodate and provides for bankfull width.

Guidelines (FW-RT-GDL)

01 Newly constructed or reconstructed roads, temporary roads, skid trails, and trails should be hydrologically disconnected from delivering water, sediment, and pollutants to water bodies (except at designated stream crossings) to maintain the hydrologic integrity of watersheds.

02 When placing physical barriers such as berms on travel routes such as roads, skid trails, temporary roads, and trails, drainage features should be sufficient to avoid future risks to aquatic resources (for example, remove culverts from stream crossings).

03 To maintain channel stability and reduce sediment delivery to watercourses, trails, fords, and other stream crossings should be hardened to protect stream beds, banks, and approaches during construction or reconstruction.

04 To reduce the risk to aquatic resources when decommissioning roads, making roads impassable, or putting roads into intermittent stored service (i.e. storing roads for longer than 1 year), roads should be left in a hydrologically stable condition (for example, drainage off roads should route away from water resources and landslide prone areas and towards stable areas of the forest floor to provide filtering and infiltration).

05 To maintain and/or improve watershed ecosystem integrity and reduce road-related mass wasting and sediment delivery to watercourses, new and relocated roads, trails (including skid trails and temporary roads), and other linear features should not be constructed on lands with high mass wasting potential.

06 For maintenance activities such as road blading and snow plowing on existing roads, sidecasting should be minimized, particularly into or adjacent to water bodies. Care should be taken when plowing snow so as not to include road soil. Breaks should be designed in the snow berms to direct water off the road.

07 Wetlands and unstable areas should be avoided when reconstructing existing roads or constructing new roads and landings. Impacts should be minimized where avoidance is not practical.

08 When constructing, reconstructing, or maintaining roads, sediment delivery to streams should be minimized. Road drainage should be routed away from potentially unstable channels, fills, and hillslopes.

09 Transportation infrastructure should be designed to maintain natural hydrologic flow paths to the extent practical (for example, streams should have crossing structures and not be routed down ditches).

10 In fish bearing streams, construction, reconstruction, or replacement of stream crossings should provide and maintain passage for all life stages of native aquatic organisms unless barriers should be created or maintained to prevent spread or invasion of nonnative species in alignment with fish management agencies. These crossings should also allow for passage for other riparian dependent species through the establishment of banks inside/beneath the crossing structure.

11 To maintain free-flowing streams, new, replacement, and reconstructed stream crossing sites (culverts, bridges and other stream crossings) should be constructed to prevent diversion of stream flow out of the channels in the event the crossing is plugged or has a flow greater than the crossing was designed.

12 Roads not needed in the long term should be decommissioned to benefit fish and wildlife habitat (prioritizing native fish habitat), enhance the desired recreation opportunity spectrum settings and opportunities, and/or create a more cost-efficient transportation system.

13 To avoid impacts to wildlife, newly constructed or reconstructed roads, temporary roads, skid trails, and trails should avoid key seasonal habitats.

Bridges (BRDG)

Introduction

There are approximately 140 road bridges under the jurisdiction of the FS within the HLC NF planning area. Most of these structures meet or exceed the minimum criteria for bridge condition. At the time of this plan, a few of these bridges (approximately 11) are at an intolerable or minimum tolerable limit for condition. Road bridges must be repaired and replaced with road maintenance funding, with a small number of structures being replaced through the capital investment program.

A trail bridge is a trail structure, including supports, erected over a depression or obstruction such as water, roadway, trail or railway that provides a continuous pathway and has a deck for carrying traffic or other loads. Trail bridges are divided into three classifications for inspection purposes:

- Complex trail bridges: all trusses, suspension, multiple-span, and nontimber/log trail bridges with a span greater than 20 feet and a vertical distance greater than 5 feet.
- Major trail bridges: all single-span timber/log trail bridges with a span greater than 20 feet and a vertical distance greater than 5 feet.
- Minor trail bridges: all trail bridges that do not meet the definition of a complex or major trail bridge and have a span less than 20 feet or a vertical distance less than 5 feet.

Desired Conditions (FW-BRDG-DC)

01 Bridges and culverts provide safe public and administrative access to NFS lands while protecting natural and cultural resources.

Guidelines (FW-BRDG-GDL)

01 Bridge removal or reconstruction should be timed to minimize impact to native wildlife nesting or roosting on structures, or aquatic connectivity.

Facilities (FAC)

Introduction

Administrative facilities are typically buildings and their appurtenances necessary to support the employees, equipment, and activities needed for the management of national forests. Administrative facilities are separate from recreation facilities. Administrative facilities include fire stations, offices, warehouses, and shops as well as living quarters such as barracks and individual residences.

There are approximately 245 administrative facilities. Under facilities, the focus is the rehabilitation or replacement of existing facilities that do not meet current operational standards, and the disposal of those facilities that are considered surplus to the forest's operational needs.

Recreation facilities are buildings, cabins, airstrips, water systems, and wastewater systems that are operated and maintained specifically to support public recreational use. These recreation facilities are often located at developed recreation sites, such as campgrounds, day use areas, and interpretive sites where recreation use requires a management investment in order to operate and/or maintain the site to health and safety standards.

Desired Conditions (FW-FAC-DC)

01 Facilities provide for safe public and administrative use.

02 NFS facilities provide for the necessary support to employees, equipment, and activities.

Goals (FW-FAC-GO)

01 Pursue partnerships to assist in completing necessary work on structures.

Benefits to People: Multiple Uses and Ecosystem Services

Introduction

Social, cultural, and economic resources in the planning 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, timber harvest, 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 of 1960 (16 U.S.C. 528–531). Economic sustainability refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and markets and nonmarket benefits.

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 planning area in partnership with both public and private landowners and stakeholders to ensure management efforts are coordinated whenever possible. Included in this section are desired conditions related to partnership and coordination.

In addition to the plan components in the following sections, many of the plan components within the previous sections above contribute to social and economic sustainability.

Public Information, Interpretation, and Education (CONNECT)

Introduction

Connecting people to their environment and to the natural and cultural history of the area is one of the primary goals of the HLC NF. Relevant and timely public information, creative interpretation, and stimulating education help the FS communicate with the public and enable visitors to be involved in the activities, actions, and expectations for activities on NFS lands. These connections provide opportunities for the development of strong stewardship ethics and appreciation for the natural and cultural history across these landscapes. Also see Lewis and Clark National Historic Trail and Interpretive Center section.

Desired Conditions (FW-CONNECT-DC)

01 Interpretation and education programming enhance visitor understanding and appreciation for the rich natural, cultural, and historic resources of the Forest.

02 Education programming promotes conservation, stewardship, and understanding of natural resources and ecological processes (such as watershed, fisheries, native plants, fire ecology, and wildlife) as well as cultural resources on public lands. Conservation education efforts are experiential, contemporary, and culturally and generationally relevant.

03 Opportunities to connect people to nature and open space, including underserved populations, promote the use of the Forest for the improvement of physical and mental well-being of the public.

Goals (FW-CONNECT-GO)

01 The presentation and delivery of public information, natural and historic interpretation, and conservation education is supported by strong partnerships and volunteer programs.

02 The operation, maintenance, and delivery of conservation education programs, historic and natural interpretation, and stewardship services are supported by strong partnerships and volunteer programs.

03 Partnerships with federal and nonfederal entities help achieve desired conditions and improve overall resources management. Partnerships and/or collaborative processes within the local communities foster relationships that help accomplish projects in the communities' and Forest's shared interest.

04 Federal, state, county, and tribal agencies, universities, nongovernmental organizations, and private landowners have the opportunity to participate in development, implementation, maintenance, and/or monitoring efforts.

05 New, nontraditional partners help the HLC NF employ new technologies and contemporary approaches to reach youth where they are and in ways that are relevant to their lives.

06 The Forest's employees and partners have the skills and resources needed to build and manage effective, sustainable partnerships to engage youth.

07 Formal and nonformal educators in local communities understand natural resource issues and partner with the forest to deliver place-based outdoor learning opportunities.

08 Outfitter and guides, recreation events, and other special uses permit holders assist the Forest in delivering interpretation and education messages that instill an appreciation for the natural and cultural resources of the Forest and promote conservation and stewardship.

09 Youth have lifelong opportunities to learn, and a continuum of experiences that span from discovery, to awareness and connection, to knowledge, to action are provided. The youth of local communities have a personal connection with the natural and cultural resources of the forest and a personal conservation ethic through their recreation experiences.

Objectives (FW-CONNECT-OBJ)

01 Within five years, expand communications about recreation and educational opportunities through social media, websites, print and web-based materials, webinars, and video technology to promote and increase tourism on the HLC NF and to provide support for state, private, and community-based partners.

02 Provide at least one hands-on outdoor learning opportunity per year for local communities and schools to: engage underserved populations, support local educators, connect youth with their natural and cultural heritage, promote the health benefits of outdoor recreation, and encourage the responsible use of natural resources.

03 Work with local partners to host at least one recreation event per year to engage community youth and their families with the rich natural and cultural resources of the forest.

Guidelines (FW-CONNECT-GDL)

01 When providing education opportunities, the HLC NF should emphasize minimum impact principles (for example, Leave No Trace, Tread Lightly, Pack it in/Take it Home) to educate communities and visitors, while instilling a sense of pride and stewardship for the rich cultural and natural resources of their forest.

Livestock Grazing (GRAZ)

Introduction

Livestock grazing on FS lands is an important contribution to the social and economic sustainability of some rural communities. Forest grazing allotments are managed to be responsive to current federal and state environmental laws and regulations. Allotment management plans describe the kind and amount of livestock, season of use, structural improvement maintenance, resource management objectives, and standards and guidelines to move towards desired conditions for the appropriate resources.

Livestock grazing is an important source of income along with other diverse agricultural enterprises in the planning area. During the past several decades, livestock numbers have been declining across the western United States. There are over 6,000 farms and ranches in the area with over 2,000 classified as beef cattle ranches and farms. Forest grazing allotments occupy over 1.3 million acres with 240 active allotments and 234 permittees.

Adaptive management practices used in allotment management plans include deferment and rest from grazing, cultural and mechanical vegetation treatments, infrastructure to control livestock, and conservation measures to protect federally listed plants and animal species and species of conservation concern.

Other agencies, local conservation districts, conservation and civic organizations, livestock industry, and rural communities participate in rangeland management planning. Forest Service policy direction for permitted livestock use are found in agency manuals and handbooks.

Desired Conditions (FW-GRAZ-DC)

01 Sustainable grazing opportunities are available for domestic livestock from lands suitable for forage production.

02 Within grazing allotments, rangelands are comprised of stable soils supporting a diverse species composition of grasses, forbs, and shrubs that create a healthy and resilient native plant community. Native plant communities provide forage for domestic livestock in addition to providing wildlife habitat and forage needs.

03 Within grazing allotments, soil stability, and hydrologic and biotic integrity function in a manner that provides for resilience relative to site potential as described in ecological classifications.

04 Within grazing allotments, plant communities in wetlands, spring/seep ecosystems, and groundwater dependent ecosystems retain desired species composition and structure.

Goals (FW-GRAZ-GO)

01 Coordination with Montana Fish, Wildlife, and Parks biologists occurs during the allotment planning/permit process to ensure that wildlife habitat/forage needs are being addressed in conjunction with domestic livestock grazing.

Standards (FW-GRAZ-STD)

01 New or revised allotment management plans shall provide site-specific management prescriptions to meet or move toward applicable desired conditions.

02 Annual livestock use indicators within inner RMZs shall be set during the allotment management planning process at levels that move towards or maintain desired rangeland vegetation, riparian function, and wildlife habitat specific to the ecological site (or equivalent classification). Indicator values shall be adapted over time based on long-term monitoring and evaluation of conditions and trends.

03 Stocking of vacant grazing allotments with domestic sheep or goats for livestock production shall only be permitted if a risk assessment using scientific information and the most current agency or interagency recommendations indicates that effective separation can be achieved between livestock and bighorn sheep. (Refer to appendix C for information on recommendations and strategies.)

04 Analysis for allotment management plan revisions or NEPA sufficiency reviews of active sheep allotments shall use scientific information and the most current agency or interagency recommendations to identify and apply management tools by which effective separation can be achieved between domestic sheep and bighorn sheep (refer to appendix C for information on recommendations and strategies)

Guidelines (FW-GRAZ-GDL)

01 To maintain or improve riparian and aquatic conditions and achieve riparian desired conditions over time through adaptive management, new grazing authorizations and reauthorizations that contain low gradient, alluvial channels should require that end-of-season stubble height be 10 to 15 cm (4 to 6 inches) along the greenline. However, application of the stubble height numeric value range should only be applied where it is appropriate to reflect existing and natural conditions for the specific geo-climactic, hydrologic, and vegetative conditions where it is being applied. Alternative use and disturbance indicators and values, including those in current ESA consultation documents, may be

used if they are based on current science and monitoring data and meet the purpose of this guideline. Long-term monitoring and evaluation should be used to adapt this numeric range and/or the use of other indicators.

02 To ensure grazing is sustainable and contributes to other resource desired conditions, forage use by livestock should maintain or enhance the desired structure and composition of plant communities on grasslands, shrub lands, and forests and should maintain or restore healthy riparian conditions as defined in the allotment management plan.

03 New or revised allotment management plans should design grazing practices (such as stocking rate, duration, timing), and/or physical structures to reduce negative effects to riparian areas or riparian dependent at risk species.

04 Allotment management plans should incorporate adaptive management to move towards desired conditions for vegetation and riparian resources, considering both the needs and impacts of domestic livestock and wildlife.

05 When updating or managing existing facilities that are located within RMZs, facilities should be minimized or relocated to other areas. Livestock management activities (trailing, bedding, watering, salting, loading, and other handling or management efforts) should be avoided in RMZs to reduce effects to riparian resources and aquatic biota. Also see FW-RMZ section for additional information.

06 Livestock watering facilities should be constructed or maintained to provide for forage use that will maintain or enhance the desired structure and composition of plant communities on suitable rangelands but avoid impacts to soil and water resources.

07 To attract livestock out of riparian areas, salt and/or supplements should be placed at least one-quarter (1/4) mile away.

Timber (TIM)

Introduction

The removal of timber is a multiple use provided by HLC NF and it is an important contributor to the economy of Montana. *Timber production* is 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. *Timber harvest* is the removal of trees for wood fiber use and other multiple-use purposes. This section of the plan provides plan components related to timber harvest and timber production.

Harvest of timber on national forest lands occurs for many different reasons, including ecological restoration, community protection in wildland-urban interfaces, public safety, habitat restoration, protection of municipal water supplies; and to contribute to economic sustainability through the production of timber, pulp for paper, specialty woods for furniture, or fuel as a renewable energy source. Timber harvest, whether for regularly scheduled wood production or for restoration and other reasons, supports local businesses and employment.

Suitability for Timber Production

The planning rule requires identification of lands that are suited and not suited for timber production, based on factors that include legal withdrawal (for example, timber production prohibited due to statute and executive order), technical factors (nonforested lands, geology or soil conditions), and compatibility with desired conditions and objectives stated in the plan (plan components).

In lands suitable for timber production, regularly scheduled timber harvest is expected to occur. Unless prohibited by other plan components, timber harvest may also occur on lands unsuitable for timber production to meet resource objectives other than timber production.

Table 28 displays the timber production suitability classification for the forest plan. See chapter 3 for descriptions and appendix A for maps of timber suitability for each GA.

Table 28. Timber production suitability classification

Land classification category	Acres
A. Total NFS lands in the planning area	2,883,227
B. Lands not suited for timber production due to legal or technical reasons	2,216,098
C. Lands that may be suited for timber production (A−B)	667,129
D. Total lands suited for timber production because timber production is compatible with the desired conditions and objectives established by the plan	368,563
E. Lands not suited for timber production because timber production is not compatible with the desired conditions and objectives established by the plan (C – D)	298,566
F. Total lands not suited for timber production (B+E)	2,514,664

[1]All acreages are approximate. The total acres (A) is based on NFS acres as of June 2018.

Timber Volume Metrics

As required by planning rule regulations, several timber volume metrics are specified in this plan, including the sustained yield limit, projected wood sale quantity, and projected timber sale quantity. Table 29 and paragraphs below it describe the characteristics of these metrics.

Table 29. Characteristics of timber volume metrics

Characteristics	Sustained yield limit	Projected wood sale quantity	Projected timber sale quantity
Based on quantity sold from lands that may be suitable for timber production (line C Table 28).	Yes	No	No
Based on quantity sold from lands suited for timber production because timber production is compatible with the desired conditions and objectives established by the plan (line D Table 28).	No	No	No
Based on quantity sold from all lands in planning area (line A Table 28).	No	Yes	Yes
Based on the assumption that all lands that may be suitable for timber production are managed for timber production.	Yes	No	No
Limited by plan components, fiscal capability, and organizational capacity.	No	Yes	Yes
All volume meets utilization standards.	Yes	No	Yes
Includes sanitation or salvage harvest volume.	No	No	No

Sustained Yield Limit

Per the National Forest Management Act and planning rule regulations, the quantity of timber that may be sold must be less than or equal to the potential sustained yield limit. The sustained yield limit is the amount of timber meeting applicable utilization standards, "which can be removed from [a] forest annually in perpetuity on a sustained-yield basis" (National Forest Management Act at section 11, 16 United States Code 1611; 36 Code of Federal Regulations 219.11(d)(6))). The sustained yield limit is not a target but is a limitation on harvest. Calculation of the sustained yield limit is based on lands that may

be suitable for timber production (line C from Table 28) and is not limited by plan components or considerations of the anticipated fiscal capability or organizational capacity. The sustained yield limit is 4.95 MMCF (26.36 MMBF) for the proclaimed Lewis and Clark National Forest, and 5.75 MMCF (31.21 MMBF) for the proclaimed Helena National Forest, for a total 10.7 MMCF (57.57 MMBF).

Projected Wood and Timber Sale Quantities

To clearly display the intended timber program associated with achieving ecological, social, and economic desired conditions, the plan identifies the projected wood sale quantity and projected timber sale quantity. The projected wood sale quantity is the estimated output of timber and all other wood products (such as fuelwood, firewood, or biomass) expected to be sold during the planning period for any purpose (except salvage harvest or sanitation harvest) on all lands in the Forest. The projected timber sale quantity is the portion of the projected wood sale quantity that meets applicable utilization standards (the sawlog portion of offered timber sales). Both the projected wood sale quantity and the projected timber sale quantity are limited by the projected fiscal capability and organizational capacity of the forest, and are disclosed in appendix C. These values provide the basis for the objectives stated in the section below.

Neither the projected wood sale quantity nor the projected timber sale quantity serves as management targets or as limitations on harvest. Rather, both are based on reasonable expectations about the fiscal capability and organizational capacity to achieve the desired conditions and objectives in the 2021 Land Management Plan for the planning period. As such, calculations of these volume estimates are sensitive to several assumptions including future budget trends, future markets for timber products, efficiency in planning and implementation, and the timing and locations of large disturbance events. If additional support to achieve desired conditions was provided through opportunities such as increased congressional allocations, stewardship contracting, or work with partners through other authorities, the potential wood and timber sale quantity could be exceeded as long as the volume levels remain below the sustained yield limit. Conversely, if available resources, markets, or other factors are less favorable than anticipated, the potential wood and timber sale quantities identified may not be met.

Desired Conditions (FW-TIM-DC)

01 Lands identified as suitable for timber production support a regularly scheduled timber harvest program that provides sustainable levels of wood fiber products.

02 Although natural disturbances occur on lands suitable for timber production, actively managed lands are resilient and/or resistant to disturbance and economic loss of the timber resource is minimized.

03 Production of timber and timber harvest contribute to economic sustainability, providing jobs and income to local economies.

04 A variety of harvest and contract methods are offered in response to market demand and local needs.

Goals (FW-TIM-GO)

01 Timber harvest from the HLC NF, along with timber harvested from other lands, contributes to maintaining regional timber harvesting and milling infrastructure, including support to small businesses. When possible, efficiencies are gained across boundaries by utilizing available authorities for partnerships and agreements with entities, such as the state of Montana.

Objectives (FW-TIM-OBJ)

01 Offer timber meeting product utilization standards for sale at an annual projected timber sale quantity of 4-7 MMCF (20-35 MMBF)[1], averaged on a 10-year basis. See appendix C for definition of timber utilization standards.

[1] A projected timber sale quantity level of approximately 7.9 MMCF (approximately 38 MMBF) would be possible within the constraints of the desired conditions and other plan components if budget was not considered as a limiting factor.

02 Offer an annual projected wood sale quantity consisting of both timber that meets utilization standards (FW-TIM-OBJ-01) plus other wood products (fuelwood, biomass, and other volumes that do not meet timber product utilization standards) for sale of 6-9 MMCF[1], averaged on a 10 year basis.

[1]A projected wood sale quantity level of approximately 10.5 MMCF would be possible within the constraints of the desired conditions and other plan components if budget was not considered as a limiting factor.

Standards (FW-TIM-STD)

01 On lands both suitable and unsuitable for timber production, timber harvest will not occur where soil, slope, or other watershed conditions may be irreversibly damaged, as identified in project specific findings. Also see Aquatic Ecosystems and Soil sections.

02 On forested lands (both suitable and unsuitable for timber production), timber harvest shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest per legal mandate. Restocking levels are prescribed in a site-specific silvicultural prescription for a treatment unit and are determined to be adequate depending on the objectives and desired conditions for the planning area. In some instances, such as when stands are treated to reduce fuel loadings, to create openings for scenic vistas, or to prevent encroaching trees to meet desired vegetation or wildlife habitat conditions, it is acceptable not to restock or restock at low tree densities. Restocking considerations do not apply in nonforested plant communities.

03 On lands both suitable and unsuitable for timber production, silvicultural treatments shall not be selected based solely on their ability to provide the greatest dollar return or output of timber; other considerations such as the purpose and need shall inform the selection of silvicultural treatments.

04 On lands both suitable and unsuitable for timber production, clearcutting shall be used as a harvest method only where it has been determined to be the method most appropriate to meet the purpose and need of the project. Other types of even-aged harvest shall be used only where determined to be appropriate. Determinations shall be based on an interdisciplinary review of site conditions and the desired conditions for vegetation, wildlife habitat, scenery, and other resources.

05 On lands both suitable and unsuitable for timber production, harvest units shall be shaped and blended to the extent practicable with the natural terrain. Also see the guidelines for Scenery.

06 Even-aged stands shall reach a minimum of 95 percent of culmination of mean annual increment, as measured by cubic volume, prior to regeneration harvest, unless at least one of the following conditions have been identified during project development:

a. When such harvesting would modify fire behavior to protect identified resource, social or economic values;
b. When harvesting of stands will trend landscapes toward vegetation desired conditions;
c. When harvest uses uneven-aged silvicultural systems, thinning, or other intermediate stand treatments that do not regenerate even-aged or two-aged stands;

d. When harvest is for sanitation or salvage of timber stands that have been substantially damaged by fire, windthrow, or other catastrophe or which are in imminent danger from insect or disease attack;

e. When harvest is on lands not suited for timber production and the type and frequency of harvest is due to the need to protect or restore multiple use values other than timber production.

07 The quantity of timber that may be sold per decade from lands both suitable and not suitable for timber production shall not exceed the sustained yield limit of 5.75 mmcf (31.21 mmbf) per year on the proclaimed Helena National Forest; and 4.95 mmcf (26.36 mmbf) per year on the proclaimed Lewis and Clark National Forest. The sustained yield limits for both proclaimed forests total 10.7 mmcf (57.57 mmbf) across the administratively combined HLC NF, except for salvage or sanitation cutting of trees damaged by fire, windthrow, or other disturbance or to manage insect infestation or disease spread. Such trees may be harvested above the sustained yield limit, where it is not feasible to substitute such timber for timber that would otherwise be sold under the forest plan and where such harvest is consistent with desired conditions for terrestrial and aquatic ecosystems.

08 The maximum opening size created by clearcutting, seedtree cutting, shelterwood seed cutting, or other cuts designed to regenerate an even-aged stand of timber in a single harvest operation shall normally be 40 acres. This standard applies to new harvest proposals on NFS lands only and need not consider existing openings on NFS lands, adjacent private or other agency lands. An exception applies to achieve desired ecological conditions for the forest planning area, including those associated with forest patterns, patch sizes and resilience in the short and long term (FW-VEGT-DC-01, 04 and FW-VEGF-DC-08, 09). The maximum opening size exception for the HLC NF is 75 acres. This is consistent with the estimated natural range of variation for average patch size of early successional forest openings.

09 Harvest openings, created as a result of a single harvest operation, that exceed the maximum opening sizes established in FW-TIM-STD-08 shall require 60-day public review and Regional Forester approval.

10 FW-TIM-STD-08 and FW-TIM-STD-09 shall not apply to the size of harvest openings created as a result of catastrophic (stand replacing) disturbances, such as fire or insect and disease infestations.

Guidelines (FW-TIM-GDL)

01 To contribute to ecological sustainability and ecosystem health, when timber harvest and maintenance activities (such as precommercial thinning) are conducted, they should be designed to move the Forest toward achievement of vegetation desired conditions (such as species composition, size class, forest density, and landscape pattern) as well as other resource desired conditions.

02 To help achieve desired conditions on lands unsuitable for timber production, but where timber harvest could occur, the use of timber harvest should be limited to the following purposes:

- Salvage dead or dying trees.
- Improve production of forage for livestock and wildlife.
- Reduce hazardous fuels and/or fire risk.
- Manage powerline right-of-ways.
- Mitigate forest insect or diseases.
- Move conditions toward desired stand or landscape vegetation composition, structure, and patterns, including restoration of ecosystem functions and improving resiliency.

- Maintain or enhance wildlife habitat.
- Perform research or administrative studies.
- Address issues of public safety and health.
- Improve recreation, infrastructure and/or scenic resource conditions, including creation of scenic vistas.

03 To provide habitat for wildlife species associated with burned habitats, clusters of burned trees of a variety of sizes should be retained where it is safe to do so when salvaging timber in areas burned by high-severity wildfire.

Suitability (FW-TIM-SUIT)

01 Timber harvest for the purpose of timber production is only allowed on lands classified as suitable for timber production. See the map of these lands in each GA (appendix A).

02 Timber harvest is suitable to protect multiple use values on all lands where it is not prohibited by other plan components. See FW-TIM-GDL-02.

Other Forest Products and Wood for Fuel (OFP)

Desired Conditions (FW-OFP-DC)

01 Vegetation conditions support sustainable use of forest products other than timber, including but not limited to mushrooms, firewood, biofuels, posts and poles, Christmas trees, medicinal plants, tepee poles, and berries.

02 A variety of special forest products are available for commercial, tribal, personal, educational, and scientific uses to meet local demand.

Guidelines (FW-OFP-GDL)

01 To provide products for current and future generations, when permits are issued special forest and botanical products should be collected in a sustainable manner.

02 When offering sales of forest products, targeted sales of small products should be available to small businesses in order to contribute to local economic growth.

03 When providing temporary opportunities for the public to collect fuelwood or other forest products in timber sale areas, the Forest should ensure that potential negative impacts to other resources including wildlife are avoided.

Fish and Wildlife (FWL)

Introduction

The 2012 Planning Rule requires that forest plans provide for ecological sustainability and diversity of plant and animal communities. This plan meets that requirement through plan components in the wildlife, terrestrial vegetation, and aquatic ecosystems sections. By maintaining fish and wildlife populations that persist over the long-term and are resilient to stressors, the opportunity for humans to enjoy those populations in a variety of way is also maintained. This section therefore includes only those plan components that are directly related to specific human uses, such as fishing, hunting, and viewing.

Desired Conditions (FW-FWL-DC)

01 Big game species remain on NFS lands throughout the archery and rifle hunting seasons at levels that support Montana Fish, Wildlife, and Parks recommendations regarding big game distribution, population size, and harvest.

02 Furbearers are present and potentially available to trappers on NFS lands, and habitat on NFS lands provides trapping opportunities that support Montana Fish, Wildlife and Parks population and harvest objectives.

03 Native and desired nonnative wildlife species are available on NFS lands for a variety of nonhunting recreational opportunities, such as viewing and photography.

04 Levels and types of public motorized access during the archery and rifle hunting seasons are balanced with desired conditions for wildlife populations and habitat security, as well as with other resource desired conditions.

05 The opportunity exists on some forest lands to fish native westslope cutthroat trout.

06 In some areas unsuitable for native fish restoration, sport fisheries habitats provide for recreational fishing opportunities.

Goal (FW-FWL-GO)

01 Forest Service and Montana Fish, Wildlife, and Parks biologists cooperate to identify potential needs for and means to achieve desired distribution and hunting opportunity of elk and other big game species.

Guidelines (FW-FWL-GDL)

01 Prior to management actions that would increase or change the location, timing, mileage, or density of wheeled motorized routes open during the archery and rifle hunting seasons, FS biologists should coordinate with Montana Fish, Wildlife, and Parks biologists to identify possible management actions that may reduce the potential for displacement of big game species from NFS lands during the archery and rifle hunting seasons. Possible management actions may vary on a project-specific or local basis, and should be based on scientific information and the most current recommendations made through agency or interagency efforts (such as that described in the U.S. Forest Service and Montana Department of Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena, and Lewis and Clark National Forests, 2013, or subsequent versions). Also see appendix C section titled “Elk and Other Big Game Species.

Special Uses (SU)

Introduction

All uses of NFS lands, improvements, and resources, except those authorized by the regulations governing sharing use of roads (36 CFR 212.9); grazing and livestock use (36 CFR 222); the sale and disposal of timber and special forest products, such as greens, mushrooms, and medicinal plants (36 CFR 223); and minerals (36 CFR 228) are designated “special uses”. These uses benefit tens of millions of people every day. The most notable of these uses revolve around energy transmission/distribution and communications. However, many of the other use types contribute substantially to the socio-economic health of smaller rural communities as well as larger metropolitan areas.

Of all uses on NFS lands, the transmission and distribution of electricity, oil, and gas (collectively called "energy uses") has the most profound impact to our daily lives. Energy uses on NFS lands, as opposed to other alternatives, help address the Nation's growing energy needs. Solar and wind energy generation, although not prevalent at this time, may be future energy uses in the planning area.

Communication facilities link us together through technology over vast distances. Many of these sites are located on NFS lands and provide critical emergency services in areas where no other alternative exists. Our communities are kept safer by these vital communication links. Communication sites connect us on a global scale by providing wireless communications, internet services, television, and public radio. Mobile radio systems existing on NFS lands allow highway workers and railroads to operate more efficiently, improving interstate commerce. In some cases, communication systems connect the electric grid which allows the early detection of system malfunctions, preventing large-scale power outages. Occupancy at communication facilities allows citizen-based organizations such as the Civil Air Patrol, Search and Rescue, and Coast Guard Auxiliary to maximize their communications, which enhances public safety and saves lives.

Special use authorizations on NFS lands allow municipalities to provide clean drinking water and enable farmers and ranchers the ability to convey water to crops and livestock. The support of military training operations on NFS lands via special use authorization contributes to the effectiveness and safety of our troops which strengthens our national security.

Recreation special uses such as ski areas, outfitter guide services, and organizational camps connect people to the forest. Annually, tens of thousands of people ski down winter slopes, get packed into remote camps to hunt big game, and/or attend summer camps on NFS lands - all of which is made possible through the issuance of special uses permits.

Desired Conditions (FW-SU-DC)

01 Authorized uses connect people to the Forest and provide for maximum public benefit.

02 Special use authorizations support the public's energy, communication, and infrastructure needs.

Geology, Energy and Minerals (EMIN)

Introduction

The geology of the HLC NF is extremely varied and unique. Tectonic forces, volcanism, alpine and continental glaciation, and alluvial process have shaped and reshaped all the GAs within the planning area. A large thrust fault system shaped the Rocky Mountain GA by displacing Mississippian-aged limestone over the top of Cretaceous-aged shale and sandstones. Granitic intrusions dominate the Elkhorn and Divide GAs as well as intrusions in the Blackfoot, Little Belts, and Crazy Mountain GAs where processes have resulted in mineralized deposits containing gold, silver, lead, copper, and other precious metals. Pleistocene glaciers left behind jagged peaks, with high mountain cirque lakes and wide glacial outwash filled valleys. Geologic processes continue today with active geomorphologic changes including stream channel migration, flooding, earthquakes, mass wasting, and anthropogenic disturbances.

The HLC NF has a long history of mineral extraction starting in the 1860s when gold and silver was discovered in the Helena area. Silver lead deposits were discovered in the 1880s and mined until the silver panic in the 1890s. Sapphires were discovered in an intrusive dike located on the east end of the Little Belt Mountains in 1879 and have been mined off and on to this day. Other geologic resources found on the HLC NF include gravel and decorative rock.

The HLC NF recognizes that historic mining has left a legacy of environmental degradation throughout the Forest. Unstable mine waste and acid mine drainage from open adits continue to degrade soil and water quality. Placer mining has impacted riparian and stream habitats and water quality. Many streams in the forest do not currently meet state water quality standards due to the impacts of mineral mining and exploration.

The FS 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. Existing Federal laws, regulations, and legal decisions guide much of how or if particular minerals and energy management actions should take place. The right of access for purposes of prospecting, locating, and mining is provided by statute. Such access must be in accordance with the rules and regulations of the FS. Plan components do not reiterate overarching Federal law, regulation, and policy that must be implemented. The energy and minerals plan components provide further clarity and specificity as to how or if particular minerals and energy management actions should take place. All mineral and energy management activities on NFS lands are required to meet applicable environmental protection measures as required by law, regulation, and policy.

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. US citizens are guaranteed the right to prospect and explore lands reserved from the public domain and open to mineral entry. The disposal of locatable minerals is nondiscretionary.
- Salable minerals: includes common varieties of sand, stone, gravel, cinders, clay, pumice, and pumicite. The FS 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. A leasing decision will not be a part of this draft plan. The disposal of these mineral resources is discretionary.

Mineral encumbrances for subsurface mineral estates include both reserved and outstanding private mineral rights on acquired lands on the HLC NF, and oil and gas leases and mining claims under the 1872 Mining Law.

The reserved and outstanding mineral rights occur on acquired lands that are split estate, federal surface, and private subsurface. Reserved mineral rights are those that a private landowner kept when the property was sold to the United States. Reserved minerals are managed based on the Secretary of Agriculture's rules and regulations. Outstanding minerals are those minerals that were separated from the surface estate sometime in the past. Outstanding minerals are subject to state laws and conditions stated in the original deed conveying the minerals. In both of these cases, the Forest Service has little control over the access and mineral activities for these private mineral rights. There are approximately 56,700 acres of lands with privately owned mineral estates within the HLC NF.

Desired Conditions (FW-EMIN-DC)

01 Caves and karst topography retain their unique geological features. Also see FW-WL-GDL-10 and 11.

02 Geologic hazards (landslides, floods, sinkholes, etc.) and associated risks to public health and safety and facilities and infrastructure are minimized or mitigated.

03 The intrinsic values and characteristics of unique geologic features and scenery are conserved.

04 Geologic resources provide ecological, scientific, educational, interpretative, scenic, recreational, and paleontological benefits for the public and academia.

05 The Forest continues to contribute to the economic strength and demands of the nation by supplying mineral and energy resources while assuring that the sustainability and resiliency of other resources are not compromised or degraded.

06 Mineral materials are available based upon public interest, material availability, in-service needs, and protection of other resource values, including consistency with desired conditions for other resources.

07 Abandoned mine sites do not pose a risk to human health and/or the environment.

Objectives (FW-EMIN-OBJ)

01 Complete reclamation on at least five abandoned mines.

Standards (FW-EMIN-STD)

01 Superfund sites shall be managed within the context of the superfund designation in coordination with the Environmental Protection Agency and the Montana Department of Environmental Quality.

02 If previously undiscovered caves are encountered during drilling operations, reasonable precautions shall be taken to protect the cave. This includes but is not limited to sealing the casing above and below the cave to prevent air flow and water leakage.

03 Activities that could compromise the infrastructure and remedy at mine waste repositories and mine reclamation sites shall be excluded.

Guidelines (FW-EMIN-GDL)

01 To minimize adverse effects to aquatic and riparian resources, new authorizations and reauthorizations for mineral development and operations should avoid RMZs to the extent practicable. If the RMZ cannot be avoided, then ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat that may be affected by the operations. Required bonding should consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.

02 To minimize adverse effects to aquatic and riparian resources, new authorizations and reauthorizations for mineral development and operations should avoid adverse effects to aquatic and riparian resources. This should include requirements that operators take all practicable measures to maintain, protect, and rehabilitate water quality, and habitat for fish and wildlife and other riparian associated resources which may be affected by the operations.

03 Controlled seismic surveys requiring explosives or other similar techniques should not be conducted, to the extent practicable, over or close enough to known caves to create disturbances to roosting or hibernating bats or bat maternity colonies.

04 The mining heritage of the HLC NF should be preserved to the extent practicable during mineral development.

05 During management activities, the FS should notify mining claimants and leaseholders of impending actions that may affect their claims or leased lands to minimize disruption of mining operations.

Carbon Storage and Sequestration (CARB)

Introduction

Carbon sequestration is the process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils. The sink of carbon sequestration in forests and wood products helps to offset sources of carbon dioxide to the atmosphere, such as deforestation, forest fires, and fossil fuel emissions. Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while enhancing other ecosystem services, such as improved soil and water quality. Planting new trees and improving forest health through thinning and prescribed burning are some of the ways to increase forest carbon in the long run. Harvesting and regenerating forests can also result in net carbon sequestration in wood products and new forest growth.

Desired Conditions (FW-CARB-DC)

01 Forests are resilient to natural disturbance processes and changing climates and maintain ecosystem biodiversity and function, which sustains carbon sequestration storage and potential. Also see Forested Vegetation and Soils.

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Chapter 3. Geographic Area Direction

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 NF have their own unique characteristics and conditions. These places, referred to as "geographic areas" (GAs), define a landscape that people associate with on the Forest. Identifying these areas gives us the opportunity to fine-tune our forestwide management to better respond to more local conditions and situations. The HLC NF has been divided into the following ten GAs (see figure 2):

- Big Belts (BB)
- Castles (CA)
- Crazies (CR)
- Divide (DI)
- Elkhorns (EH)
- Highwoods (HW)
- Little Belts (LB)
- Rocky Mountain Range (RM)
- Snowies (SN)
- Upper Blackfoot (UB)

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 30 displays total acres and the acres of the HLC NF by GA.

Table 30. Acres within the ten GAs on the HLC NF

Geographic area	Total acres (all ownerships)	NFS acres within GA	Percent 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 existing distinctive roles and contributions. GA specific desired conditions not covered by forestwide direction are also included. GA objectives, and in some cases standards and guidelines, are also specified. In all cases, please refer to the forestwide direction first, followed by any specific GA direction that may apply. Each GA has a set of associated maps (appendix A).

Some of the GAs have emphasis areas located within them. Emphasis areas are distinct landscapes with specific management needs. The specific plan components for these emphasis areas are unique from the broader forestwide direction. In addition to the emphasis areas, many GAs contain other features that call for specific plan components, such as municipal watersheds and permitted ski areas.

A number of small parcels that fall within FS jurisdiction are located outside of the HLC NF boundary and are not associated with any GA. These small parcels are primarily used administratively, except for the Lewis and Clark National Historic Trail Interpretive Center in Great Falls, MT, which is a large interpretive and educational facility. These small parcels often fall within or very close to the communities surrounding the HLC NF.

Table 31 describes the locations and sizes of these smaller parcels.

Table 31. Parcels that are within FS jurisdiction, but outside of HLC NF boundary

Parcel general location and town/range/section	Description	Acres
Augusta, Montana T20N R06E S17	Augusta Information Station, several administrative buildings in the city limits.	1.5
Harlowton, Montana T08N R15E S21 and S22	Administrative buildings in the city limits.	1.4
White Sulphur Springs, Montana T09N R07E S18	Belt Creek-White Sulphur Springs Ranger District office, several administrative buildings located on several city lots within the city limits.	0.4
White Sulphur Springs, Montana T09N R07E S18		0.4
White Sulphur Springs, Montana T09N R07E S18		0.4
White Sulphur Springs, Montana T09N R07E S18		0.4
White Sulphur Springs, Montana T09N R07E S18 and T09N R07E S13		0.4
White Sulphur Springs, Montana T09N R07E S18 and T09N R07E S13		0.4
Townsend, Montana T07N R02E S32	Administrative buildings and corrals outside of the city limits.	39.8
Townsend, Montana T07N R02E S31	Administrative buildings in the city limits.	0.2
Helena, Montana T10N R03W S20	Old Helena Ranger District office, administrative buildings in the city limits, near the airport.	18.0
Helena, Montana T10N R03W S22	Tanker Base, administrative buildings near the airport.	8.3
Great Falls, Montana T21N R04E S32 and S33	Lewis and Clark National Historic Trail Interpretive Center within city limits.	29.3
Stanford, Montana T16N R12E S16 and S17	Administrative buildings in city limits.	6.7
Choteau, Montana T24N R05W S24	Administrative buildings and corrals north of the city limits	5.0
Total		112.6

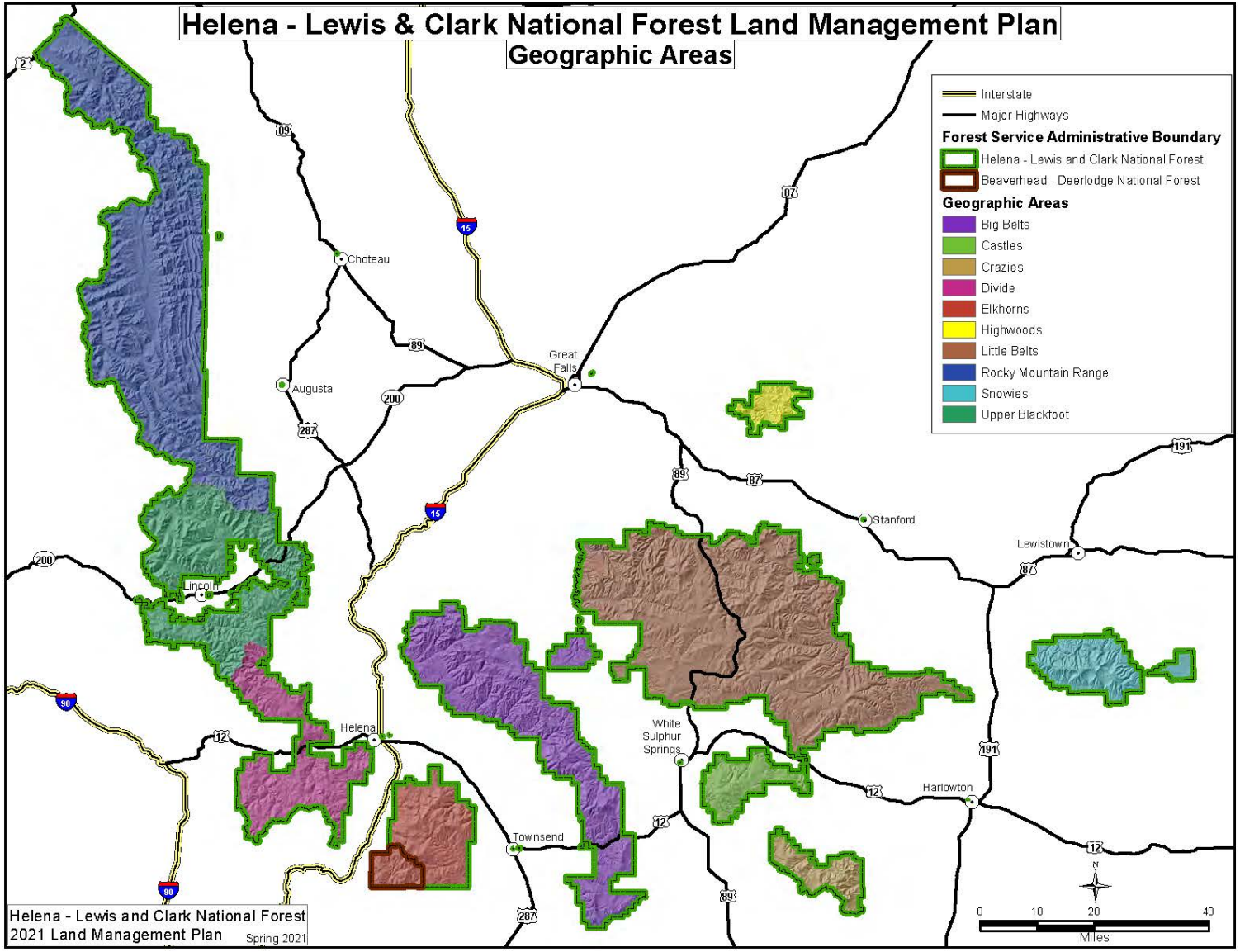

Figure 2. Geographic areas on the HLC NF

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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 centers include Helena, Townsend, and White Sulphur Springs. This GA is adjacent to the Missouri River and several large reservoirs.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Missouri River flows northwest along the west side of this GA and then flows north through the Big Belt Mountains. The area 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 the 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 Smith River flows through the valley to the east of the Big Belt Mountains and the Dry Range. The tallest mountains, Mount Baldy and Mount Edith, are found in the south-central part of the range. Some of the highest elevations have evidence of localized glaciation, such as the cirque on Mount Edith. Another prominent local landform feature are bars, which are depositions of material within a stream body over time. Many, such as Montana Bar, have been productive sources for valuable minerals, such as gold and sapphires from placer mining.

The geology of this GA is complex. The southern parts of the GA are predominantly granitic, uplifted, sedimentary, Precambrian limestone, sandstones, and shale. The northwest end of the Big Belts has an excellent exposure of the Precambrian-aged Helena (Empire shale) Formation. This area features dramatically deformed Mississippian-aged massive limestones that are exposed along the Missouri River corridor and in primary drainages. 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. High elevation lakes such as Camas, Edith, and Boulder are in basins surrounding Mount Baldy and Boulder Baldy peaks. Gipsy Lake, a manmade reservoir, is also on the east side.

The GA supports a mosaic of productive grasslands and conifer forests. 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. This GA hosts a unique bitterbrush/sagebrush/skunkbush complex in the Sweats Gulch area, as well as a heavy sagebrush zone in the southern portion. Mountain mahogany occurs along the Missouri river, providing deer winter range. Other unique nonforested vegetation communities include rough fescue-dominated grasslands, horizontal juniper, and high elevation wetlands in the Boulder-Baldy and Mount Edith areas. The interior slopes support extensive conifer forests interspersed with higher elevation grass and shrublands, as well as several rocky peaks above treeline. The Big Belts is notable for its preponderance of warm, dry potential vegetation types and potential to promote ponderosa pine, aspen, limber pine, and open savannas, as well as whitebark pine on cold potential vegetation types at the highest elevations. Cool moist potential vegetation types and associated species (including lodgepole pine, subalpine fir, and Engelmann spruce) are present but less common in this GA than elsewhere on the Forest. Extensive sagebrush and aspen communities are present. The Long Gulch lodgepole pine test plantation is located here. The limestone cliffs near the Missouri support unique plant communities. In

addition, the Needles rock formation area supports a unique bog feature where livid sedge (*Carex livida*) can be found.

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 and flammulated owls, species of conservation concern, are also found here. This GA is not within the Northern Continental Divide Ecosystem Recovery Zone for grizzly bears, but is within management Zone 2, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, and grizzly bears have been documented in this GA. 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 viewing and hunting opportunities for a variety of big game species including elk, mule deer, and white-tailed deer, and has a population of wild turkeys that provides a hunting opportunity. The 36,000-acre Beartooth Wildlife Management Area borders the Big Belts GA and is managed by FWP to provide wildlife habitat and big game winter range. There are several streams containing conservation populations of westslope cutthroat trout that play a role in maintaining the viability of this trout in the Upper Missouri and Smith River 4th digit watersheds. Examples include Ray Creek, Avalanche, and Greyson Creek as well as Whites Gulch. In addition, Beaver Creek is a blue-ribbon trout stream.

Social and Economic Characteristics

The Big Belts GA provides a 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, many nonmotorized trails offer recreation opportunities into quiet areas, such as the Gates of the Mountains Wilderness and the Camas Inventoried Roadless Area. 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, Miller, and Thompson Guard Station. 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 Belts 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.

Roads have been constructed for resource extraction and now fragment some areas 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, including a portion of the Gates of the Mountain Wilderness. In contrast to the roaded landscapes in the GA, inventoried roadless areas are in the GA, including the Mount Baldy Inventoried Roadless Area which provides a particularly remote expanse of land. A large livestock grazing program is active in the GA. Mineral production is primarily occurring via small mining operations, and there are several abandoned mines in the GA that need reclamation.

Cultural and Historical Characteristics

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. Tool stone quarries and artifacts such as projectile points and associated flakes are commonly encountered. The Flathead Trail, a historic travel corridor, traverses the southern Big Belt Mountains.

Early European settlement began with the Lewis and Clark expedition of 1804-1806. Shortly thereafter, settlers and miners began to settle within the area. 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. Thompson Civilian Conservation Corps Camp, Meriwether Guard Station, and Hogback Lookout stand as reminders of the Civilian Conservation Corps and FS history.

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 because 13 fire personnel 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.

Designated Areas

Designated areas are specific areas or features within the forest planning area that have been given a permanent designation to maintain their unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 32 and associated map(s) (appendix A) display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 32. Designated areas in the Big Belts GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Gates of the Mountains Wilderness	28,441	9	5
Inventoried roadless areas (11)	148,939	47	10
Recommended Wilderness Areas (2)	15,176	5	10
Research natural area (1)	2,409	1	13
Eligible wild and scenic rivers (4)	23	N/A	N/A
Lewis and Clark National Historic Trail	.5	N/A	N/A
Hanging Valley National Recreation Trail	6	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There are two emphasis areas within the Big Belts GA. Each of these are mapped and are assigned specific plan components. See Table 33 below. Table 33 and the associated maps (s) (appendix A) display the emphasis areas in this GA.

Table 33. Emphasis areas in the Big Belts GA

Area	Acres	Percent of GA
Missouri River Corridor	3,633	1
Smith River Corridor	See Little Belts GA	See Little Belts GA

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Other GA Features

There are no other features within the Big Belts GA.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the recreation opportunity spectrum classes in the glossary. Table 34 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter in this GA. In addition, the associated map(s) (appendix A) display the recreation opportunity spectrum categories in this GA.

Table 34. Recreation opportunity spectrum classes for the Big Belts GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	46,031	15	46,031	15
Semiprimitive nonmotorized	107,915	34	127,286	40
Semiprimitive motorized	39,021	12	84,657	27
Roaded natural	112,531	36	48,502	15
Rural	9,700	3	8,722	3
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Big Belts GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social, economic, historic, and cultural characteristics commonly found throughout this GA. Scenic integrity objectives (Table 35) tied to the scenic character for the Big Belts GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 35. Scenic integrity objectives for the Big Belts GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	46,032	15
High	177,770	56
Moderate	50,537	16
Low	40,860	13
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. The Big Belts GA contributes a substantial proportion of the forestwide total area of lands suitable for timber production. Table 36 and associated map(s) in appendix A display the lands suitable for timber production in this GA.

Table 36. Lands suitable for timber production in the Big Belts GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
54,701	17	15

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (BB-VEGT-DC)

01 Table 37 shows the desired condition for cover types in the Big Belts GA.

Table 37. Big Belts GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	21 (18-28)	15-25
Aspen/hardwood	0	2-5
Ponderosa pine	9 (5-12)	25-40
Douglas-fir	41 (31-50)	15-30
Lodgepole pine	8 (5-12)	5-10
Spruce/fir	5 (2-7)	5-10
Whitebark pine	3 (1-6)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock)

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (BB-VEGF-DC)

01 Table 38 shows the existing and desired conditions for tree species presence in the Big Belts GA.

Table 38. Big Belts GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	3 (1-6)	5-15
Rocky Mountain juniper	17 (12-21)	5-15
Ponderosa pine	10 (6-13)	40-50
Douglas-fir	49 (42-54)	50-60
Aspen	1 (0.3-3)	2-10
Engelmann spruce	4 (1-6)	5-15

Tree species	Existing (percent)	Desired range (percent)
Lodgepole pine	16 (12-2)	10-20
Subalpine fir	15 (10-19)	5-15
Whitebark pine	6 (3-9)	5-15

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 39 shows the existing and desired conditions for forest size class in the Big Belts GA.

Table 39. Big Belts GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	7 (4-11)	1-15
Small (5-9.9”)	31 (24-36)	2-15
Medium (10-14.9”)	18 (14-23)	5-20
Large (15.0-19.9”)	8 (5-11)	20-30
Very large (20”+)	2 (1-5)	10-30

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 40 shows the existing and desired conditions for forest density class in the Big Belts GA.

Table 40. Big Belts GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (<39.9%)	33	25-55
Med/high (40-59.9%)	29	30-50
High (60+%)	39	10-40

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (BB-VEGNF-DC)

01 Unique plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to the bitterbrush/sagebrush/skunkbush complex in Sweats Gulch, mountain mahogany communities along the Missouri River, the heavy sagebrush zone of the southern Belts, high elevation rough fescue-dominated grasslands, horizontal juniper components, and high elevation wetlands and bogs in the Boulder-Baldy and Mount Edith areas.

Plan Components - Wildlife (WL)

Desired Conditions (BB-WL-DC)

01 The risk of disease transmission from domestic livestock to bighorn sheep is minimal.

02 Ponderosa pine-dominated forests contain large-tree structure (see glossary) comprised of ponderosa pine and/or Douglas-fir trees and snags with relatively open canopy available for nesting by flammulated owls. These areas occur within a larger mosaic of closed-canopy forest and shrub-dominated openings that serve as flammulated owl roosting and foraging areas.

03 The Big Belts GA provides habitat connectivity for wide ranging species (e.g., grizzly bear and others) between public lands in northern Montana and those in south and southwestern Montana, including lands in the Greater Yellowstone Ecosystem.

Standards (BB-WL-STD)

01 Scientific information and the most current recommendations made through agency or interagency efforts, shall be used to determine and establish the means with which to achieve effective separation between bighorn sheep and domestic sheep and goats on NFS lands (refer to appendix C for information on recommendations and strategies).

Plan Components – Missouri River Corridor (MISCOR)

The Missouri River is a nationally recognized river famous for its fishing, outstanding scenery, and the history present along it. The Missouri River Corridor has much historic and cultural significance. Captains Meriwether Lewis and William Clark passed through this corridor on route to the Pacific Ocean and back in 1805-06. Captain Lewis used the term “Gates of the Mountains” to describe these scenic and unique cliffs in the area. The Lewis and Clark National Historic Trail, a nationally designated trail, is in the bottom of the corridor. Additionally, the historic Mann Gulch Fire Historic Landscape is located within the Missouri River Corridor area. This historic landscape is recognized on the National Register of Historic Places and memorializes the loss of smokejumper fire fighters during the 1949 Mann Gulch fire.

Recreation use of the Missouri River Corridor is year-round but particularly high during the summer months when water recreation is the most active throughout the corridor. A commercial tour boat operation offers boat trips up the river and there are many developed and dispersed recreation sites along the banks of the river. This area also provides access to the western portions of the Gates of the Mountain Wilderness. In addition, there are concentrations of cliff nesting raptors in this corridor (also see FW-WLO-DC-03).

Desired Conditions (BB-MISCOR-DC)

01 The developed recreation settings and opportunities along the Missouri River Corridor are ecologically sustainable and recreational user conflicts are minimal.

02 The Missouri River Corridor canyon appears largely natural.

03 The Missouri River Corridor maintains its historic and cultural features. Interpretation is available and enhances visitor experiences of the area.

04 Travelers within the Missouri River Corridor have opportunities to learn about the 1806 Lewis and Clark Expedition and the Mann Gulch Fire, and to experience and appreciate the unique natural environment of the area. Trailside interpretation and related visitor information services enhance visitor appreciation of the outdoors, the natural resources, scenery, and cultural and historic values within the corridor.

05 Developed recreation sites accommodate increased recreational use in the corridor while protecting the unique and important natural resources and historic and cultural features within the area.

06 Dispersed recreation opportunities along the river corridor allow for exploration and discovery with minimal environmental impacts and user conflicts.

Goals (BB-MISCOR-GO)

01 The operation, maintenance, and delivery of recreation along the Missouri River corridor is supported by strong partnerships and volunteer programs.

Guidelines (BB-MISCOR-GDL)

01 To protect and enhance the scenic quality of the area, management activities in the Missouri River Corridor should be consistent with the scenic integrity objective of high to very high.

Suitability (BB-MISCOR-SUIT)

01 The Missouri River Corridor is unsuitable for timber production. However, harvest may be used for other multiple use values such as providing for public safety and enhancing the recreational or aesthetic values of the corridor.

Plan Components – Smith River Corridor (SMITH)

The Smith River Corridor is located within two GAs - Big Belts and the Little Belts. Only a small portion of the corridor crosses the Big Belts on the far western portion of the GA, called the Dry Range. The majority of the corridor is located within the Little Belts GA. Therefore, the forest plan components for the Smith River corridor are in the Little Belts GA section.

Plan Components – Benefits to People (SU)

Goal (BB-SU-GO)

01 Work with permit holder to relocate the utility corridor outside of the Gates of the Mountains Wilderness.

Standards (BB-SU-STD)

01 Maintenance of the utility corridor in the Gates of the Mountains Wilderness shall be managed to have minimal effects on wilderness character.

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.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

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 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. This GA is dominated by nonforested and warm dry potential vegetation types, with more aspen, lodgepole pine, and limber pine than across the Forest as a whole, along with less Douglas-fir, ponderosa pine, and subalpine fir. Aspen stands grow in moist areas, and the western portion of the mountain range supports a large expanse of whitebark pine forest at the highest elevations. On the drier, eastern sections, plant communities are dominated by grassy parks interspersed with patches of conifers. Historically, fire was the primary shaper of plant communities.

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 several species that use that habitat type, such as Vesper sparrow and possibly Brewer's sparrow and loggerhead shrike. The northeastern portion of the GA has important elk winter range. This GA is within management Zone 3, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, although grizzly bears have not been documented in the Castles as of early 2020.

The Castles GA drains to the North and South Forks of the Smith River on the west side and to the North and South Forks of the Musselshell River on the east side. 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. Several streams on the west slope of the Castles support westslope cutthroat trout.

Water quality in the upper areas of the Willow Creek drainage is good. The watershed is the primary source water for the municipal water for the city of White Sulphur Springs. The reservoir and infrastructure include a small dam and stream diversion just off FS lands on city property. A small conservation population of westslope cutthroat trout are present in the drainage.

Social and Economic Characteristics

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. Livestock grazing is a primary multiple use on this GA. Mineral production is primarily occurring via small mining operations, and there are several abandoned mines in the GA that need reclamation.

Private land inholdings and checkerboard ownership patterns in this GA make access to other NFS lands within the area challenging.

Cultural and Historical Characteristics

This GA has a long history of occupation. Native Americans left evidence of their presence via rock art, stone tool quarries, and workshop sites. Euro-American settlement began with the discovery of metal deposits. This was followed by homesteading as a result of railroad development. The small railroad town of Lennep is a remnant of this era, as are the mining ghost towns of Castletown and Blackhawk. The short-lived city of Castletown (1887 to 1893), located on the south side of the Castle Mountains, had a population of over 2,000 individuals during the silver heydays of the late 1880s. Cities of White Sulphur Springs, Lennup, and Martinsdale were also established when silver was discovered in the Castle Mountains. Locals report the active use of Prohibition stills in the surrounding foothills, with one known recorded location.

Designated Areas

Designated areas are specific areas or features within the forest planning area that have been given permanent designation to maintain their unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 41 and associated map(s) in appendix A display the designated areas in this GA.

Table 41. Designated areas in the Castles GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Inventoried roadless areas (1)	29,386	42	2

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number.

GA Emphasis Areas

There are no emphasis areas in the Castles GA.

Other GA Features

There is one other feature within the Castles GA that requires specific plan components (Table 42).

Table 42. Other features within the Castles GA

Area	Acres	Percent of GA
Willow Creek Municipal Watershed	6,856	9

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation

opportunity spectrum and its associated plan components as well as the definitions of the recreation opportunity spectrum classes in the glossary. Table 43 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 43. Recreation opportunity spectrum classes for the Castles GA

ROS Class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	0	0	0	0
Semiprimitive nonmotorized	16,876	24	12,986	19
Semiprimitive motorized	16,343	24	56,722	81
Roaded natural	36,490	52	0	0
Rural	0	0	0	0
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Castles GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. Scenic integrity objectives (Table 44) tied to the scenic character for the Castles GA are displayed in the scenic integrity objective maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 44. Scenic integrity objectives for the Castles GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	0	0
High	39,690	57
Moderate	18,584	27
Low	11,434	16
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This GA contributes a relatively small proportion of the forestwide total area of lands suitable for timber production. Table 45 and associated map(s) (see appendix A) display the lands suitable for timber production in this GA.

Table 45. Lands suitable for timber production in the Castles GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
15,084	22	4

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Watershed (WTR)

Desired Conditions (CA-WTR-DC)

01 Willow Creek municipal watershed provides a clean water supply for the city of White Sulphur Springs. See FW-WTR-STD-01.

Goals (CA-WTR-GO)

01 Coordinate management of the municipal watershed with the state of Montana and municipality.

Guidelines (CA-WTR-GDL)

01 Management activities within the Willow Creek municipal watershed should emphasize restoration and resiliency.

02 Livestock grazing should only be permitted in the Willow Creek watershed when moving animals between pastures which are adjacent to the watershed.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (CA-VEGT-DC)

01 Table 46 shows the existing and desired condition for cover types in the Castles GA.

Table 46. Castles GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	15 (6-23)	10-20
Aspen/hardwood	2 (2-6)	2-5
Ponderosa pine	0	15-30
Douglas-fir	35 (23-46)	10-20
Lodgepole pine	35 (23-46)	30-40
Spruce/fir	6 (1-12)	5-10
Whitebark pine	4 (3-8)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock)

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (CA-VEGF-DC)

01 Table 47 shows the existing and desired conditions for tree species presence in the Castles GA.

Table 47. Castles GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	15 (6-23)	35-45
Rocky Mountain juniper	2 (1-6)	1-5

Tree species	Existing (percent)	Desired range (percent)
Ponderosa pine	6 (5-12)	20-30
Douglas-fir	48 (38-62)	20-30
Aspen	2 (1-6)	2-10
Engelmann spruce	2 (1-6)	2-10
Lodgepole pine	44 (32-56)	35-45
Subalpine fir	15 (7-24)	5-15
Whitebark pine	19 (10-28)	10-20

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 48 shows the existing and desired conditions for forest size class in the Castles GA.

Table 48. Castles GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	7 (2-13)	1-20
Small (5-9.9”)	50 (39-62)	2-25
Medium (10-14.9”)	7 (2-14)	2-25
Large (15.0-19.9”)	13 (6-23)	25-35
Very large (20”+)	4 (4-9)	5-15

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 49 shows the existing and desired condition for forest density class in the Castles GA.

Table 49. Castles GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	28	20-40
Med/high (40-59.9%)	46	30-50
High (60+%)	26	15-45

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (CA-VEGNF-DC)

01 The extent and health of native grass and shrublands support habitat for potential use by native wildlife species associated with these habitats.

02 Unique plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to sagebrush communities.

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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.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Crazy Mountains make up an island range that abruptly rises from the surrounding Shield, Musselshell, and Yellowstone River valleys. 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.

The Crazy Mountains support a mix of nonforested, warm dry, cool moist, and cold potential vegetation types. Riparian forests of aspen, willow, dogwood, and cottonwood grow along their courses. Grasslands occupy much of the lower elevations, more so than the forest as a whole, which intergrade with coniferous forest at higher elevations. Small patches of aspen punctuate the dense canopy of evergreen trees, although this species is relatively rare. Limber pine is present, but ponderosa pine and juniper are notably absent. Spruce/fir cover types are the most common, and although lodgepole pine and Douglas-fir are common, they are less prevalent here than on the forest as a whole. At the highest elevations whitebark pine communities are particularly prevalent, eventually giving way to nonforested alpine habitats. Historically, fire would have been a major influence on plant communities.

The Crazies GA is home to several wildlife species, including western toads, Clark's nutcrackers, black bears, moose, elk, mule deer, and others. The Crazies support a population of mountain goats introduced by Montana Fish, Wildlife, and Parks in 1941 and 1943 that currently provide an important hunting and viewing opportunity. This GA is within management Zone 3, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, although grizzly bears have not been documented in the Crazies as of early 2020. The Crazy Mountains may provide some connectivity for certain wildlife species between the Little Belt Mountains to the north, and the mountain ranges of the Greater Yellowstone Ecosystem to the south.

All the GA's streams drain into the Musselshell River on their way to the Gulf of Mexico via the Missouri River. There is no mapped population of westslope cutthroat trout in theCrazies.

Social and Economic Characteristics

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 near Forest Lake. Private land inholdings and checkerboard ownership patterns in this GA make access to other NFS lands within the area challenging. Hunting is a very popular recreation activity in the GA. Outfitter and guides provide unique hunting opportunities and access that is difficult to achieve otherwise.

Cultural and Historical Characteristics

The rugged and awe-inspiring range has captivated people over time. The Mountain Crow people 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 FS administration. Today people still seek spiritual experiences through various recreational and other means.

Designated Areas

Designated areas are specific areas or features within the forest planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 50 and associated map(s) (appendix A) display the designated areas in this GA.

Table 50. Designated areas in the Crazies GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Inventoried roadless areas (2)	37,498	65	3

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number.

GA Emphasis Areas

There are no emphasis areas in the Crazies GA.

Other GA Features

There are no other features within the Crazies GA.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 51 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) (appendix A) display the recreation opportunity spectrum categories in this GA.

Table 51. Recreation opportunity spectrum classes for the Crazies GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	0	0	0	0
Semiprimitive nonmotorized	33,899	59	35,830	62
Semiprimitive motorized	15,126	26	21,838	38
Roaded natural	8,642	15	0	0
Rural	0	0	0	0
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Crazies GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table

52) for the Crazies GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 52. Scenic integrity objectives for the Crazies GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	0	0
High	47,087	82
Moderate	6,584	11
Low	3,996	7
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This GA contributes a small proportion of the forestwide total area of lands suitable for timber production. Table 53 and associated map(s) (appendix A) display the lands suitable for timber production in this GA.

Table 53. Lands suitable for timber production in the Crazies GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
5,353	9	1

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (CR-VEGT-DC)

01 Table 54 shows the desired condition for cover types in the Crazies GA.

Table 54. Crazies GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	19 (9-32)	10-20
Aspen/hardwood	0	1-2
Ponderosa pine	0	5-15
Douglas-fir	34 (14-55)	5-15
Lodgepole pine	14 (5-24)	25-35
Spruce/fir	21 (10-34)	15-25
Whitebark pine	5 (4-12)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock)

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (CR-VEGF-DC)

01 Table 55 shows the desired condition for tree species presence in the Crazies GA.

Table 55. Crazies GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	12 (4-23)	20-30
Rocky Mountain juniper	0	1-5
Ponderosa pine	0	2-10
Douglas-fir	45 (30-58)	10-20
Aspen	0	1-10
Engelmann spruce	12 (2-21)	15-25
Lodgepole pine	33 (20-46)	25-40
Subalpine fir	45 (33-60)	15-30
Whitebark pine	21 (11-35)	15-25

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 56 shows the desired condition for forest size class in the Crazies GA.

Table 56. Crazies GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	17 (11-25)	2-20
Small (5-9.9”)	46 (39-52)	5-25
Medium (10-14.9”)	17 (12-21)	5-25
Large (15.0-19.9”)	6 (3-9)	15-25
Very large (20”+)	3 (1-6)	5-25

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 57 shows the desired condition for forest density class in the Crazies GA.

Table 57. Crazies GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	25	30-55
Med/high (40-59.9%)	29	25-45
High (60+%)	46	15-45

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components - Wildlife (WL)

Desired Conditions (CR-WL-DC)

01 The Crazies GA provides habitat connectivity for wide-ranging species (e.g., grizzly bear and others) between public lands in northern Montana and those in south and southwestern Montana, including lands in the Greater Yellowstone Ecosystem.

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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. Unlike many of the other GAs in the HLC NF planning area, the Divide is not an island range, but rather a portion of the larger Continental Divide that extends north/south across Montana. One of its most unique characteristics is that a significant portion of the GA is located west of the Continental Divide.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Divide GA encompasses landscapes that span across the Continental Divide. It is located west of Helena and extends both north and south of Highway 12. East of the Continental Divide, it includes the Tenmile drainage as well as the headwaters of Prickly Pear and Little Prickly Pear Creeks. West of the Continental Divide, it includes the Little Blackfoot drainage. The range is predominantly sedimentary, with some volcanic intrusions. The area has been heavily mined since the late 1800s. Red Mountain is a notable peak visible from many locations, distinguished by its expanses of bare red rock. Greenhorn Mountain is also a key topographical feature.

The Divide GA supports a wide range of vegetation conditions. Historically, fire was the primary disturbance and would determine composition and patterns of vegetation, although the most recent large fire occurred in the 1860's. Much of the area west of the Continental Divide is covered with mature conifer forest, characterized by large expanses of even-aged lodgepole pine. It also includes other species such as whitebark pine, Engelmann spruce, and subalpine fir at the highest elevations and Douglas-fir with limited ponderosa pine at lower elevations. Many wetlands are present in the western portion of the GA. Large parks are distributed at both high and low elevations, including Irish Mine Hill, Baldy Mountain, Bullion Parks, and Blackhall Meadows, a unique aspen and grassland community. High quality native vegetation can be found in many rough fescue grasslands. East of the Continental Divide the landscape supports rolling foothills where conifer forest is interspersed with grass and shrubland communities. The Sweeney Creek area includes a unique vegetation complex of ponderosa pine and bitterbrush. Limber pine is present, although limited in this GA by the extent of its natural range. This area includes the dry ponderosa pine and Douglas-fir forests and meadows that abut the city of Helena. The 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. This GA also has the Cellar-Ogilvie lodgepole pine test plantation.

The Divide GA provides opportunities for connections 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 Northern Continental Divide Ecosystem Recovery Zone for grizzly bears and is an important north/south connectivity corridor. This GA is almost entirely within management Zone 2, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, and grizzly bears have been documented in the Divide GA. The northern portion of the Divide GA is within Unit 3 of designated Canada lynx Critical Habitat. Other wildlife species present in this GA include flammulated owl, western toad, Clarks' nutcracker, wolverine, wolves, and big game and other species that provide wildlife viewing, hunting, and trapping opportunities. The Upper Blackfoot GA provides important

connectivity for a variety of wildlife species between larger blocks of public land to the north and the south. Several streams within the Divide GA support westslope cutthroat trout and bull trout are known to occur at very low densities.

Tenmile drainage is a high priority watershed. Water quality in the upper Tenmile drainage is good and the watershed 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 and Scott Reservoir, the 4.8 miles Chessman flume, and five separate headgate/intakes distributed along Tenmile Creek. Tributaries include Beaver, Moose, Banner and Minnehaha Creeks, and Water Gulch. Historic mining includes 150 mine features in the Divide GA which have impacted water quality in lower Tenmile Creek and the Little Blackfoot River.

Social and Economic Characteristics

The Divide landscape hosts a wide variety of recreation opportunities such as, but not limited to, developed and dispersed site camping, hiking, mountain biking, fishing, snowmobiling, hunting, all-terrain vehicle riding, and driving for pleasure.

Especially unique to the Divide GA, is the South Hills Recreation Area which provides a large dispersed recreation area adjacent to the city limits of Helena. The well-used and popular trail system through this area crosses NFS, Bureau of Land Management, City of Helena, and private lands and is maintained through a memorandum of understanding between the managing entities. Extension of this area north and west to the Continental Divide provides for additional remote and more backcountry dispersed recreation and trail opportunities.

A variety of developed campgrounds are located within the Divide GA. A couple of the more unique ones are Park Lake Campground and Cromwell Dixon. Park Lake Campground provides access to a small mountain lake and is one of the most popular campgrounds due to its proximity to Helena. Cromwell Dixon campground is located along the Continental Divide National Scenic Trail at the top of MacDonald Pass.

The MacDonald Pass area is also home to the MacDonald Pass Cross Country Ski Trails which are groomed and operated under a special use permit. This area offers a network of cross-country skiing trails that are easily accessed by the community of Helena. As mentioned above, the Continental Divide National Scenic Trail follows the crest of the continental divide west of the city of Helena and is easily accessed from trailheads in the MacDonald Pass area. The Continental Divide National Scenic Trail crosses several GAs and focuses on remote and primitive dispersed recreation opportunities for hiking, horseback riding, and mountain biking.

The Divide GA also remains host to many active mining claims, primarily for gold, and there are several historic mining districts in the GA. Amidst the active mining claims, residential development on patented claims and extensive reclamation activities associated with historic mining are taking place throughout the GA. A large portion of this GA has been identified as a Comprehensive Environmental Response, Compensation, and Liability Act superfund site, which is referred to as Upper Tenmile Creek Mining Area.

Livestock grazing takes place across much of the GA and some riparian benches have been converted to pasture on private property, adding a rural setting in parts of the Divide GA.

Cultural and Historical Characteristics

While the GA has a rich history of prehistoric occupation, it's signature on the landscape is not obvious. A legacy of historic uses has left behind a suite of structures - cabins, kilns, flumes, railroad beds, logging evidence, and over 139 named mines including the historic Charter Oak Mine and Mill, Armstrong Mine, and Beattrice Mine. Many former mining communities were settled and have since vanished. Several historic administrative sites are also present on the landscape, for example the Moose Creek Ranger Station near Rimini and Kading Guard Station located near Elliston. The historic Mullan Road passed through this GA and sections are still visible on NFS land.

Designated Areas

Designated areas are specific areas or features within the forest planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 58 and associated map(s) (appendix A) display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 58. Designated areas in the Divide GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Inventoried roadless areas (4)	63,852	32	4
Recommended wilderness areas (2)	32,877	16	21
Eligible wild and scenic rivers (5)	21	N/A	N/A
Continental Divide National Scenic Trail	68	N/A	N/A
Mt. Helena National Recreation Trail	6	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There is one emphasis area within the Divide GA. This area is mapped and assigned specific plan components. See Table 59 below. Associated maps (s) (appendix A) display the emphasis area in this GA.

Table 59. Emphasis areas in the Divide GA

Area	Acres	Percent of GA
South Hills Recreation Area	50,181	25

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Other GA Features

There is one other feature within the Divide GA that requires specific plan components (Table 60).

Table 60. Other features within the Divide GA

Area	Acres	Percent of GA
Tenmile municipal watershed	25,911	11

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 61 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) (appendix A) display the recreation opportunity spectrum categories in this GA.

Table 61. Recreation opportunity spectrum classes for the Divide GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	32,877	16	32,878	16
Semiprimitive nonmotorized	69,213	34	46,710	23
Semiprimitive motorized	22,446	11	64,555	32
Roaded natural	69,298	34	48,639	24
Rural	8,808	5	9,860	5
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Divide GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 62) for the Divide GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 62. Scenic integrity objectives for the Divide GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	32,877	16
High	103,252	51
Moderate	52,603	26
Low	13,909	7
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This GA contributes a substantial proportion of the forestwide total area of lands suitable for timber production. Table 63 and associated map(s) in appendix A display the lands suitable for timber production in this GA.

Table 63. Lands suitable for timber production in the Divide GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
54,387	27	15

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Watershed (WTR)

Desired Conditions (DI-WTR-DC)

01 The Tenmile Creek watershed provides a clean water supply which will, with adequate treatment, result in a satisfactory and safe domestic water supply for the City of Helena. See FW-WTR-STD-01.

Goals (DI-WTR-GO)

01 Coordinate management of the municipal watershed with the state of Montana and municipality.

Guidelines (DI-WTR-GDL)

01 Management activities within the Tenmile Creek municipal watershed should emphasize restoration and resiliency.

Plan Components – Fisheries and Aquatic Habitat (FAH)

Desired Conditions (DI-FAH-DC)

01 Bull trout spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat, and appropriate life history strategies (for example, resident, fluvial, and adfluvial) are supported.

02 The bull trout population trends towards recovery.

Goals (DI-FAH-GO)

01 Bull trout population recovery is supported through the Bull Trout Conservation Strategy, the Bull Trout Recovery Plan, and the Columbia Headwaters Recovery Unit Implementation Plan or the latest guiding documents through cooperation and coordination with the USFWS, tribes, state agencies, other federal agencies, and interested groups.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (DI-VEGT-DC)

01 Table 64 shows the desired condition for cover types in the Divide GA.

Table 64. Divide GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	8 (5-12)	5-15
Aspen/hardwood	1 (1-3)	2-5
Ponderosa pine	0	10-20
Douglas-fir	40 (31-52)	20-30
Lodgepole pine	37 (29-42)	20-30
Spruce/fir	10 (7-14)	5-15
Whitebark pine	1 (1-3)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).

[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.

[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock)

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (DI-VEGF-DC)

01 Table 65 shows the desired condition for tree species presence in the Divide GA.

Table 65. Divide GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	2 (2-3)	5-15
Rocky Mountain juniper	3 (1-5)	1-5
Ponderosa pine	3 (1-5)	25-35
Douglas-fir	53 (46-59)	45-55
Aspen	6 (3-9)	2-10
Engelmann spruce	13 (10-19)	5-15
Lodgepole pine	59 (53-65)	25-35
Subalpine fir	23 (18-29)	10-20
Whitebark pine	8 (4-11)	5-15

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 66 shows the desired condition for forest size class in the Divide GA.

Table 66. Divide GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	17 (11-25)	2-20
Small (5-9.9”)	46 (39-52)	5-25
Medium (10-14.9”)	17 (12-21)	5-25
Large (15.0-19.9”)	6 (3-9)	15-25
Very large (20”+)	3 (1-6)	5-25

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 67 shows the desired condition for forest density class in the Divide GA.

Table 67. Divide GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	18	25-55
Med/high (40-59.9%)	39	30-50
High (60+%)	43	10-35

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

04 Lynx habitat (see glossary) provides the amount, distribution, and structural conditions (based on scientific information and the most current recommendations made through agency or interagency efforts), at the scale of a reproductive female lynx home range, necessary to support the recovery and persistence of Canada lynx in the forest planning area.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (DI-VEGNF-DC)

01 Unique plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to the large fescue grasslands and the bitterbrush communities in the Sweeney Gulch area.

Plan Components – Wildlife (WL)

Desired Conditions (DI-WL-DC)

01 The Divide landscape provides habitat connectivity for wide-ranging species (grizzly bear, Canada lynx, wolverine, and others) between public lands in northern Montana and those in south and southwestern Montana, including lands in the Greater Yellowstone Ecosystem.

02 Ponderosa pine-dominated forests contain large-tree structure (see glossary) comprised of ponderosa pine and/or Douglas-fir trees and snags with relatively open canopy available for nesting by flammulated owls. These areas occur within a larger mosaic of closed-canopy forest and shrub-dominated openings that serve as flammulated owl roosting and foraging areas.

Goals (DI-WL-GO)

01 Acquire ownership of or easements on non-NFS lands that are intermingled with or immediately adjacent to NFS lands, for the purpose of ensuring connectivity and security for wildlife species.

Guidelines (DI-WL-GDL)

01 In order to maintain or improve wildlife security and connectivity, resource management activities in the central portion of the GA, adjacent to Highway 12, and where private ownerships are intermingled with NFS lands, should maintain or enhance high quality wildlife habitat, wildlife movement areas, and connectivity. In order to improve wildlife security and connectivity in these areas:

- Vegetation management activities should provide for wildlife hiding cover needs.
- Motorized access should not be increased.
- New trails should be constructed only where minimal impacts will occur to wildlife habitats and movement corridors.

Plan Components – South Hills Recreation Area (SHRA)

The South Hills Recreation Area is located just to the south and west and adjacent to the city of Helena, Montana. The South Hills Recreation Area is approximately 50,180 acres in size and extends to MacDonald Pass and the Continental Divide. This large landscape includes lands in and around private land ownership, shares boundaries with the City of Helena, and has shared jurisdiction with the City of Helena on many of the trails nearest the community. Additionally, the area includes large portions of nonmotorized inventory roadless areas as well as portions of the Continental Divide National Scenic Trail.

Increased recreational use of the forest, and especially the South Hills Recreation Area, has generated the need to incorporate flexible management strategies to address emerging technologies and potential future uses.

Desired Conditions (DI-SHRA-DC)

01 The area offers dispersed nonmotorized recreation opportunities with high scenic quality within proximity to the city of Helena, Montana. Also see forestwide Recreation Opportunities, Dispersed Recreation.

02 The area provides dispersed, trail-related recreation opportunities ranging from those that are easy and readily accessible to those that are more difficult and require greater skills.

Goals (DI-SHRA-GO)

01 Partners and volunteer groups work collaboratively with the FS for the planning, management, and offering of recreation experiences and settings within the South Hills Recreation Area.

Guidelines (DI-SHRA-GDL)

01 When conducting vegetation management in the South Hills Recreation Area, projects should be designed to meet desired conditions for vegetation and other resources while emphasizing values such as visitor safety, desirable recreation experiences, improving forest resilience, reducing the risk of high severity wildfire, and reducing hazardous fuels.

Suitability (DI-SHRA-SUIT)

01 The South Hills Recreation Area is unsuitable for timber production, although harvest may be conducted to provide for other multiple use values compatible with the recreation values of the area, such as those described in DI-SHRA-GDL-01.

02 Within the South Hill Recreation Area, mechanized means of transportation (such as mountain bikes) are suitable on FS established roads and trails only. Mechanized means of transportation are not suitable off of NFS roads and trails.

Elkhorns Geographic Area and Wildlife Management Unit

General Overview

The Elkhorns GA encompasses the Elkhorn Mountains, an island mountain range, in Broadwater, Jefferson, and Lewis and Clark 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 Elkhorn Mountains were designated a Wildlife Management Unit in 1986 and that designation continues under this plan.

The Elkhorn Mountains provide rich wildlife habitat, and NFS management extends throughout the entire mountain range to the surrounding valley bottoms, including sizeable areas of ungulate winter range. The combination of NFS management of large blocks of year-round habitat, along with the presence of adjacent lands managed by both the Bureau of Land Management and the state of Montana, results in a unique opportunity for comprehensive and cooperative management of wildlife and their habitats.

The Elkhorns Wildlife Management Unit was designated as a wildlife management unit in the 1986 Helena Forest Plan, and is the only one of its kind in the nation. The designation continues under this plan. The Elkhorns Wildlife Management Unit encompasses the entire Elkhorns GA, which includes portions of both the HLC NF and the Beaverhead-Deerlodge National Forest. In this forest plan, the Elkhorns GA is synonomous with the Elkhorns Wildlife Management Unit, and the forest plan components specified for the GA are designed to meet the purposes for the designation of the wildlife management unit. Habitats are managed in this unit to maintain populations of species associated with the existing ecosystems, with emphasis on those for which seclusion is an important requirement. Unlike other mountain ranges where winter range is largely on private land, the Elkhorns includes winter range. Collaborative groups comprising federal, state, and local citizens work toward habitat maintenance and restoration and interpretation of the area's history. 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 Natural Resources Conservation Service.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Elkhorns GA is surrounded by the Divide Mountains and Boulder Batholith on the west, and the Missouri and Boulder River valleys on the north, east, and, south. This GA is an island mountain range, prominently visible from the northwest, west, and southwest. 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 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.

The sedimentary geologic area found extensively on the eastern side of the range is a gradient of foothill prairie and partially forested low mountains. Grasslands and shrub communities which contain bitterbrush and sagebrush are major components. Rocky mountain juniper and Douglas-fir in particular, with limited amounts of limber pine and ponderosa pine, are found in ecotone areas with nonforested plant

communities. Plant communities on the batholith portion are mostly forested with conifers, including ponderosa pine and Douglas-fir at low elevations and lodgepole pine, subalpine fir, and whitebark pine at high elevations. Parks, rich with grasses and forbs, are frequent at lower elevations and break up the forest in montane elevations. Aspen stands and water-loving plants take advantage of riparian areas and wet seeps across the GA. Fire has historically been a major influence on plant communities, and a large expanse of this GA burned in 1988 and is now dominated by young lodgepole pine forest.

Wildlife observed in this GA include elk, mule deer, Clark's nutcracker, river otter, wolverine, turkeys 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. This GA is within management Zone 2, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, and grizzly bears may be present in the Elkhorns GA. The Elkhorns provide important connectivity for certain wildlife species.

The western side of the GA is generally wetter than the eastern side. The entire landmass is drained by many perennial and intermittent creeks including several tributaries to Prickly Pear Creek on the west, Crow Creek, Beaver Creek, and Staubach Creek on the east, and Elkhorn and Muskrat Creeks on the southwest. All creeks flow to the Missouri River, some via Prickly Pear Creek or 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. Management of the WMU in the Elkhorn Mountains has led to the expanded distribution of westslope cutthroat trout by limiting and/or removing brook trout populations. A number of these efforts have been successful and have helped increase the potential for continued viability of westslope populations in the upper Missouri 4th digit watershed.

Water quality in the upper areas of McClellan Creek drainages are good, and the watershed is the primary source of municipal water for the city of East Helena. Infrastructure includes an infiltration gallery downstream of the forest boundary.

Social and Economic Characteristics

There are numerous trailheads and dispersed recreation opportunities throughout the Elkhorns, including several dispersed nonmotorized trails and primitive camping areas. The area is used primarily by hunters, as the Elkhorns are known to produce trophy bull elk. The area is also used for many other purposes such as hiking, mountain biking, trail running, driving for pleasure, and wildlife viewing.

The interior of the GA provides an expanse of unroaded and remote country surrounding steep, rugged peaks. 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 livestock grazing program in portions of the Elkhorns; grazing allotments are present across most of the GA. Mineral production is primarily occurring via small mining operations, predominantly for gold. There are several abandoned mines in the GA that need reclamation. There is an ongoing mine reclamation project at the Warm Springs Tailings site. One designated electric energy corridor (approximately four miles long) is located in the southwest corner of the Elkhorn GA per the *Designation of Energy Corridors on Federal Lands in the 11 Western States* (U.S. Department of Energy [USDE] & USDI Bureau of Land Management [BLM], 2008).

Cultural and Historical Characteristics

The Elkhorns GA has been occupied by human inhabitants for thousands of years. Two of the oldest known human occupations in Montana are found in this GA. However, prehistoric occupations and use

are less evident on the surface 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, Ruddville, 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 standing reminders of FS administration in the GA.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 68 and associated map(s) in appendix A display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 68. Designated areas in the Elkhorns GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Inventoried roadless area (1)	75,415	47	5
Eligible wild and scenic rivers (1)	2	N/A	N/A
Research natural area (1)	1,578	1	9

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

The Elkhorns Wildlife Management Unit encompasses all HLC NFS lands within the Elkhorns GA. All plan components in this section apply to the wildlife management unit. See Table 69 below and associated maps in appendix A.

Table 69. Emphasis area in the Elkhorns GA

Area	Acres	Percent of GA
Elkhorns Wildlife Management Unit	160,599	100

Other GA Features

There is one other feature within the Elkhorns GA that requires specific plan components. There is also an additional primitive ROS area in the core area of the GA (see FW-ROS plan components). Table 70 and associated maps (appendix A) display these other features.

Table 70. Other features within the Elkhorns GA

Area	Acres	Percent of GA
McClellan Creek municipal watershed	16,697	10
Primitive ROS area in the core area	44,316	25

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 71 displays the percentage breakout of each recreation opportunity spectrum class for

both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 71. Recreation opportunity spectrum classes for the Elkhorns GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	45,894	28	45,894	29
Semiprimitive nonmotorized	48,708	30	90,832	56
Semiprimitive motorized	6,450	4	14,682	9
Roaded natural	57,346	36	6,989	4
Rural	2,853	2	2,853	2
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Elkhorns GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 72) for the Elkhorns GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 72. Scenic integrity objectives for the Elkhorns GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	45,894	28
High	64,510	40
Moderate	24,181	15
Low	26,653	17
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. No such lands are identified in this GA. Forestwide and GA-specific plan components for harvest in lands unsuitable for timber production apply.

Plan Components – Watershed (WTR)

Desired Conditions (EH-WTR-DC)

01 McClellan Creek provides a clean water supply for the City of East Helena. See FW-WTR-STD-01.

Goals (EH-WTR-GO)

01 Coordinate management of the municipal watershed with the state of Montana and municipality.

Guidelines (EH-WTR-GDL)

01 Management activities within the McClellan Creek municipal watershed should emphasize restoration and resiliency.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (EH-VEGT-DC)

01 Table 73 shows the desired condition for cover types in the Elkhorns GA.

Table 73. Elkhorns GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	23 (15-31)	20-30
Aspen/hardwood	1 (1-3)	2-5
Ponderosa pine	1 (1-4)	10-20
Douglas-fir	19 (13-33)	10-20
Lodgepole pine	23 (14-30)	20-30
Spruce/fir	17 (10-26)	5-15
Whitebark pine	4 (3-7)	5-10

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (EH-VEGF-DC)

01 Table 74 shows the desired condition for tree species presence in the Elkhorns GA.

Table 74. Elkhorns GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	1 (0-4)	2-10
Rocky Mountain juniper	5 (1-9)	1-5
Ponderosa pine	1 (1-4)	20-30
Douglas-fir	28 (20-38)	20-40
Aspen	2 (2-5)	2-10
Engelmann spruce	20 (11-27)	5-15
Lodgepole pine	32 (22-41)	25-35
Subalpine fir	29 (19-37)	5-15
Whitebark pine	14 (6-20)	10-20

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 75 shows the desired condition for forest size class in the Elkhorns GA.

Table 75. Elkhorns GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	21 (9-34)	1-20
Small (5-9.9”)	29 (19-37)	5-25
Medium (10-14.9”)	9 (4-16)	5-25
Large (15.0-19.9”)	7 (2-13)	15-25
Very large (20”+)	0	5-20

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 76 shows the desired condition for forest density class in the Elkhorns GA.

Table 76. Elkhorns GA desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	15	25-55
Med/high (40-59.9%)	34	25-45
High (60+%)	52	10-35

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (EH-VEGNF-DC)

01 Unique plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to bitterbrush and sagebrush.

Plan Components – Wildlife (WL)

Desired Conditions (EH-WL-DC)

01 NFS lands within the Elkhorn Mountains GA support native species associated with the existing ecosystems, with emphasis on those for which seclusion is an important requirement, consistent with the purpose of its designation as a wildlife management unit.

02 The Elkhorns GA provides habitat connectivity for wide ranging species (e.g., grizzly bear and others) between public lands in northern Montana and those in south and southwestern Montana, including lands in the Greater Yellowstone Ecosystem.

03 Ponderosa pine-dominated forests contain large-tree structure (see glossary) comprised of ponderosa pine and/or Douglas-fir trees and snags with relatively open canopy available for nesting by flammulated owls. These areas occur within a larger mosaic of closed-canopy forest and shrub-dominated openings that serve as flammulated owl roosting and foraging areas.

04 The risk of disease transmission from domestic livestock to bighorn sheep is minimal.

Goals (EH-WL-GO)

01 The Elkhorn Mountains are managed cooperatively across political and administrative boundaries through a memorandum of understanding with other agencies.

02 The Forest Service coordinates with the BLM, NRCS, and Montana Fish, Wildlife and Parks in the planning, analysis, and monitoring of management activities occurring in the wildlife management unit.

03 A Cooperative Elkhorns Wildlife Monitoring Program involving Montana Fish, Wildlife, and Parks, BLM, NRCS and the FS 1) evaluates forest plan management direction for the wildlife management unit, 2) makes recommendations to maintain and improve wildlife habitats, 3) monitors habitat conditions and wildlife populations to determine the effectiveness of management, and 4) recommends adjustments to management based on monitoring and research.

Standards (EH-WL-STD)

01 Scientific information and the most current recommendations made through agency or interagency efforts, shall be used to determine and establish the means with which to achieve effective separation between bighorn sheep and domestic sheep and goats on NFS lands (refer to appendix C for information on recommendations and strategies).

Guidelines (EH-WL-GDL)

01 Maintenance, enhancement, and restoration of wildlife habitats should be the priority for resource management in the Elkhorns Wildlife Management Unit. Management activities and permitted uses should be compatible with wildlife values and habitats, and/or should be designed to avoid negative impacts to wildlife and wildlife habitats.

02 When permitting or authorizing activities such as grazing, special uses, rights-of-way, seismic activities, and others, specific conditions should be incorporated into permits or authorizations to reduce potential impacts to wildlife. These conditions include but are not limited to conditions regarding timing of activities, location of activities or infrastructure, access, retention of forage or cover, and others.

03 Livestock head months should be maintained no higher than existing levels and should be reduced if needed to address impacts to wildlife forage or wildlife habitat.

Plan Components – Recreation Access (ACCESS)

Desired Conditions (EH-ACCESS-DC)

01 The Elkhorns Wildlife Management Unit offers high quality dispersed nonmotorized recreation opportunities, consistent with its wildlife emphasis. Authorized motorized recreation opportunities occur in defined areas and during defined time periods.

Guidelines (EH-ACCESS-GDL)

01 Access to authorized routes to private inholdings or valid mining claims should protect wildlife habitat through restrictions on both locations and timing of use.

Suitability (EH-ACCESS-SUIT)

01 Motorized travel is not suitable in elk wintering areas from the end of hunting season through early spring, except as required for specific resource management activities.

Plan Components – Roads and Trails (RT)

Standards (EH-RT-STD)

01 New permanent roads shall be constructed only for alleviating resource concerns (e.g., removing a road from a riparian area and replacing it with a road in another location) or to allow reasonable access to private lands that cannot be accessed except by crossing NFS lands. Permanent roads constructed for these purposes shall include conditions (for example, timing of use restrictions, location restrictions) in order to meet wildlife habitat objectives.

02 A trans-mountain road (bisecting the Elkhorns Mountain Range) shall not be constructed.

Guidelines (EH-RT-GDL)

01 Roads constructed for exploration or development of leasable minerals, as required by law or regulation for access to those resources, should avoid identified elk wintering areas, big-game calving or lambing areas, or other identified wildlife habitats in which wildlife are known to be sensitive to disturbance or displacement. Timing restrictions should be placed on road-building activities and road use to avoid disturbance and displacement of wildlife.

Plan Components – Benefits to People (TIM)

Guidelines (EH-TIM-GDL)

01 Harvest of timber or forest products such as Christmas trees and posts and poles in identified elk winter range should occur only during the nonwinter season when elk use of the area is minimal. If these activities are allowed during the winter for specific resource management purposes, disturbance activities should be limited in time and space.

Suitability (EH-TIM-SUIT)

01 The Elkhorns Wildlife Management Unit is not suitable for timber production. However, timber harvest is suitable to provide for other multiple use purposes when compatible with wildlife values and habitats.

Plan Components – Benefits to People (EMIN)

Guidelines (EH-EMIN-GDL)

01 To the extent possible, surface activities associated with the exploration and development of locatable minerals should be avoided in identified elk wintering areas, big game calving or lambing areas, identified elk summer habitat, or other key seasonal habitats during the time when wildlife using those habitats are sensitive to disturbance or displacement

Highwoods Geographic Area

General Overview

The Highwoods GA is the smallest of the GAs within the planning 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.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Highwood Mountains are a small island mountain range of volcanic origin. The highest point is Highwood Baldy at 7,670 feet. The mountains have been weathered over time by natural processes, leaving 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.

The Highwoods GA contains a high proportion of warm dry and nonforested potential vegetation types, and very little cool moist or cold types. 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. Open savannas, grasslands, and shrublands are common even on the warm dry forested potential vegetation types. Aspen communities are present to a higher degree than most other places in the planning area. Conifer forests are relatively dense and single-aged composed of primarily Douglas-fir and lodgepole pine, with small amounts of subalpine fir at higher elevations. Unlike the Forest as a whole, there is little to no Engelmann spruce, ponderosa pine, Rocky Mountain juniper, or limber pine. Fire was historically the main determinant of vegetative cover. Riparian areas are composed of willow, dogwood, water birch, cottonwood, Hawthorne, and other water-loving plants.

The Highwoods provides habitat for a variety of wildlife species, including a population of mountain goats. They were introduced by Montana Fish, Wildlife, and Parks in 1943 in an area east of the GA, then augmented in 1971. By 1994 they had dispersed and were established in the Highwoods GA. The Highwood Mountains support many other wildlife species. The Highwoods GA is within management Zone 3, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy. Grizzly bears have been observed on private lands south of the Highwood Mountains.

Most of the area drains north to the Missouri River; drainages include Thain and Highwood Creeks. Cottonwood Creek drains to Arrow Creek on the east side, and Little Belt Creek drains the southwest portion. The area is a westslope cutthroat trout emphasis area and has several relatively secure westslope cutthroat trout populations, including Big Coulee, Cottonwood, and North Fork and Middle Fork Little Belt Creeks. The North Fork Highwood Creek could also repopulate from a pure headwaters population of westslope cutthroat trout over approximately 5.3 stream miles of habitat above a barrier where non-native salmonids have been removed. All these streams are critical to maintaining westslope cutthroat trout viability in the Highwoods GA and the upper Misouri River drainage.

Social and Economic Characteristics

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 and bicyclists as well as by hikers and horseback riders.

The mountain goat population provides an important hunting and viewing opportunity. Other big game species are found in the Highwoods and provide important and highly sought-after hunting opportunities. In addition to hunting and trapping opportunities, wildlife viewing is an important activity in this GA. An active grazing program is one of the many multiple uses of this landscape and contributes substantially to the economy of Choteau County.

Cultural and Historical Characteristics

Native Americans have a long history in this GA and the evidence can be seen in prehistoric occupations, rock cairns and travel routes. Euro-American use can be seen in homesteads, mines, cemeteries, trails, roads and recreational cabins. The Highwoods have a long history of grazing and their history is seen in historic corrals, fence post caches, cow camps, and grazing association cabins. The historically significant Shonkin Grazing Association cabin and the newer Highwood Creek Grazing Association cabin are reminders of this heritage. Forest Service history is represented by trails, roads, Thain Creek campground, several dismantled guard stations, and the one remaining guard station on North Fork Highwood Creek.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 77 and associated map(s) in appendix A display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 77. Designated areas in the Highwoods GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Inventoried roadless areas (2)	39,653	94	3
Eligible wild and scenic rivers (4)	10	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There are no emphasis areas in the Highwoods GA.

Other GA Features

There are no other features within the Highwoods GA.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 78 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum class categories in this GA.

Table 78. Recreation opportunity spectrum classes for the Highwoods GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	0	0	0	0
Semiprimitive nonmotorized	29,906	71	30,834	73
Semiprimitive motorized	8,219	19	11,457	27
Roaded natural	4,165	10	0	0
Rural	0	0	0	0
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Highwoods GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 79) for the Highwoods GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 79. Scenic integrity objectives for the Highwoods GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	0	0
High	41,160	97
Moderate	1,009	3
Low	122	<1
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. No such lands are identified in this GA. Forestwide and GA-specific plan components for harvest in lands unsuitable for timber production apply.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (HI-VEGT-DC)

01 Table 80 shows the desired condition for cover types in the Highwoods GA.

Table 80. Highwoods GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	37 (21-52)	20-40
Aspen/hardwood	3 (2-10)	4-10
Ponderosa pine	0	5-20
Douglas-fir	12 (11-30)	20-30
Lodgepole pine	31 (16-46)	5-15
Spruce/fir	3 (2-10)	2-10

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock)

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (HI-VEGF-DC)

01 Table 81 shows the desired condition for tree species presence in the Highwoods GA.

Table 81. Highwoods GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	3 (3-10)	5-20
Rocky Mountain juniper	0	1-5
Ponderosa pine	0	10-20
Douglas-fir	34 (19-50)	45-60
Aspen	3 (3-10)	5-15
Lodgepole pine	45 (30-62)	15-30
Subalpine fir	3 (3-10)	2-10

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 82 shows the desired condition for forest size class in the Highwoods GA.

Table 82. Highwoods GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	0	1-15
Small (5-9.9”)	23 (9-37)	2-15
Medium (10-14.9”)	23 (10-38)	1-10
Large (15.0-19.9”)	3 (3-10)	20-35
Very Large (20”+)	0	10-30

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 83 shows the desired condition for forest density class in the Highwoods GA.

Table 83. Highwoods GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	10	25-55
Med/high (40-59.9%)	33	30-50
High (60+%)	57	25-45

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (HI-VEGNF-DC)

01 Diverse plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to sagebrush and riparian woody shrub communities.

Plan Components – Wildlife (WL)

Desired Conditions (HI-WL-DC)

01 The system of ridges is generally dominated by nonforested habitats and connected by nonforested or open forest habitats and provides habitat connectivity within the mountain range for wildlife.

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Little Belts Geographic Area

General Overview

The Little Belts GA is a large isolated mountain range in central Montana. Portions of this GA are 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 (Highway 89), along which the small historic mining communities of Niehart and Monarch reside. Most of the Little Belts can be described as remote but accessible by a well-distributed transportation network.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Little Belts is the largest of the isolated island ranges in central Montana, comprised primarily of rolling hills. The geology of the Little Belts is rich in limestone with pockets of metamorphic and igneous rock. Some of the oldest rocks in Montana are located within the Little Belts. Bands of limestone bluffs break up uniform expanses of evergreen forest. The limestone nature also leads to many caves throughout the GA, including Lick Creek Cave. The GA served as the landscape in much of the work of artist Charlie Russell, who resided in the area.

This large GA supports a wide diversity of vegetation communities, including expansive and productive grasslands that characterize low elevations and open flat-topped plateaus. Thick stands of conifers can be found in the interior, which at lower elevations includes limber pine and ponderosa pine (in a higher abundance than most other places on the Forest); transitioning to productive Douglas-fir and lodgepole pine forests; and Engelmann spruce, subalpine fir, and whitebark pine at the highest elevations. Some mountain summits lack vegetation, revealing gently sloping, broad ridges. Aspen is present but rare. This GA hosts several vegetation research and tree improvement areas, including the Tenderfoot Experimental Forest, the Adams Creek whitebark pine seed orchard, the future Spur Park whitebark pine test plantation, and the Wet Park lodgepole pine test plantation.

The Little Belts GA supports a wide variety of wildlife species, including carnivores such as black bear, mountain lion, bobcat, and wolverine, and big game such as moose, elk, mule deer, and white-tailed deer. NFS lands in the Little Belts GA include more big game winter range than is present in most GAs on the HLC NF. The Little Belt Mountains historically supported bighorn sheep but were extirpated by the early 1900s. Groups of bighorn sheep have been observed in the Little Belts in recent years. Mountain goats were introduced in the early to mid 1900s, where they did not historically occur. This population did not persist, although occasional individual mountain goats are found there. This GA is within management Zone 3, identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, and grizzly bears may be present in the Little Belts.

The many streams of the Little Belts are picturesque and ecologically rich. Stream courses have carved exposed escarpments and palisades. Drainages typically flow outward, radially from the center of the range where upon reaching the foothills, streams lose as much as 70-80% of their flow to the Madison aquifer. The Belt Creek watershed drains to the north, the Judith River watershed drains to the east, and the Tenderfoot and Sheep Creek watersheds drain to the Smith River on the west. Multiple streams in the Belt Creek and Judith Creek watersheds support westslope cutthroat trout.

Water quality in the upper areas of the O'Brien and Shorty Creek drainages are good, and the watershed is the primary source of municipal water for the city of Neihart. Infrastructure includes a small low head dam, a diversion on Shorty Creek, and a water plant just east of forest lands. A small conservation population of westslope cutthroat trout is present in O'Brien Creek.

Social and Economic Characteristics

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 which includes the Silvercrest groomed cross-country ski area, snowmobile, snowshoe, and dogsled opportunities; cabin rentals; and interpretive panels. The Middle Fork Judith Wilderness Study 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, trapping, and wildlife viewing opportunities.

This GA supports 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.

Mineral production primarily occurs via small mining operations, primarily for lead, zinc, silver, gold, and sapphires (Yogo). There are several inholdings as well as extensive reclamation activities associated with historic mining, including two Comprehensive Environmental Response, Compensation, and Liability Act superfund sites: Carpenter Snow Creek and Barker Hughesville.

Cultural and Historical Characteristics

Native Americans have a long history in the area. They used local outcrops as quarries for tools and weapons. They created pictographs on rock shelters, cliff walls, and overhangs. Native Americans left many remnants of past occupations across the landscape.

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. Areas within the Little Belt Mountains were also developed mining areas. The towns of Monarch, Neihart, Barker, and Hughesville were population hubs for the extraction of lead and silver. Many communities sprang up quickly and then disappeared. A few former community names include 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 exist. FS guard stations and fire lookouts, including Monument and Porphyry Lookouts, remain in various locations and conditions.

The Yogo mining district is 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 several years. The eventual discovery of sapphires brought fame to the lower Yogo district.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 84 and associated map(s) in appendix A display the designated areas

in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 84. Designated areas in the Little Belts GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Middle Fork Judith Wilderness Study Area	82,127	10	48
Inventoried roadless areas (16)	439,106	55	29
Research natural areas (4)	5,909	1	32
Eligible wild and scenic rivers (5)	63	N/A	N/A
National recreation trails (6)	26	N/A	N/A
Kings Hill Scenic Byway	40	N/A	N/A
Tenderfoot Creek Experimental Forest	8,870	1	100%

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There is one emphasis area within the Little Belts GA. This area is mapped and assigned specific plan components. See Table 85 below. Associated maps (s) (appendix A) display the emphasis area in this GA.

Table 85. Emphasis areas in the Little Belts GA

Area	Acres	Percent of GA
Smith River Corridor	3,330	<1

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Other GA Features

There are two other features within the Little Belts GA that require specific plan components. There are also additional primitive ROS areas added in the Deep Creek and Tenderfoot Creek areas (see FW-ROS plan components). Table 86 and associated maps (appendix A) display these other features.

Table 86. Other features within the Little Belts GA

Area	Acres	Percent of GA
Showdown Ski Area (Special User Permit)	600	<1
O'Brien Creek municipal watershed	7,025	<1
Primitive ROS areas in lower Deep Creek/Tenderfoot Creek	37,008	4

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 87 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 87. Recreation opportunity spectrum classes for the Little Belts GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	101,801	13	97,483	12
Semiprimitive nonmotorized	189,693	23	301,377	37
Semiprimitive motorized	222,541	28	308,679	39
Roaded natural	287,385	36	93,828	12
Rural	3,239	<1	3,290	<1
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Little Belts GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 88) for the Little Belts GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 88. Scenic integrity objectives for the Little Belts GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	101,801	13
High	461,085	57
Moderate	154,241	19
Low	87,531	11
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This large, productive GA contributes a substantial proportion of the forestwide total area of lands suitable for timber production, more than any other GA in the planning area. Table 89 and associated map(s) in appendix A display the lands suitable for timber production in this GA.

Table 89. Lands suitable for timber production in the Little Belts GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
187,392	23	51

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Watershed (WTR)

Desired Conditions (LB-WTR-DC)

01 O'Brien Creek municipal watershed provides a clean water supply for the city of Neihart. See FW-WTR-STD-01.

Goals (LB-WTR-GO)

01 Coordinate management of the municipal watershed with the state of Montana and municipality.

Guidelines (LB-WTR-GDL)

01 Management activities within the O'Brien Creek municipal watershed should emphasize restoration and resiliency.

02 Livestock grazing should only be allowed within the municipal watershed when moving animals between pastures adjacent to the watershed.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (LB-VEGT-DC)

01 Table 90 shows the desired condition for cover types in the Little Belts GA.

Table 90. Little Belts GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	8 (6-9)	5-10
Aspen/hardwood	<1 (0.4-1)	2-5
Ponderosa pine	9 (7-11)	20-35
Douglas-fir	39 (33-44)	15-25
Lodgepole pine	29 (26-32)	15-25
Spruce/fir	11 (9-13)	15-25
Whitebark pine	1 (0.6-2)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (LB-VEGF-DC)

01 Table 91 shows the desired condition for tree species presence in the Little Belts GA.

Table 91. Little Belts GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	24 (21-26)	15-25
Rocky Mountain juniper	4 (2-5)	1-10
Ponderosa pine	8 (6-10)	20-35
Douglas-fir	59 (56-62)	35-50
Aspen	1 (0.3-2)	2-10
Engelmann spruce	27 (24-30)	15-25
Lodgepole pine	43 (40-46)	20-30
Subalpine fir	23 (21-26)	15-25
Whitebark pine	10 (8-12)	5-15

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 92 shows the desired condition for forest size class in the Little Belts GA.

Table 92. Little Belts GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	10 (7-13)	1-15
Small (5-9.9”)	46 (43-49)	2-20
Medium (10-14.9”)	26 (24-29)	5-25
Large (15.0-19.9”)	5 (4-7)	25-35
Very large (20”+)	2 (1-3)	10-25

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 93 shows the desired condition for forest density class in the Little Belts GA.

Table 93. Little Belts GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	15	25-50
Med/high (40-59.9%)	25	30-50
High (60+%)	61	15-45

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

Plan Components – Wildlife (WL)

Desired Conditions (LB-WL-DC)

01 The system of ridges in the southeastern Little Belts Mountains is generally dominated by nonforested habitats and connected by nonforested or open forest habitats and provides habitat connectivity between seasonal ranges for mule deer, blue grouse, and other species.

02 The risk of disease transmission from domestic livestock to bighorn sheep is minimal.

Standards (LB-WL-STD)

01 Scientific information and the most current recommendations made through agency or interagency efforts shall be used to determine and establish the means with which to achieve effective separation between bighorn sheep and domestic sheep and goats on NFS lands (refer to appendix C for information on recommendations and strategies).

Plan Components – Smith River Corridor (SMITH)

The Smith River is a nationally recognized river famous for its fishing, outstanding scenery, and the opportunity it provides for a 60-mile float through private, state, and NFS lands during the late spring and early summer months.

The majority of the Smith River Corridor is located within the Little Belts GA. However, the southern portion lies within the Dry Range which is located within the Big Belts GA.

Desired Conditions (LB-SMITH-DC)

01 The developed recreation settings and opportunities along the Smith River corridor are compatible with other resources and allow for ecological sustainability.

02 Visitor experiences are focused on the natural, cultural, and historic resources along the Smith River corridor.

03 Dispersed recreation opportunities along the river corridor allow for exploration and discovery with minimal environmental impacts and user conflicts.

Goals (LB-SMITH-GO)

01 The operation, maintenance, and delivery of recreation along the Smith River is supported by partnerships and volunteer programs.

Guidelines (LB-SMITH-GDL)

01 To protect and enhance the scenic quality of the area, management activities in the Smith River Corridor should be consistent with the scenic integrity objective of high to very high.

Suitability (LB-SMITH-SUIT)

01 Timber production is not suitable in the Smith River Corridor. However, timber harvest is suitable to provide for other multiple use values such as public safety and to enhance the recreational or aesthetic values.

Plan Components – Showdown Ski Area (SHOWSKI)

The Showdown Ski Area is located on Kings Hill Pass, along Highway 89. This historic ski resort has been in operation since 1936 and is currently authorized by a long-term special use permit which permits winter ski resort development on approximately 600 acres. Currently, the Showdown Ski Area services approximately 45,000 visitors per year.

Desired Conditions (LB-SHOWSKI-DC)

01 The Showdown Ski Area provides public access to developed recreation activities such as downhill skiing, snowboarding, snowshoeing, and other potential recreational opportunities.

02 The vegetation and forest conditions at Showdown Ski Area provide for public health and safety, recreational settings and user experiences, enhanced scenic values, and protection of facilities and infrastructure. Also see FW-VEGT-DC-05, FW-VEGF-GDL-01 and FW-VEGF-GDL-02.

Suitability (LB-SHOWSKI-SUIT)

01 Timber production is not suitable in the Showdown Ski Area. However, timber harvest is suitable for other multiple use purposes such as improved recreation opportunity, guest safety, protection of facilities and infrastructure, fuel reduction, and forest health.

Plan Components – Tenderfoot Creek Experimental Forest (TCEF)

The Tenderfoot Creek Experimental Forest encompasses the headwaters of Tenderfoot Creek in the Little Belt Mountains. It was established in 1961 to investigate lodgepole pine harvesting techniques which maintained soil stability while increasing water yield. In the early 1900's a new objective was outlined to develop and evaluate methods for sustaining the productivity and biodiversity of east-side lodgepole pine communities. In addition, the vision of using the experimental forest as a demonstration area for forest research and management options for ecosystem management activities was expressed. Recent work on the experimental forest includes forest monitoring and health; mountain pine beetle assessments; spatial fuel analysis; hydrologic processes including factors affecting hydrologic connectivity, water quality, sediment transport and discharge; climate studies involving net ecosystem exchange of carbon and water; and sustainable silvicultural methods.

Management and administrative responsibilities for the Tenderfoot Creek Experimental Forest are conducted cooperatively between the HLC NF and the Rocky Mountain Research Station, as guided by the letter of agreement.

Desired Conditions (LB-TCEF-DC)

01 The Tenderfoot Creek Experimental Forest provides the necessary vegetation conditions and management opportunities to support research and demonstration activities conducted by the Rocky Mountain Research Station.

02 The Tenderfoot Creek Experimental forest provides opportunities to continue long-term studies as well as the collection of baseline hydrology, climate, and other resource information.

03 Research facilities and infrastructure (for example, buildings, roads, and signs) are sufficient to support the research and education programs of the Tenderfoot Creek Experimental Forest.

04 Dispersed recreation opportunities are present within the Tenderfoot Creek Experimental Forest and their use and management is compatible with research activities.

Suitability (LB-TCEF-SUIT)

01 The Tenderfoot Creek Experimental Forest is unsuitable for timber production. However, this area is suitable for timber harvest and other vegetation management activities for the purposes of conducting and demonstrating research or for other reasons as mutually agreed upon between Rocky Mountain Research Station and the HLC NF.

02 The Tenderfoot Creek Experimental Forest is not suitable for the removal of nontimber forest products (for example, mushrooms, firewood, botanical products) for commercial use.

03 The Tenderfoot Creek Experimental Forest is not suitable for the removal of the following nonforest products for personal use: firewood, Christmas trees, boughs, and surface rock. Removal of other nonforest products for personal use (for example, mushrooms and botanical products) may occur.

04 The Tenderfoot Creek Experimental Forest is not suitable for livestock grazing.

05 The Tenderfoot Creek Experimental Forest is suitable for motorized travel on designated routes or trails.

Plan Components – Kings Hill Scenic Byway (KHSB)

The Kings Hill Scenic Byway is a 71-mile long National Forest scenic byway that begins at Armington Junction (the junction of US Highways 89 and 12) near Belt, MT and ends where Highway 89 intersects Highway 12, near White Sulphur Springs, MT. Approximately 40 miles of the Kings Hill Scenic Byway passes through NFS lands located in the Little Belt Mountains GA.

Desired Conditions (LB-KHSB-DC)

01 NFS lands visible from Kings Hill Scenic Byway are natural-appearing and promote high scenic qualities.

02 The interpretive and recreation infrastructure that service visitors along the scenic byway protect, complement, and promote the intrinsic scenic and historic values along the route.

03 The interpretation along the Kings Hill Scenic Byway is cohesive and enhances the appreciation of the natural, historic, and cultural landscape of the area.

Goals (LB-KHSB-GO)

01 The interpretation along the Kings Hill Scenic Byway is supported by partnerships with state and local highway districts and volunteers. Together these groups update, promote, and maintain the signage along the Kings Hill Scenic Byway.

Guideline (LB-KHSB-GDL)

01 To protect and enhance the scenic quality as well as the historically relevant natural and cultural resources of the area, management activities in and adjacent to the Kings Hill Scenic Byway should be consistent with the scenic integrity objective of high, and should maintain or enhance the valued attributes for which the byway was established.

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Rocky Mountain Range Geographic Area

General Overview

The Rocky Mountain Range GA is 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 Highway 2 and Glacier National Park to the north. The Blackfeet Nation lands are to the northeast. The east and southeast are bordered by state, private, and Bureau of Land Management 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 NF 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.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

This GA is a part of the larger Rocky Mountain Front, where large bands of exposed limestone along a roughly 90-mile-long Lewis Thrust fault are visible. Two highlights of this overthrust 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.

During the Pleistocene age, the last ice age, the GA was heavily glaciated and sculpted by mountain glaciers moving though and east out of the mountains onto the foothills and prairies. Many glacial derived sediment and ice chiseled features dominate the landscape. Moraines, ice block features, and u-shaped valleys all add to the scenic quality of the Rocky Mountain Front.

Many wildfires in this GA have been managed to achieve multiple resource objectives, allowing fire to operate as an important disturbance, and drive the mosaic and pattern of vegetation. There are many natural barriers that tend to slow or stop fire spread, including major river drainages and rocky ridges.

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. This GA is characterized by a dominance of cool moist and cold forest potential vegetation types, in contrast to most other areas on the Forest. Prairie, limber pine, and aspen cover lower foothills. Rare cottonwood can be found and are more abundant here than in other GAs. Prairie vegetation extends into the front ridges and gives way to conifer forests. Engelmann spruce and subalpine fir forests are particularly prevalent. Lodgepole pine and Douglas-fir forests are also common along with whitebark pine at the highest elevations; Rocky mountain juniper is also present. Ponderosa pine is present but rare. Exposed rock, aspen, and open grassland break up the forest. This GA hosts high plant diversity and is home to several endemic species.

The very diverse topography and vegetation of this GA supports a wide array of wildlife species. All the wildlife species present before Euro-American settlement of the continent, except for bison, are believed to be present in 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 entirely within the Primary Conservation Area identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy. This GA is also within Unit 3 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 Sun River Game Preserve was established in 1913 by the Montana legislature to protect what was then a dwindling elk population. It is the largest state game preserve and one of only a few remaining in Montana. Despite the elk population having grown substantially since its establishment, the preserve continues to be championed by many members of the public. 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.

Most precipitation in this GA comes in the form of snow and early spring rains with watersheds draining eastward from the continental divide to the Missouri River. Major drainages include the Two Medicine, Teton, Dearborn, Birch Creek, and Sun River watersheds. There are several streams that support westslope cutthroat trout, including a meta-population in the Badger watershed. Upon exiting the forest boundary, the preponderance of water is quickly captured in reservoirs for irrigation and other agricultural use. Many of the streams and rivers within this GA are noted for their ecological and scenic value.

Strong, frequent Chinook winds in this GA provide open winter range habitat key to many wildlife species, including big game. The strong winds also affect plant communities, such as dry limber pine, krummholz, savannah, and snow that is pushed and drifted into coulees that melt and irrigate snow-bank riparian areas.

Social and Economic Characteristics

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 5th 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, and 197,568 acres of Conservation Management Area were also designated. 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.

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 FS 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 in a roaded natural setting. Because of the large amount of designated wilderness there is substantial backcountry recreation. Backpacking, hiking, 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, cabin rentals, and an airstrip. There is a high proportion of recreation residences in comparison to other GAs on the HLC NF. The Continental Divide National Scenic Trail follows the continental divide through this GA. This area has a history of oil and gas production.

Cultural and Historical Characteristics

Portions of the Old North Trail, an ice-free corridor used for southward travel through North America, run through this GA. More recent indigenous cultures revere the area as a sacred landscape with spiritual importance for ceremonial purposes. Its continued use for cultural and spiritual resources has led to the designation of the Badger-Two Medicine area as a Traditional Cultural District. An emphasis area, Badger-Two Medicine, has been added to address and support special management needs of this area. Archaeological and cultural sites dot the entire GA.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 94 and associated map(s) in appendix A display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 94. Designated areas in the Rocky Mountain Range GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Bob Marshall Wilderness	351,651	45	62
Scapegoat Wilderness	100,535	13	18
Conservation management area	195,073	25	100
Inventoried roadless areas (2)	359,341	46	24
Research natural areas (2)	1,774	<1	1
Eligible wild and scenic rivers (20)	189	N/A	N/A
Continental Divide National Scenic Trail	140	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There are two emphasis areas within the Rocky Mountain Range GA. Each of these are mapped and are assigned specific plan components. See Table 95 below. Associated maps (s) (appendix A) display the emphasis areas in this GA.

Table 95. Emphasis areas in the Rocky Mountain Range GA

Area	Acres	Percent of GA
Badger Two Medicine	129,591	17
Green Timber Basin – Beaver Creek	2,942	<1

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Other GA Features

There is one other feature within the Rocky Mountain Range GA that requires specific plan components. There are also additional primitive ROS areas added in the GA in the Badger Two Medicine area (see FW-ROS plan components). Table 96 and associated maps (appendix A) display this other feature.

Table 96. Other features within the Rocky Mountain Range GA

Area	Acres	Percent of GA
Teton Pass Ski Area (Special Use Permit)	407	<1

Area	Acres	Percent of GA
Primitive ROS in Badger two medicine area	125,266	16

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 97 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 97. Recreation opportunity spectrum classes for the Rocky Mountain Range GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	578,357	74	579,452	75
Semiprimitive nonmotorized	144,091	19	150,120	19
Semiprimitive motorized	24,553	3	35,288	5
Roaded natural	27,796	4	9,937	1
Rural	3,226	<1	3,226	<1
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Rocky Mountain Range GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 98) for the Rocky Mountain Range GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 98. Scenic integrity objectives for the Rocky Mountain Range GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	578,357	74
High	197,809	26
Moderate	1,710	<1
Low	146	<1
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. No such lands are identified in this GA. Forestwide and GA-specific plan components for harvest in lands unsuitable for timber production apply.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (RM-VEGT-DC)

01 Table 99 shows the desired condition for cover types in the Rocky Mountain Range GA.

Table 99. Rocky Mountain Range GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	21 (15-27)	5-15
Aspen/hardwood	3 (1-5)	2-10
Ponderosa pine	2 (0.2-4)	2-5
Douglas-fir	15 (7-22)	10-20
Lodgepole pine	20 (15-27)	10-20
Spruce/fir	22 (16-28)	35-45
Whitebark pine	5 (2-8)	5-10

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (RM-VEGF-DC)

01 Table 100 shows the desired condition for tree species presence in the Rocky Mountain Range GA.

Table 100. Rocky Mountain Range GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	5 (2-8)	5-15
Rocky Mountain juniper	3 (0.4-5)	1-5
Ponderosa pine	0	2-10
Douglas-fir	27 (20-33)	20-40
Aspen	5 (2-8)	2-15
Engelmann spruce	33 (27-40)	25-40
Lodgepole pine	32 (26-40)	10-25
Subalpine fir	36 (29-43)	30-50
Whitebark pine	14 (9-20)	10-20

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 101 shows the desired condition for forest size class in the Rocky Mountain Range GA.

Table 101. Rocky Mountain Range GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9")	21 (16-27)	1-15
Small (5-9.9")	29 (24-33)	2-15
Medium (10-14.9")	16 (13-20)	5-20
Large (15.0-19.9")	1 (0.3-3)	20-30
Very large (20"+)	0	10-20

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5' above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 102 shows the desired condition for forest density class in the Rocky Mountain Range GA.

Table 102. Rocky Mountain Range GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	38	30-50
Med/high (40-59.9%)	17	30-50
High (60+%)	45	10-35

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

04 Lynx habitat (see glossary) provides the amount, distribution, and structural conditions (based on scientific information and the most current recommendations made through agency or interagency efforts), at the scale of a reproductive female lynx home range, necessary to support the recovery and persistence of Canada lynx in the planning area.

Plan Components – Wildlife (WL)

Desired Conditions (RM-WL-DC)

01 The Rocky Mountain Range GA provides habitat connectivity for wide-ranging species (grizzly bear, Canada lynx, wolverine, and others) between public lands in northern Montana and those in central and southern Montana, including lands in the Greater Yellowstone Ecosystem.

02 The risk of disease transmission from domestic livestock to bighorn sheep is minimal.

03 Known harlequin duck breeding streams are relatively undisturbed by human activities during the brood-rearing time period.

Standards (RM-WL-STD)

01 To avoid potential conflicts with grizzly bears and to avoid risk of disease transmission to wild bighorn sheep, domestic sheep or goat grazing on NFS lands within the Rocky Mountain Range GA will not be permitted. See also PCAZ1-NCDE-STD-03, PCAZ1-NCDE-STD-04, PCA-NCDE-STD-10, and PCA-NCDE-GDL-09.

02 Scientific information and the most current recommendations made through agency or interagency efforts, shall be used to determine and establish the means with which to achieve effective separation between bighorn sheep and domestic sheep and goats on NFS lands (refer to appendix C for information on recommendations and strategies).

Guidelines (RM-WL-GDL)

01 Livestock grazing in identified bighorn sheep winter range should be managed to prioritize maintenance of overwinter forage for bighorn sheep.

02 In order to minimize potential disturbance to harlequin duck broods, management and recreation activities that have the potential to separate or displace harlequin pairs or broods (for example, timber harvest, road construction and heavy maintenance, boating, rafting) should be avoided on or immediately adjacent to known harlequin duck breeding streams during the brood-rearing period.

Plan Components – Teton Pass Ski Area (TETONSKI)

The Teton Pass Ski Area is along the Teton Canyon Road. This ski area is approximately 30 miles west of Choteau, MT. Teton Pass Ski Resort has been in operation since 1966 and is currently authorized by a long-term special use permit which permits winter ski resort development and some summer activities on approximately 407 acres. Currently, the Teton Pass Ski Area services approximately 6,000 - 8,000 visitors per year.

Desired Conditions (RM-TETONSKI-DC)

01 The Teton Pass Ski Area provides public access to developed recreation activities such as, but not limited to, downhill skiing, snowboarding, snowshoeing, and backcountry skiing.

02 The vegetation and forest conditions at Teton Pass Ski Area provide for public health and safety, recreational settings and user experiences, enhancing scenic values, protection of facilities and infrastructure. Also see FW-VEGT-DC-05, FW-VEGF-GDL-01 and FW-VEGF-GDL-02.

Suitability (RM-TETONSKI-SUIT)

01 The Teton Pass Ski Area is not suitable for timber production. However, timber harvest is suitable for other multiple use purposes such as improved recreation opportunity, guest safety, protection of facilities and infrastructure, fuel reduction, and forest health.

Plan Components – Badger Two Medicine (BTM)

The area commonly known as the Badger Two Medicine encompasses approximately 129,591 acres at the northern end of the Rocky Mountain Range GA. The majority of this area is located within the Badger-Two Medicine Traditional Cultural District, an area acknowledged for its significance to the oral traditions and culture practices of the Blackfeet people, who have used the lands for traditional purposes for generations and continue to value the area as important to maintaining their community's continuing cultural identity. This area also falls within the 1895 Agreement with the Indians of the Blackfeet Indian Reservation in Montana, which states that the Blackfeet Nation will retain rights to extract timber, fish, animals, and other resources in the Badger Two Medicine area.

Desired Conditions (RM-BTM-DC)

01 Badger Two Medicine is a sacred land, a cultural touchstone, a repository of heritage, a living cultural landscape, a refuge, a hunting ground, a critical ecosystem, a habitat linkage between protected lands, a wildlife sanctuary, a place of solitude, a refuge for wild nature, and an important part of both tribal

and nontribal community values. It is important to the people who rely upon it, critical to the wild nature that depends upon it, and has an inherent value and power of its own.

02 The Badger Two Medicine is a large, undeveloped landscape that is characterized by a natural environment where ecological processes such as natural succession, fire, insects, and disease function and exist. Impacts from visitor uses do not detract from the natural setting.

03 Education and research opportunities are available within the Badger Two Medicine.

Standards (RM-BTM-STD)

01 Management activities in the Badger Two Medicine shall be conducted in close consultation with the Blackfeet Nation to fulfill treaty obligations, and the federal Indian trust responsibility. Project and activity authorizations shall be protected and honor Blackfeet reserved rights and sacred land. The uses of this area must be compatible with desired conditions and compatibility shall be determined through government to government consultation.

02 Management activities shall accommodate Blackfeet tribal member access to the Badger Two Medicine for the exercise of reserved treaty rights, and enhance opportunities for tribal members to practice spiritual, ceremonial, and cultural activities.

Suitability (RM-BTM-SUIT)

01 The Badger Two Medicine is unsuitable for timber production. However, timber harvest may occur to provide for other multiple use values, such as habitat restoration, hazardous fuel reduction, and to support tribal treaty rights.

02 The Badger Two Medicine is suitable for restoration activities (such as but not limited to management ignited fires, tree planting, and active weed management) to protect and/or enhance the natural ecology and habitat conditions of this area.

Plan Components – Rocky Mountain Front Conservation Management Area (CMA)

On December 19, 2014, President Obama signed into effect Public Law 113-291: National Defense Authorization Act for Fiscal Year 2015. Included within this law was language that established the Rocky Mountain Front Conservation Management Area. The law includes approximately 195,073 acres of federal land managed by the FS and approximately 13,087 acres of federal land managed by the Bureau of Land Management.

Desired Conditions (RM-CMA-DC)

01 The conservation management area on the Rocky Mountain Front conserves, protects, and enhances the recreational, scenic, historic, cultural, fish, wildlife, roadless, and ecological values of the area for the benefit and enjoyment of present and future generations.

02 The vegetation and forest conditions of the Rocky Mountain Front Conservation Management Area provide for public health and safety, recreational settings and user experiences, enhance scenic values, and protect facilities and infrastructure.

03 Nonmotorized recreation trail opportunities enable access to the primitive and semiprimitive recreation opportunity spectrum settings within the conservation management area.

Standards (RM-CMA-STD)

01 No new or temporary roads shall be constructed within the Rocky Mountain Front Conservation Management Area, except:

- To reroute or close an existing route to protect resources.
- To allow motorized access for timber management activities not more than ¼ mile from Teton Road, South Fork Teton Road, Sun River Road, Beaver Willow Road, or Benchmark Road.
- To allow for administrative access, permitted access, and access to valid existing rights.
- For emergency purposes.

02 Temporary roads that are constructed for vegetation management projects shall be restored within 3 years of project completion, including site preparation and planning activities.

Guidelines (RM-CMA-GDL)

01 Management framework found in the Rocky Mountain Ranger District Invasive Plant Management Strategy (2015), and any subsequent amendments, should provide for the control, prevention, and eradication of terrestrial and aquatic nonnative invasive species within the Rocky Mountain Front Conservation Management Area to maintain the native landscape.

Suitability (RM-CMA-SUIT)

01 The Rocky Mountain Front Conservation Management Area is not suitable for timber production. However, timber harvest may occur to provide for other multiple use values.

02 Permitted grazing is suitable in the Rocky Mountain Front Conservation Management Area.

Plan Components – Green Timber Basin-Beaver Creek Emphasis Area (GB)

The Green Timber Basin-Beaver Creek emphasis area encompasses a location with unusually high orchid diversity. The area has ten documented orchids specieis across a variety of habitats. Two of these species, sparrow's egg lady slipper (Cypripedium passerinum) and round-leaved orchid (Amerorchis rotundifolia), are species of conservation concern that are rare in Montana. Both species exhibit a high fidelity to a very narrow range of ecological tolerance.

It is uncommon in Montana for conditions to exist that support large populations of rare botanical species. The Green Timber Basin-Beaver Creek emphasis area is approximately 2,910 acres in size and provides a valuable opportunity for plant enthusiasts to enjoy viewing multiple orchid species.

Desired Conditions (RM-GB-DC)

01 The diversity and density of orchid and other plant species that make this area botanically unique is maintained.

Guidelines (RM-GB-GDL)

01 Any management activities that occur in this area should be designed to avoid or minimize impacts to botanical resources, primarily the unique diversity and density of orchid species.

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Snowies Geographic Area

General Overview

The Snowies is the GA farthest to the east within the HLC NF planning area. This remote GA is primarily in Fergus County with smaller portions in Golden Valley County. Lewistown is the largest nearby population center.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The Snowies GA includes both the Big and Little Snowy Mountain ranges, which constitute portions of an extensive series of low, rolling hills. This GA displays prominent changes in elevation accentuated by the surrounding grassland, high plains, and conifer timbered foothills.

The Little Snowies are separated from the Big Snowies by a subtle break in topography. They are characterized by nonforested and warm dry forested potential vegetation types, with foothills that are partially forested primarily with limber pine, ponderosa pine, and Douglas-fir. The Little Snowies are especially noted for unique expanses of ponderosa pine which transition from a 3-needled to a 2-needled variety that typifies populations in the eastern part of Montana. Due to its position in the rain shadow created by the Big Snowies, the country is semiarid and dominated by grassy vegetation. The landform is rolling with slopes that are gentle to flat, except where creeks have dissected them. The area lacks prominent high points.

The Big Snowies is the largest and most prominent landform in this GA, higher in elevation and larger than the Little Snowies, dominated by cool moist potential vegetation types. The spine of this 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 treeless plateau of alpine that is characterized by rock and tundra. Floristically, the Big Snowies are unique with many vegetation types compressed into the same area. Fire was the historic driver of plant communities. Slopes vary from steep, rocky canyons to gentle benches. The northern portion of the GA receives abundant moisture and supports dense forests of Douglas-fir, lodgepole pine, subalpine fir, and Engelmann spruce with some whitebark pine. 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.

The Snowies GA includes habitat for big game species such as moose, elk, mule deer, 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. An introduced population of wild turkeys provides a valued hunting opportunity in the Little Snow Mountains.

Streams flowing out of the north side of the Big Snowies flow into the Judith River. Major streams on the north side of the Big Snowies include Rock, Cottonwood, Flatwillow, and Half Moon Creeks. Those flowing out of the south side flow into the Musselshell River. South side streams include Careless and Swimming Woman Creeks; both flow south out of a unique geologic feature known as a pseudo cirque. Westslope cutthroat trout are present in the Cottonwood, Big Spring, and Half Moon drainages. The populations in Cottonwood and Big Spring are aboriginal and at the easternmost extent of westslope cutthroat trout range.

Snow in the Big Snowies is a primary source of water recharge that feeds the underlying Madison limestone aquifer and discharges to Big Spring. Big Spring is a first-magnitude artesian spring and surfaces approximately 6 miles south of Lewistown. The spring discharges approximately 50,000 to 64,000 US gallons per minute, providing Lewistown's water supply, which requires no treatment for use by consumers. See municipal watershed map. Halfmoon, Big Spring, and Cottonwood Creeks support westslope cutthroat trout. The major drainages in the Little Snowies are Willow Creek and the North Fork of Pole Creek, both of which drain south to the Musselshell River.

Social and Economic Characteristics

Most of the Little Snowies is used for dispersed recreation opportunities, such as hunting and camping. The area is known for its wild turkey populations and wildlife viewing is a popular activity. 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 several developed recreation sites along Crystal Lake and Crystal Lake Guard station still actively facilitates FS stewardship and is available as a cabin rental. Several dispersed trails take off from this location and provide access to interpretive points such as the Ice Caves, which is one of many caves in the area.

The Big Snowies Wilderness Study Area (approximately 88,000 acres) is located in 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.

Livestock grazing in the Little Snowies also supports the local economy.

Cultural and Historical Characteristics

The Little Snowy Mountain range has a rich cultural history, beginning with Native Americans and then later with homesteaders. 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 Big Snowy Mountains have long been a unique and revered destination. Early Native Americans 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 visitors.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 103 and associated map(s) in appendix A display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 103. Designated areas in the Snowies GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Big Snowies Wilderness Study Area	87,968	74	52
Inventoried roadless areas (2)	97,113	82	7
Recommended wilderness area (1)	66,894	57	44
Research natural areas (3)	3,483	3	21
Eligible wild and scenic rivers (2)	9.1	N/A	N/A

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Crystal Lake Loop National Recreation Trail	2	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There is one emphasis area within the Snowies GA. This area is mapped and assigned specific plan components. See Table 104 below. Associated maps (s) (appendix A) display the emphasis areas in this GA.

Table 104. Emphasis area in the Snowies GA

Area	Acres	Percent of GA
Grandview Recreation Area	32,296	27

Other GA Features

There is one other feature within the Snowies GA that requires specific plan components. There are also additional primitive ROS areas added in the GVRA. (see FW-ROS plan components). Table 105 and associated maps (appendix A) display this other feature.

Table 105. Other features within the Snowies GA

Area	Acres	Percent of GA
Big Spring Creek municipal watershed	9,649	8
Additional Primitive ROS areas	1,374	1

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 106 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 106. Recreation opportunity spectrum classes for the Snowies GA

ROS class	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	95,628	81	82,216	70
Semiprimitive nonmotorized	0	0	0	0
Semiprimitive motorized	6,541	5	35,500	30
Roaded natural	15,328	13	456	<1
Rural	676	1	0	0
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Snowies GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 107) for the Snowies GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 107. Scenic integrity objectives for the Snowies GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	95,628	81
High	4,316	4
Moderate	7,765	6
Low	10,463	9
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This GA contributes a small proportion of the forestwide total area of lands suitable for timber production. Table 108 and associated map(s) (appendix A) display the lands suitable for timber production in this GA.

Table 108. Lands suitable for timber production in the Snowies GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
9,531	8	3

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Watershed (WTR)

Desired Conditions (SN-WTR-DC)

01 Big Spring Creek municipal watershed provides a clean water supply for the city of Lewistown. See FW-WTR-STD-01.

Goals (SN-WTR-GO)

01 Coordinate management of the municipal watershed with the state of Montana and municipality.

Guidelines (SN-WTR-GDL)

01 Within the Big Spring Creek municipal watershed, management activities should emphasize restoration and resiliency.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (SN-VEGT-DC)

01 Table 109 shows the desired condition for cover types in the Snowies GA.

Table 109. Snowies GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	9 (4-14)	5-15
Aspen/hardwood	1 (1-3)	2-5
Ponderosa pine	22 (15-30)	15-30
Douglas-fir	37 (24-50)	15-25
Lodgepole pine	10 (5-16)	15-25
Spruce/fir	20 (13-27)	15-30

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (SN-VEGF-DC)

01 Table 110 shows the desired condition for tree species presence in the Snowies GA.

Table 110. Snowies GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	26 (19-34)	5-25
Rocky Mountain juniper	2 (2-4)	1-5
Ponderosa pine	26 (19-34)	20-35
Douglas-fir	62 (54-70)	35-50
Aspen	2 (2-5)	5-15
Engelmann spruce	48 (39-56)	15-30
Lodgepole pine	18 (12-25)	20-35
Subalpine fir	19 (13-27)	15-30
Whitebark pine	1 (1-2)	5-15

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 111 shows the desired condition for forest size class in the Snowies GA.

Table 111. Snowies GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	14 (9-23)	1-20
Small (5-9.9”)	47 (39-56)	5-25

Size class[1]	Existing (percent)[2]	Desired range (percent)
Medium (10-14.9”)	27 (19-34)	5-30
Large (15.0-19.9”)	1 (1-3)	20-30
Very large (20”+)	1 (1-3)	5-25

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 112 shows the desired condition for forest density class in the Snowies GA.

Table 112. Snowies GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	18	25-55
Med/high (40-59.9%)	19	30-50
High (60+%)	63	10-35

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

04 Juniper recruitment into mule deer and elk summer range in the Little Snowies portion of the GA is minimal, although the species persists at the GA scale.

Plan Components – Nonforested Vegetation (VEGNF)

Guidelines (SN-VEGNF-GDL)

01 When conducting management activities, vegetation should be managed to enhance and maintain high quality forage on big game summer range, particularly on the northern slopes of the Big Snowy Mountains.

Plan Components – Benefits to People (TIM)

Guidelines (SN-TIM-GDL)

01 When timber harvest and other vegetation management activities are conducted, projects should be designed to emphasize ponderosa pine restoration, wildlife habitat, reduction of hazardous fuels, protection of communities and values at risk, and/or public safety.

Plan Components – Benefits to People (EMIN)

Standards (SN-EMIN-STD)

01 Within the Snowies GA new leases for leasable minerals shall include a no surface occupancy stipulation.

Plan Components – Grandview Recreation Area (GVRA)

The Grandview Recreation Area is in the western portion of the Big Snowies GA, south of the community of Lewistown, Montana in the Big Snowy Mountain range. This recreation area is approximately 32,296 acres and includes the Crystal Lake Campground complex and a portion of the Big Snowies Wilderness Study Area. The Grandview Recreation Area contains several challenging mountain bike trails that lead to

prominent features and vistas, as well as popular motorized over-snow areas. The Grandview Recreation Area abuts the Big Snowies Recommended Wilderness Area which is in the eastern portion of the mountain range.

Increased recreational use of the forest, and especially the Grandview Recreation Area, has generated the need to incorporate flexible management strategies to address emerging technologies and potential future uses.

Since a portion of this recreation area also falls within the Big Snowies Wilderness Study Area, plan components for the wilderness study area will also need to be followed. Please also see Forestwide, Designated areas, Wilderness Study Areas.

Desired Conditions (SN-GVRA-DC)

01 Recreation activities within the Grandview Recreation Area enhance and support the primitive character and wilderness characteristics of the area. Also see Forestwide Designated Areas, Wilderness Study Areas.

02 The Crystal Lake Complex provides developed recreation experiences and trailhead opportunities for the greater Grandview Recreation Area.

03 Trails within the Grandview Recreation Area offer dispersed, nonmotorized recreation opportunities. These opportunities range in complexity from those that are easy and readily accessible to those that are more difficult and require greater skills. Also see Forestwide Recreation Opportunities, Dispersed Recreation.

Goals (SN-GVRA-GO)

01 Partners and volunteer groups work collaboratively with the FS in the planning, management, and offering of recreation experiences and settings within the Grandview Recreation Area.

Suitability (SN-GVRA-SUIT)

01 The entire Grandview Recreation Area is unsuitable for timber production. The Crystal Lake Campground complex, outside of the Big Snowies WSA, is suitable for timber harvest to provide for other multiple use values.

02 Within the Grandview Recreation Area, mechanized means of transportation (such as mountain bikes) are suitable on FS established roads and trails as long as the total amount of mountain bike use maintains the wilderness characteristics within the WSA as they existed in 1977. Mechanized means of transportation off of NFS roads and trails in the Grandview Recreation Area is not suitable.

03 Within the Grandview Recreation Area, motorized over-snow uses are suitable within winter recreation areas as authorized by the current travel plan.

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Upper Blackfoot Geographic Area

General Overview

The Upper Blackfoot GA spans Lewis and Clark and Powell counties. The community of Lincoln is within the GA, and the city of Helena is relatively nearby. The Upper Blackfoot GA 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. Montana Highway 200 cuts east-west through the center of the GA, crossing over Rogers Pass to follow the Blackfoot River. 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 Southwest Crown of the Continent ecosystem.

Please see maps (appendix A) for detailed information.

Distinctive Roles and Contributions

Ecological Characteristics

The landform west of the continental 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. There are a few notable passes over the Continental Divide: Rogers, Stemple, and Flesher.

The Upper Blackfoot GA contains a mosaic of nonforested and forested potential vegetation types. Most of the area is forested with conifers, predominantly lodgepole pine, Douglas-fir, and subalpine fir with some Rocky Mountain juniper, ponderosa pine, limber pine, Engelmann spruce, and whitebark pine. Notably, western larch occurs in low amounts at the far eastern edge of its range. This species is not present in any other GA within the planning area. Aspen stands are intermittent. Grasslands are limited but do occur along valley bottoms and sun exposed aspects. Wetland complexes (such as Indian Meadows), fens, and other groundwater dependent ecosystems harbor rich assemblages of plants. Fire is a major driver in the structure and composition of plant communities. The unique climate of this area, being west of the Divide and subject to more maritime influences than the rest of the planning area, gives rise to unique species associations at higher elevations, such as ponderosa pine and limber pine mixed with whitebark pine. There is also a unique botanical area near Granite Butte containing a montane rough fescue grassland, a snowglade feature, and a whitebark pine ribbon forest.

The species and habitats on the Upper Blackfoot GA differ from most of the planning area due to it being 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 (also the Primary Conservation Area) for grizzly bears – which is the southernmost extent of the Northern Continental Divide Ecosystem Grizzly Bear Recovery Zone. The south half of the Upper Blackfoot GA is almost entirely within management Zone 1 identified in the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy; a few acres of this GA are within Zone 2. This GA is also within Unit 3 of federally designated Canada lynx Critical Habitat. Other uncommon species that are present include the harlequin duck, wolverine, and occasional fisher. The Upper Blackfoot GA also provides habitat for moose, white-tailed deer, elk, wolves, and mule deer. Mountain goats may occasionally be

present in higher elevations near the boundary with the Rocky Mountain Range GA. The Upper Blackfoot GA provides important connectivity for a variety of wildlife species between larger blocks of public land to the north and the south.

The Blackfoot River has its headwaters here in the GA. This highly valued recreational and scenic river clips other portions of the GA. 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. High value populations of bull trout, currently listed as threatened under the federal Endangered Species Act, and westslope cutthroat trout are found throughout the GA, including Landers Fork and Poorman Creek. This GA contains all the designated critical habitat for bull trout on the HLC NF.

Social and Economic Characteristics

Recreation use in the Upper Blackfoot GA varies by location. The northern area includes the south part of the Scapegoat Wilderness (part of the greater Bob Marshall Wilderness complex), and recreation activities such as backpacking, horseback riding, and outfitter guiding take place across the 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 along with cross country skiing, particularly on Stemple Pass. The Continental Divide National Scenic Trail transects the GA, north to south. Numerous snowmobile trails lead from the community of Lincoln onto NFS lands. This GA also has the Lincoln Airstrip.

Mineral production occurs via small mining operations, primarily for gold, silver, lead, and copper. There are several inholdings as well as extensive reclamation activities associated with historic mining, including a state superfund site at the Upper Blackfoot Mining Complex/Mike Horse.

Cultural and Historical Characteristics

Native American groups once occupied, seasonally used, or traveled though this large river valley and the adjacent foothills and mountains. Native Americans attach great cultural significance to the ancient campsites, hunting and plant gathering places, tool stone quarries, paint pigment sources, vision questing sites, and old trails found throughout the GA.

The Euro-American settlement mirrors that of Montana in general. Portions of the Lewis and Clark Trail traverse the Blackfoot River and Alice Creek. The trail passes over the Continental Divide at Lewis and Clark Pass. The Lewis and Clark Expedition of 1804-1806 gave way to fur trapping and trading, then early military expeditions and railroad route explorations. A gold strike in Abe Lincoln Gulch brought permanent settlement at the Old Lincoln townsite. Remnants of former communities dot the landscape, such as the post offices and dwellings of McClellan Gulch, Rochester, Gould, Stemple Pass, and Mike Horse. Relics of historic mining infrastructure and tools are frequent. Three historic buildings, Webb Lake Guard Station, Stonewall Lookout, and Granite Butte Lookout stand testament to the FS's administration.

Designated Areas

Designated areas are specific areas or features within the planning area that have been given a permanent designation to maintain its unique special character or purpose. Please see chapter 2 for forestwide direction of designated areas. Table 113 and associated map(s) in appendix A display the designated areas in this GA. Note that there can be overlap between the different areas and that there can also be portions of the GA outside of a designated area, so the sum of these acreages may differ from the total GA acreage.

Table 113. Designated areas in the Upper Blackfoot GA

Designated area	Acres/miles	Percent of GA[1]	Percent forestwide total[2]
Scapegoat Wilderness	83,519	26	15
Inventoried roadless areas (8)	152,724	46	10
Recommended wilderness areas (3)	38,001	12	25
Research natural areas (3)	3,283	1	18
Eligible wild and scenic rivers (4)	43	N/A	N/A
Continental Divide National Scenic Trail	65	N/A	N/A
Lewis and Clark National Historic Trail	12	N/A	N/A

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number. Not applicable to linear features.
[2] Percentage of total NFS lands of the same designation on the Forest, rounded to the nearest whole number. Not applicable to linear features.

GA Emphasis Areas

There are no emphasis areas in the Upper Blackfoot GA.

Other GA Features

There are additional primitive ROS areas in the Arrastra and Alice Creek areas (see FW-ROS plan components). Table 114 and associated maps (appendix A) display this other feature.

Table 114. Other features within the Upper Blackoot GA

Area	Acres	Percent of GA
Additional Primitive ROS areas Arrastra and Alice creek	12,197	3.5

[1] Percentage of total NFS lands in the GA, rounded to the nearest whole number.

Recreation Opportunity Spectrum

The recreation opportunity spectrum influences the suitability of lands for various multiple uses or activities based on the desired conditions. Please see chapter 2 for a description of the recreation opportunity spectrum and its associated plan components as well as the definitions of the ROS classes in the glossary. Table 115 displays the percentage breakout of each recreation opportunity spectrum class for both summer and winter. In addition, the associated map(s) in appendix A display the recreation opportunity spectrum categories in this GA.

Table 115. Recreation opportunity spectrum classes for the Upper Blackfoot GA

ROS Cclass	Summer		Winter	
	Acres	Percent of GA[1]	Acres	Percent of GA[1]
Primitive	134,127	40	133,591	40
Semiprimitive nonmotorized	118,187	36	60,523	18
Semiprimitive motorized	7,099	2	93,394	28
Roaded natural	73,723	22	45,628	14
Rural	481	<1	481	<1
Urban	0	0	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Scenic Integrity Objectives

The scenic character for the Upper Blackfoot GA is described in the Distinctive Roles and Contributions section. This scenic character highlights the ecological, social and economic, and historic and cultural characteristics commonly found throughout this GA. The locations of scenic integrity objectives (Table 116) for the Upper Blackfoot GA are displayed in the scenic integrity objectives maps (appendix A). Please refer to FW-SCENERY for plan components that apply to scenery and aesthetics. Also, please see appendix G and the glossary for more information.

Table 116. Scenic integrity objectives for the Upper Blackfoot GA

Scenic integrity objective	Acres	Percent of GA[1]
Very high	134,127	40
High	151,845	45
Moderate	38,698	12
Low	8,948	3
Very low	0	0

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.

Lands Suitable for Timber Production

Lands suitable for timber production are areas where timber production is an appropriate management objective. Please see chapter 2 for information on timber suitability and plan components for harvest on lands identified as suitable and unsuitable for timber production. This productive GA contributes a substantial proportion of the forestwide total of lands suitable for timber production. Table 117 and associated map(s) in appendix A display the lands suitable for timber production in this GA.

Table 117. Lands suitable for timber production in the Upper Blackfoot GA

Acres	Percent of the GA[1]	Percent of forestwide total[2]
42,117	13	11

[1] Percentage of the total NFS lands found in the GA, rounded to the nearest whole number.
[2] Percentage of the total NFS lands suitable for timber production forestwide, rounded to the nearest whole number

Plan Components – Fisheries and Aquatic Habitat (FAH)

Desired Conditions (UB-FAH-DC)

01 Bull trout spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat, and appropriate life history strategies (for example, resident, fluvial, and adfluvial) are supported.

02 The bull trout population trends towards recovery.

Goals (UB-FAH-GO)

01 Bull trout population recovery is supported through the Bull Trout Conservation Strategy, the Bull Trout Recovery Plan, and the Columbia Headwaters Recovery Unit Implementation Plan or the latest guiding documents through cooperation and coordination with the USFWS, tribes, state agencies, other federal agencies, and interested groups.

Plan Components – Terrestrial Vegetation (VEGT)

Desired Conditions (UB-VEGT-DC)

01 Table 118 shows the desired condition for cover types in the Upper Blackfoot GA.

Table 118. Upper Blackfoot GA existing and desired conditions for cover type (percent of area)

Cover type[1]	Existing (percent)[3]	Desired range (percent)
Nonforested[2]	16 (12-20)	5-15
Aspen/hardwood	<1 (0.4-1.2)	2-5
Ponderosa pine	2 (0.6-4)	10-25
Douglas-fir	33 (26-42)	15-25
Western larch	<1 (0-0.1)	1-5
Lodgepole pine	26 (20-30)	20-30
Spruce/fir	10 (7-14)	15-25
Whitebark pine	1 (1-2)	2-5

[1] Cover types reflect the most common species in a stand (see appendix D).
[2] Nonforested areas include grass and shrub cover types, which may support widely scattered trees in some cases.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data. Existing condition represents 2018 conditions and will change through time. Estimates are rounded to the nearest whole number unless the value is less than 1%, in which case it is rounded to the nearest 10th. The totals do not necessarily equal 100% due to nonvegetated areas (water or rock).

Plan Components - Forested Vegetation (VEGF)

Desired Conditions (UB-VEGF-DC)

01 Table 119 shows the desired condition for tree species presence in the Upper Blackfoot GA.

Table 119. Upper Blackfoot GA existing and desired conditions for tree species presence (percent of area)[1, 2, 3]

Tree species	Existing (percent)	Desired range (percent)
Limber pine	9 (7-13)	5-15
Rocky Mountain juniper	2 (1-4)	1-5
Ponderosa pine	1 (1-3)	15-30
Douglas-fir	45 (40-51)	35-50
Aspen	1 (0.2-3)	2-10
Engelmann spruce	15 (11-19)	10-25
Lodgepole pine	46 (40-51)	20-40
Western larch	1 (1-2)	1-10
Subalpine fir	34 (28-39)	15-30
Whitebark pine	7 (3-9)	5-15

[1] Percent of area where at least one tree of the species is present.
[2] Totals may be greater 100% because more than 1 species can be present on a site. Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.
[3] Distributions include trees that occur on nonforested potential vegetation type.

02 Table 120 shows the desired condition for forest size class in the Upper Blackfoot GA.

Table 120. Upper Blackfoot GA existing and desired conditions for forest size class (percent of area)[3]

Size class[1]	Existing (percent)[2]	Desired range (percent)
Seedling/sapling (0-4.9”)	17 (12-25)	1-20
Small (5-9.9”)	30 (25-35)	5-25
Medium (10-14.9”)	18 (14-22)	5-30
Large (15.0-19.9”)	7 (4-10)	20-30
Very large (20”+)	0 (0.4-1)	10-25

[1] Size class = the average diameter class of live trees based on basal area weighted diameter, shown as ranges of diameter at breast height, or 4.5’ above ground level. A stand within a size class may contain trees smaller and/or larger than the class range.
[2] Total may less than 100% because nonforested areas (grass, shrub, savanna) are excluded.
[3] Existing condition shown is the mean percent of the area with the 90% confidence interval (see glossary) shown in parenthesis. Source is R1 Summary Database, FIA data.

03 Table 121 shows the desired condition for forest density class in the Upper Blackfoot GA.

Table 121. Upper Blackfoot GA existing and desired conditions for forest density class (percent of area)

Density class[1]	Existing (percent)[2]	Desired range (percent)
Low/med (< 39.9%)	28	25-55
Med/high (40-59.9%)	41	35-55
High (60+%)	31	10-35

[1] Density class = the average canopy cover of live trees, shown as ranges of canopy cover percent.
[2] Existing condition is from the SIMPPLLE input landbase, based on VMap imagery.

04 Lynx habitat (see glossary) provides the amount, distribution, and structural conditions (based on scientific information and the most current recommendations made through agency or interagency efforts), at the scale of a reproductive female lynx home range, necessary to support the recovery and persistence of Canada lynx in the planning area.

Plan Components – Nonforested Vegetation (VEGNF)

Desired Conditions (UB-VEGNF-DC)

01 Unique plant communities persist and are in a condition consistent with natural processes. This includes but is not limited to habitats dominated by rough fescue, silver sagebrush, potentilla fruticose, wetland meadows, and the Indian Meadow fens.

Plan Components – Wildlife (WL)

Desired Conditions (UB-WL-DC)

01 The Upper Blackfoot GA provides habitat connectivity for wide-ranging species (grizzly bear, Canada lynx, wolverine, and others) between public lands in northern Montana and those in central and southern Montana, including lands in the Greater Yellowstone Ecosystem.

02 Ponderosa pine-dominated forests contain large-tree structure (see glossary) comprised of ponderosa pine and/or Douglas-fir trees and snags with relatively open canopy available for nesting by flammulated owls. These areas occur within a larger mosaic of closed-canopy forest and shrub-dominated openings that serve as flammulated owl roosting and foraging areas.

03 Known harlequin duck breeding streams are relatively undisturbed by human activities during the brood-rearing time period.

Guidelines (UB-WL-GDL)

01 Resource management activities in the west-central and east-central portions of the GA, where NFS lands narrow and approach the area of private lands surrounding Highway 200, should maintain or enhance high quality wildlife habitat, wildlife movement areas, and connectivity. In order to improve wildlife security and connectivity in these areas:

- Vegetation management activities should provide for wildlife hiding cover needs
- Motorized access should not be increased
- New trails should be constructed only where minimal impacts will occur to wildlife habitats and movement corridors

02 In order to minimize potential disturbance to harlequin duck broods, management and recreation activities that have the potential to separate or displace harlequin pairs or broods (for example, timber harvest, road construction and heavy maintenance, boating, rafting) should be avoided on or immediately adjacent to known harlequin duck breeding streams during the brood-rearing period.

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Glossary

A

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 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.

adfluvial the migration of fish between lakes to rivers.

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

administrative use a generic term for authorized agency activity. Specifically, in the portion of the 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 other personnel authorized to perform duties by appropriate agency officials as long as doing so does not exceed either six trips (three round trips) per week or one 30-day unlimited use period during the nondenning season (see also nondenning season).

aerial retardant avoidance area mapped areas (interactive map online at https://www.fs.fed.us/fire/retardant/index.html) that are to be avoided during applications of fire retardant; including: habitat for threatened, endanger, proposed, candidate or sensitive species and all waterways. This national direction is mandatory and would be implemented except in cases where human life or public safety is threatened and retardant use within avoidance areas could be reasonably expected to alleviate that threat**.**

aircraft an airplane, helicopter, or other machine capable of flight.

airstrip an area of land that is used as a runway for aircraft to take off and land.

alpine high elevation ecosystem dominated by grasses and low-lying shrubs.

animal month a month's tenure upon range by one animal. Must specify kind and class. Not synonymous with animal-unit month.

animal unit considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to 6 months of age, or their equivalent, based on a standardized amount of forage consumed.

animal unit month (AUM) the amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day.

aquifer an underground layer of water-bearing permeable rock, rock fractures or unconsolidated material (gravel, sand or silt) from witch groundwater can be extracted using a water well.

aquatic organism passage a passage that provides the ability for fish and other aquatic creatures to move up and downstream under a road.

at-risk community a community located in the wildland urban interface or a group of homes and other structures with basic infrastructure and services within or adjacent to federal land in which conditions are conducive to a large-scale wildland fire disturbance event, and for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.

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 (from the Northern Continental Divide Ecosystem Food/Wildlife Attractant Storage Order).

B

baseline the environmental conditions at a specific point in time. The baseline for the NCDE is defined as conditions as of December 31, 2011, as modified by changes in numbers that were evaluated and found to be acceptable through the Endangered Species Act Section 7 consultation with USFWS while the grizzly bear was listed as threatened. The baseline will be updated to reflect changes 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 square miles, (Mace & Roberts, 2012)].

bear management unit an area about 400 square miles, 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.

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

big game the term ‘big game’ refers to the ungulate species found on the HLC NF: deer (both white-tailed and mule deer), elk, moose, bighorn sheep, mountain goat, and pronghorn. The term is used to indicate all or a portion of that suite of species.

biodiversity 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.

biological soil crust a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria occurring on the soil surface in open spaces within arid and semiarid systems.

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

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

boneyard 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.) (USFWS Critical Habitat Final Rule 2009).

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.

C

candidate species a status (1) for USFWS 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 (of developed recreation sites within the NCDE primary conservation area) the number of sites available for overnight use (e.g., the number of sites in a campground; the number of rooms available for lodging (as a commercial rental); or the number of cabins, bunkhouses, or recreation residences managed under a special-use permit).

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). Also see regeneration method.

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 adaption 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.

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 in the absence of disturbance.

coarse woody debris a piece or pieces of larger sized dead woody material (for example, 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 NFS 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 Code of Federal Regulations 251.51).

community wildfire protection plans strategic plans developed by communities to address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection—or all of the above. The Healthy Forests Restoration Act (HFRA) in 2003 includes statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this opportunity, it must prepare a Community Wildfire Protection Plan (CWPP).

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

confidence interval a range of values around the estimated mean that defines a specified probability that the value of a parameter lies within it.

consultation see interagency consultation.

contemporary vegetation management challenges issues with controlling, restoring or improving vegetation dynamics to achieve certain resource objectives. Some examples include but are not limited to such things as controlling invasive exotic weeds, reducing fire risk in the wildland-urban interface, and finding chemical-free ways to control weeds, etc.

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.

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 Code of Federal Regulations 219.19). Connectivity needs vary by species.

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.

coppice a forest regeneration method by which the majority of regeneration is from sprouts or root suckers. The suitable species on the HLC NF for this method is limited to aspen.

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 can occur as horizontal cover, which may provide security from disturbance by humans or predators, or thermal cover (often provided by vegetation canopy), which can help animals regulate body temperature during periods of extreme heat or cold.

cover type the vegetation composition of an area, described by the dominant plant species. Also see forest type.

Cretaceous a geologic period and system from 145 ± 4 to 66 million years (Ma) ago.

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 (16 United States Code 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 Endangered Species Act (16 USC 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species. Endangered Species Act, sec. 3 (5)(A), (16 USC 1532 (3)(5)(A)). Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce. Endangered Species Act, sec. 4 (a)(3) and (b)(2) (16 United States Code 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

decision document a record of decision, decision notice, or decision memo (36 Code of Federal Regulations 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.

deleterious having a harmful or injurious effect.

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

den emergence time period the time period in the spring when a grizzly bear emerges from its den and remains in the vicinity before moving to lower elevations. The den emergence time period occurs at the beginning of the nondenning season. Females with cubs usually emerge later and spend more time (a few days to a few weeks) near the den after emergence than do male bears.

denning season the typical time period during which most grizzly bears are hibernating in dens. Within the NCDE denning season is as follows:

- west of the Continental Divide: from December 1 through March 31.
- east of the Continental Divide: from December 1 through April 15.

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-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.

desired condition (DC) a description of specific social, economic, and/or ecological characteristics of the planning area, or a portion of the planning area, toward which management of the land and resources should be directed. Also see chapter 1.

desired plant community the one species composition (of the many possible within any given ecological site or equivalent) that is most compatible with management objectives for a site. This decision depends on the relative value expected to be obtained from alternative land uses, as well as the feasibility of implementing actions required to change the present vegetation to a more desirable type. It is unlikely that the desired plant community would feature substandard levels of soil protection, biotic integrity and hydrologic function, because it is assumed that maintaining site potential should be an intrinsic goal of any management plan. Desired plant community is in essence the benchmark against which to compare existing vegetation and provides a system to evaluate the success of current practices in meeting management objectives. (Global Rangelands 2016).

developed recreation site capacity within the NCDE primary conservation area for purposes of implementing standard NCDE-STD-AR-05, developed recreation site capacity on NFS lands that are designed and managed for overnight use includes

- the number of camp sites available in a campground,
- the number of rooms available for lodging at a ski area or guest lodge,
- the maximum sleeping capacity of a cabin rental or bunkhouse that is available for overnight use by the public, and
- the maximum parking capacity at picnic areas, trailheads, or boat launches that are not closed to overnight use.

developed recreation site within the NCDE primary conservation area for purposes of implementing standard NCDE-STD-AR-05, developed recreation sites on NFS lands that are designed and managed for

overnight use include campgrounds, lodging at ski areas, cabin rentals, huts, guest lodges, and recreation residences. This standard does not apply to dispersed recreations sites nor to developed recreation sites managed for day-use only (e.g., outfitter camps, roadside trail crossings or interpretive pull-outs; trailheads, picnic areas, or boat launches that are closed at night; and ski areas that do not have overnight lodging).

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.

discretionary the exploration and development of leasable mineral resources are discretionary activities, meaning that leasing them may or may not be allowed.

dispersed recreation an area in a national forest or national grassland with limited or no amenities provided for recreational users (36 CFR § 261.2).

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 activities activities which result in notable vegetation removal and/or soil disturbance (road construction, timber harvest, etc.).

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.

E

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 NF, 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.

early successional forest patches specifically defined for modeling purposes as areas classified into the seedling/sapling size class (less than 5” diameter) and transitional areas reforesting following disturbance (these areas have little to no tree cover but are found on forested potential vegetation types).

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 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 Code of Federal Regulations 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. The term ecosystem can be used at a variety of scales; for the forest plan, the ecosystem is referred to spatially at the forestwide and geographic area scales as well as within potential vegetation types. An ecosystem is commonly described in terms of its:

- composition: the biological elements within the different levels of biological organization, from genes and individual plant and animal species to communities (such as cover types).
- structure: the organization and physical arrangement of biological elements such as, snags and down woody debris, vertical (size class and structure class) and horizontal (density) 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.

ecotone 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. See also xeric ecotone.

effective separation spatial or temporal separation between wild sheep and domestic sheep or goats, resulting in minimal risk of contact and subsequent transmission of respiratory disease between animal groups (from WSWG, 2012).

elk security the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other activities (Lyon and Christensen 1992).

emergency situation a circumstance on 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 (must meet the requirements of 36 § CFR 218.21).

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 Code of Federal Regulations 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.

evacuation route roads and/or trails that would be used to evacuate the public during a natural disturbance event.

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.

even-aged system a planned sequence of treatments designed to maintain and regenerate a stand with predominantly one age class. Treatments include clearcutting, seedtree, shelterwood, and coppice regeneration methods.

F

feed any noninjurious, edible material having nutritive value when ingested.

final regeneration harvest the final timber harvest in a sequence of harvests designed to regenerate a timber stand or release a regenerated stand. A final regeneration harvest could be a clearcut, removal of a shelterwood or seedtree system, or a selectin cut.

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 (also see fire-tolerant tree species).

fire control see 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-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 NF.

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 prehistoric human 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 NF are as follows, with detail added to describe conditions found on the HLC NF:

Fire regime group	Frequency (fire return interval)	Severity	Representative vegetation types/habitats
I	0 to 35 years	Nonlethal, low intensity to mixed severity (less than 75 percent of the dominant overstory vegetation replaced)	Ponderosa pine, dry-site Douglas-fir *Open forest, woodland, shrub and savanna structures maintained by frequent nonlethal fire; also includes mixed severity fire 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. These fires result in minimal overstory mortality (<25% of dominant overstory) and small patch size (Agee 1998; Arno et al. 2000; Hessburg et al 2005). The forests that adapted to these fires on the HLC NF were often dominated by ponderosa pine or Douglas-fir; fire maintained these species and promoted open, often uneven-aged, structures. Surviving fire-resistant trees reforest the gaps created by disturbance. These fires also maintained open, dry forest savanna structures and a shifting distribution of dry limber pine/juniper ecotone communities.*
II	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) *Shrub or grasslands maintained or cycled by frequent fire; fire typically remove nonsprouting shrubs, tops of sprouting shrubs and most tree regeneration. These fires are important in vegetation communities such as big mountain sagebrush.*
III	35 to 100+ years	Nonlethal 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 *A mosaic of different ages, open forests, early to mid-seral forest structure stages, and shrub and herb dominated patches is maintained by infrequent fire events. Mixed severity fires kill a moderate amount of the overstory, burning with a mosaic of severities but replacing <75% of the overstory (Barrett et al. 2010). Highly variable patch sizes are created, with a mosaic of effects including stand replacement, low severity, and unburned areas (Agee 1998; Arno et al. 2000). This creates an irregular pattern with an abundant amount of edge. Fire tolerant species often survived many fire events, with large, old trees becoming prominent overstory components. These fires also resulted in*

Fire regime group	Frequency (fire return interval)	Severity	Representative vegetation types/habitats
			unburned patches that could develop into climax conditions dominated by shade tolerant species.
IV	35 to100+ years	Stand-replacing, high intensity (greater than 75 percent of the dominant overstory vegetation replaced)	Lodgepole pine *Large patches of similar age, post-fire structures and early to mid-seral forests are cycled by infrequent fire events. Stand replacing fires kill most of the trees (>75%) over a substantial area (Barrett et al. 2010) and creating an intermediate amount of edge (Agee 1998; Arno et al. 2000). Lodgepole pine regenerates large areas without a living seed source by storing serotinous cones on trees and in the soil that open under intense heat. Fire return intervals are generally long; however, shorter intervals also occur (USDA 1990; Barrett 1993) and forests may re-burn after the dead trees have fallen. Lodgepole pine produces open cones at a very young age to re-seed re-burned or understocked patches. Serotiny in fire-prone ecosystems is typically expressed from 30-60 years of age (USDA 1983) to ensure that seed is available for regeneration after the next stand-replacing event.*
V	200+ year	Stand-replacing, high intensity.	Boreal forest and high elevation conifer forest; lodgepole pine/subalpine fir; subalpine fir; whitebark pine *Variable size patches of shrub and herb dominated structures, or early to mid to late seral forest occur depending on the type of biophysical environment and are cycled by rare fire or other disturbance events. These forests often have complex structures influenced by small gap disturbances and understory regeneration. These fires result may result in the regeneration of lodgepole pine but also provide suitable sites for the establishment of whitebark pine at the highest elevations. Many sites become dominated by subalpine fir at the later stages of succession.*

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

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

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 (lower branches are shed as the tree grows), and protected buds. Examples of fire-tolerant species on the HLC NF are western larch, ponderosa pine and, to a lesser extent, Douglas-fir.

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

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 planning area. Focal species would be commonly selected on the basis of their functional role in ecosystems (36 Code of Federal Regulations 219.19).

food-conditioned (bear) a bear that associates humans and areas of human activity (e.g., campgrounds, cabins, dwellings, etc.) with food, usually as a result of repeatedly obtaining food rewards (e.g., garbage, camp food, pet or livestock food, bird seed, etc.) in such areas.

forage the browse and herbage available to livestock or wildlife for feed.

forage allocations for ecological needs determination of forage production for the dominant ecological sites (or their equivalent) within the grazing allotment (at the allotment management planning level). Forage allocations permitted for livestock grazing are made after analyzing the effects to other resources. Examples of resource areas taken into consideration prior to determining forage availability for livestock grazing include soil health, native plant community viability and resilience, hydrologic function, aquatic habitat quality, and the forage and cover needs of wildlife species.

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

forest connectivity see 'connectivity' above; an area providing those functions 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 floor all organic matter generated by forest vegetation, including litter and unincorporated humus, on the mineral soil surface.

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 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 planning area and within the context of the broader landscape, giving due consideration to the relative values of the various resources in particular areas (36 Code of Federal Regulations 219.1(b)). Consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 United States Code 528–531), the FS manages NFS 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 NFS road.

forest type a category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees (for example, subalpine fir/spruce; lodgepole pine).

fuel management an act or practice of controlling flammability and reducing resistance to control of wildand fuels through mechanical, chemical, biological or manual means, or by fire, in support of land management objectives (from Northern Wildfire Coordinating Group 2013).

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) (from National Wildfire Coordinating Group 2013).

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

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.

G

geographic area (GA) a spatially contiguous land area identified within the planning area. A geographic area may overlap with a management area (36 Code of Federal Regulations 219.19).

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

goals (GO) broad statements of intent, other than desired conditions, usually related to process or interaction with the public. Also see chapter 1.

gradient (stream) the slope of a streambed.

graminoids grasses.

grazing allotment a designated area of land that is available for livestock grazing and is represented on a map. A grazing allotment can include NFS and non-NFS lands. Permits are issued for the use of allotments or portions of allotments. Allotments may be:

- 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 authorizations and reauthorizations grazing permits with term status of ten years or with temporary status of one year. Upon expiration of an existing grazing permit, the permit can be reauthorized provided eligibility and qualification requirements are met. Upon sale of base property or

permitted livestock, a grazing permit with term status may be authorized to the purchaser of base property or permitted livestock as the preferred applicant, provided the eligibility and qualifications requirements are met (36 CFR 222).

grazing permit authorizes livestock to use National Forest System or other lands under Forest Service control for the purpose of livestock production. Term permits are issued for up to 10 years with priority for renewal at the end of the term. On-and-off grazing permits are permits with specific provisions on rangelands only part of which is National Forest System lands or other lands under Forest Service control. Private land grazing permits are permits issued to persons who control grazing lands adjacent to or within national forest proclaimed boundary and who waive exclusive grazing use of these lands to the United States for the full period the permit is to be issued (36 CFR 222). Temporary permits are issued for up to 1 year. Examples include livestock use permits for transportation livestock to persons engaged in commercial packing or dude ranching**.**

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

grazing permit in nonuse status a term that applies to circumstances where a grazing permit holder either does not place any livestock, or at numbers less than 90% of permitted, on an allotment due to personal convenience, resource protection, or range research reasons (FSH 2209.13). Approval for grazing permit nonuse is granted by a Forest Service authorized officer prior to livestock turnout for the specific grazing year.

greenline (riparian) the first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. Most often it occurs at or slightly below the bankfull stage.

Grizzly Bear Conservation Strategy (GBCS) a document published by the U.S. Fish and Wildlife Service that describes the regulatory framework for management of the Northern Continental Dive Ecosystem 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, or obtain anthropogenic foods or attractants or agricultural crops.

grizzly bear management zone 1 (zone 1) an area surrounding the grizzly bear primary conservation area in the NCDE where the intent is to maintain occupancy by grizzly bears but at expected lower densities than inside the primary conservation area.

grizzly bear management zone 2 (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.

grizzly bear management zone 3 (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 is on conflict response.

ground-based logging system a log skidding method using tracked or wheeled tractors. These tractors or "skidders" typically operate on gentle slopes (for example, on slopes less than 40%). Steeper slopes may require cable logging systems.

ground cover the material on the soil surface that impedes raindrop impact and overland flow of water. Ground cover consists of all living and dead herbaceous and woody material in contact with the ground and all rocks greater than 0.75 inches in diameter.

ground fire term used to describe organic material, such as duff, organic soils, roots, and rotten buried logs, burning beneath the surface. (from National Wildfire Coordinating Group 2013).

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 NFS lands that involves a group of 75 or more people, either as participants or spectators (36 Code of Federal Regulations 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 NFS lands (36 Code of Federal Regulations 251.51).

guideline (GDL) a constraint on project and activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met. Also see chapter 1.

H

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 NF, habitat types are based upon Pfister et al. 1977. Also see potential vegetation type.

habituated (bear) a bear that does not display avoidance behavior near humans or in human use areas (e.g., campgrounds, lodges, town sites, cabin or dwelling yards, within 100m of open roads, etc.), as a result of repeated exposure to those circumstances.

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.

head month (HM) one month's use and occupancy of the range by one animal, e.g. one weaned or adult cow with or without calf, bull, steer, heifer, horse, mule or 5 sheep or goats.

Healthy Forests Restoration Act public law (108-148), passed in December 2003, which provides statutory processes for hazardous fuel reduction projects on certain types of at-risk NFS 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 (from Northern Rockies Lynx Management Direction 2007).

heterogeneity exhibiting dissimilarity among members of a group (Helms 1998).

high-use areas areas that receive high levels of visitor use such as trailheads, developed campgrounds, etc.

high value resources includes things such as but not limited to; communities, watersheds, infrastructure, ecosystem functions, air quality, rangeland values, recreation, timber, and wildlife - as identified through a wildfire risk assessment.

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

historic climax 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 variation 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 variation 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. Also see 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.

hydrologic unit code (HUC) the United States is divided and sub-divided into successively smaller hydrologic units (watersheds) which are classified into six levels: regions (HUC 1), sub-regions (HUC 2), basin (HUC 3), subbasin (HUC 4), watershed (HUC 5), subwatersheds (HUC 6). The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units). Each hydrologic unit is identified by a unique hydrologic unit code consisting of two to twelve digits based on the levels of classification in the hydrologic unit system.

I

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

integrated pest management a broad-based approach that includes several techniques, including physical, chemical, biological, and cultural control for long-term and economic control of invasive species.

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 (from National Wildfire Coordinating Group 2013).

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 USFWS about the impacts of the activity on the species (50 CFR 402).

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.

introduction as a result of human activity, the intentional or unintentional escape, release, dissemination, or placement of an organism into an ecosystem to which it is not native (EO 13751).

invasive plant management activities methods and practices designed to locate, monitor, prevent and reduce invasive species infestations and introductions. These include prevention, survey, inventory, treatment, and monitoring activities.

invasive species with regard to a particular ecosystem, a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health (EO 13751).

K

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 planning area.

key seasonal habitats habitats that provide specific characteristics (e.g., hiding or thermal cover, forage, lack of snow, lack of disturbance, etc.) that are required for an animal's survival or other life history needs during specific seasons. Key seasonal habitats provide components that may be limiting to survival or reproduction, that may not be available in other parts of an individual or population's range at that time of year, and that may be needed for specific activities (such as breeding, calving, nesting, or others) occurring seasonally.

L

laccolith a sheet intrusion (or concordant pluton) that has been injected between two layers if sedimentary rocks. The pressure of the magma is high enough that the overlying strata's are forced upwards forming a dome shape rock formation.

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 Code of Federal Regulations 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.

lands special uses authorization to occupancy and use NFS lands by private individuals or companies for a wide variety of uses such as roads, utility corridors, communications sites, and other private or commercial uses that cannot be reasonably accommodated on non-NFS lands. Activities and facilities authorized through a legal document such as a permit, lease or easement. Lands special uses are nonrecreation types of uses. A list of the allowable uses which can be authorized under a special use authorization is found in the Special Uses Handbook 2709.11, Section 19, Exhibit 02.

large-tree structure is defined using the following minimum criteria:

- warm dry potential vegetation type: “Large” includes areas with at least 5 trees per acre of trees greater than or equal to 15” diameter. “Very large” includes areas with at least 4 trees per acre greater than or equal to 20” diameter.
- cool moist potential vegetation type: “Large” includes areas with at least 10 trees per acre of trees greater than or equal to 15” diameter. “Very large” includes areas with at least 10 trees per acre greater than or equal to 20” diameter.
- cold potential vegetation type: “Large” includes areas with at least 8 trees per acre of trees greater than or equal to 15” diameter. “Very large” includes areas with at least 8 trees per acre greater than or equal to 20” diameter.

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 NF, 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 (greater than16 inches diameter breast height).

Lidar a detection system that works on the principle of radar but uses a light from a laser.

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 or genetic connectivity between geographically separate patches of habitat suitable for that species. Linkage areas facilitate movements of an animal (for example, dispersal, breeding season movements, exploratory movements) beyond its home range. Linkage areas may include sizeable areas of nonhabitat and areas influenced by human actions.

livestock domestic animals of any kind kept or raised for use or pleasure. Small livestock refers to animals such as sheep, goats, and llamas.

livestock movement guides defined utilization limits for key species developed at the allotment management plan level that when achieved would trigger the need for livestock to be moved to the next scheduled pasture/area or off of the allotment depending on the authorized management system in place on any respective allotment.

losing stream a stream or river that loses its water as it flows downstream. Water infiltrates into the ground recharging the local groundwater because the groundwater is below the bottom of the stream channel.

lynx habitat boreal forest with gentle rolling topography, dense horizontal cover, deep snow, and moderate to high snowshoe hare densities (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 (from the Canada Lynx Conservation Assessment and Strategy, 3rd Edition).

M

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 Code of Federal Regulations 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 (from Lynx Conservation Assessment Strategy).

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.

MCF/MMCF (thousand cubic feet and million cubic feet, respectively) a specialized unit of measure for the volume lumber. One cubic foot is a unit of true volume that measures 1x1x1 foot.

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 means of transportation 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. 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 Code of Federal Regulations 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 NF, 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 FS 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 nonlethal, 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 C, 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 NFS road or NFS trail that is designated for motorized use on a motor vehicle use map pursuant to 36 Code of Federal Regulations 212.51.

motorized use the designation of roads, trails, and areas that are open to motor vehicle use as specified in Federal Register / Volume 70, Number 216 / Wednesday, November 9, 2005 /36 Code of Federal Regulations Parts 212, 251, 261, Travel Management; Designated Routes and Areas for Motor Vehicle Use; Final Rule.

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 defined by the Multiple-Use Sustained-Yield Act of 1960 (16 United States Code 528–531) as “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).

multiscale analysis an assessment that looks at species and habitat conditions at different scales and takes those conditions into consideration when making a management decision. It can demonstrate project level level consistency with forest plan components.

municipal watershed a watershed that serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act) or as defined in state safe drinking water regulations.

N

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 Tennant Act (50 Stat. 525, 7 United States Code 1010-1012), and other lands, waters or interests therein which are administered by the FS or are designated for administration through the FS 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 disturbance regime the historic patterns (frequency and extent) of natural processes such as fire, insects, wind, and mass movement that affect the ecosystems and landscapes in a particular area.

natural fire regime see definition of "fire regime".

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. Also see historical range of variation. The natural range of variation (or historic range of variation) is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition. The natural range of variation 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.

naturally ignited wildfire see wildfire.

net change (as used for NCDE grizzly bear plan components) 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.

NFS road see road.

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

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

nondiscretionary activities involving the exploration and development of locatable mineral resources, meaning that the Forest Service cannot prohibit reasonably necessary activities required or the exploration, prospecting, or development of valuable mineral deposits.

non-native species with respect to a particular ecosystem, an organism, including its seeds, eggs, spores, or other biological material capable of propagating that species, that occurs outside of its natural range (Executive Order 13751).

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 Grizzly Bear Conservation Strategy encompassing about 27.3 million acres of land in 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 Grizzly Bear Conservation Strategy, 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 strategy. Members of the interagency group may include Montana Fish, Wildlife & Parks; U.S. Fish & Wildlife Service; U.S. National Park Service; U.S. Forest Service; U.S. APHIS Wildlife Services; U.S. Geological Survey; U.S. Bureau of Land Management; the Blackfeet Tribe; and the Confederated Salish and Kootenai Tribes.

noxious weed 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 (MCA 7-22-2101).

O

objective (OBJ) a concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Also see chapter 1.

occupied lynx habitat mapped lynx habitat is considered occupied by lynx when (2006 Amendment to the Canada Lynx Conservation Assessment):

1. there are at least 2 verified lynx observations or records since 1999 on the national forest unless they are verified to be transient individuals; or
2. there is evidence of lynx reproduction on the national forest.

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 Code of Federal Regulations 212.1).

old growth an ecosystem distinguished by old trees and related structural attributes. For the HLC NF, old growth stands are specifically defined as those that meet the definitions in Green et al. 1992 (errata corrected 12/11). Those definitions include the discussion in that document titled "USE OF OLD GROWTH TYPE DESCRIPTIONS" (pages 11 and 12). If that document is revised or replaced by the Northern Region, the updated version will be used. Old growth identification and mapping is dynamic through time to reflect changing conditions on the landscape.

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

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 five inches) created as a result of one even-aged harvest operation (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.

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. Open motorized route density is reported as the percent of a bear management subunit that exceeds 1 mile/mile2 open motorized route density calculated using a moving window analysis. Temporary changes as allowed by specific plan components (e.g., PCA-NCDE-STD-04) refer to changes to the percent of a subunit that exceeds 1 mile/mile2 open motorized route density, calculated using a moving window analysis. Note: Motorized routes closed only by sign or order are considered to be open for purposes of this calculation. See also moving window analysis.

ordinary high water mark the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (US Army Corps of Engineers).

outfitting to rent on, or deliver to, NFS lands for pecuniary remuneration or other gain any saddle or pack animal, vehicle, boat, camping gear, or similar supplies or equipment (36 Code of Federal Regulations 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 Code of Federal Regulations 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 NF.

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

P

Palustrine any inland wetland which lacks flowing water. Wetlands within this category include inland marshes and swamps, as well as bogs, fens and floodplains.

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).

pathway the mechanism and processes by which non-natvie species are moved, intentionally or unintentionally, into a new ecosystem (Executive Order 13751).

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 NFS land or facilities for specified purposes, and which is both revocable and terminable (36 Code of Federal Regulations 251.51).

permit modification the revision of one or more grazing permit terms and conditions made in accordance with 36 Code of Federal Regulations 222.4(a)(7) or (a)(8) (or applicable Code of Federal Regulations as revised).

piscicide a chemical substance which is poisonous to fish.

plan a document, or set of documents, that provides management direction for an administrative unit of the NFS developed under the requirements of the 2012 Planning Rule or a prior planning rule. Also see forest plan.

planning area the NFS lands covered by a forest plan.

planned fire any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and where applicable, National Environmental Policy Act requirements must be met, prior to ignition.

Pleistocene the geological epoch which lasted from about 2,588,000 to 11,700 years ago, spanning the world's recent period of repeated glaciations.

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 and smaller than 8 inches diameter at breast height.

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 (the climax plant community) would be similar within a particular potential vegetation type classification.

Precambrian the largest span of time in Earth's history before the current Phanerozoic Eon. It spans from the formation of Earth about 4.6 billion years ago (Ga) to the beginning of the Cambrian Period, about 541 million years ago (Ma), when hard-shelled creatures first appeared in abundance.

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 (from National Wildfire Coordinating Group 2013).

primary conservation area an area identified in the NCDE Grizzly Bear Conservation Strategy to be managed as a source area for the grizzly bear population where continuous occupancy by grizzly bears would be maintained. Habitat within the primary conservation area would receive the most stringent protection. The primary conservation area is the same area as the NCDE grizzly bear recovery zone identified in the Grizzly Bear Recovery Plan (USFWS, 1993).

productivity the capacity of NFS 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.

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

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 (see administrative use). Activities involving recurring helicopter use (see recurring helicopter use) are also considered to be a project.

projected timber sale quantity 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, the projected timber sale quantity includes volume from timber harvest for any purpose from lands in the planning area based on expected harvests that would be consistent with the plan components. The projected timber sale quantity is also based on the planning unit's fiscal capability and organizational capacity. Projected timber sale quantity 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 the estimated quantity of timber and other wood products that is expected to be sold from the planning area for the plan period. The projected wood sale quantity 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 projected wood sale quantity includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. The projected wood sale quantity is also based on the planning unit's fiscal capability and organizational capacity. Projected wood sale quantity 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 NFS lands identified by location, tasks, outputs, effects, times, and responsibilities for execution (36 Code of Federal Regulations 219.19).

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 USFWS, 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 FS activities, plans, and decisions, and participation in the planning processes which lead to final decision making.

R

rangelands land on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem. If plants are introduced, they are managed similarly. Rangelands include natural grasslands, savannas, shrublands, many deserts, tundra, alpine communities, marshes, and wet meadows (Society for Range Management 1999). Also included in this definition are oak and pinyon-juniper woodlands.

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

range improvements developments and/or activities (treatments) intended to improve rangeland and watershed conditions, enhance wildlife habitat, enhance or improve livestock grazing management or serve similar purposes. There are two kinds of range improvements: nonstructural and structural. Seedings or prescribed burns are examples of nonstructural range improvements. Fences or facilities such as wells or water pipelines are examples of structural improvements.

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.

reasonable assurance a judgment made by the Responsible Official based on the best available scientific information and local professional experience that practices based on existing technology and knowledge are likely to deliver the intended results. Reasonable assurance applies to average and foreseeable conditions for the area and does not constitute a guarantee to achieve the intended results.

recently burned forest a forest area that has burned (via natural or planned ignition) in the last 10 years. These areas contain specific vegetation characteristics including recently burned snags.

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 Code of Federal Regulations 219.19). This definition is for the purposes of the land management planning regulation at 36 Code of Federal Regulations 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 NFS that is ecologically, economically, and socially sustainable for present and future generations. Also see sustainable recreation.

recreation development scale a relative scale of development that is used in Forest Service recreation management and planning to describe the level of development associated with the diverse recreation opportunity spectrum settings within the forest.

> **recreation development scale 1** recreation sites with minimum site modification. Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access not provided or permitted. Development scale 1 recreation sites are most associated with Primitive ROS settings.
>
> **recreation development scale 2** recreation sites with little site modification. Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. Use of synthetic materials avoided. Minimum controls are subtle. Little obvious regimentation. Spacing informal and extended to minimize contacts between users. Motorized access provided or permitted. Primary access over primitive roads. Interpretive services informal. Development scale 2 recreation sites are most associated with semiprimitive ROS settings (both nonmotorized and motorized).
>
> **recreation development scale 3** recreation sites with moderate modification. Facilities about equal for protection of natural site and comfort of users. Contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls usually provided. Roads may be hard surfaced and trails formalized. Development density about three family units per acre. Primary access may be over high standard roads. Interpretive services informal, but generally direct. Development scale 3 recreation sites are most associated with Roaded Natural ROS settings.
>
> **recreation development scale 4** recreation sites that are heavily modified. Some facilities designed strictly for comfort and convenience of users. Luxury facilities not provided. Facility design may incorporate synthetic materials. Extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually obvious. Primary access usually over paved roads. Development density about three to five family units per acre. Plant materials usually native. Interpretive services often formal or structured. Development scale 4 recreation sites are most associated with Rural ROS settings.
>
> **recreation development scale 5** recreation sites with a high degree of site modification. Facilities mostly designed for comfort and convenience of users and usually include flush toilets;

may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials commonly used. Formal walks or surfaced trails. Regimentation of users is obvious. Access usually by high-speed highways. Development density about five or more family units per acre. Plant materials may be foreign to the environment. Formal interpretive services usually available. Designs formalized and architecture may be contemporary. Mowed lawns and clipped shrubs not unusual. Development scale 5 recreation sites are most associated with Urban ROS settings.

recreation event a recreational activity conducted on NFS 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 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** 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 are few, if any facilities or developments. Most of the primitive recreation opportunity spectrum settings coincide with designated wilderness boundaries.
- **semiprimitive nonmotorized** large, semiremote, areas of the forest that provide for backcountry nonmotorized uses. 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.
- **semiprimitive motorized** large, semiremote areas of the forests that provide for motorized backcountry motorized on designated routes or in designated areas. 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 semiprimitive, 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 semiprimitive motorize, semiprimitive nonmotorized and primitive areas.
- **rural** the rural settings represent the developed recreation sites and modified natural settings with higher concentrations of use and increased opportunities for group recreation activities and social interactions. Facilities are designed primarily for user comfort and convenience. The road system is well defined, often paved, and can easily accommodate all forms of transportation. Rural settings often include a combination of private lands intermixed with FS lands.
- **urban** the urban setting is characterized by a substantially developed environment although the background may have natural appearing elements. Highly developed ski areas, visitor centers, interpretive centers, and resorts are examples of an urban setting on National FS lands. Urban areas

offer visitor comfort and convenience and modern building materials, such as concrete and asphalt, are a common occurrence.

recreation setting the social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities. The FS uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. Also see recreation opportunity.

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

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

reference watershed designated watersheds that have been minimally managed and meet the following criteria: no grazing for the past 40 years, low road density, no apparent hard rock mining in the riparian zone, and less than 10% of upstream catchment has been harvested.

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 any removal of trees intended to assist in the regeneration of a new age class or to make regeneration of a new age class possible. Regeneration harvest may be through even-aged or uneven-aged methods.

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

relative return on investment is a means to evaluate the conservation benefits of an invasive plant control project in relation to cost (Murdock et al. 2007).

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

resistance the ability of a community to avoid alteration of its present state by a disturbance (Helms 1998).

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.

restocked the condition of the growing space occupancy of trees to be achieved after a disturbance that has substantially altered the existing stocking (see “stocking”).

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 Code of Federal Regulations 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 management zone (RMZs) are portions of watersheds where riparian-associated resources receive primary emphasis, and management activities are subject to specific plan components including standards and guidelines. RMZs include traditional riparian corridors, wetlands, intermittent streams, and other areas that maintain the integrity of aquatic ecosystems.
RMZs shall be delineated on the ground based on site conditions as follows:

- **Category 1** fish-bearing streams: RMZs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.
- **Category 2** permanently flowing nonfish bearing streams: RMZs consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.
- **Category 3** *constructed ponds and reservoirs, and wetlands greater than 1 acre* – RMZs consist of the body of water or wetland and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.
  lakes and natural ponds - RMZs consist of the body of water and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance, whichever is greatest.
- **Category 4** *seasonally flowing or intermittent streams, wetlands, seeps and springs less than 1 acre, and unstable and potentially unstable areas* - This category applies to features with high variability in size and site-specific characteristics. At a minimum, the RMZs should include:
  - The extent of unstable and potentially unstable areas (including earthflows).
  - The stream channel and extend to the top of the inner gorge.
  - The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation, extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. A site-potential tree height is the average maximum height of the tallest dominant trees for a given site class.
  - Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are

sometimes referred to as ephemeral streams if they meet these two physical criteria. Fish-bearing intermittent streams are distinguished from nonfish-bearing intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the guidelines for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.

In order to achieve watershed desired conditions, the RMZ is broken into two areas called the inner and outer RMZs. Some activities are prohibited or restricted in the inner RMZ, whereas more active management is allowed in the outer RMZ. RMZs are not intended to be "no touch zones," but rather "carefully managed zones" with an increase in protections in close proximity to water resources.

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 Code of Federal Regulations 212.1, FS Manual 7705):

- decommissioned: the stabilization and restoration of an unneeded road to a more natural state (36 Code of Federal Regulations 212.1).
- forest road or trail: a route wholly or partly within or adjacent to and serving the NFS that is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources (36 Code of Federal Regulations 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).
- 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 (FS 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.

- NFS: 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 Code of Federal Regulations 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 Code of Federal Regulations 212.1. In the Northern Continental Divide Ecosystem primary conservation area, temporary roads will meet the definition of impassable when no longer needed.

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.

S

salvage harvest the removal of dead trees or trees being damaged or dying due to injurious agents other than competition, to recover value that would otherwise be lost and/or to meet other resource objectives.

sanitation cutting removal of trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and disease.

sapling 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.

savanna a lowland grassland with a wide scattering of trees (generally 5-10% canopy cover) that typically occurs on the driest habitats in the Warm Dry broad potential vegetation type, where the dominance of grasses and shrubs would historically be maintained by frequent fire.

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: landscapes where the valued landscape character “is” intact with minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level. These landscapes generally provide for ecological change only.

- high: landscapes in which the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such a scale that they are not evident. Management activities do not dominate the landscape.
- moderate: landscapes in which the valued landscape character "appears slightly altered". Noticeable deviations must remain visually subordinate to the landscape character being viewed. Management activities are subordinate to the attributes described within the described scenic character of the area.
- low: landscapes in which the valued landscape character "appears altered". Deviations begin to dominate the landscape character being viewed but borrow valued attributes such as size, shape, edge effect and pattern of natural openings vegetation type changes or architectural styles outside of the landscape being viewed. Management activities are visible and sometimes dominant features on the landscape.
- very low: landscape where the valued landscape character "appears heavily altered". Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as sized, shape, edge effect and pattern of natural opening, vegetative type changes or architectural styles within or outside of the landscape being viewed. Management activities are visible and dominate the views of the overall landscape.

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 500 meters or more from (1) a route open to public wheeled motorized use during the grizzly bear nondenning season, (2) a gated route, or (3) a route closed only with a sign 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-snow motorized routes/areas, and nonmotorized trails are allowed within secure core, unless otherwise restricted (e.g., by other national forest plan direction). Secure core is reported as the percent of a bear management subunit meeting this definition, as calculated using a moving windows analysis. Temporary changes as allowed by specific plan components (e.g., PCA-NCDE-STD-04) refer to changes to the percent of a subunit meeting this definition, as calculated using a moving windows analysis.

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.

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.

sensitive soils riparian and hydric soils, mollic soils, ash and loess influenced soils, soils developed in igneous intrusive rocks, shallow soils, and landslide prone areas.

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 Code of Federal Regulations 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.

Source Water Protection Area (SWPA) the area delineated by the state for a public water system (PWS) or including numerous PWSs, whether the source is ground water or surface water or both, as part of the state SWPA approved by EPA under section 1453 of the Safe Drinking Water Act.

species of conservation concern (SCC) a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the planning 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 planning area (36 Code of Federal Regulations 219.9(c)).

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.

standard (STD) a mandatory constraint on project and activity decision making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. Also see chapter 1.

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) (Northern Rockies Lynx Management Direction).

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

storm proofing measures taken to reduce the risk or amount of damage to roads from major storms.

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. Also see stand initiation structural stage, stem exclusion structural stage, and understory reinitiation structural stage.

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. Also see forest structure.

stubble height the measure or height (in centimeters or inches) of herbage left ungrazed at any given time (FSTR 1743-3 1999).

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

subwatershed a 6th level/12 digit hydrologic unit code watershed. They range in size from 10,000 to 40,000 acres, 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 planning 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 or for some species 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 Code of Federal Regulations 219.19).

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

sustained yield limit the amount of timber, meeting applicable utilization standards, "which can be removed from [a] forest annually in perpetuity on a sustained-yield basis" (National Forest Management Act at section 11, 16 United States Code 1611; 36 Code of Federal Regulations 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 sustained yield limit is not limited by land management plan desired condition, other plan components, or the planning unit's fiscal capability and organizational capacity. The sustained yield limit is not a target but is a limitation on harvest, except when the plan allows for a departure.

system road see road (NFS road).

T

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 Code of Federal Regulations sections 17.11, 17.12, and 223.102.

thrust fault a type of low angle fault, or break in the Earth's crust across which there has been relative movement, in which rocks of lower stratigraphic position are pushed up and over higher strata. They are often recognized because they place older rocks above younger.

timber wood, other than fuelwood, potentially usable for lumber.

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

timber management the growing of, tending to, commercial harvesting of, and regeneration of crops of trees (from Northern Rockies Lynx Management Direction).

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 Code of Federal Regulations 219.19).

total maximum daily load is a pollution budget and includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocated the necessary reductions to one or more pollutant sources (metals, sediment, turbidity, etc.). A total maximum daily load serves as a planning tool and potential starting point for restoration or protection activities with the ultimate goal of attending or maintaining water quality standards.

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. See also moving window analysis. Total motorized route density is reported as the percent of a bear management subunit that exceeds 2 mile/mile2 total motorized route density calculated using a moving window analysis. Temporary changes as allowed by specific plan components (e.g., PCA-NCDE-STD-04) refer to changes to the percent of a subunit that exceeds 2 mile/mile2 total motorized route density, calculated using a moving window analysis.

total soil resource commitment the conversion of a productive site to an essentially nonproductive site (0 to 40 percent of natural productivity) for a period of more than 50 years. Examples include system roads, administrative sites, developed campgrounds, rock quarries, mine sites, livestock watering facilities, and home ignition zones.

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 Code of Federal Regulations 212.1).

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

trailhead an area that provides parking for or access to a singular trail or trails through the forest.

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 NFS lands.

two-aged stand a stand containing two distinctive age classes or cohorts.

U

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 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 (from Lynx Conservation and Assessment Strategy).

uneven aged stand a stand of trees of three or more distinct age classes, either intimately mixed or in groups.

uneven aged system a planned sequence of treatments designed to regenerate or maintain a timber stand with three or more age classes. Treatments include single-tree, selection, and group selection regeneration methods.

untrammeled 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 and/or limited ecological sites ecological sites (or their equivalent) that are limited in size/area and/or distribution.

utilization standards utilization standards are specifications for merchantable forest products offered in a timber sale.

V

values at risk the elements of a community or natural area considered valuable by an individual or community that could be negatively impacted by a wildfire or wildfire operations. These values can vary by community and can include diverse characteristics such as homes, specific structures, water supply, power grids, natural and cultural resources, community infrastructure, and other economic, environmental, and social values.

vegetation management a management activity that changes the composition and structure of vegetation to meet specific objectives that may be done with a variety of implementation methods (such as by hand or with machinery), including but not limited to activities such as prescribed fire, timber harvest, tree planting, noncommercial stand tending, or re-arrangement and/or removal of hazardous fuels. 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.

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 Code of Federal Regulations 219.19).

viewshed the visible portion of the landscape seen from viewpoints. Viewpoints can include residences, recreational facilities, and travelways.

W

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.

watershed condition framework a comprehensive approach for proactively implementing integrated restoration on priority watersheds on national forests and grasslands.

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 United States Code 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 United States Code 1131–1136).

wilderness character a measure that reflects the nature of wilderness being untrammeled, undeveloped, natural, and having outstanding opportunities for solitude or a primitive and unconfined type of recreation.

- **untrammeled** unhindered and free from modern human control or manipulation.
- **natural** wilderness ecological systems are substantially free from the effects of modern civilization.
- **undeveloped** an area retaining its primeval character and influence, without permanent improvements or human habitation.
- **solitude or a primitive unconfined type of recreation** recreation opportunities where people can experience wilderness without signs of moderan civilization, recreation facilities, and/or management restrictions on visitor behavior.

wildfire unplanned ignition of a wildland fire or an escaped prescribed fire. Wildfire includes unplanned fires that are human-caused and those that are naturally-ignited by lightning.

wildland fire any nonstructure fire that occurs in the wildland. There are two types of wildland fire: unplanned (natural or human-caused ignitions) and planned (prescribed fire).

wildland-urban interface 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 ½ -mile from the boundary of an at-risk community;

(ii) an area within 1½ 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.

wildlife security the protection inherent in any situation that allows animals to remain in a defined area despite an increase in stress or disturbance associated with human activities.

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 specific period of winter. In the Rocky Mountains, winter range areas tend to have a relatively low amount of snow cover.

X

xeric (of an environment or habitat) containing little moisture; very dry.

xeric ecotone the zone of transition between nonforested grass/shrub communities and forested communities, and may often blend with savannas. This zone is found on dry potential vegetation types and shifts in location and condition based on climate influences, successional processes, and disturbance processes. See also “ecotone.”

Y

yarding the operation of hauling timber from the stump to a collecting point.

Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Helena-Lewis and Clark National Forest | R1-20-16 | October 2021

2021 Land Management Plan, Appendices

Helena - Lewis and Clark National Forest

Appendices

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Appendix A. Maps

The maps included in this appendix are maps associated with the preferred alternative (alternative F) from the FEIS. The maps for all the other alternatives analyzed during the environmental analysis are included in appendix A of the FEIS.

Forestwide maps are displayed first, followed by the geographic areas. Each set of geographic area maps includes a land ownership map. This map displays topographic features, roads, and other reference points that are not displayed on the rest of the maps.

Map Name	Map Number
Forestwide Maps	
Montana State 2018 305(b) 303(d) Streams	FW-1
Eligible Wild and Scenic Rivers	FW-2
Grizzly Bear Management Zones	FW-3
Lynx Occupied/Unoccupied and Critical Habitat	FW-4
Recommended Wilderness Areas	FW-5
Geographic Area Maps	
Big Belts GA Maps	
Land Ownership	BB-1
Watersheds	BB-2
Lynx Analysis Units and Potential Habitat	BB-3
Desired Recreation Opportunity Spectrum	BB-4
Desired Winter Recreation Opportunity Spectrum	BB-5
Scenic Integrity Objectives	BB-6
Designated and Emphasis Areas	BB-7
Designated Areas and Desired Recreation Opportunity Spectrum	BB-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	BB-9
Inventoried Roadless Areas	BB-10
Range Allotments	BB-11
Lands Where Harvest Could Occur	BB12
Castles GA Maps	
Land Ownership	CA-1
Watersheds	CA-2
Lynx Analysis Units and Potential Habitat	CA-3
Desired Recreation Opportunity Spectrum	CA-4
Desired Winter Recreation Opportunity Spectrum	CA-5
Scenic Integrity Objectives	CA-6
Inventoried Roadless Areas	CA-7
Range Allotments	CA-8
Lands Where Harvest Could Occur	CA-9
Crazies GA Maps	
Land Ownership	CR-1
Watersheds	CR-2

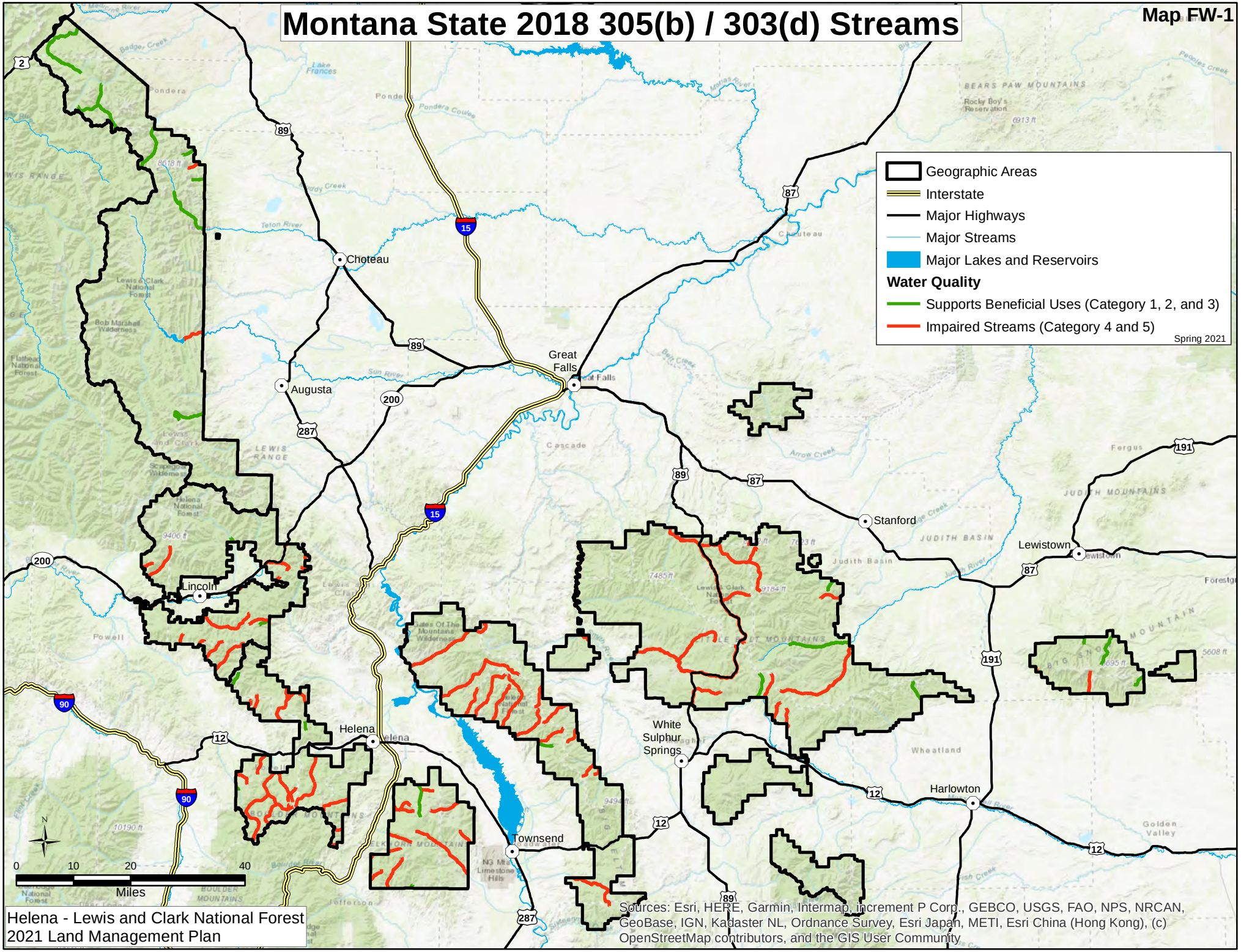
Map Name	Map Number
Lynx Analysis Units and Potential Habitat	CA-3
Desired Recreation Opportunity Spectrum	CR-4
Desired Winter Recreation Opportunity Spectrum	CR-5
Scenic Integrity Objectives	CR-6
Inventoried Roadless Areas	CR-7
Range Allotments	CR-8
Lands Where Harvest Could Occur	CR-9
Divide GA Maps	
Land Ownership	D-1
Watersheds	D-2
Lynx Analysis Units and Potential Habitat	D-3
Desired Recreation Opportunity Spectrum	D-4
Desired Winter Recreation Opportunity Spectrum	D-5
Scenic Integrity Objectives	D-6
Designated and Emphasis Areas	D-7
Designated Areas and Desired Recreation Opportunity Spectrum	D-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	D-9
Inventoried Roadless Areas	D-10
Range Allotments	D-11
Lands Where Harvest Could Occur	D-12
Elkhorns GA Maps (these maps also reflect the Elkhorns Wildlife Management Unit)	
Land Ownership	E-1
Watersheds	E-2
Lynx Analysis Units and Potential Habitat	E-3
Desired Recreation Opportunity Spectrum	E-4
Desired Winter Recreation Opportunity Spectrum	E-5
Scenic Integrity Objectives	E-6
Designated Areas	E-7
Designated Areas and Desired Recreation Opportunity Spectrum	E-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	E-9
Inventoried Roadless Areas	E-10
Range Allotments	E-11
Lands Where Harvest Could Occur	E-12
Highwoods GA Maps	
Land Ownership	H-1
Watersheds	H-2
Lynx Analysis Units and Potential Habitat	H-3
Desired Recreation Opportunity Spectrum	H-4
Desired Winter Recreation Opportunity Spectrum	H-5
Scenic Integrity Objectives	H-6
Inventoried Roadless Areas	H-7
Range Allotments	H-8

Map Name	Map Number
Lands Where Harvest Could Occur	H-9
Little Belts GA Maps	
Land Ownership	LB-1
Watersheds	LB-2
Lynx Analysis Units and Potential Habitat	LB-3
Desired Recreation Opportunity Spectrum	LB-4
Desired Winter Recreation Opportunity Spectrum	LB-5
Scenic Integrity Objectives	LB-6
Designated and Emphasis Areas	LB-7
Designated Areas and Desired Recreation Opportunity Spectrum	LB-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	LB-9
Inventoried Roadless Areas	LB-10
Range Allotments	LB-11
Lands Where Harvest Could Occur	LB-12
Rocky Mountain Range GA Maps	
Land Ownership	RM-1
Watersheds	RM-2
Lynx Analysis Units and Potential Habitat	RM-3
Desired Recreation Opportunity Spectrum	RM-4
Desired Winter Recreation Opportunity Spectrum	RM-5
Scenic Integrity Objectives	RM-6
Designated and Emphasis Areas	RM-7
Designated Areas and Desired Recreation Opportunity Spectrum	RM-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	RM-9
Inventoried Roadless Areas	RM-10
Range Allotments	RM-11
Lands Where Harvest Could Occur	RM-12
Snowies GA Maps	
Land Ownership	S-1
Watersheds	S-2
Lynx Analysis Units and Potential Habitat	S-3
Desired Recreation Opportunity Spectrum	S-4
Desired Winter Recreation Opportunity Spectrum	S-5
Scenic Integrity Objectives	S-6
Designated and Emphasis Areas	S-7
Designated Areas and Desired Recreation Opportunity Spectrum	S-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	S-9
Inventoried Roadless Areas	S-10
Range Allotments	S-11
Lands Where Harvest Could Occur	S-12
Upper Blackfoot GA Maps	
Land Ownership	UB-1

Map Name	Map Number
Watersheds	UB-2
Lynx Analysis Units and Potential Habitat	UB-3
Desired Recreation Opportunity Spectrum	UB-4
Desired Winter Recreation Opportunity Spectrum	UB-5
Scenic Integrity Objectives	UB-6
Designated Areas	UB-7
Designated Areas and Desired Recreation Opportunity Spectrum	UB-8
Designated Areas and Desired Winter Recreation Opportunity Spectrum	UB-9
Inventoried Roadless Areas	UB-10
Range Allotments	UB-11
Lands Where Harvest Could Occur	UB-12

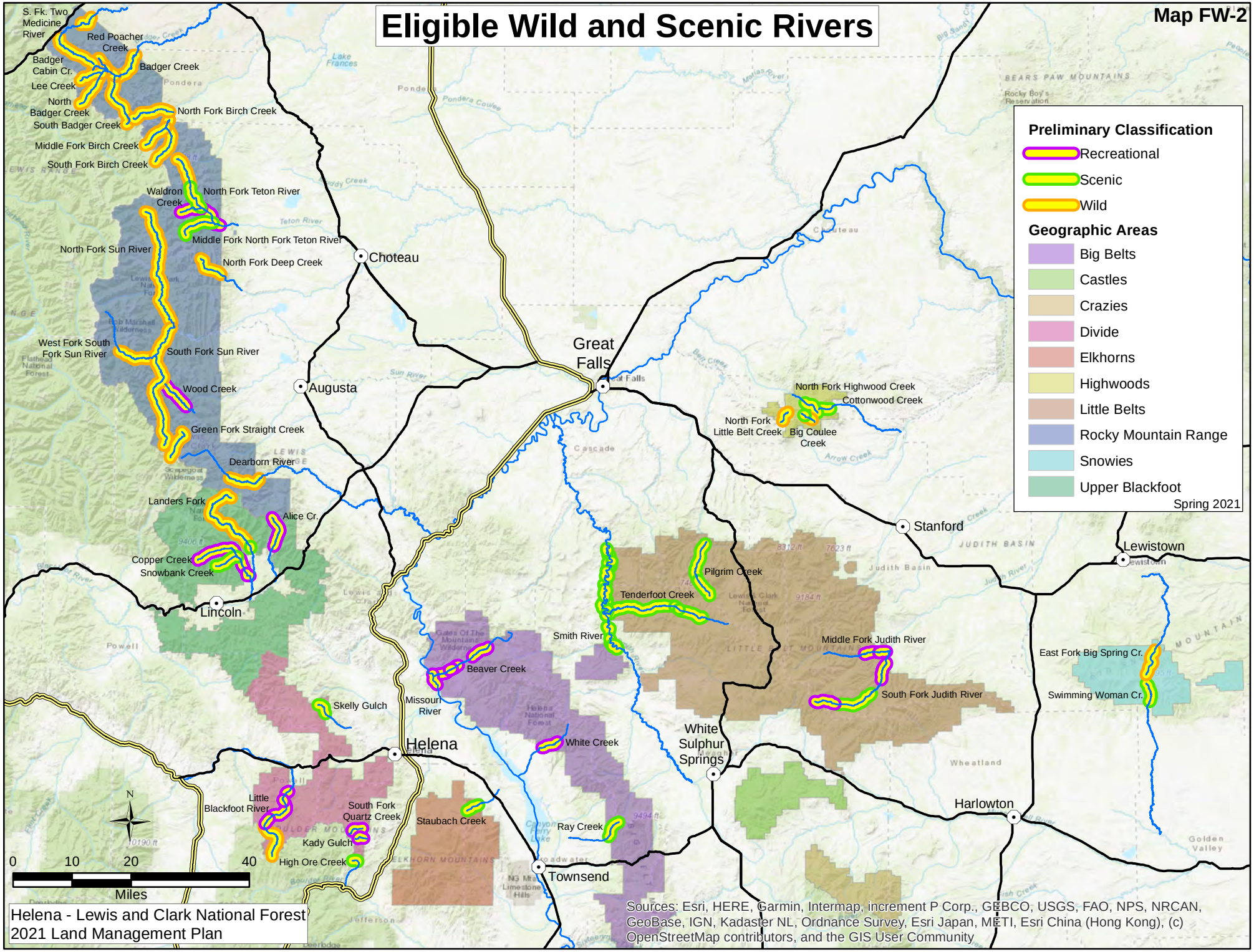
Montana State 2018 305(b) / 303(d) Streams

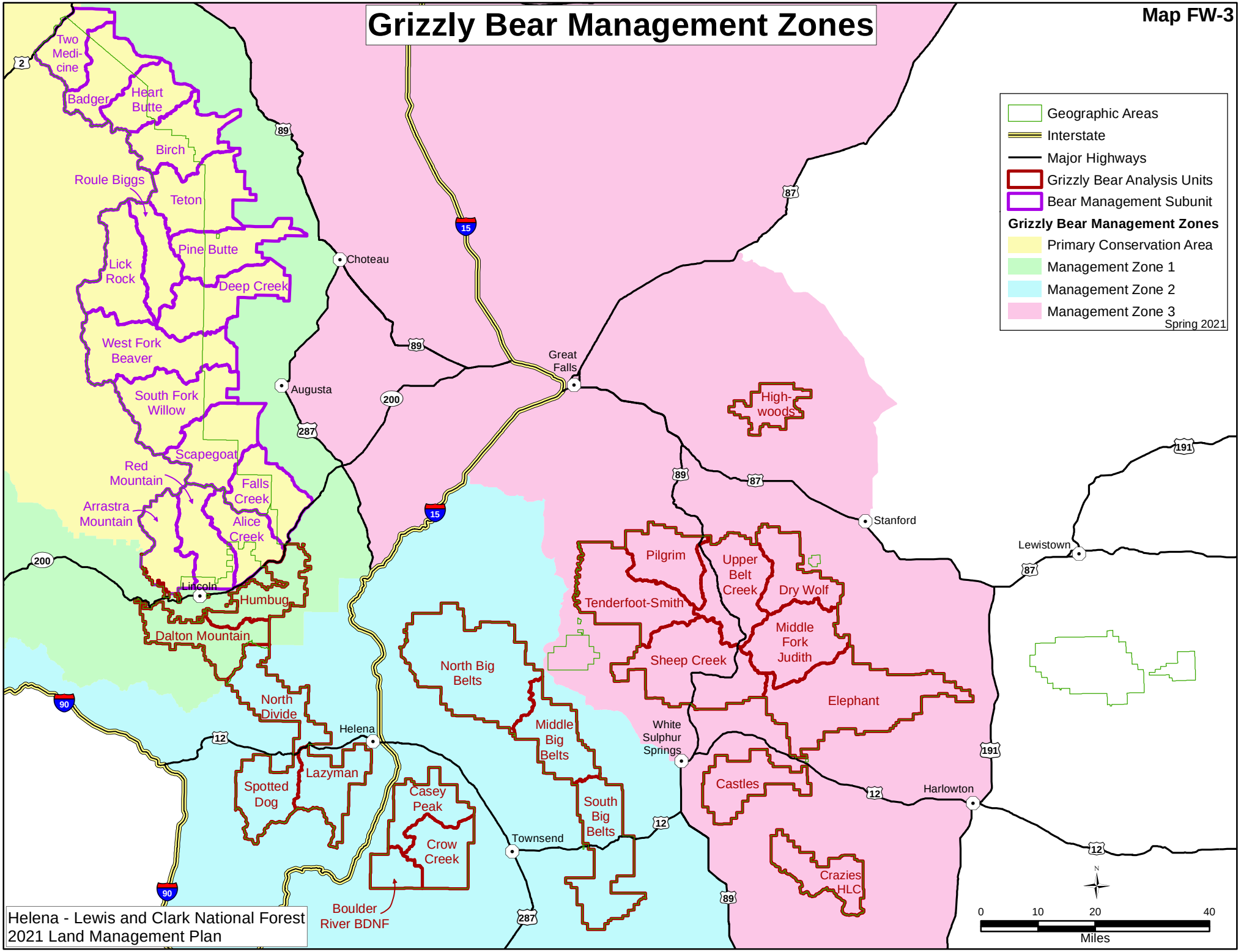
Map FW-1



Eligible Wild and Scenic Rivers

Map FW-2




Grizzly Bear Management Zones
Map FW-3
Two Medi-cine
Badger
Heart Butte
Birch
Roule Biggs
Teton
Pine Butte
Lick Rock
Deep Creek
West Fork Beaver
South Fork Willow
Scapegoat
Red Mountain
Arrastra Mountain
Falls Creek
Alice Creek
Humbug
Dalton Mountain
North Divide
Spotted Dog
Lazyman
Casey Peak
Crow Creek
Boulder River BDNF
North Big Belts
Middle Big Belts
South Big Belts
Townsend
Helena
Lincoln
Augusta
Choteau
Great Falls
Stanford
Lewistown
Harlowton
White Sulphur Springs
High-woods
Pilgrim
Upper Belt Creek
Dry Wolf
Tenderfoot-Smith
Middle Fork Judith
Sheep Creek
Elephant
Castles
Crazies HLC
Geographic Areas
Interstate
Major Highways
Grizzly Bear Analysis Units
Bear Management Subunit
Grizzly Bear Management Zones
Primary Conservation Area
Management Zone 1
Management Zone 2
Management Zone 3
Spring 2021
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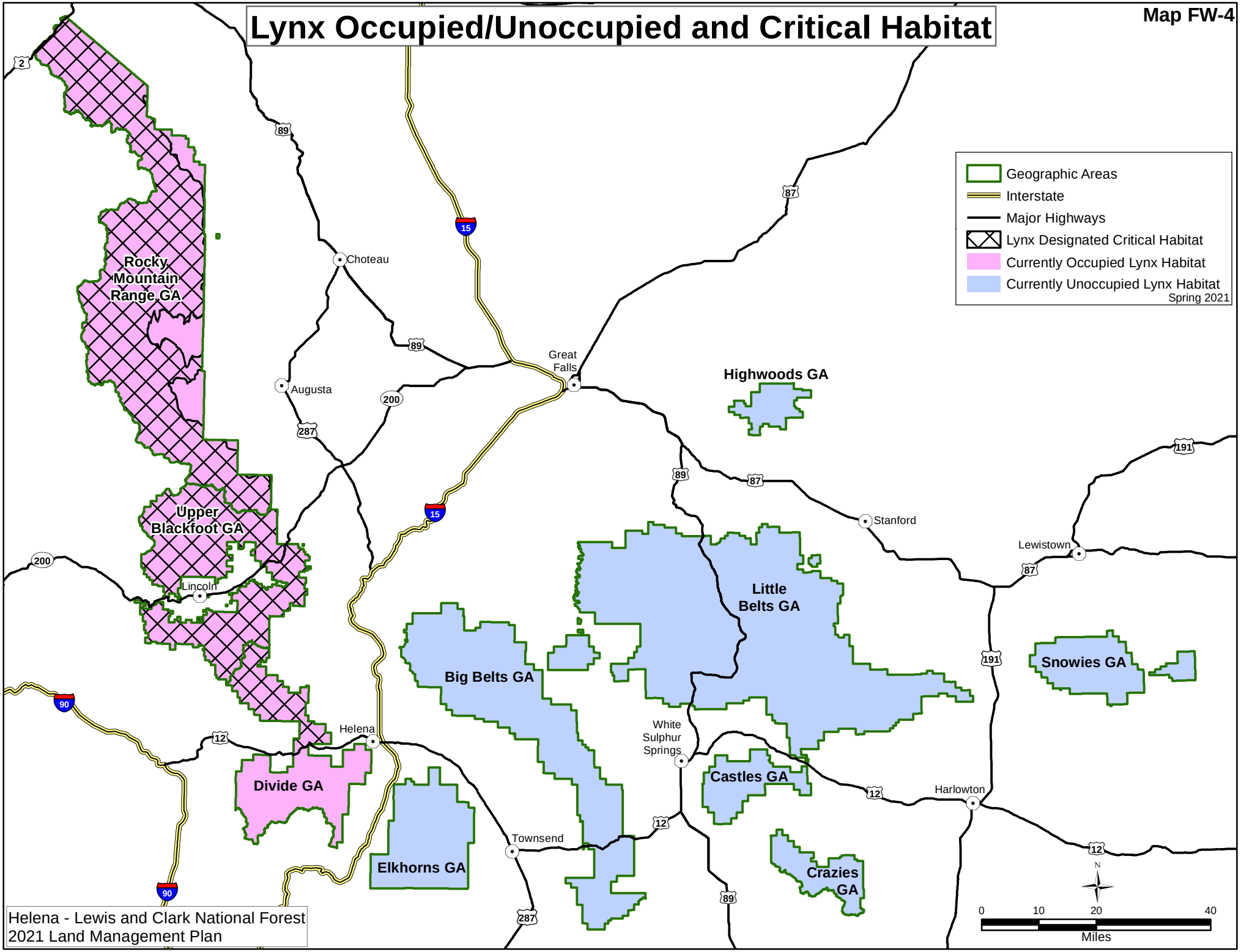
0 10 20 40
Miles

Lynx Occupied/Unoccupied and Critical Habitat

Map FW-4



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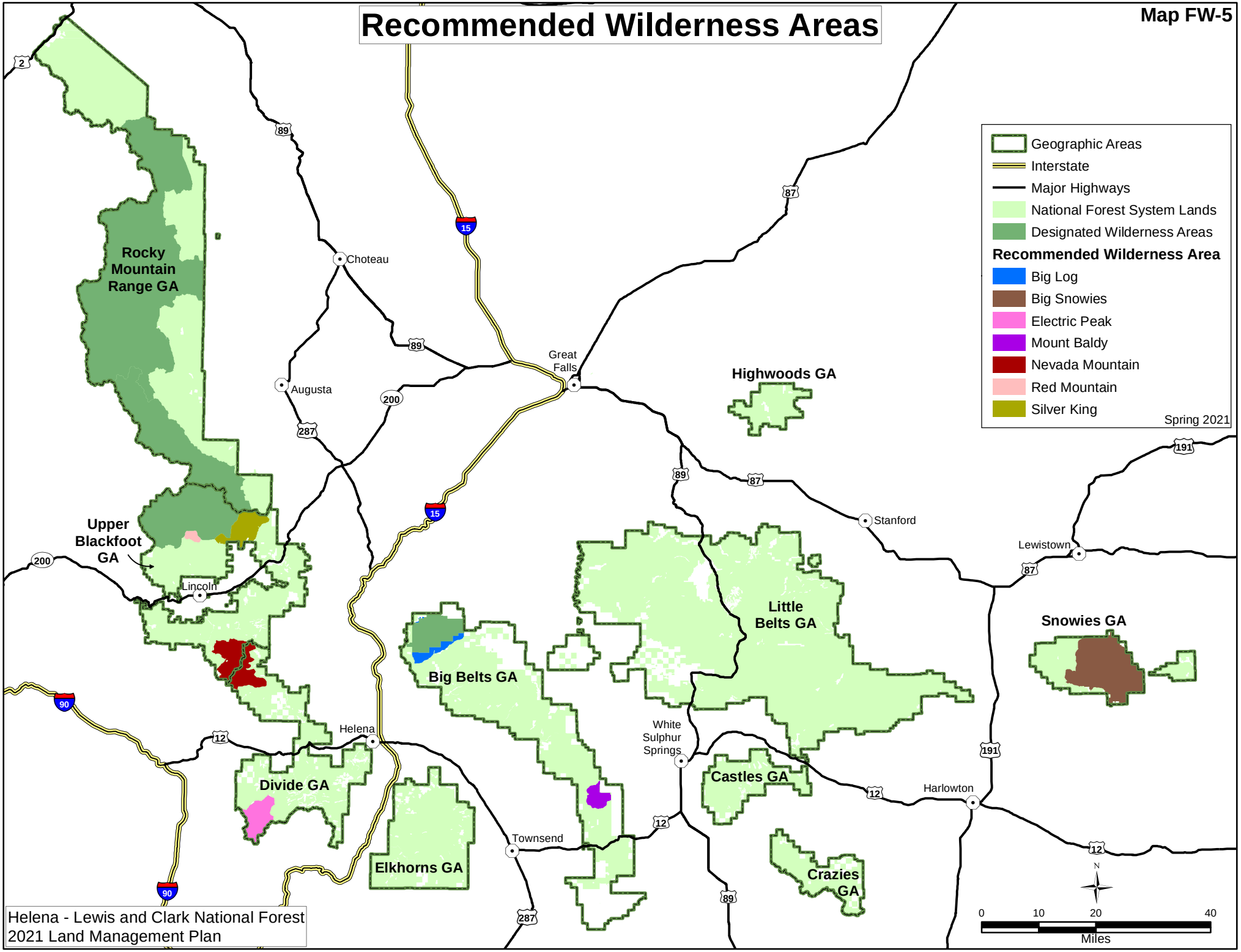
Recommended Wilderness Areas
Map FW-5
Geographic Areas
Interstate
Major Highways
National Forest System Lands
Designated Wilderness Areas
Recommended Wilderness Area
Big Log
Big Snowies
Electric Peak
Mount Baldy
Nevada Mountain
Red Mountain
Silver King
Spring 2021
Rocky Mountain Range GA
Upper Blackfoot GA
Highwoods GA
Little Belts GA
Big Belts GA
Snowies GA
Castles GA
Crazies GA
Elkhorns GA
Divide GA
Choteau
Augusta
Great Falls
Stanford
Lewistown
Lincoln
Helena
White Sulphur Springs
Harlowton
Townsend
0 10 20 40
Miles
Helena - Lewis and Clark National Forest
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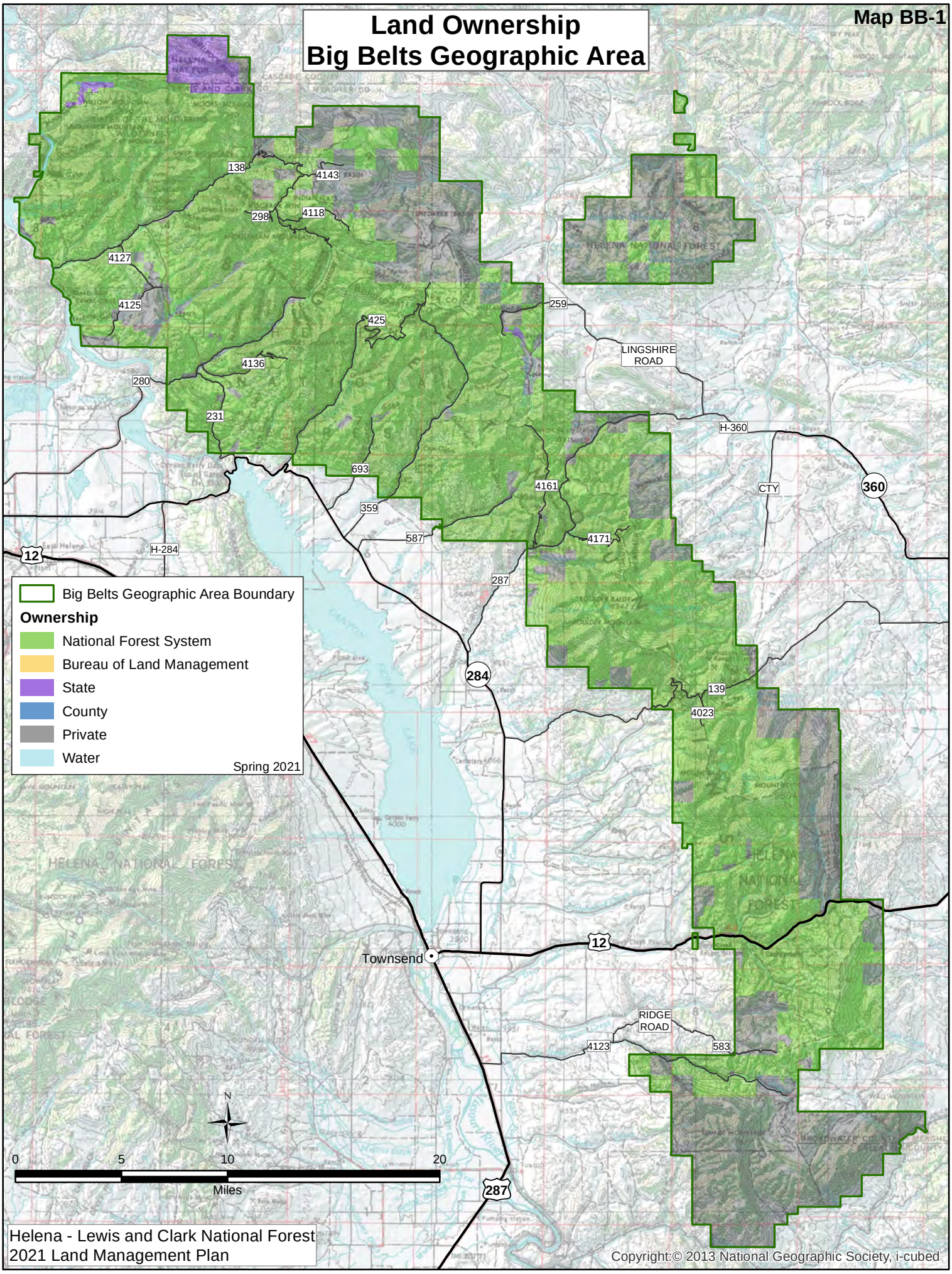
Land Ownership
Big Belts Geographic Area
Map BB-1
Big Belts Geographic Area Boundary
Ownership
National Forest System
Bureau of Land Management
State
County
Private
Water
Spring 2021
HELENA NATIONAL FOREST
LINGSHIRE ROAD
RIDGE ROAD
Townsend
H-284
H-360
CTY
138
4143
298
4118
4127
4125
425
259
4136
280
231
693
4161
359
587
4171
287
139
4023
4123
583
12
284
360
N
0
5
10
20
Miles
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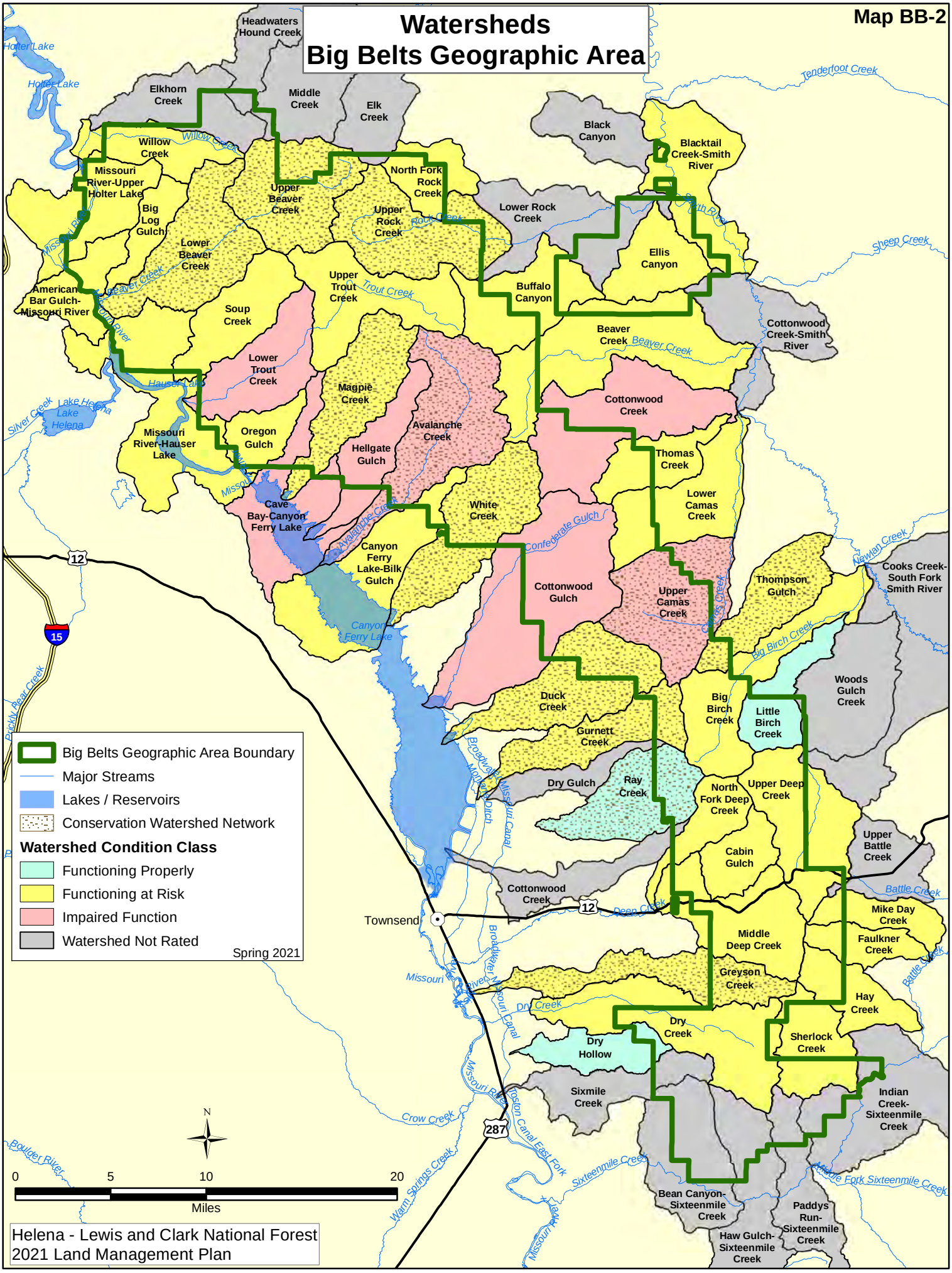
Watersheds
Big Belts Geographic Area
Map BB-2
Headwaters Hound Creek
Holter Lake
Elkhorn Creek
Middle Creek
Elk Creek
Willow Creek
Missouri River-Upper Holter Lake
Big Log Gulch
Lower Beaver Creek
Upper Beaver Creek
North Fork Rock Creek
Upper Rock Creek
Rock Creek
Lower Rock Creek
Black Canyon
Blacktail Creek-Smith River
Tenderfoot Creek
Sheep Creek
Ellis Canyon
Buffalo Canyon
Beaver Creek
Cottonwood Creek-Smith River
American Bar Gulch-Missouri River
Soup Creek
Upper Trout Creek
Trout Creek
Lower Trout Creek
Magpie Creek
Avalanche Creek
Hellgate Gulch
Oregon Gulch
Missouri River-Hauser Lake
Lake Helena
Silver Creek
Cave Bay-Canyon Ferry Lake
White Creek
Cottonwood Creek
Thomas Creek
Lower Camas Creek
Confederate Gulch
Canyon Ferry Lake-Bilk Gulch
Cottonwood Gulch
Upper Camas Creek
Thompson Gulch
Newlan Creek
Cooks Creek-South Fork Smith River
Big Birch Creek
Woods Gulch Creek
Duck Creek
Gurnett Creek
Big Birch Creek
Little Birch Creek
Dry Gulch
Ray Creek
North Fork Deep Creek
Upper Deep Creek
Cabin Gulch
Upper Battle Creek
Battle Creek
Mike Day Creek
Faulkner Creek
Middle Deep Creek
Greyson Creek
Hay Creek
Dry Creek
Dry Hollow
Sherlock Creek
Sixmile Creek
Indian Creek-Sixteenmile Creek
Middle Fork Sixteenmile Creek
Bean Canyon-Sixteenmile Creek
Paddys Run-Sixteenmile Creek
Haw Gulch-Sixteenmile Creek
Sixteenmile Creek
Townsend
Missouri River
Broadwater Missouri Canal
Toston Canal East Fork
Crow Creek
Warm Springs Creek
Boulder River
Deep Creek
12
15
287
Big Belts Geographic Area Boundary
Major Streams
Lakes / Reservoirs
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Impaired Function
Watershed Not Rated
Spring 2021
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
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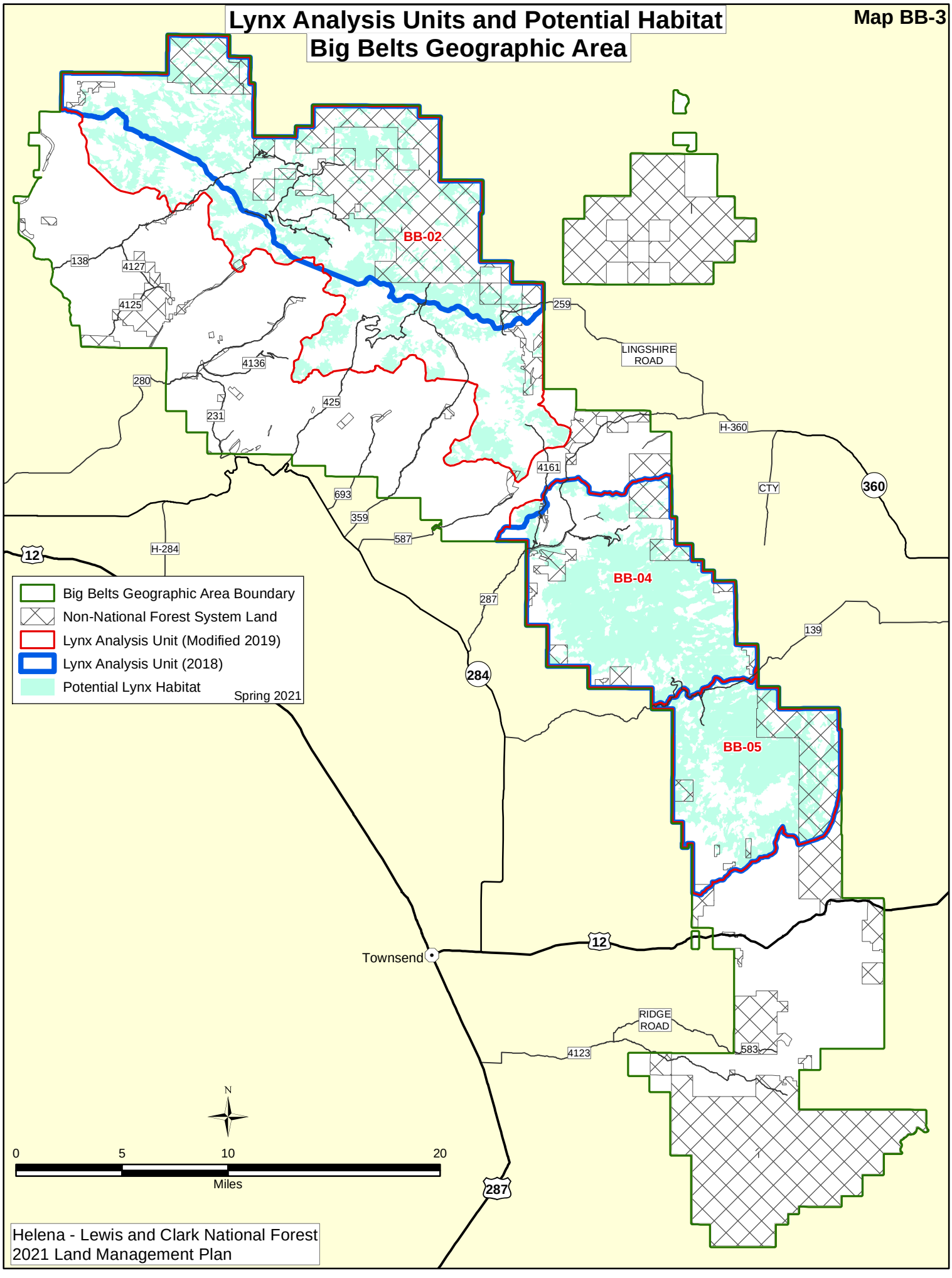
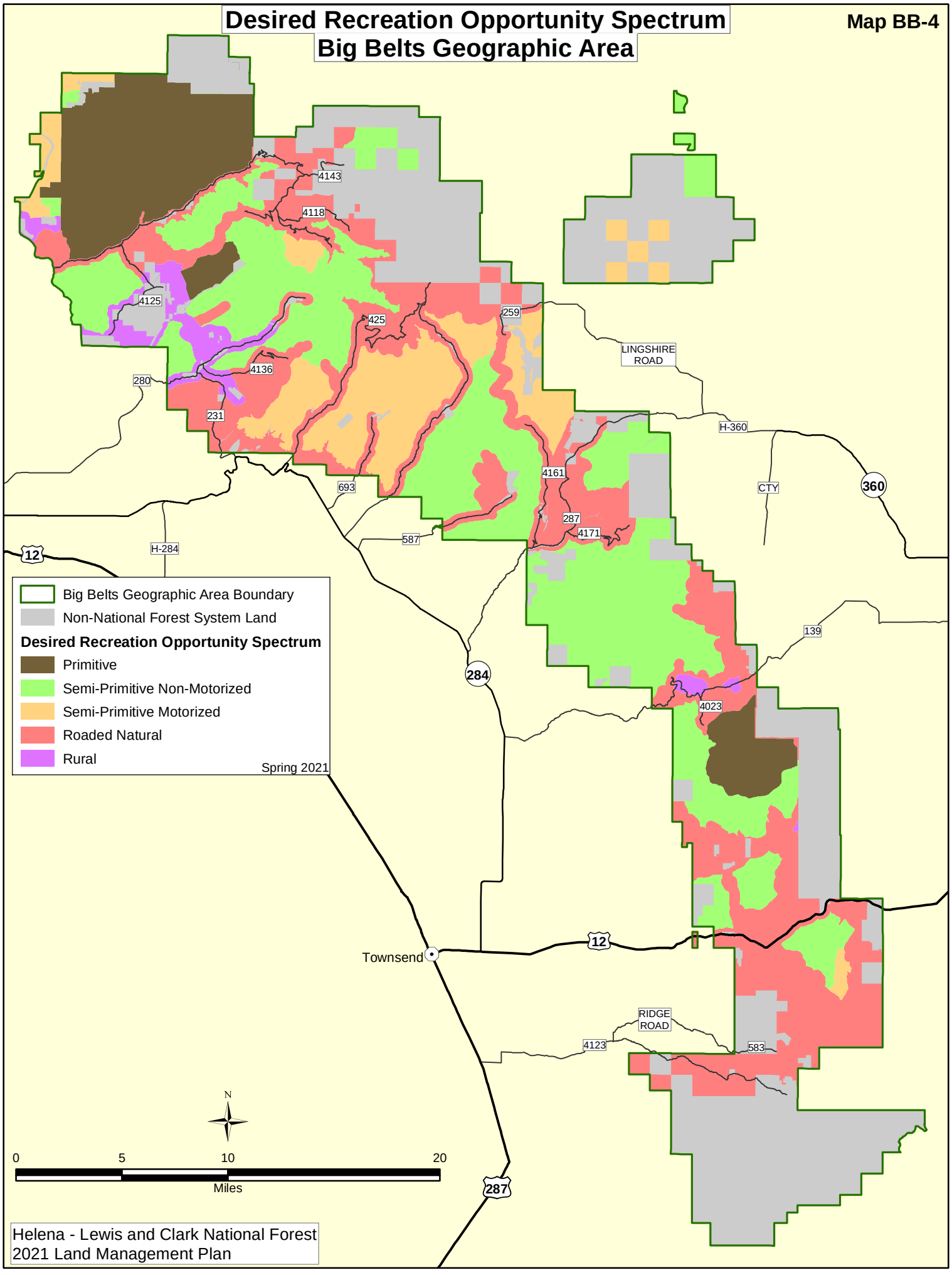

Lynx Analysis Units and Potential Habitat
Big Belts Geographic Area
Map BB-3
BB-02
BB-04
BB-05
Big Belts Geographic Area Boundary
Non-National Forest System Land
Lynx Analysis Unit (Modified 2019)
Lynx Analysis Unit (2018)
Potential Lynx Habitat
Spring 2021
138
4127
4125
4136
280
231
425
259
LINGSHIRE ROAD
H-360
4161
693
359
587
CTY
360
12
H-284
287
284
139
Townsend
RIDGE ROAD
4123
583
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Big Belts Geographic Area

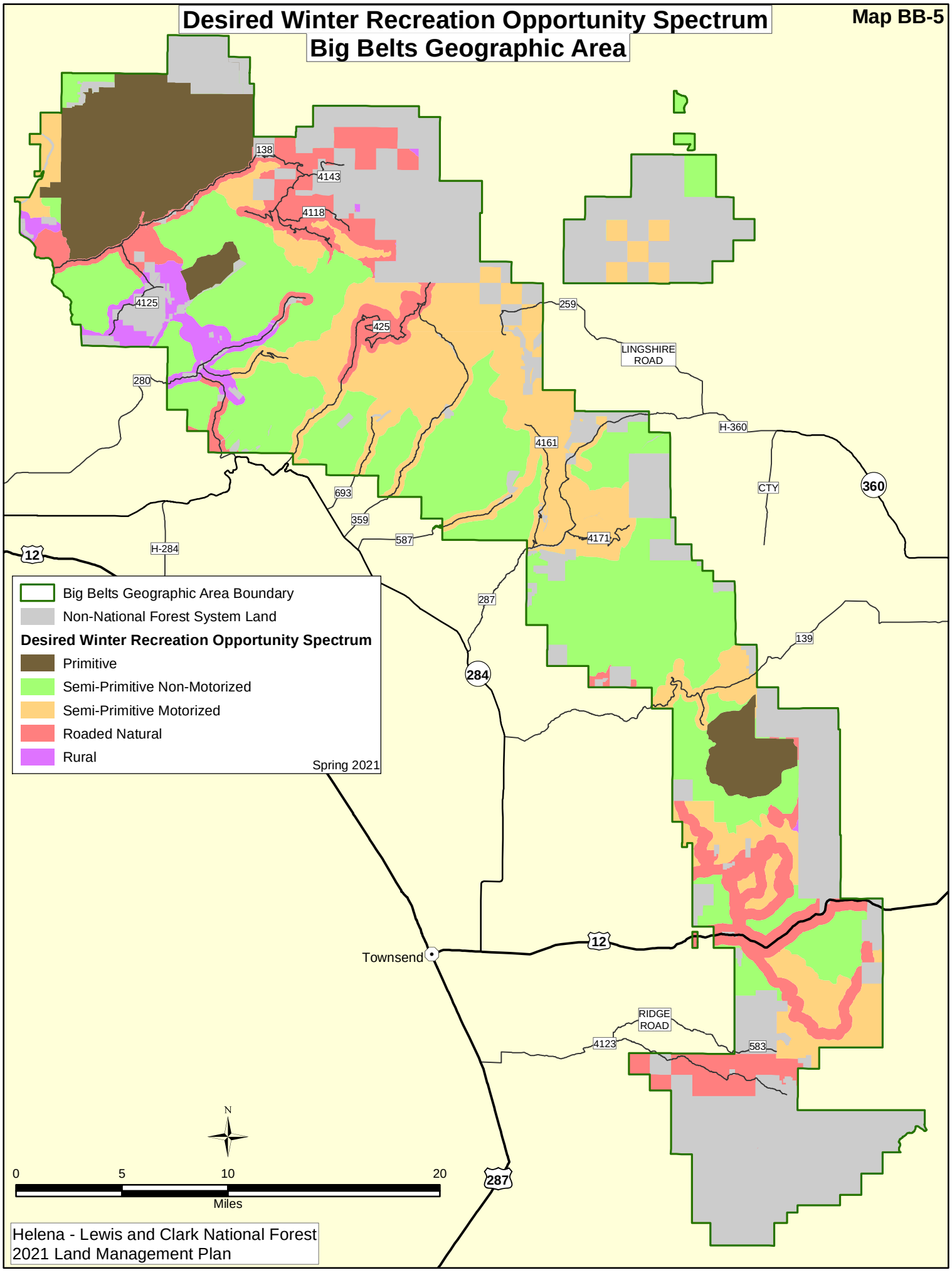
Map BB-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Big Belts Geographic Area

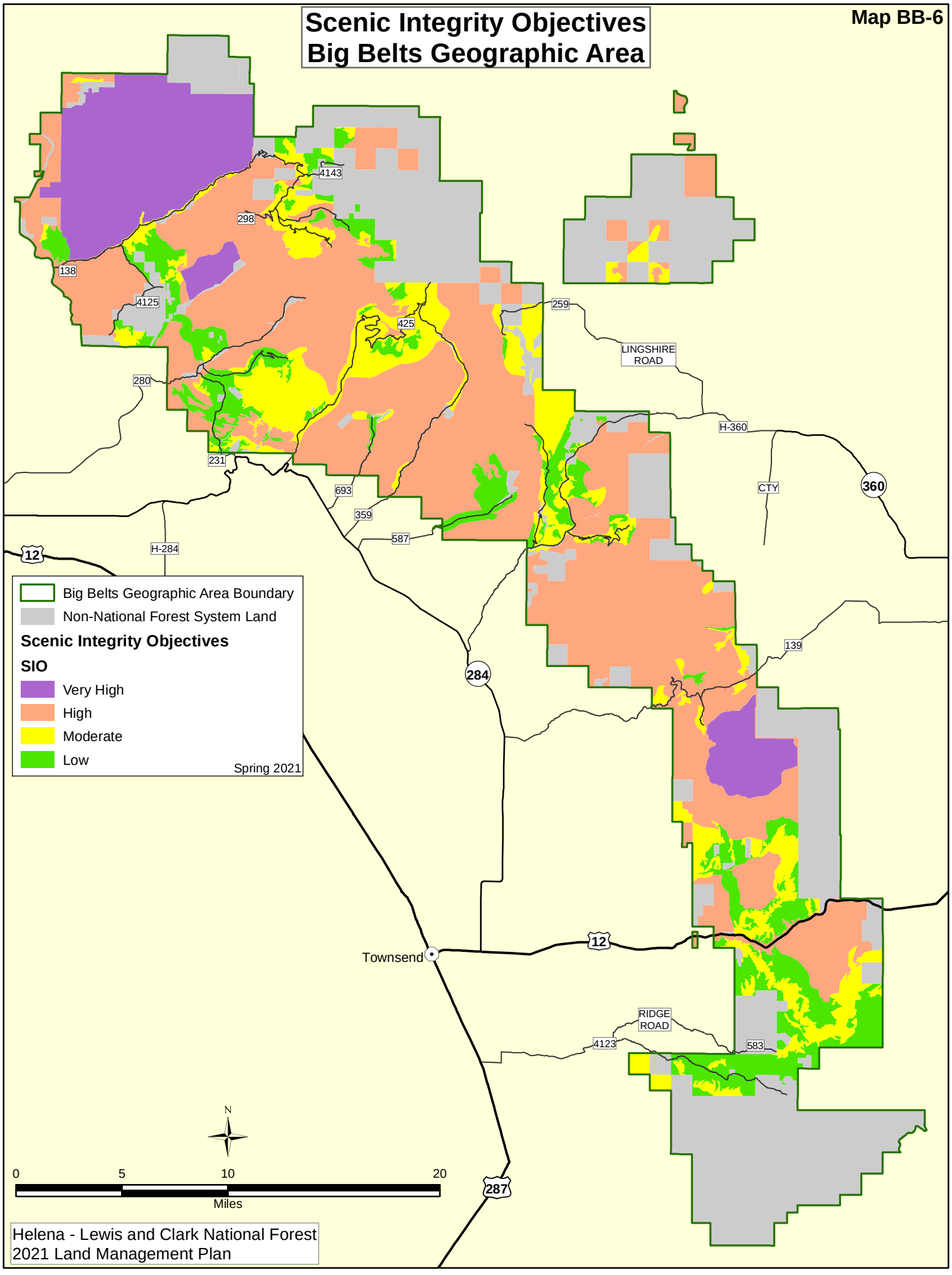
Map BB-5



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Big Belts Geographic Area

Map BB-6



Helena - Lewis and Clark National Forest
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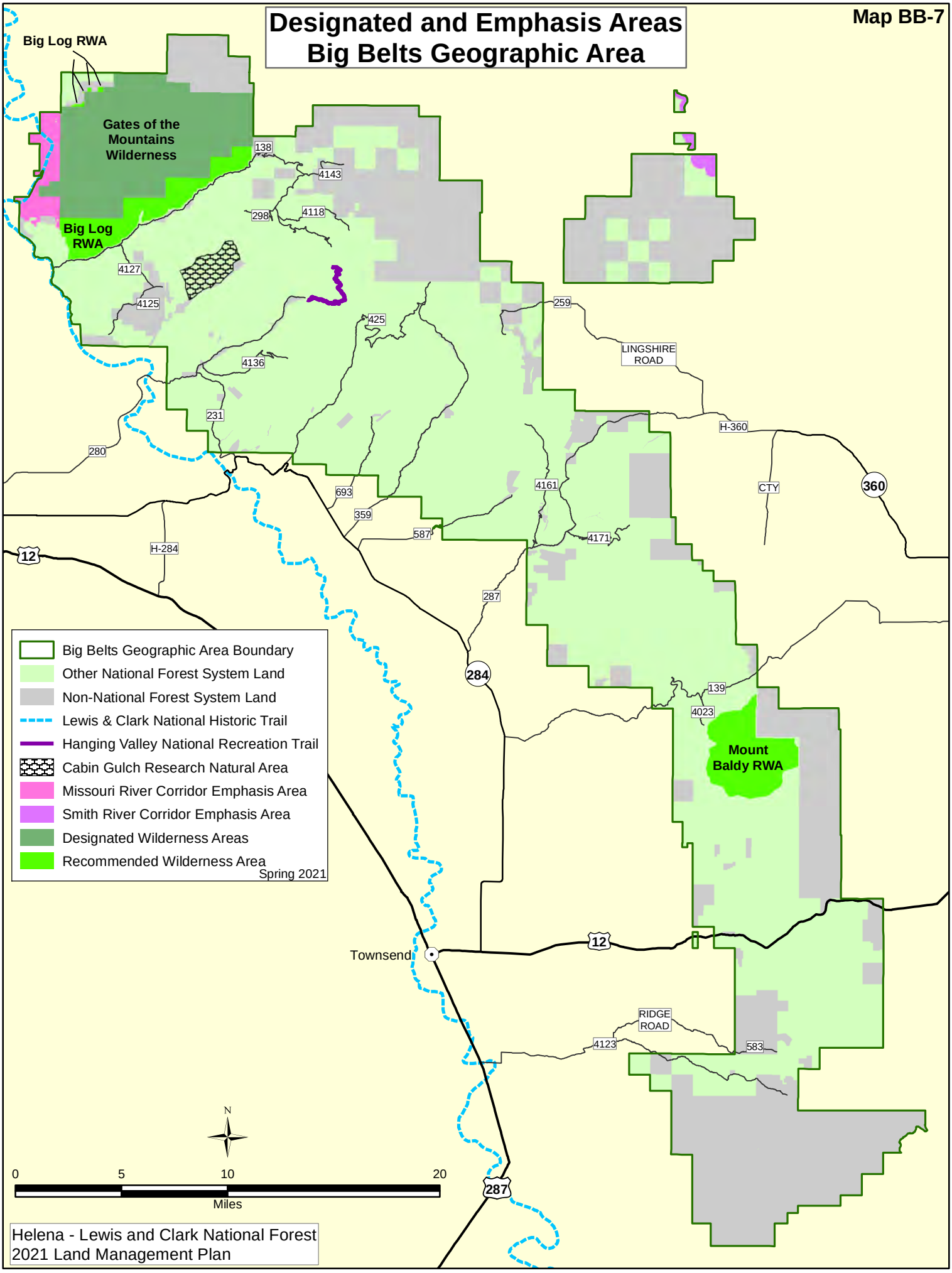
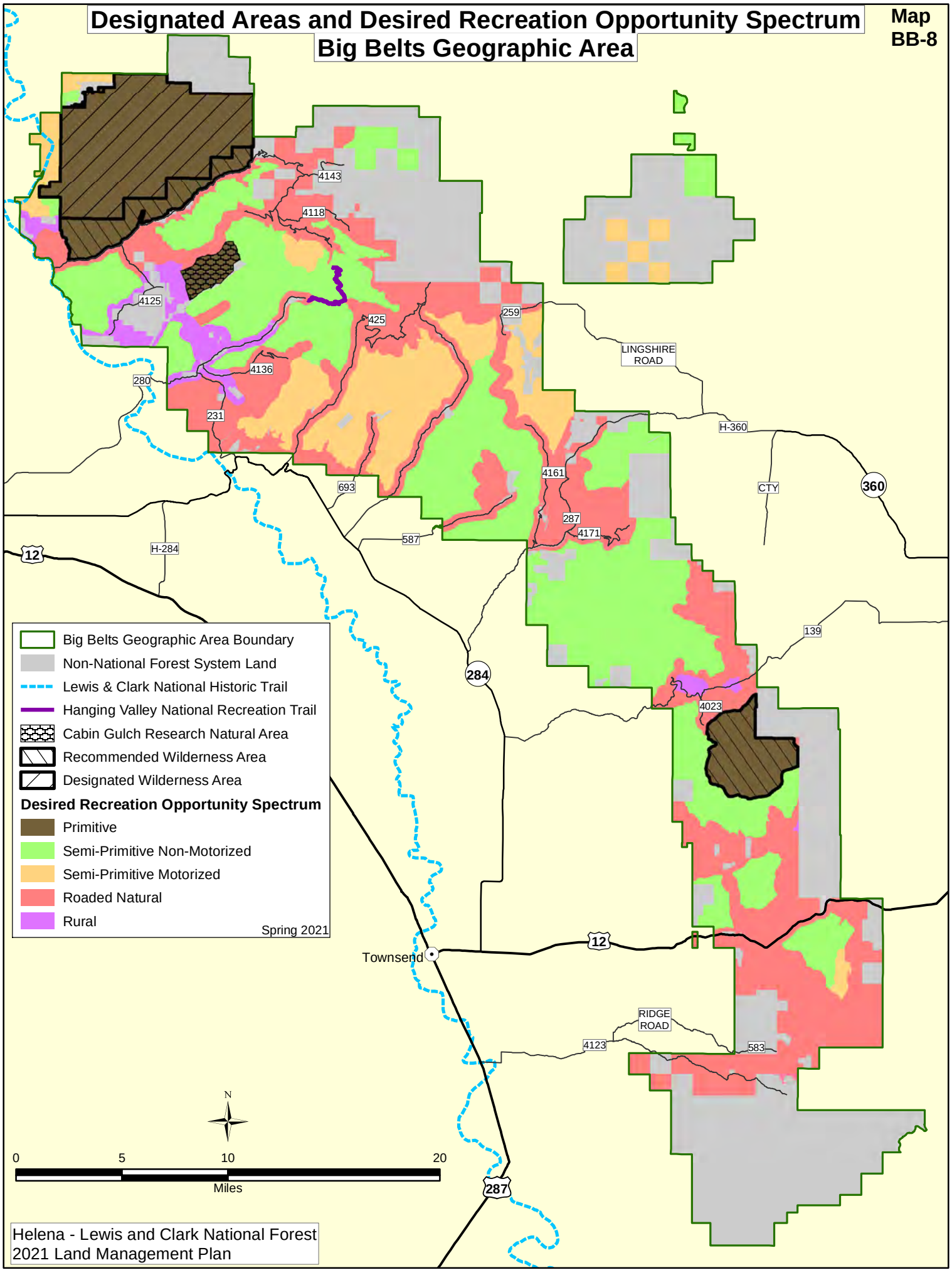

Designated and Emphasis Areas
Big Belts Geographic Area
Map BB-7
Big Log RWA
Gates of the Mountains Wilderness
Big Log RWA
138
4143
298
4118
4127
4125
425
259
LINGSHIRE ROAD
4136
231
280
H-360
693
359
587
4161
4171
CTY
360
12
H-284
287
284
139
4023
Mount Baldy RWA
Townsend
12
RIDGE ROAD
4123
583
287
Big Belts Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Lewis & Clark National Historic Trail
Hanging Valley National Recreation Trail
Cabin Gulch Research Natural Area
Missouri River Corridor Emphasis Area
Smith River Corridor Emphasis Area
Designated Wilderness Areas
Recommended Wilderness Area
Spring 2021
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Recreation Opportunity Spectrum
Big Belts Geographic Area

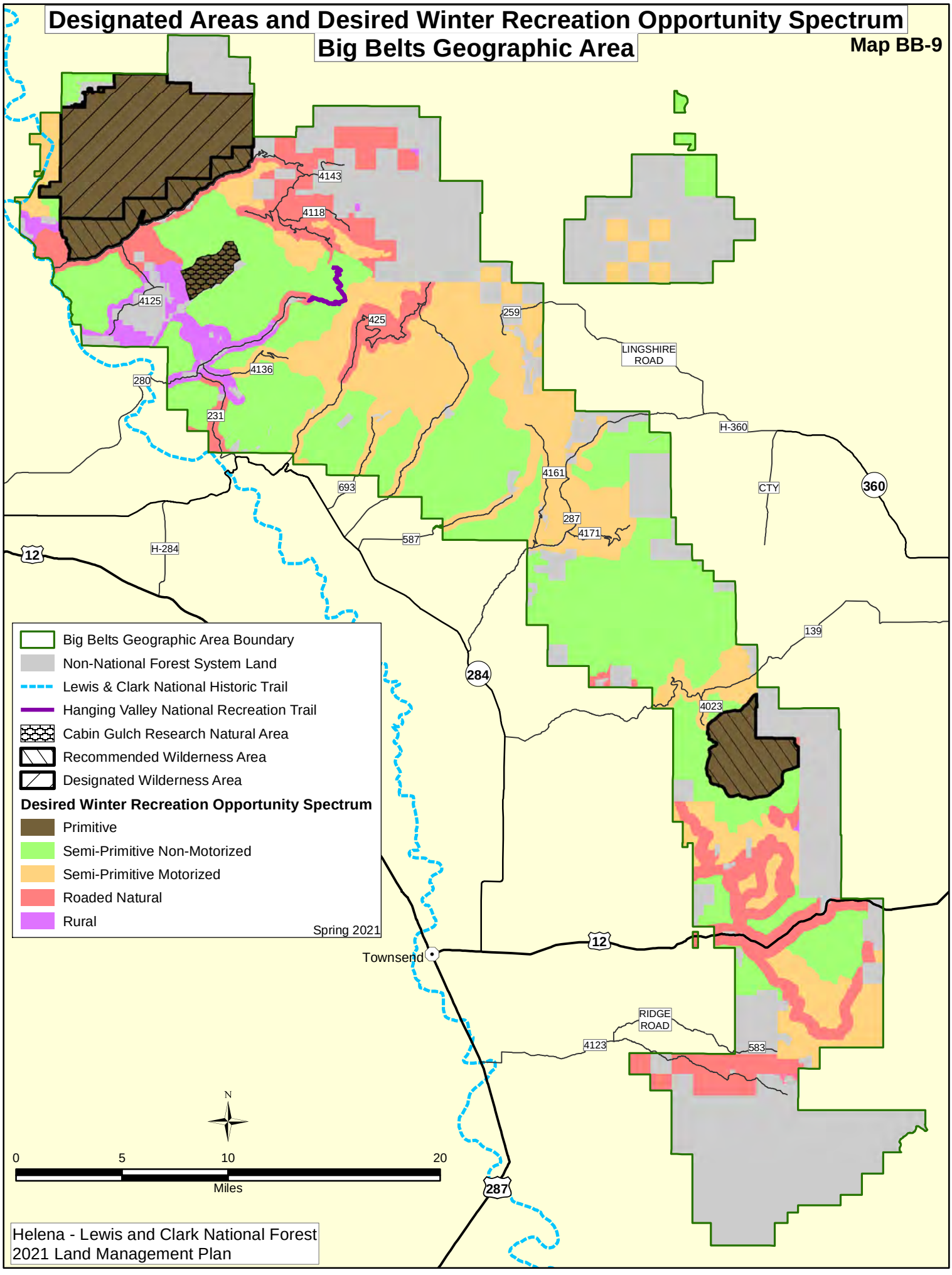
Map BB-8



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Winter Recreation Opportunity Spectrum
Big Belts Geographic Area

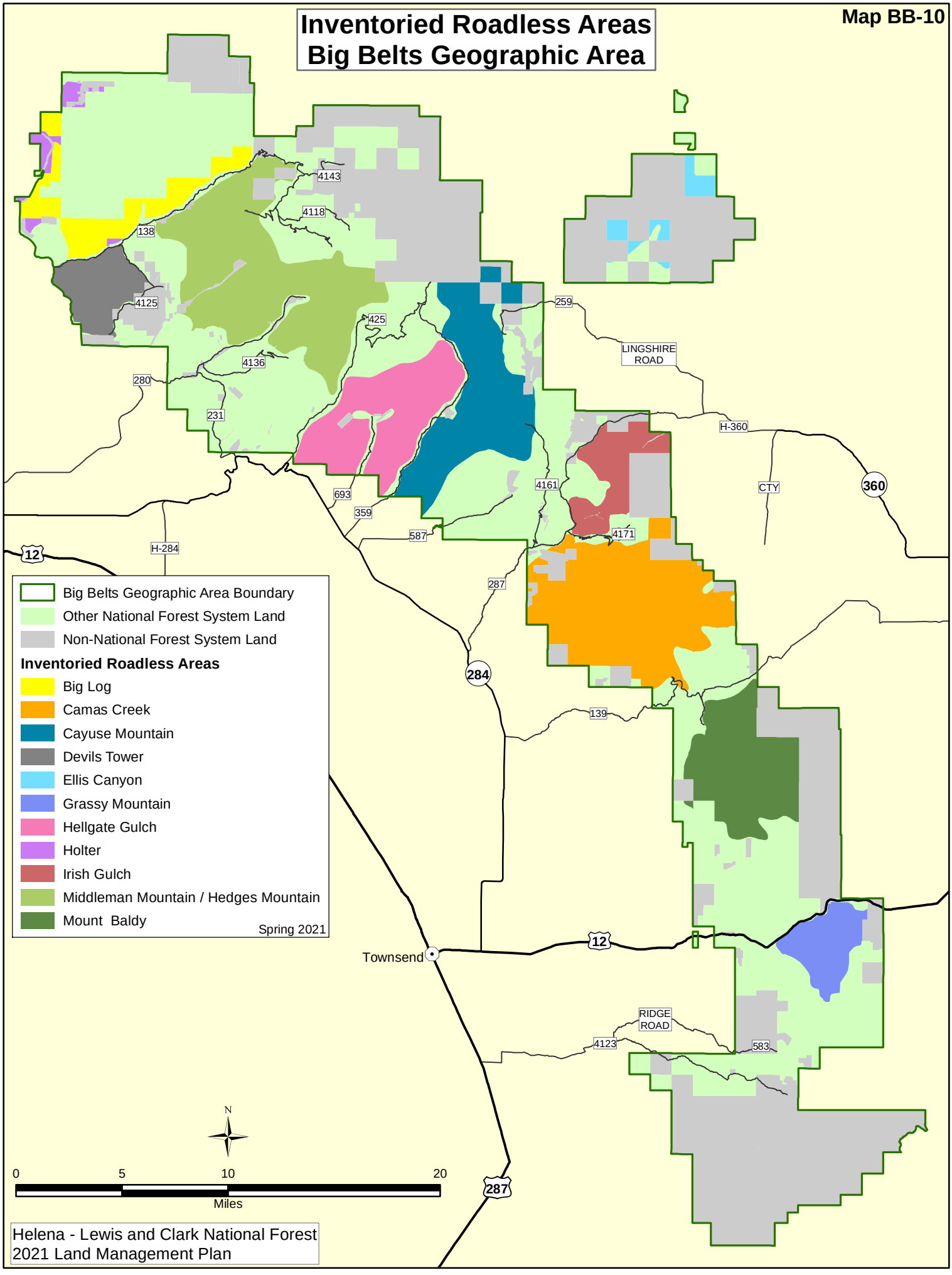
Map BB-9



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Map BB-10

Inventoried Roadless Areas
Big Belts Geographic Area



Helena - Lewis and Clark National Forest
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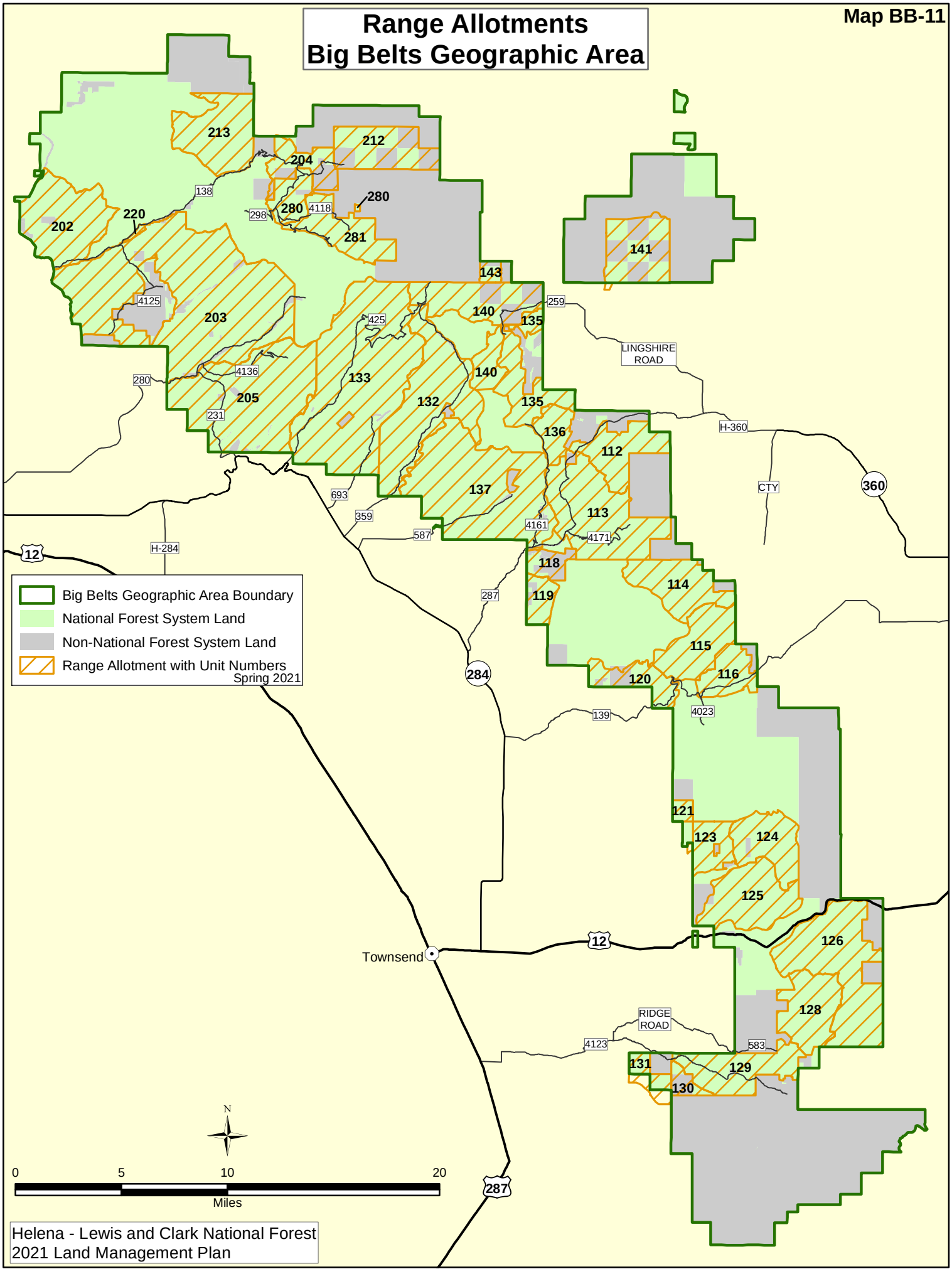
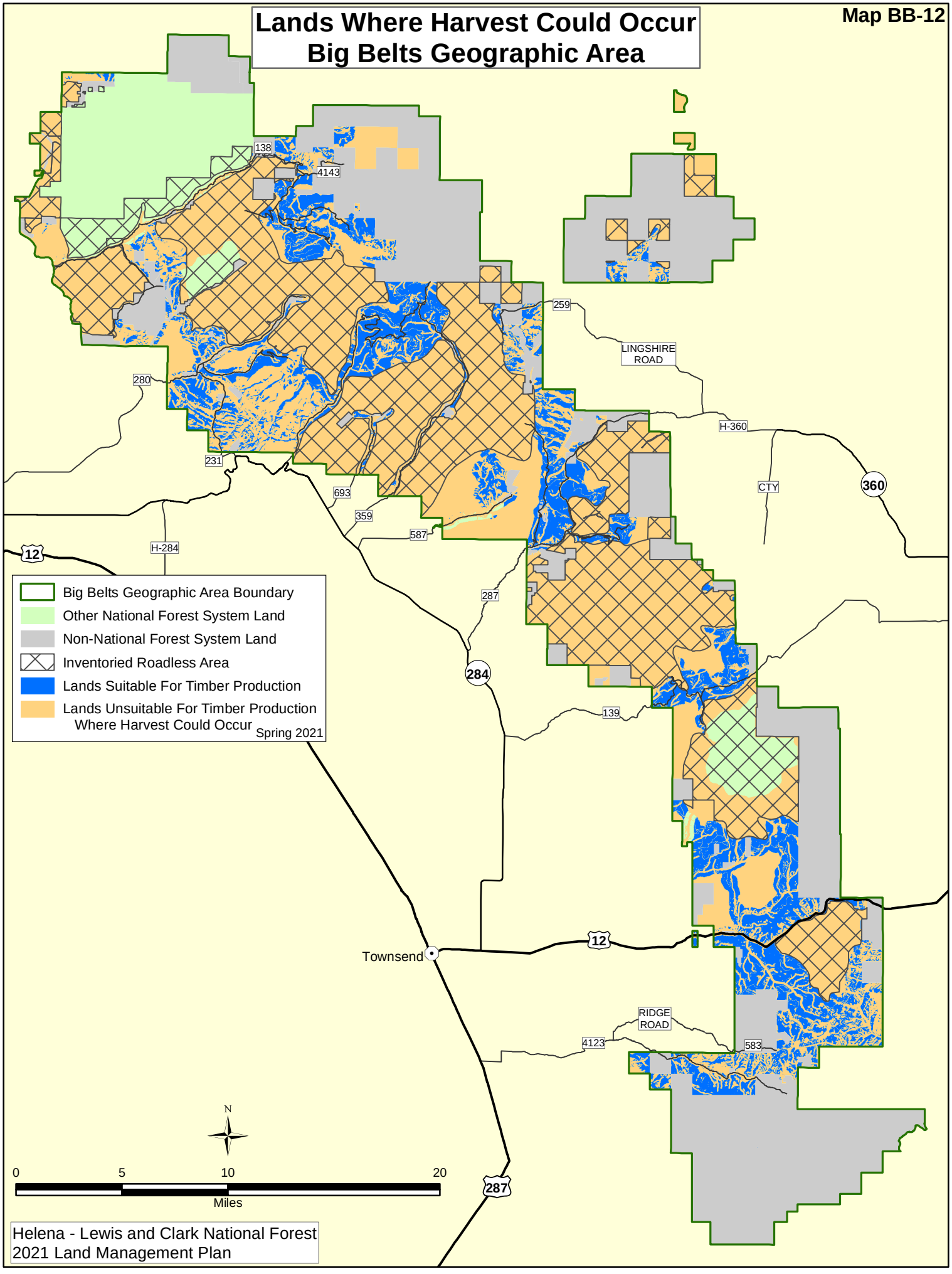
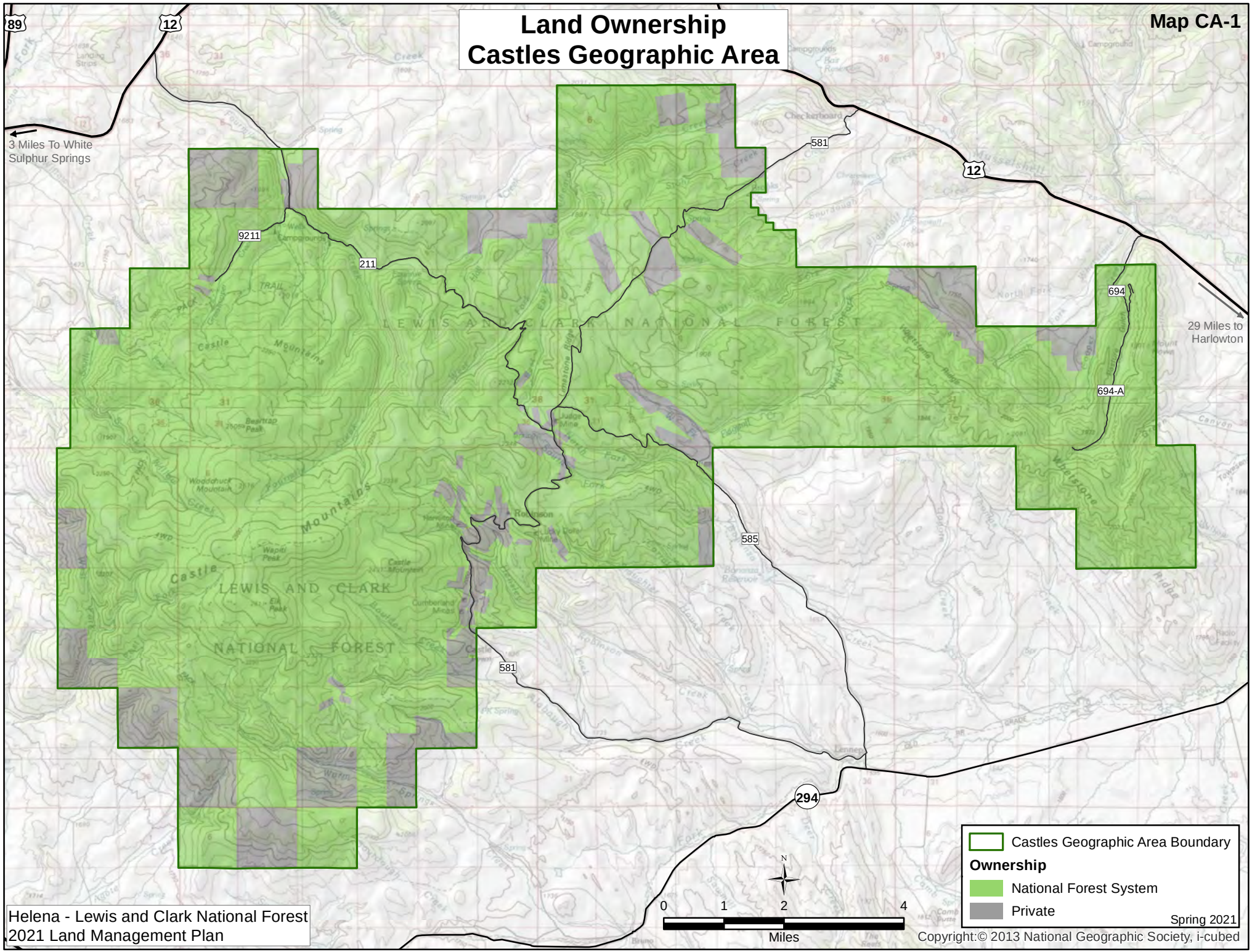

Range Allotments
Big Belts Geographic Area
Map BB-11
213
212
204
138
220
202
298
280
4118
280
281
141
143
4125
203
425
140
135
259
LINGSHIRE ROAD
280
4136
205
231
133
132
140
135
136
112
H-360
693
137
359
587
4161
113
4171
CTY
360
12
H-284
118
119
114
287
115
284
120
116
139
4023
121
123
124
125
126
Townsend
12
128
RIDGE ROAD
4123
583
131
129
130
287
Big Belts Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Lands Where Harvest Could Occur
Big Belts Geographic Area

Map BB-12



Helena - Lewis and Clark National Forest
2021 Land Management Plan


Land Ownership
Castles Geographic Area
Map CA-1
89
12
3 Miles To White Sulphur Springs
581
12
9211
211
694
29 Miles to Harlowton
694-A
LEWIS AND CLARK NATIONAL FOREST
Castle Mountains
Beartrap Peak
Woodchuck Mountain
Wapiti Peak
Castle Mountain
Elk Peak
Cumberland Mtns
Robinson
585
581
294
Castles Geographic Area Boundary
Ownership
National Forest System
Private
Spring 2021
N
0 1 2 4
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
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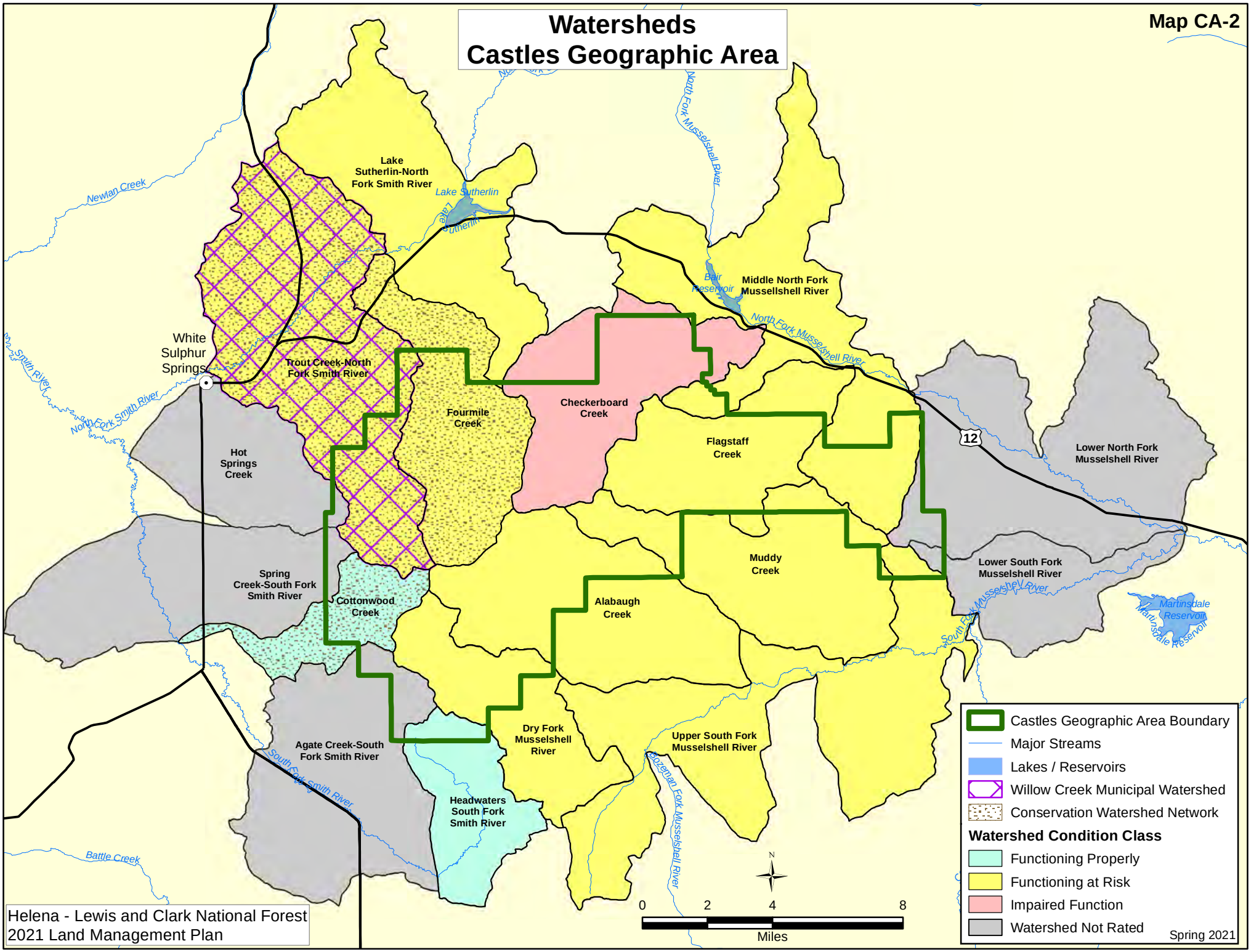
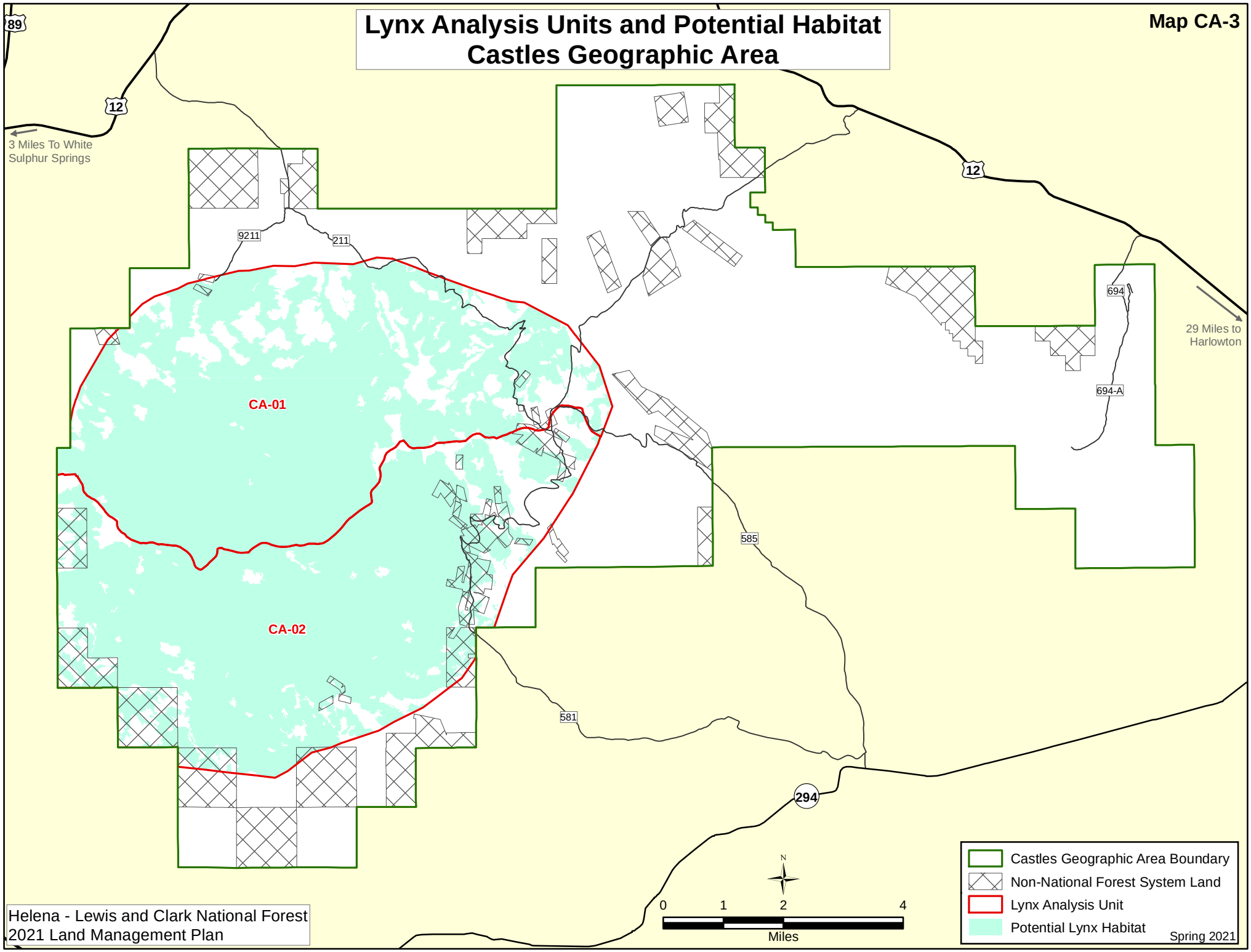
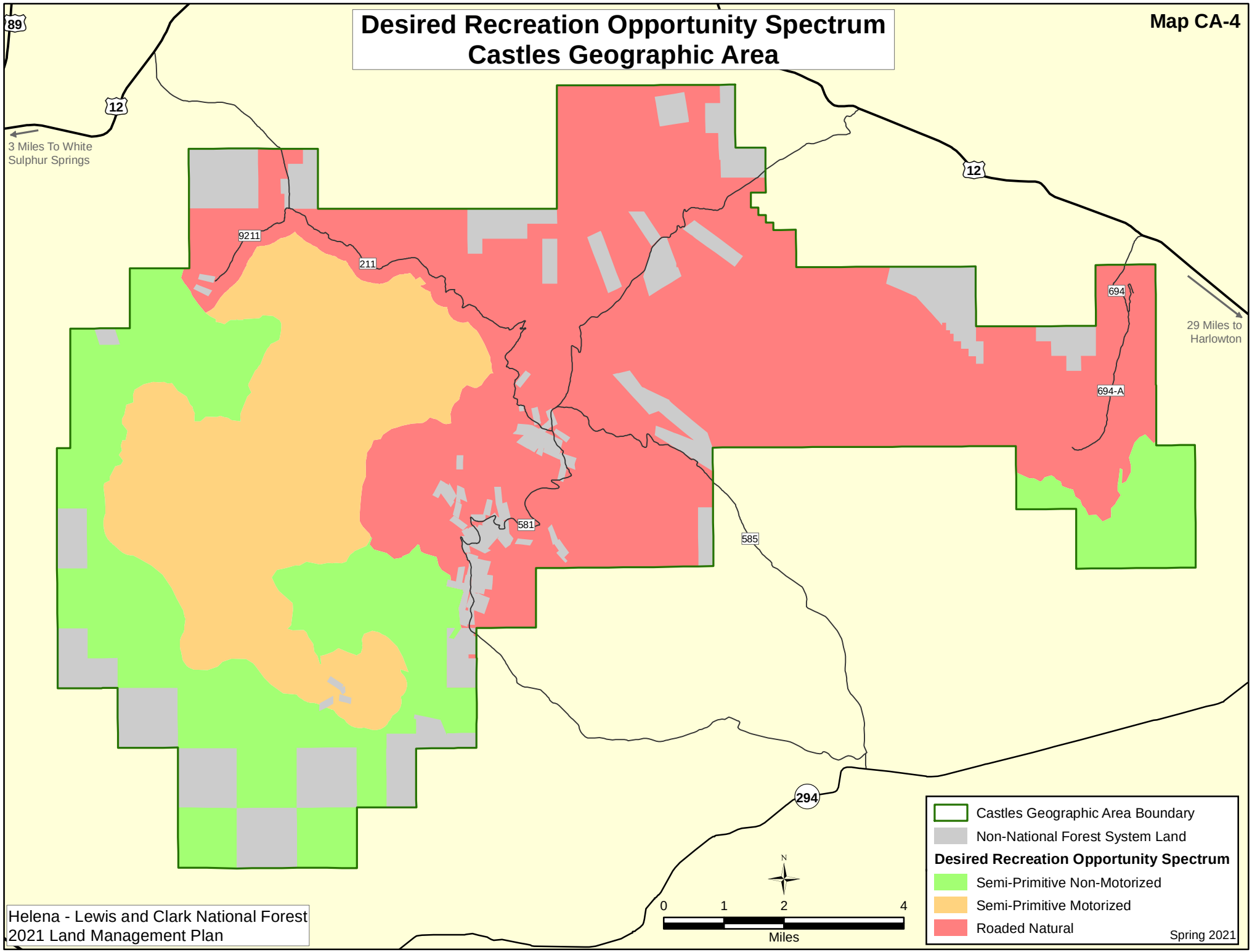

Watersheds
Castles Geographic Area
Map CA-2
Lake Sutherlin-North Fork Smith River
Lake Sutherlin
Newlan Creek
North Fork Musselshell River
Middle North Fork Musselshell River
Bair Reservoir
North Fork Musselshell River
White Sulphur Springs
Trout Creek-North Fork Smith River
North Fork Smith River
Fourmile Creek
Checkerboard Creek
Flagstaff Creek
12
Lower North Fork Musselshell River
Hot Springs Creek
Muddy Creek
Lower South Fork Musselshell River
Spring Creek-South Fork Smith River
Cottonwood Creek
Alabaugh Creek
South Fork Musselshell River
Martinsdale Reservoir
Martinsdale Reservoir
Agate Creek-South Fork Smith River
Dry Fork Musselshell River
Upper South Fork Musselshell River
South Fork Smith River
Headwaters South Fork Smith River
Bozeman Fork Musselshell River
Battle Creek
N
0
2
4
8
Miles
Castles Geographic Area Boundary
Major Streams
Lakes / Reservoirs
Willow Creek Municipal Watershed
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Impaired Function
Watershed Not Rated
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Lynx Analysis Units and Potential Habitat
Castles Geographic Area
Map CA-3
89
12
3 Miles To White
Sulphur Springs
9211
211
12
694
694-A
29 Miles to
Harlowton
CA-01
CA-02
585
581
294
N
0
1
2
4
Miles
Castles Geographic Area Boundary
Non-National Forest System Land
Lynx Analysis Unit
Potential Lynx Habitat
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Castles Geographic Area

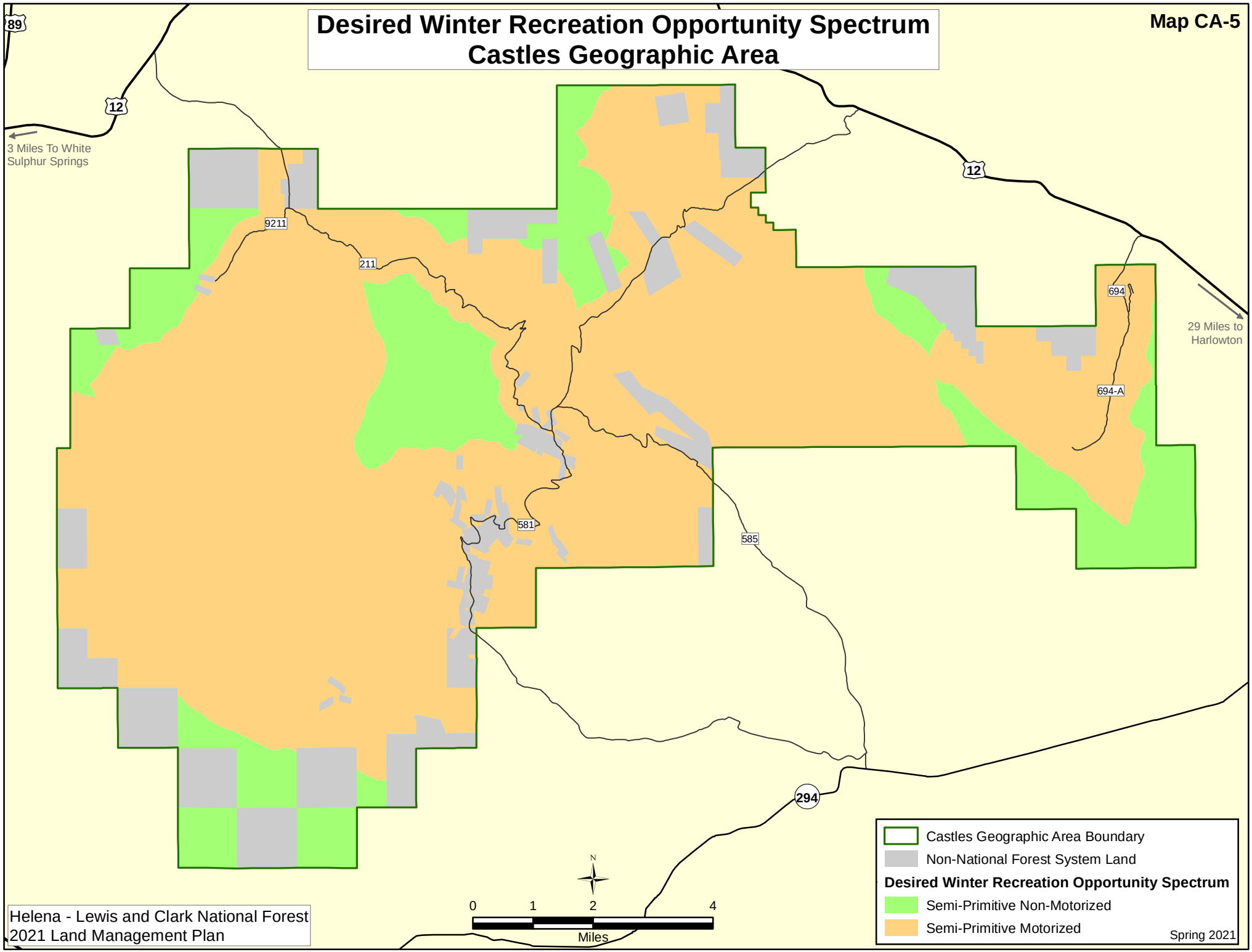
Map CA-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Castles Geographic Area

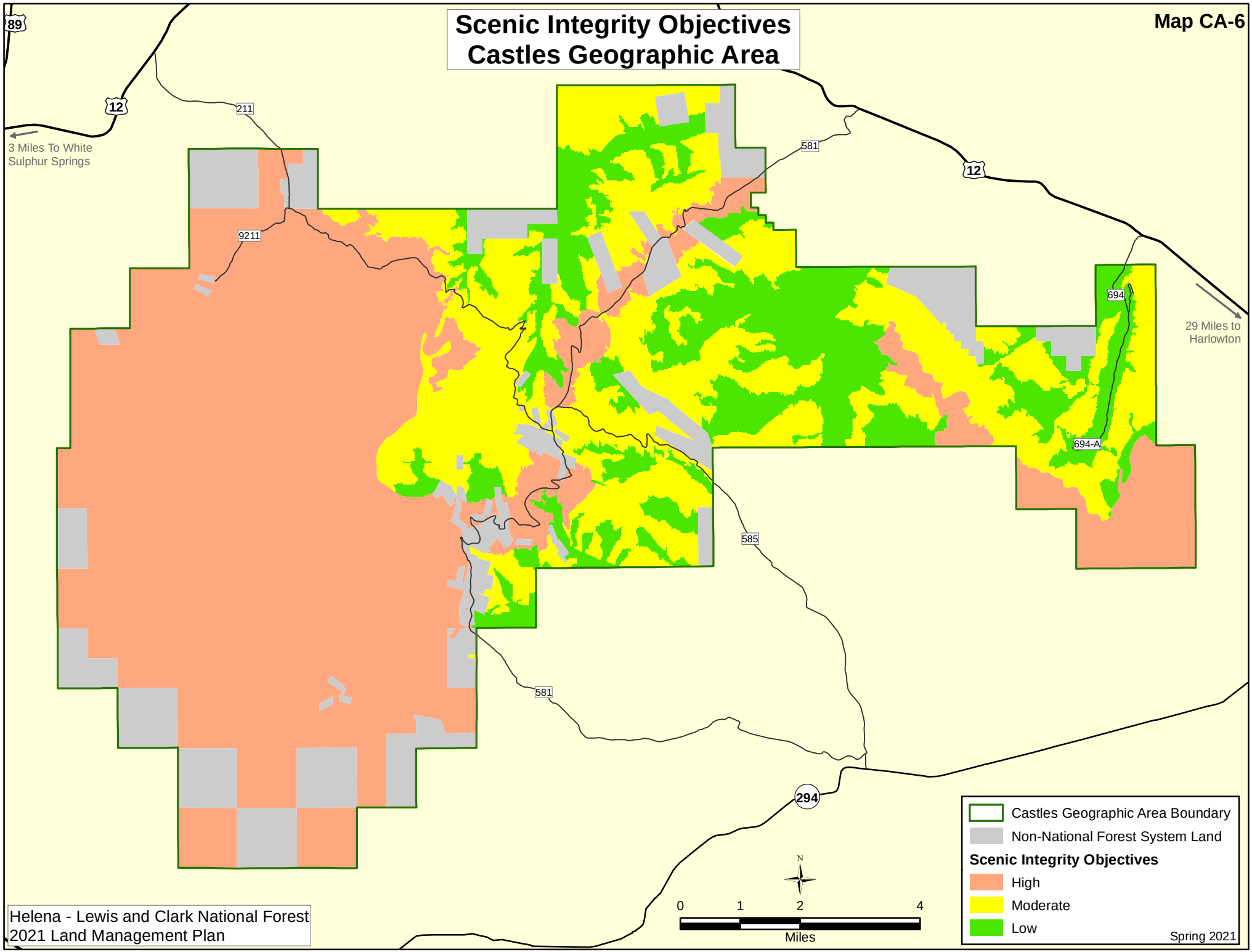
Map CA-5



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Castles Geographic Area

Map CA-6



Helena - Lewis and Clark National Forest
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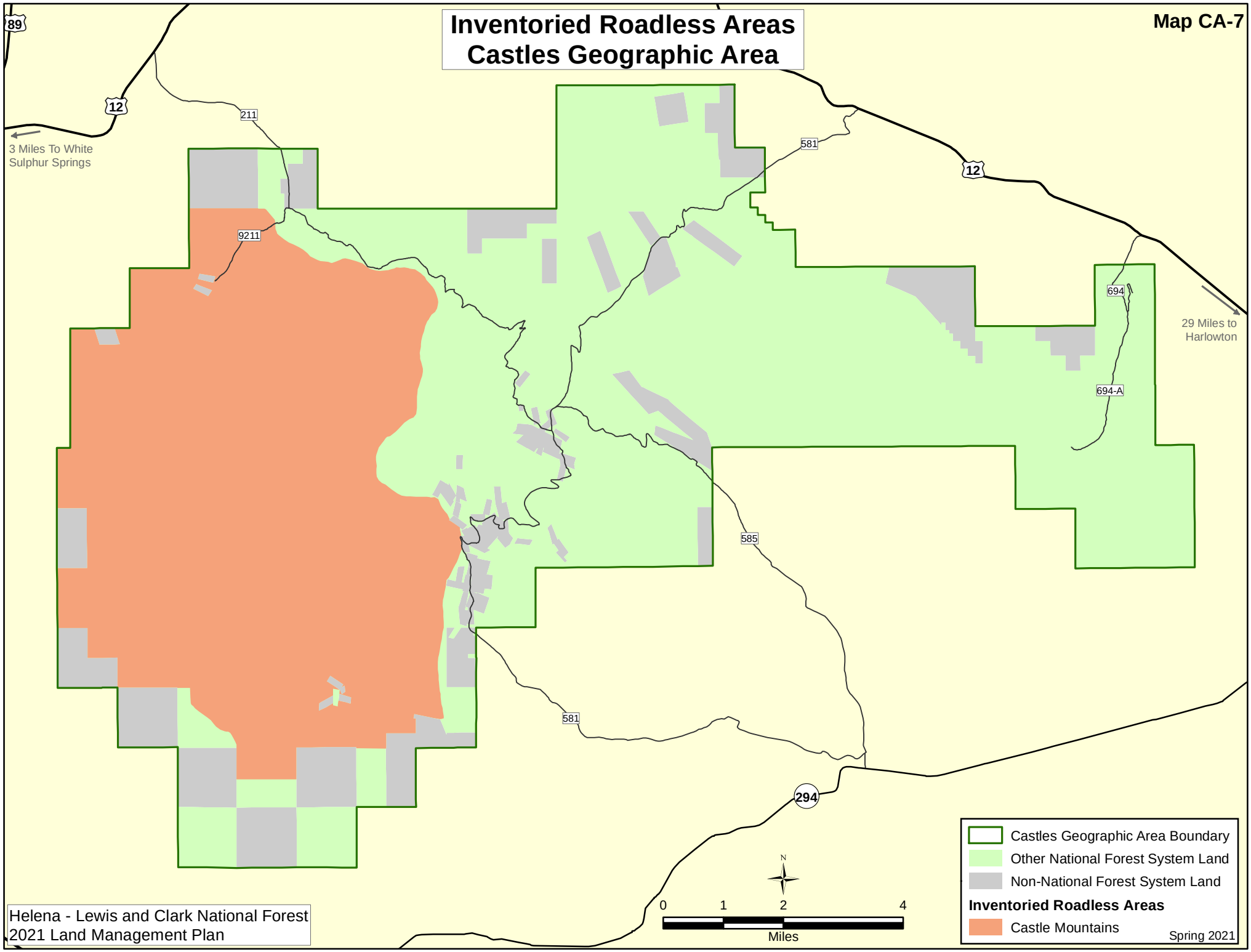
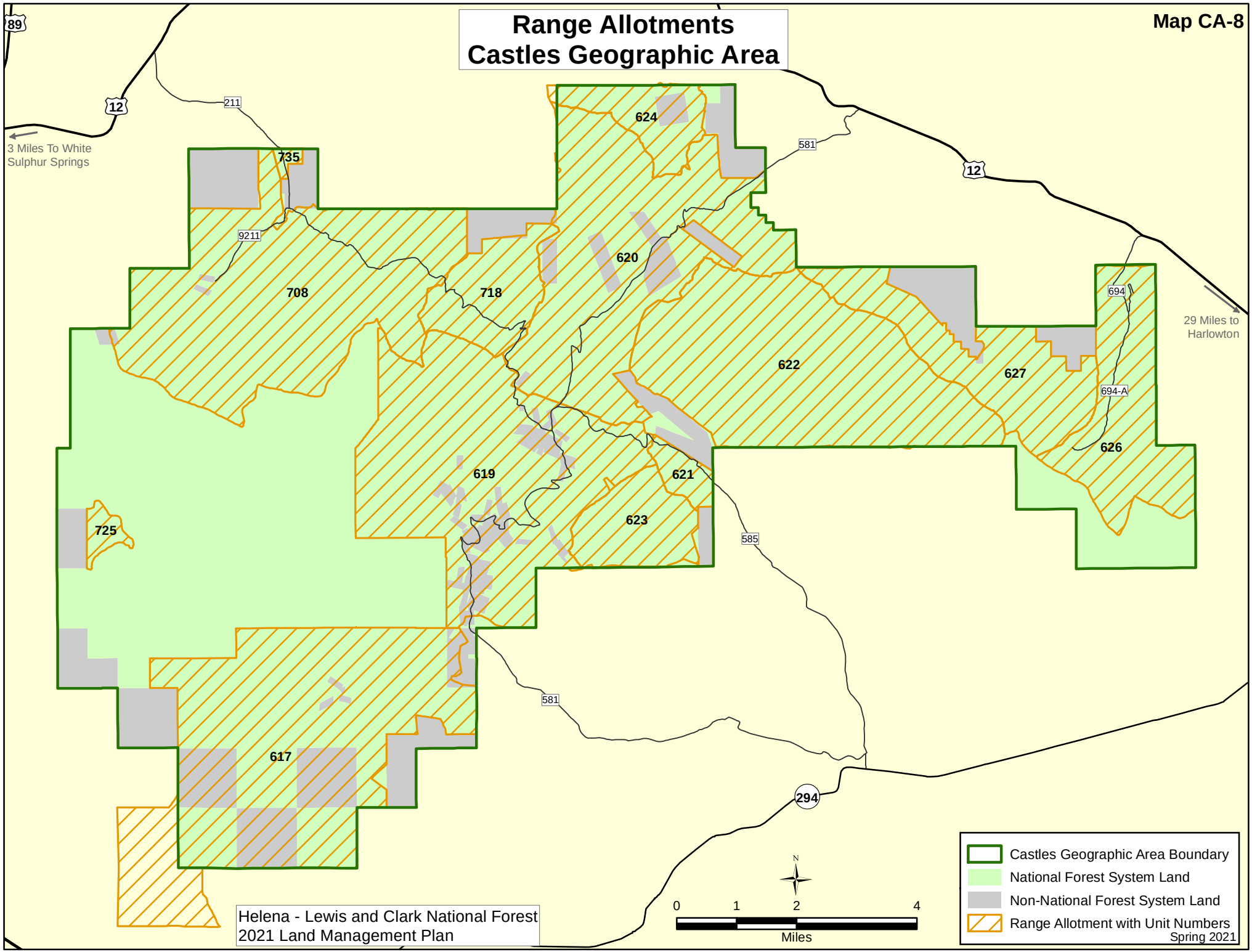
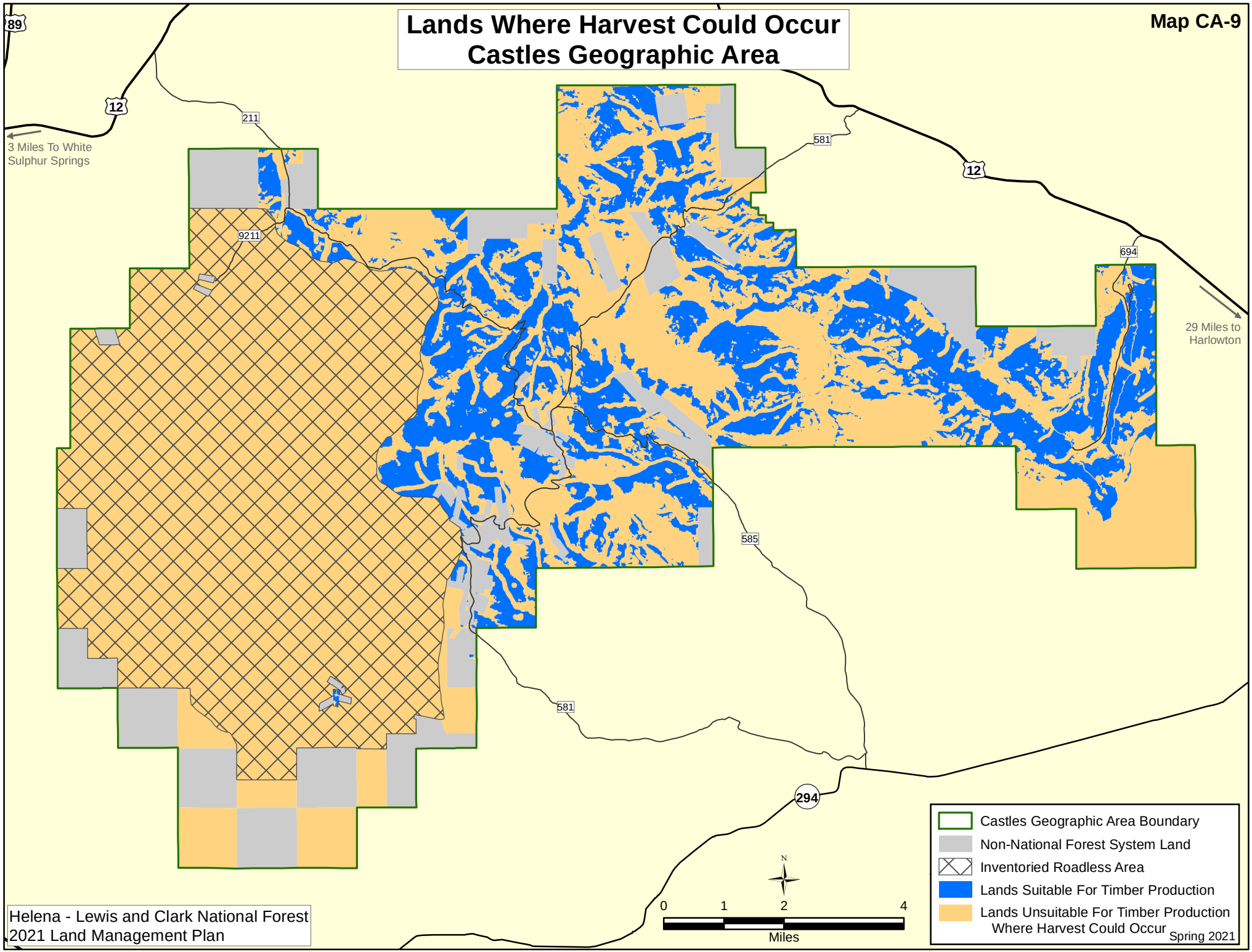

Inventoried Roadless Areas
Castles Geographic Area
Map CA-7
89
12
211
3 Miles To White
Sulphur Springs
581
12
9211
694
29 Miles to
Harlowton
694-A
585
581
294
Castles Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Castle Mountains
Spring 2021
N
0
1
2
4
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Range Allotments
Castles Geographic Area
Map CA-8
89
12
211
3 Miles To White
Sulphur Springs
581
12
624
735
9211
620
708
718
694
29 Miles to
Harlowton
622
627
694-A
626
619
621
623
725
585
581
617
294
Helena - Lewis and Clark National Forest
2021 Land Management Plan
N
0
1
2
4
Miles
Castles Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021

Lands Where Harvest Could Occur
Castles Geographic Area

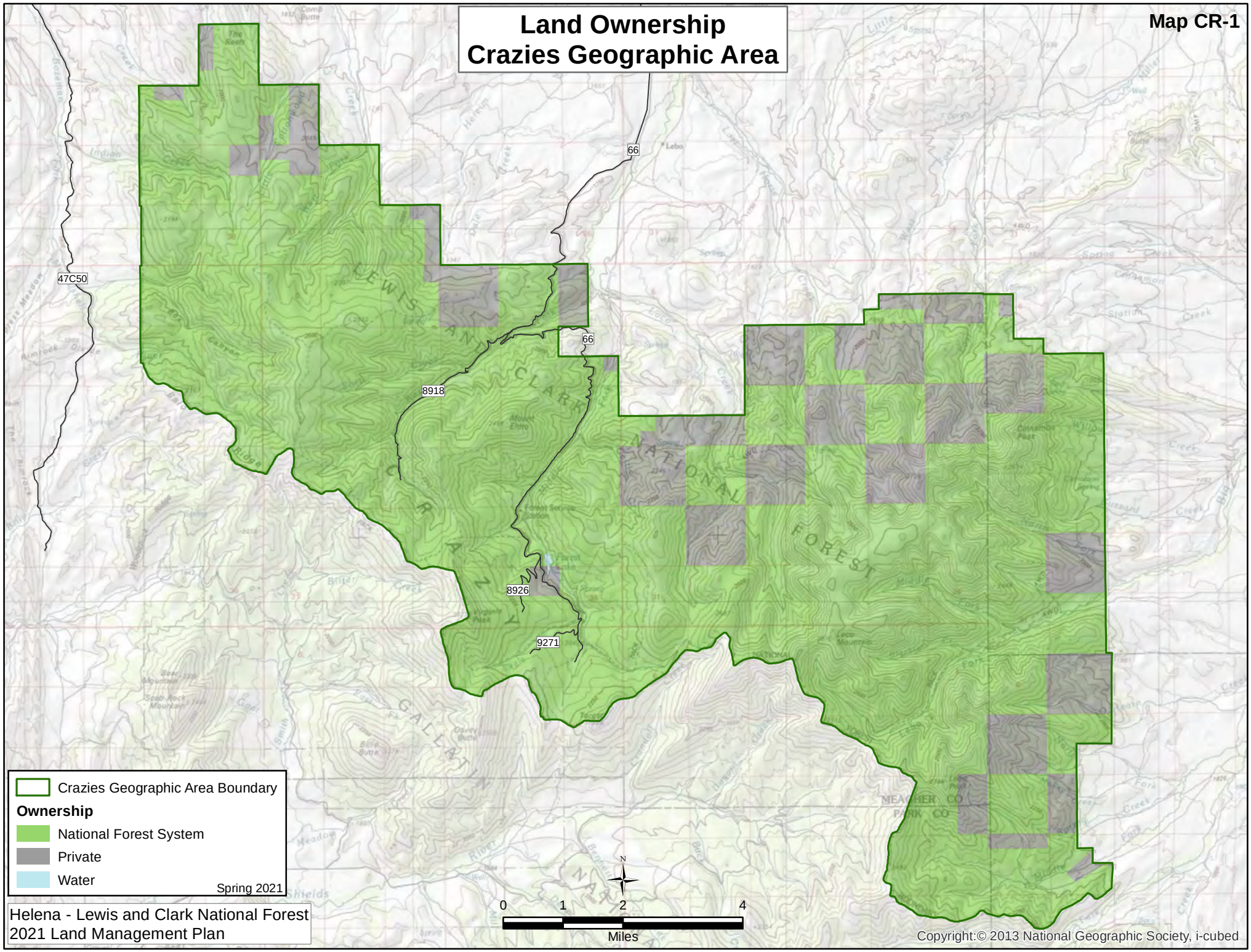
Map CA-9



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Land Ownership
Crazies Geographic Area

Map CR-1



Helena - Lewis and Clark National Forest
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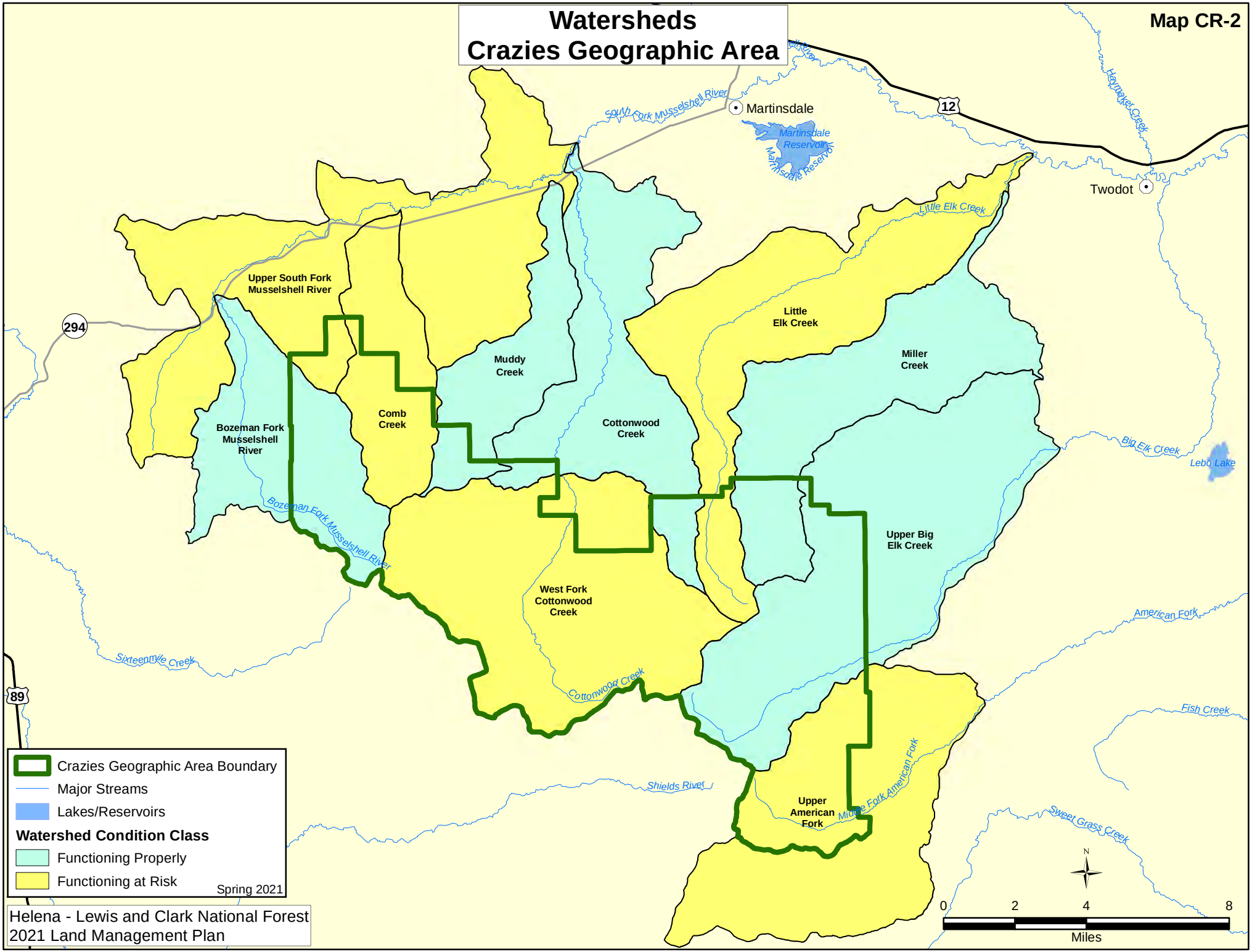
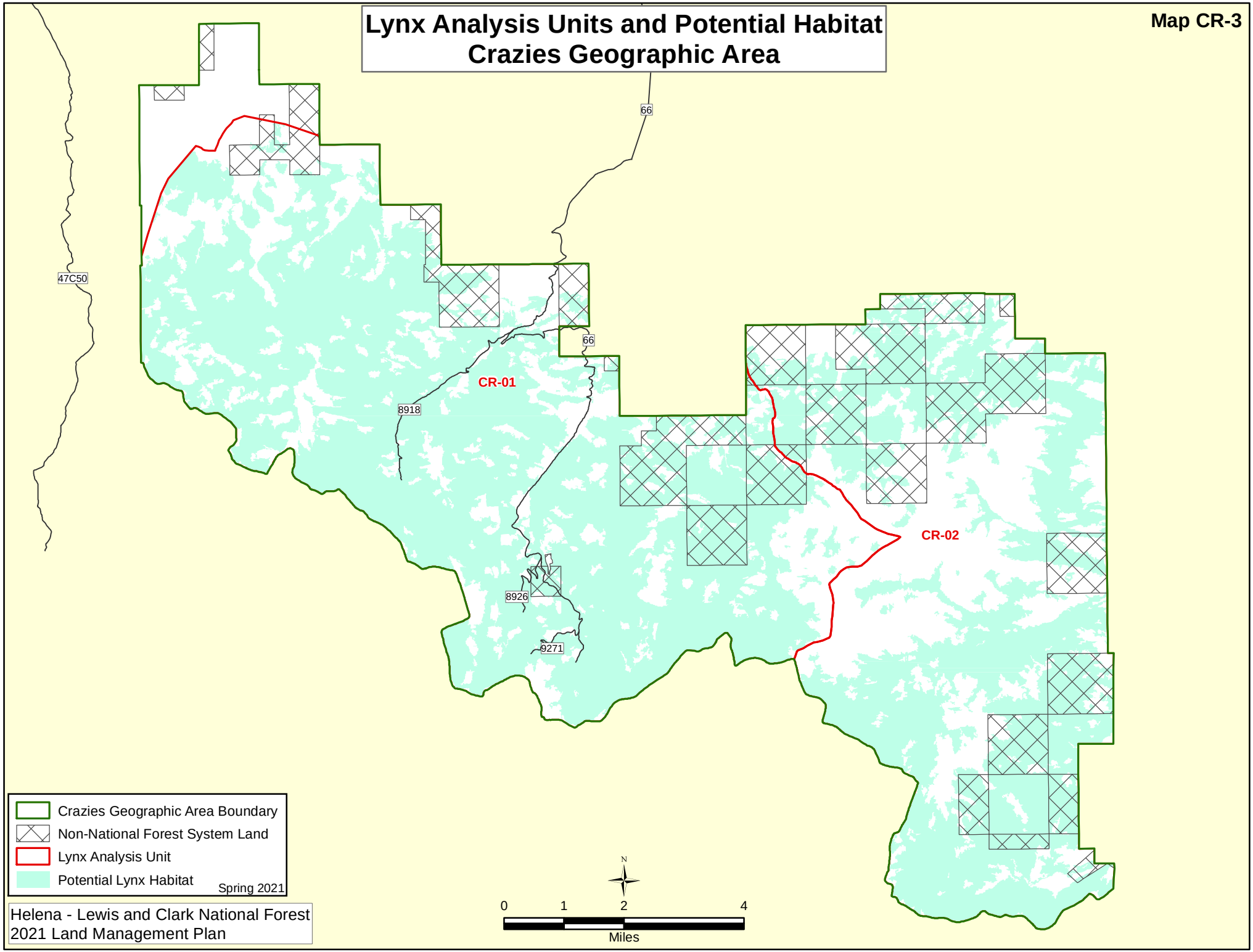

Watersheds
Crazies Geographic Area
Map CR-2
Martinsdale
Martinsdale Reservoir
Twodot
South Fork Musselshell River
Little Elk Creek
Upper South Fork Musselshell River
Little Elk Creek
Miller Creek
Muddy Creek
Comb Creek
Cottonwood Creek
Bozeman Fork Musselshell River
Big Elk Creek
Lebo Lake
Upper Big Elk Creek
West Fork Cottonwood Creek
American Fork
Sixteenmile Creek
Cottonwood Creek
Fish Creek
Shields River
Middle Fork American Fork
Upper American Fork
Sweet Grass Creek
294
12
89
Crazies Geographic Area Boundary
Major Streams
Lakes/Reservoirs
Watershed Condition Class
Functioning Properly
Functioning at Risk
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan
N
0
2
4
8
Miles

Lynx Analysis Units and Potential Habitat
Crazies Geographic Area

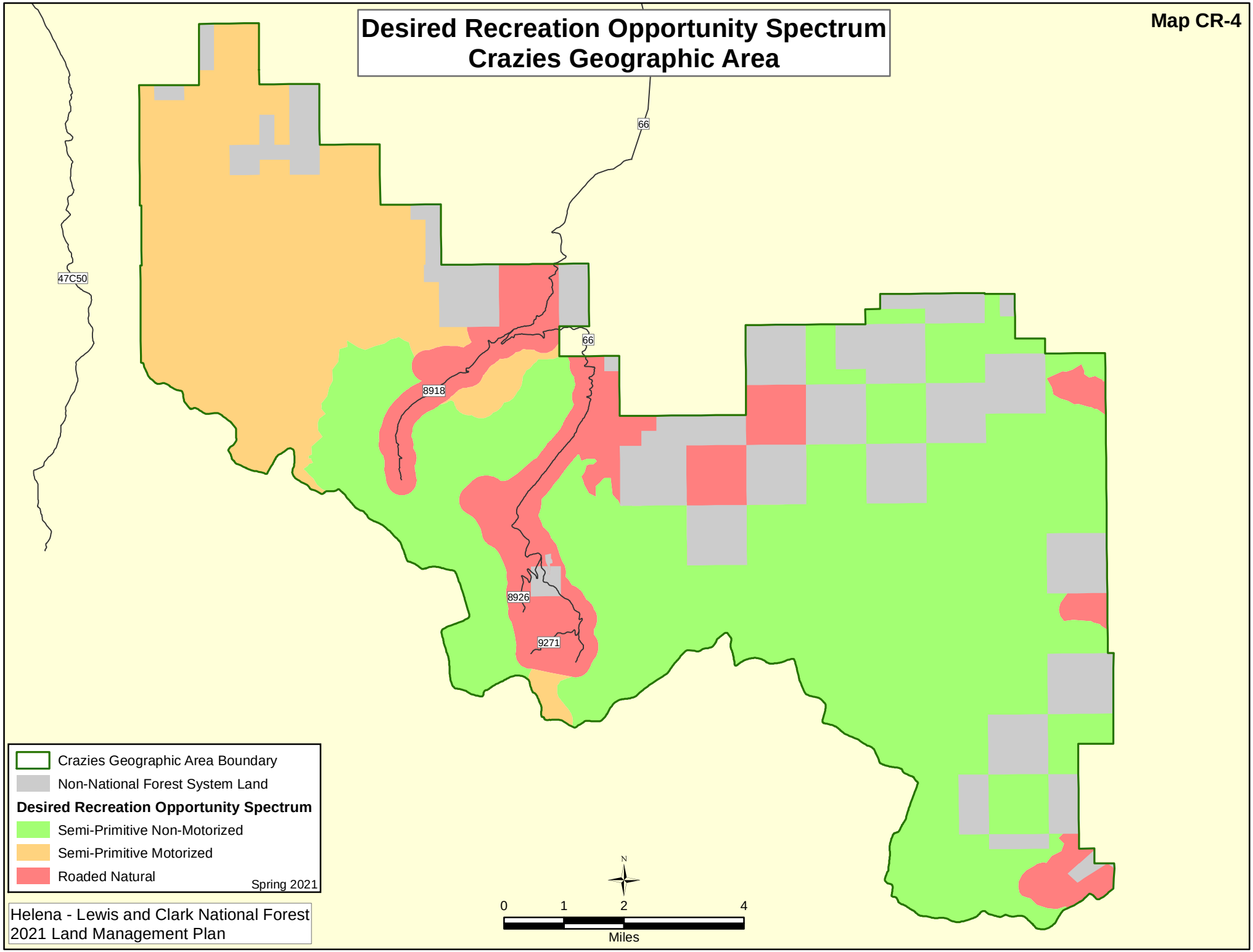
Map CR-3



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Crazies Geographic Area

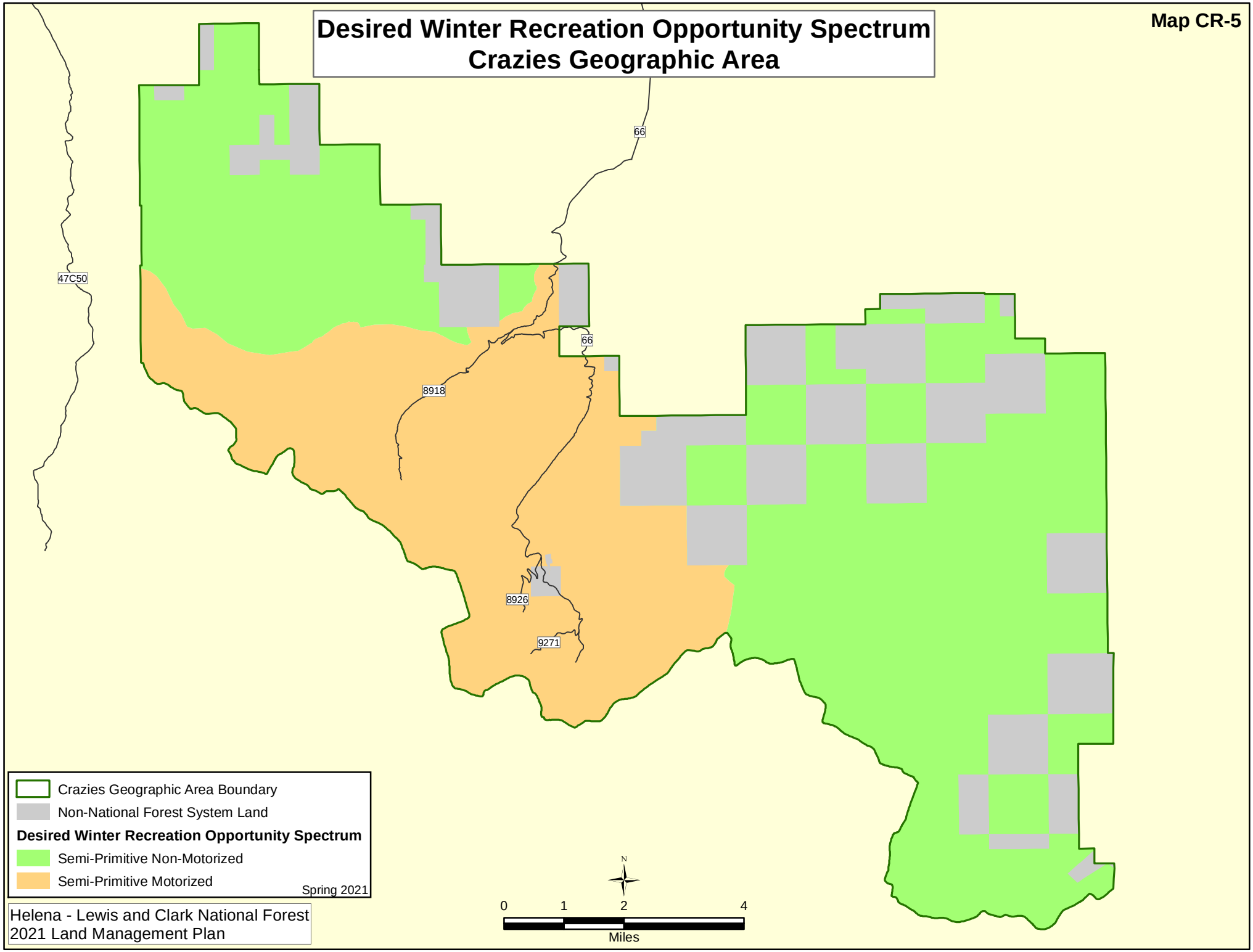
Map CR-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Map CR-5

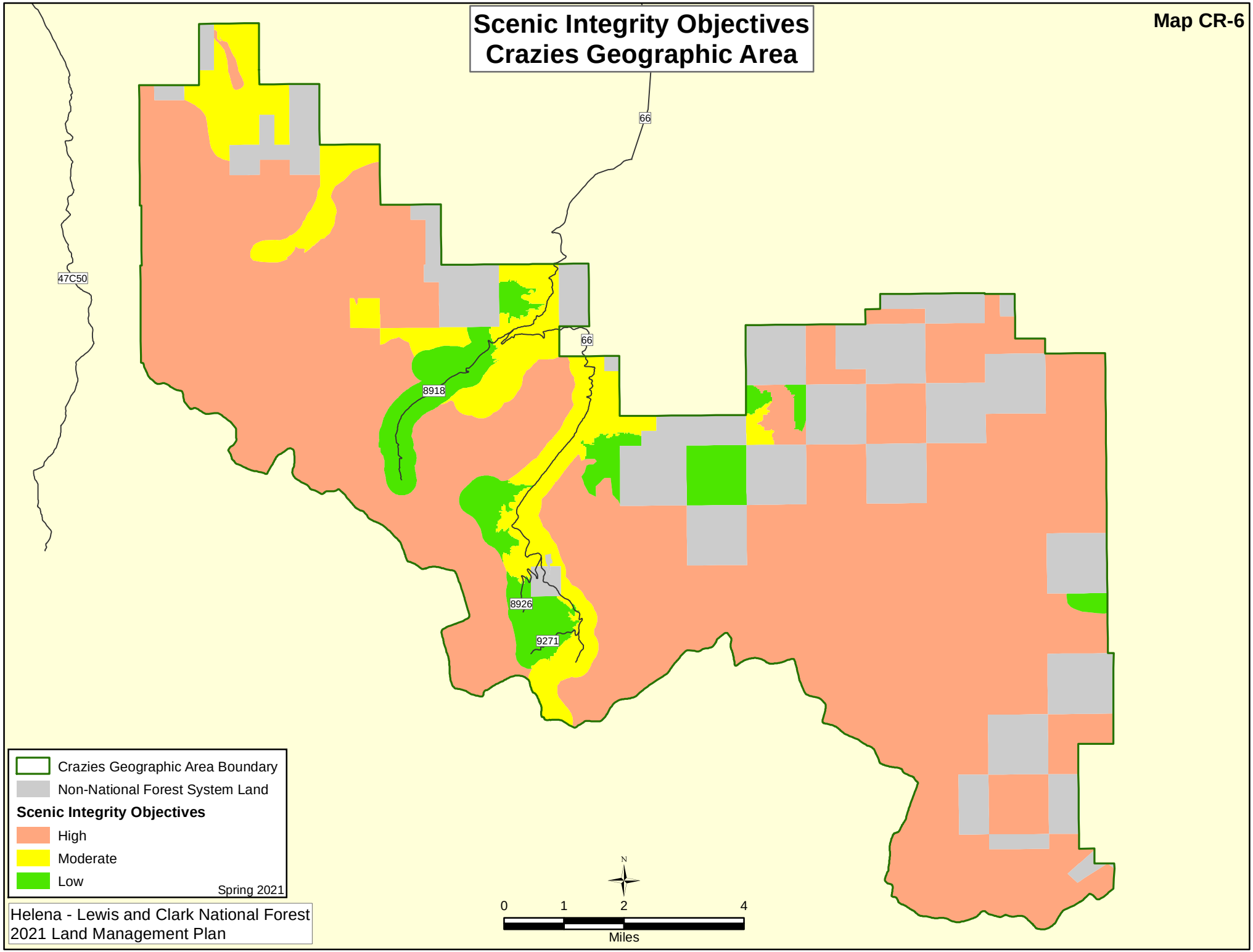
Desired Winter Recreation Opportunity Spectrum
Crazies Geographic Area



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Crazies Geographic Area

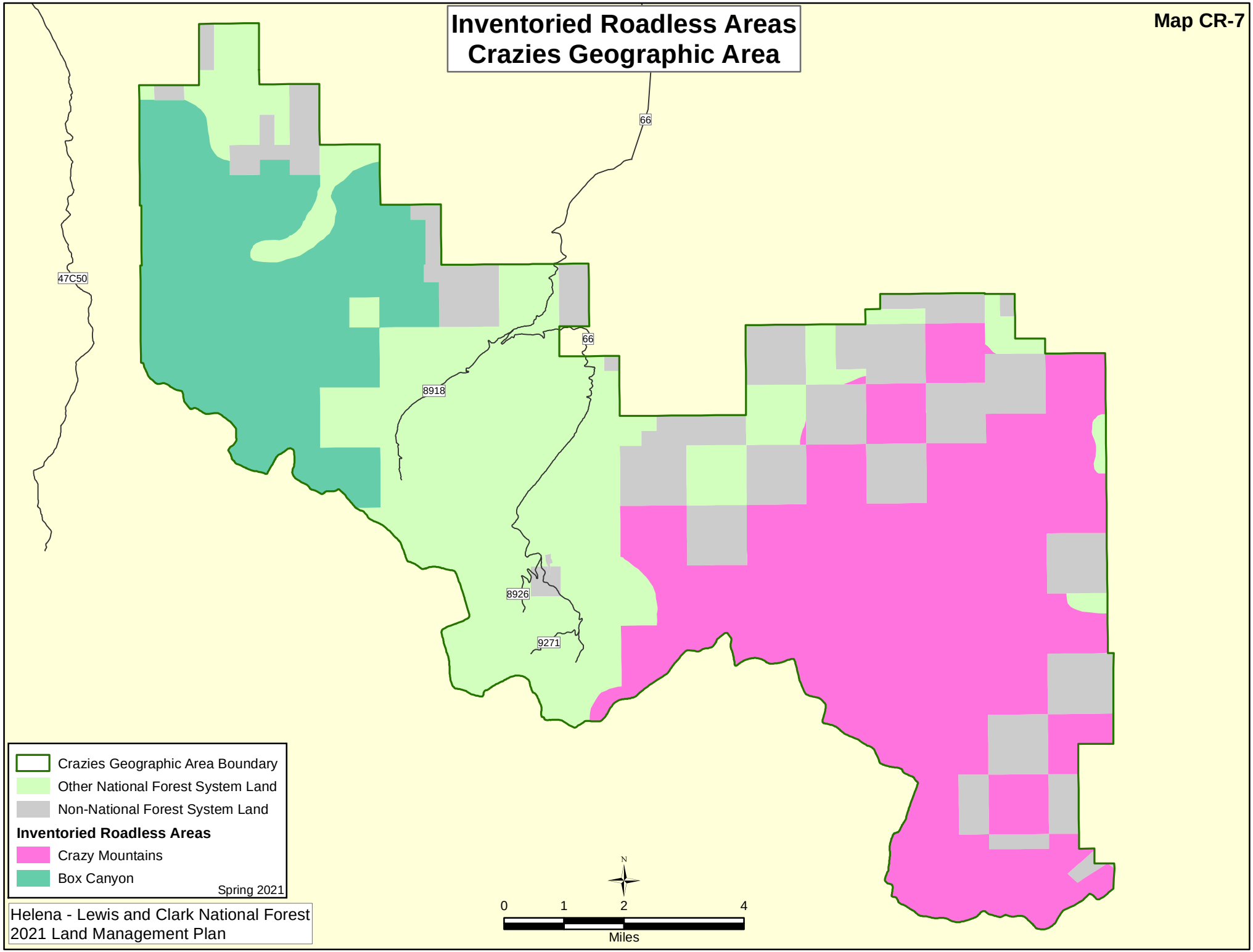
Map CR-6



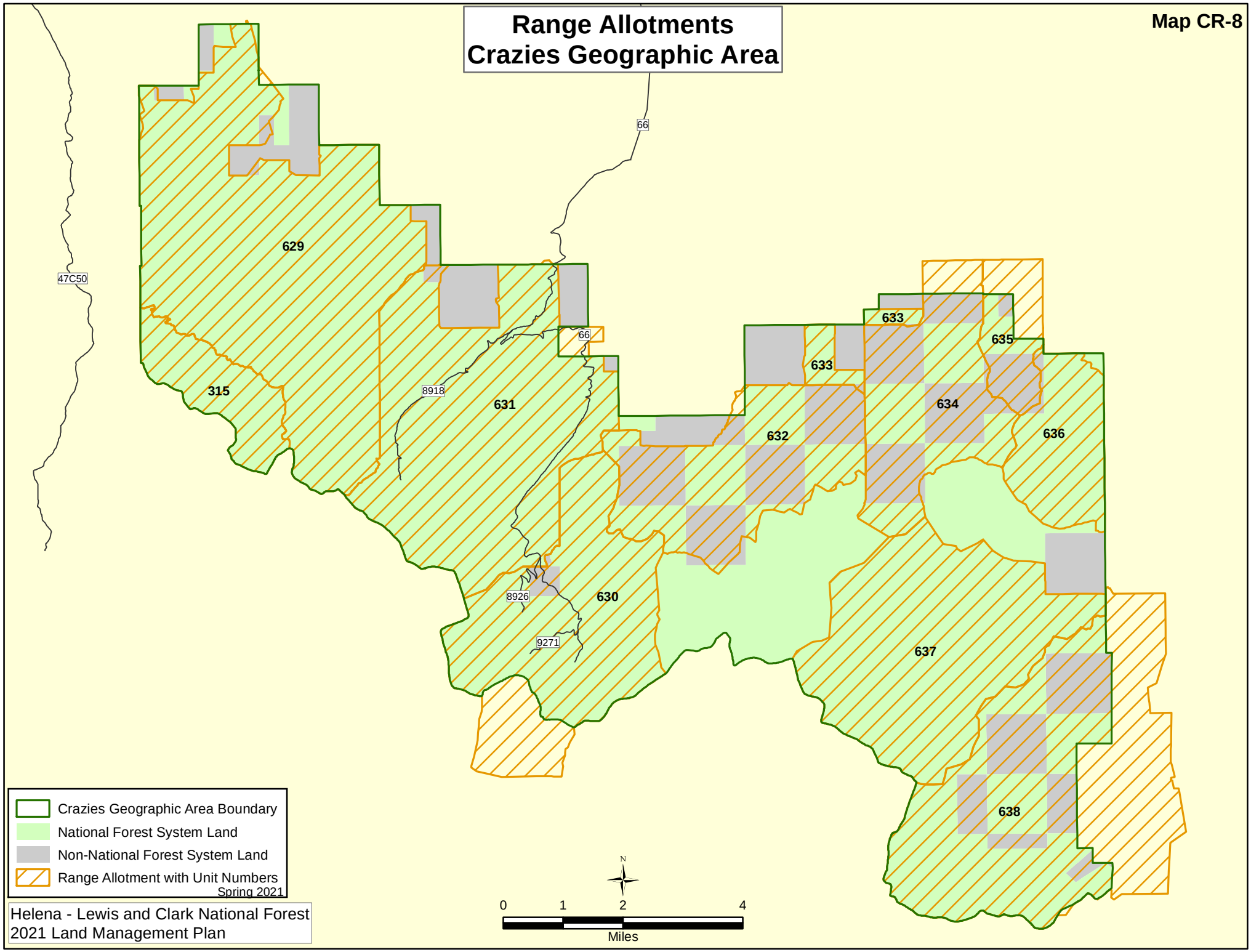
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Inventoried Roadless Areas
Crazies Geographic Area

Map CR-7

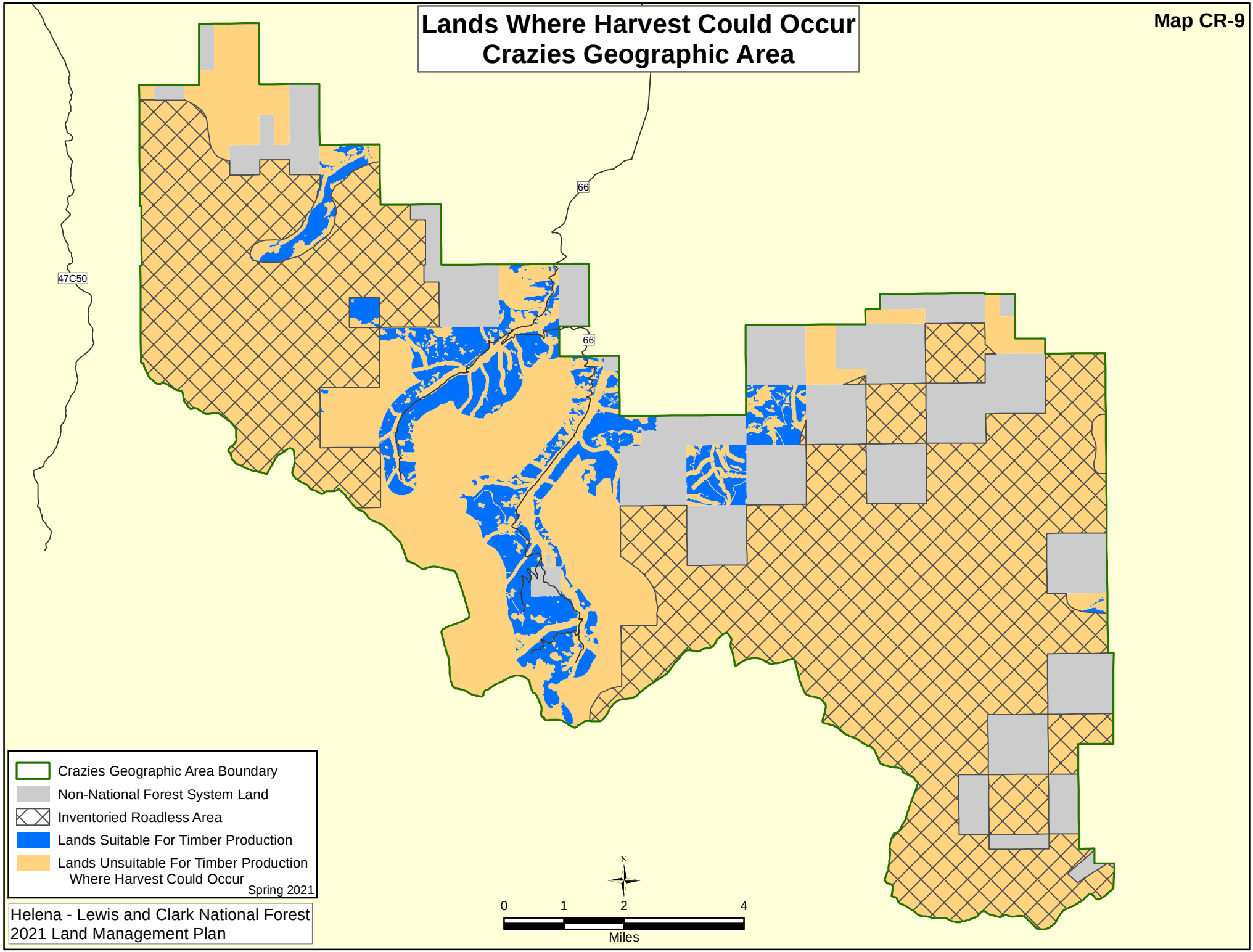


Helena - Lewis and Clark National Forest
2021 Land Management Plan

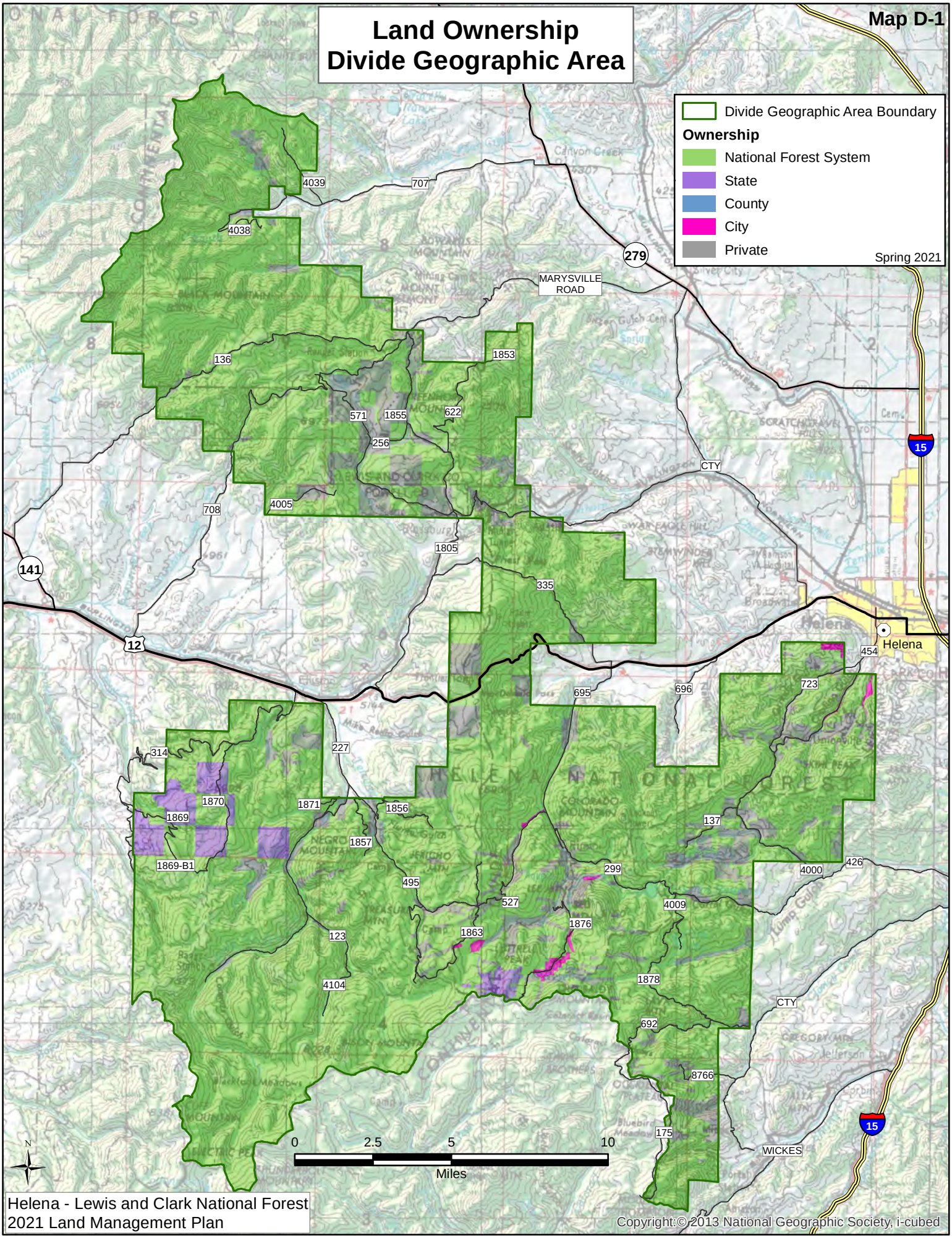

Range Allotments
Crazies Geographic Area
Map CR-8
66
47C50
629
66
633
635
633
315
8918
631
634
632
636
8926
630
9271
637
638
Crazies Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan
N
0
1
2
4
Miles

Lands Where Harvest Could Occur
Crazies Geographic Area

Map CR-9



Helena - Lewis and Clark National Forest
2021 Land Management Plan


Map D-1
Land Ownership
Divide Geographic Area
Divide Geographic Area Boundary
Ownership
National Forest System
State
County
City
Private
Spring 2021
MARYSVILLE ROAD
CTY
Helena
HELENA NATIONAL FOREST
WICKES
4039
707
4038
279
136
1853
571
1855
622
256
15
708
4005
1805
141
335
12
454
723
695
696
314
227
1870
1871
1856
1869
137
1857
1869-B1
299
4000
426
495
527
4009
1876
123
1863
4104
1878
692
8766
175
0
2.5
5
10
Miles
N
Helena - Lewis and Clark National Forest
2021 Land Management Plan
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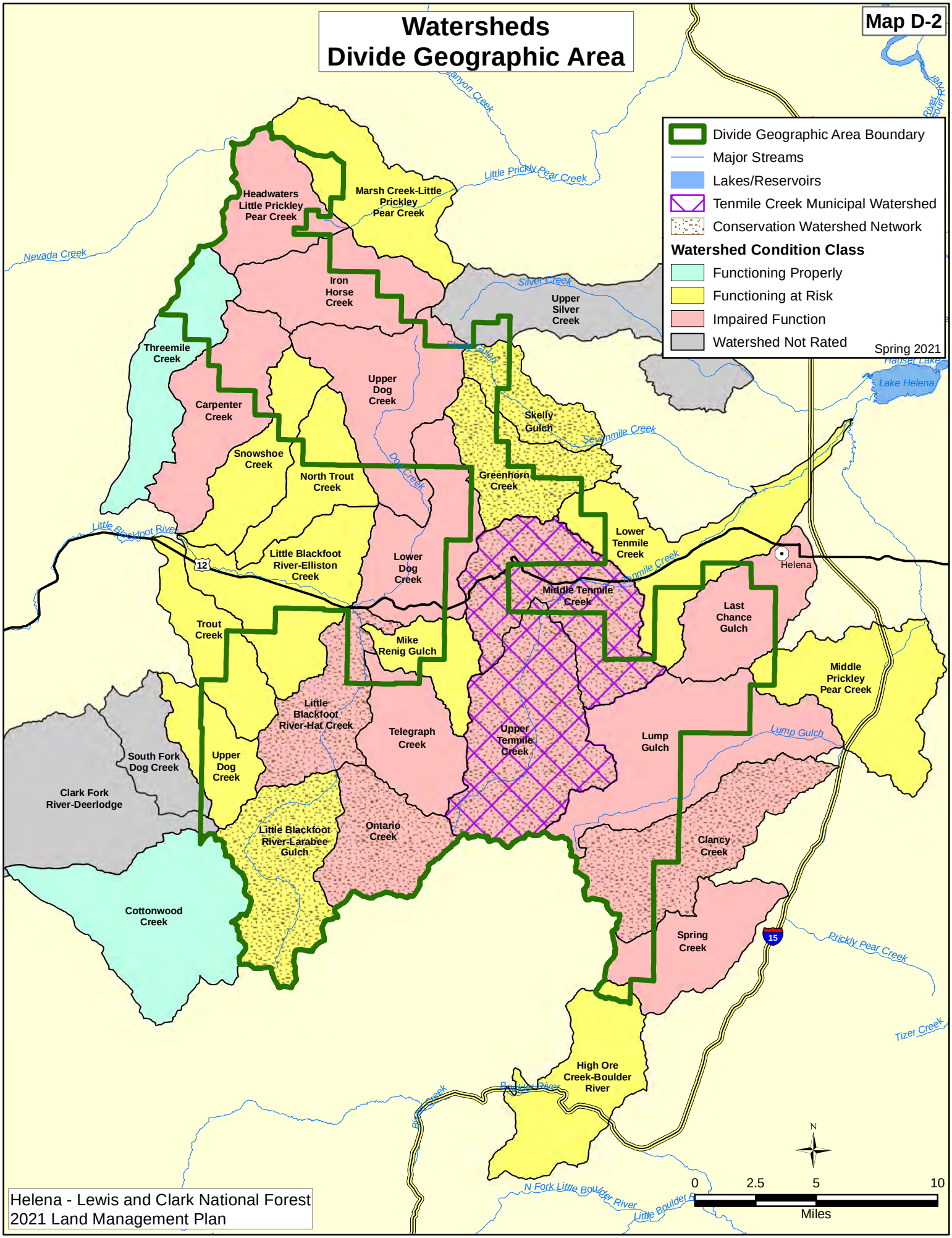
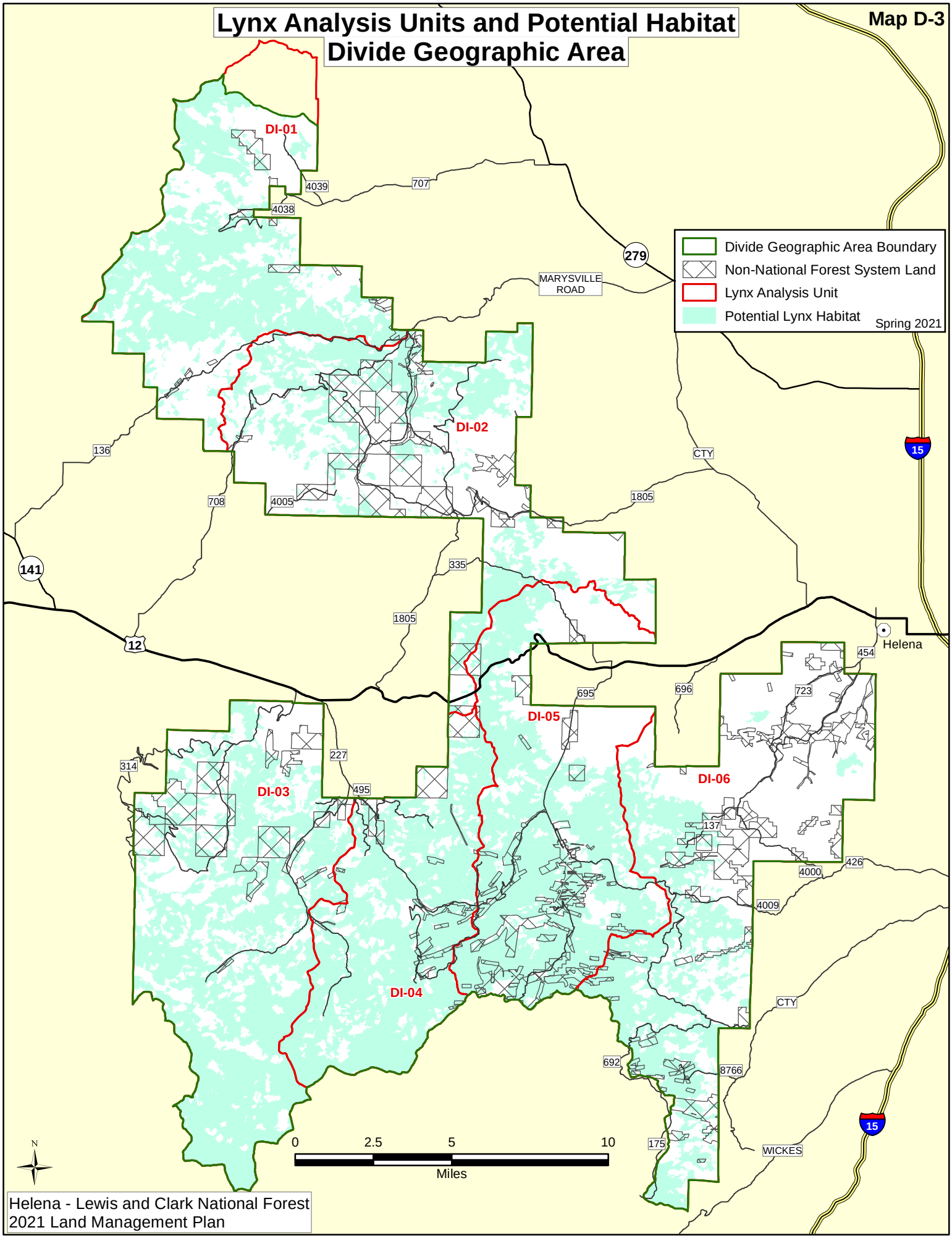
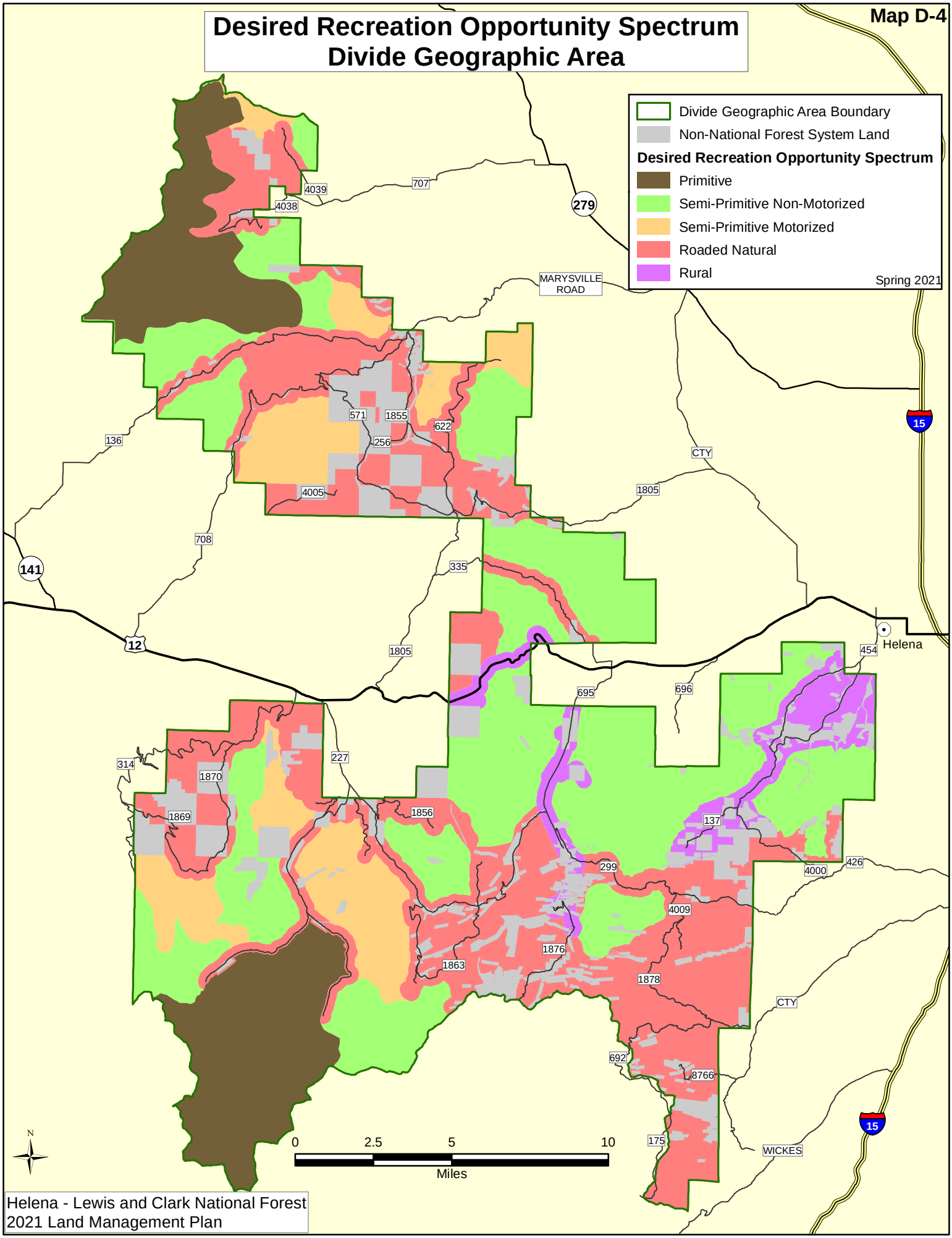

Watersheds
Divide Geographic Area
Map D-2
Divide Geographic Area Boundary
Major Streams
Lakes/Reservoirs
Tenmile Creek Municipal Watershed
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Impaired Function
Watershed Not Rated
Spring 2021
Headwaters Little Prickley Pear Creek
Marsh Creek-Little Prickley Pear Creek
Iron Horse Creek
Upper Silver Creek
Threemile Creek
Carpenter Creek
Upper Dog Creek
Skelly Gulch
Snowshoe Creek
North Trout Creek
Greenhorn Creek
Lower Tenmile Creek
Little Blackfoot River-Elliston Creek
Lower Dog Creek
Middle Tenmile Creek
Last Chance Gulch
Trout Creek
Mike Renig Gulch
Middle Prickley Pear Creek
Little Blackfoot River-Hat Creek
Telegraph Creek
Upper Tenmile Creek
Lump Gulch
South Fork Dog Creek
Upper Dog Creek
Clark Fork River-Deerlodge
Little Blackfoot River-Larabee Gulch
Ontario Creek
Clancy Creek
Cottonwood Creek
Spring Creek
High Ore Creek-Boulder River
Nevada Creek
Little Prickly Pear Creek
Silver Creek
Canyon Creek
Sevenmile Creek
Dog Creek
Little Blackfoot River
Lump Gulch
Prickly Pear Creek
Tizer Creek
Boulder River
N Fork Little Boulder River
Little Boulder R
Hauser Lake
Lake Helena
Helena
12
15
N
0
2.5
5
10
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Lynx Analysis Units and Potential Habitat
Divide Geographic Area
Map D-3
DI-01
DI-02
DI-03
DI-04
DI-05
DI-06
4039
4038
707
279
MARYSVILLE ROAD
136
708
4005
CTY
1805
15
141
335
12
Helena
454
695
696
723
227
314
495
137
426
4000
4009
692
8766
175
WICKES
Divide Geographic Area Boundary
Non-National Forest System Land
Lynx Analysis Unit
Potential Lynx Habitat
Spring 2021
N
0
2.5
5
10
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Divide Geographic Area

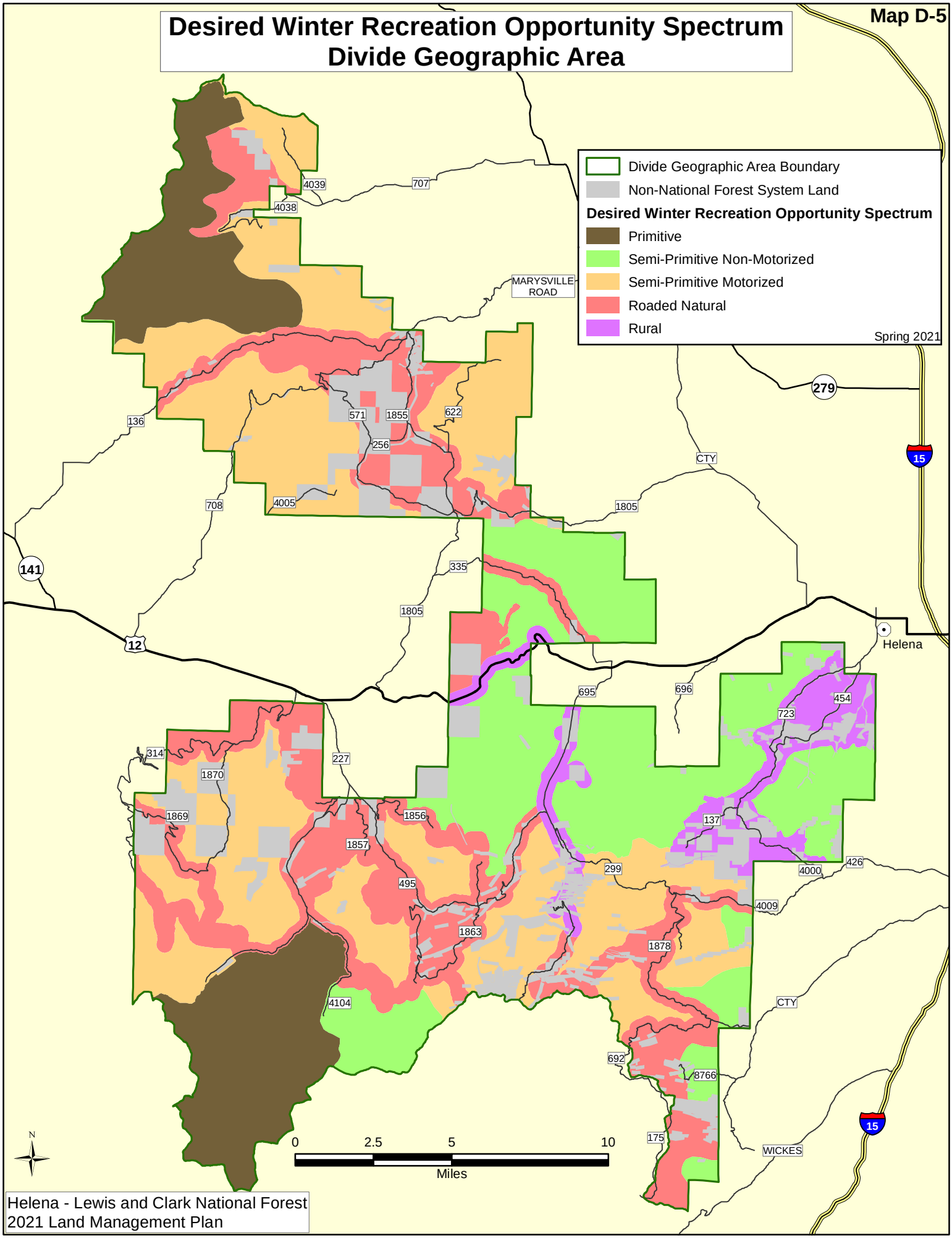
Map D-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Map D-5

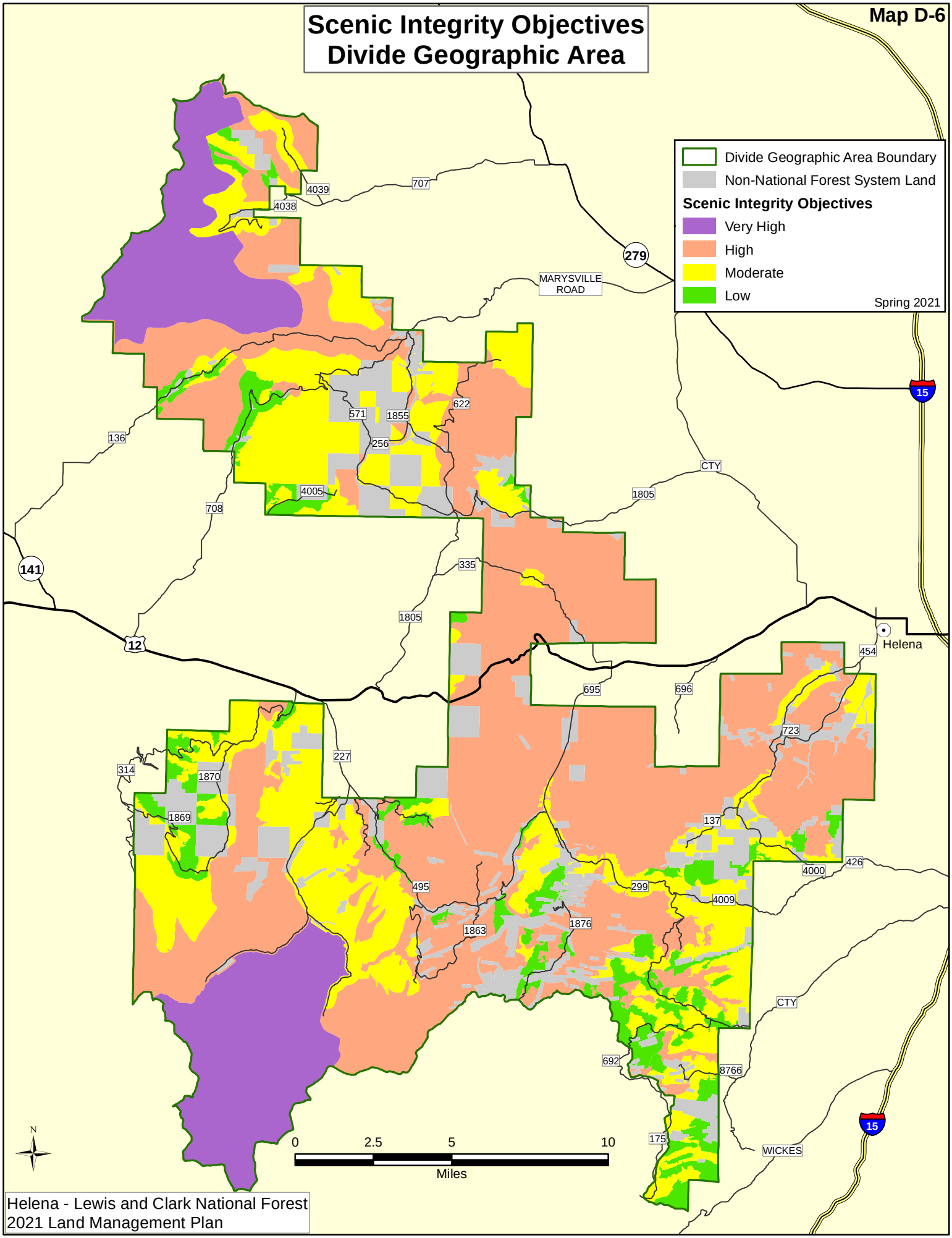
Desired Winter Recreation Opportunity Spectrum
Divide Geographic Area



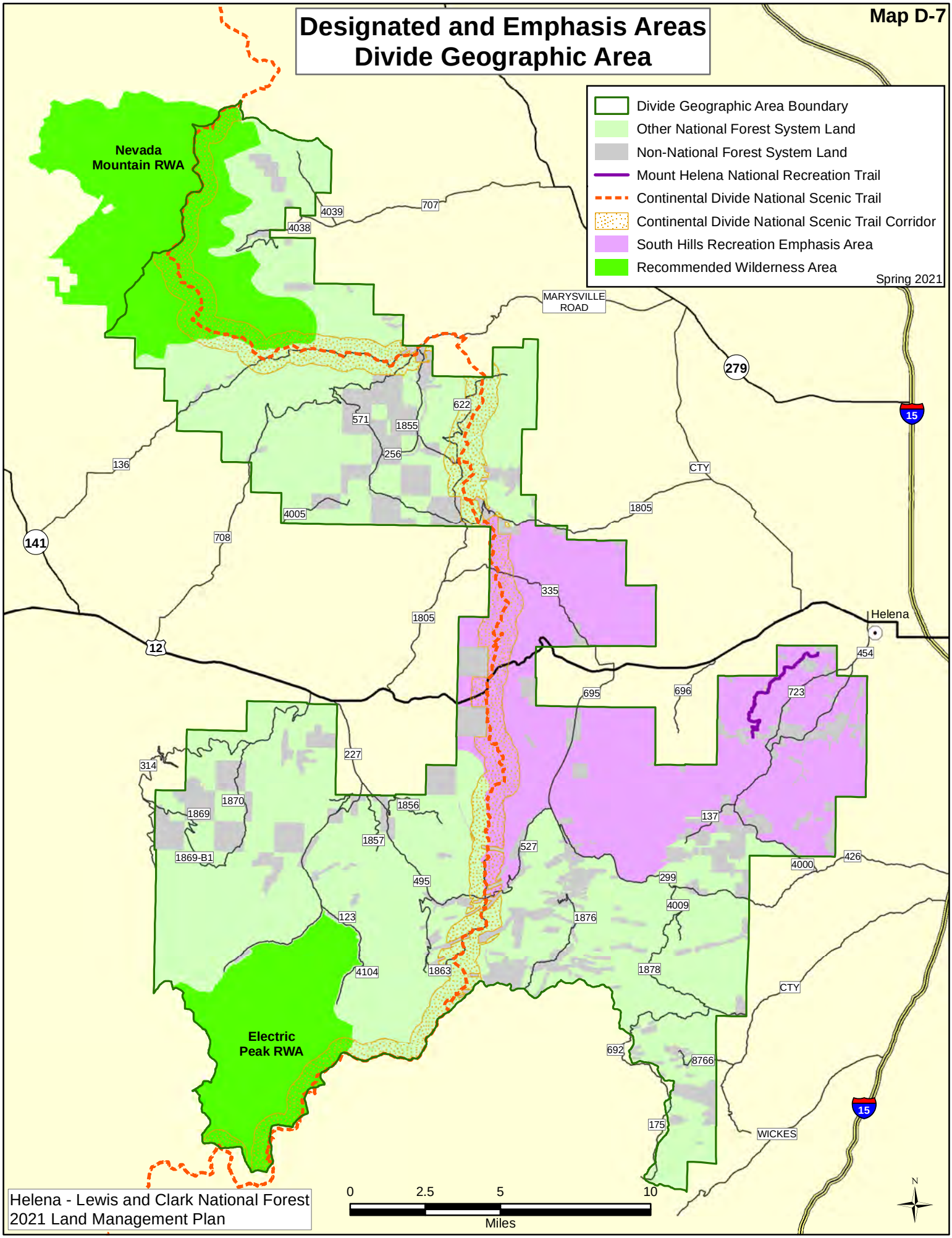
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Divide Geographic Area

Map D-6

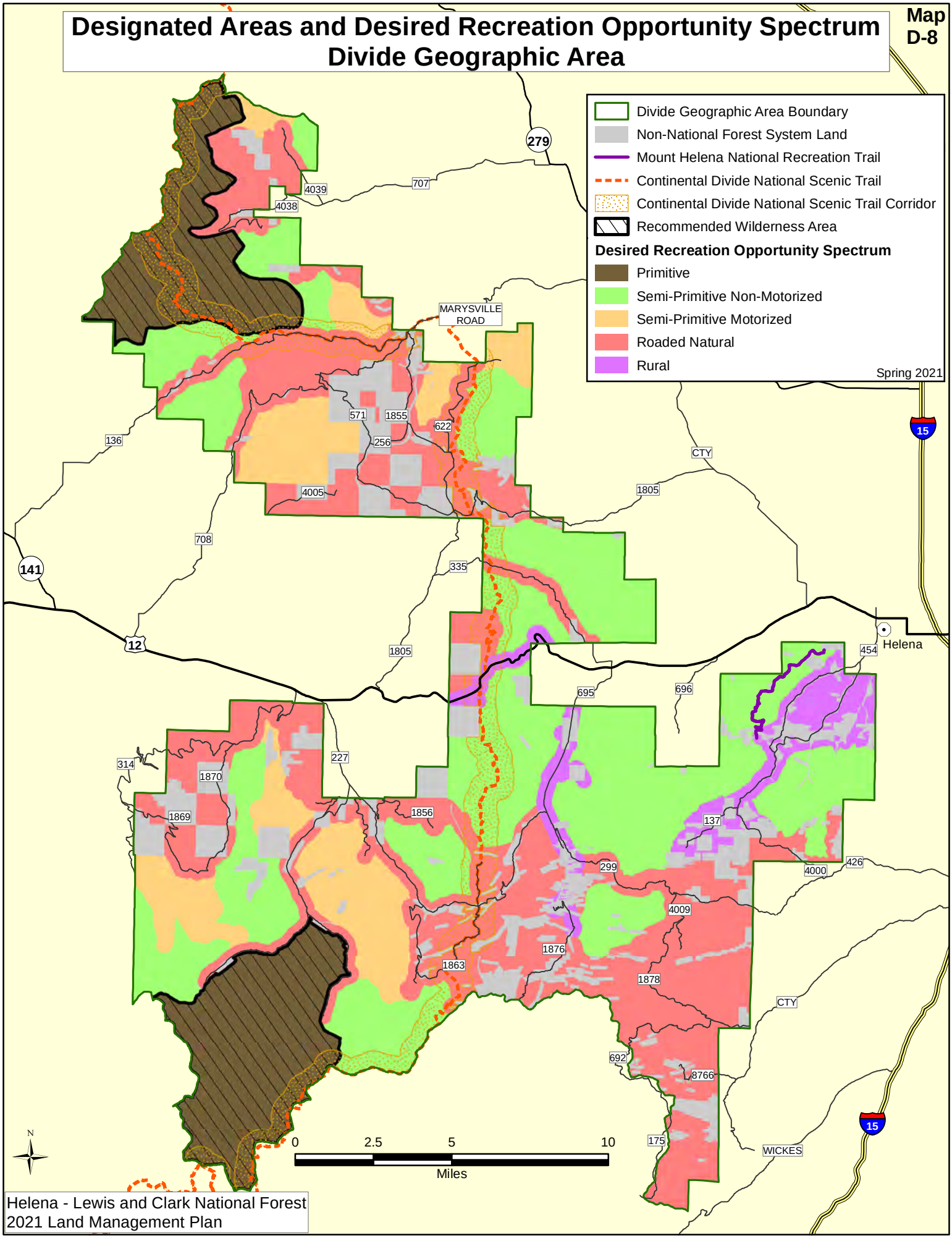


Helena - Lewis and Clark National Forest
2021 Land Management Plan


Designated and Emphasis Areas
Divide Geographic Area
Map D-7
Divide Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Mount Helena National Recreation Trail
Continental Divide National Scenic Trail
Continental Divide National Scenic Trail Corridor
South Hills Recreation Emphasis Area
Recommended Wilderness Area
Spring 2021
Nevada Mountain RWA
Electric Peak RWA
MARYSVILLE ROAD
CTY
Helena
WICKES
4039
4038
707
622
571
1855
256
136
4005
708
141
1805
335
12
454
695
696
723
227
314
1870
1869
1856
1857
1869-B1
527
137
426
4000
495
299
4009
123
1876
4104
1863
1878
692
8766
175
279
15
0
2.5
5
10
Miles
N
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Recreation Opportunity Spectrum
Divide Geographic Area

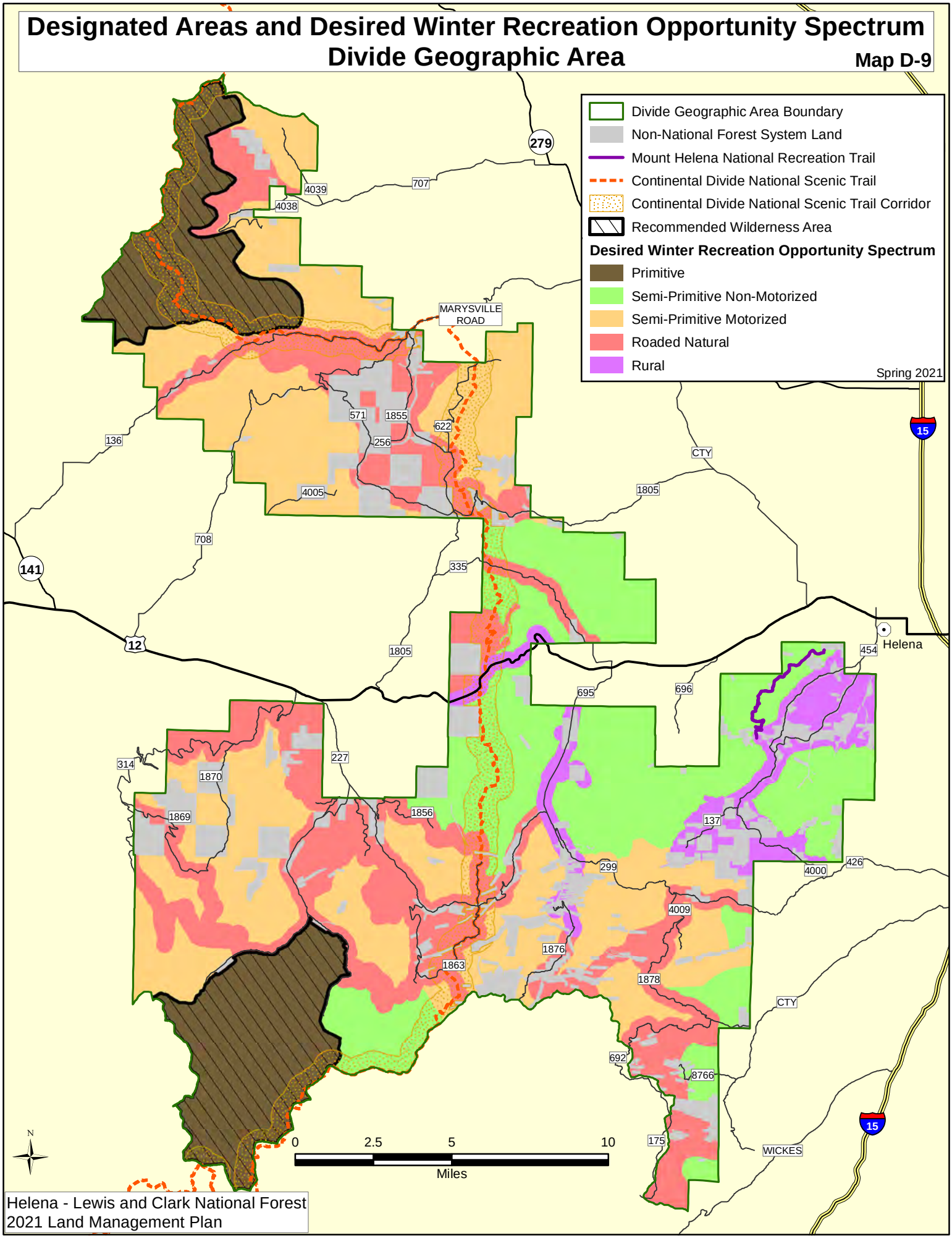
Map D-8



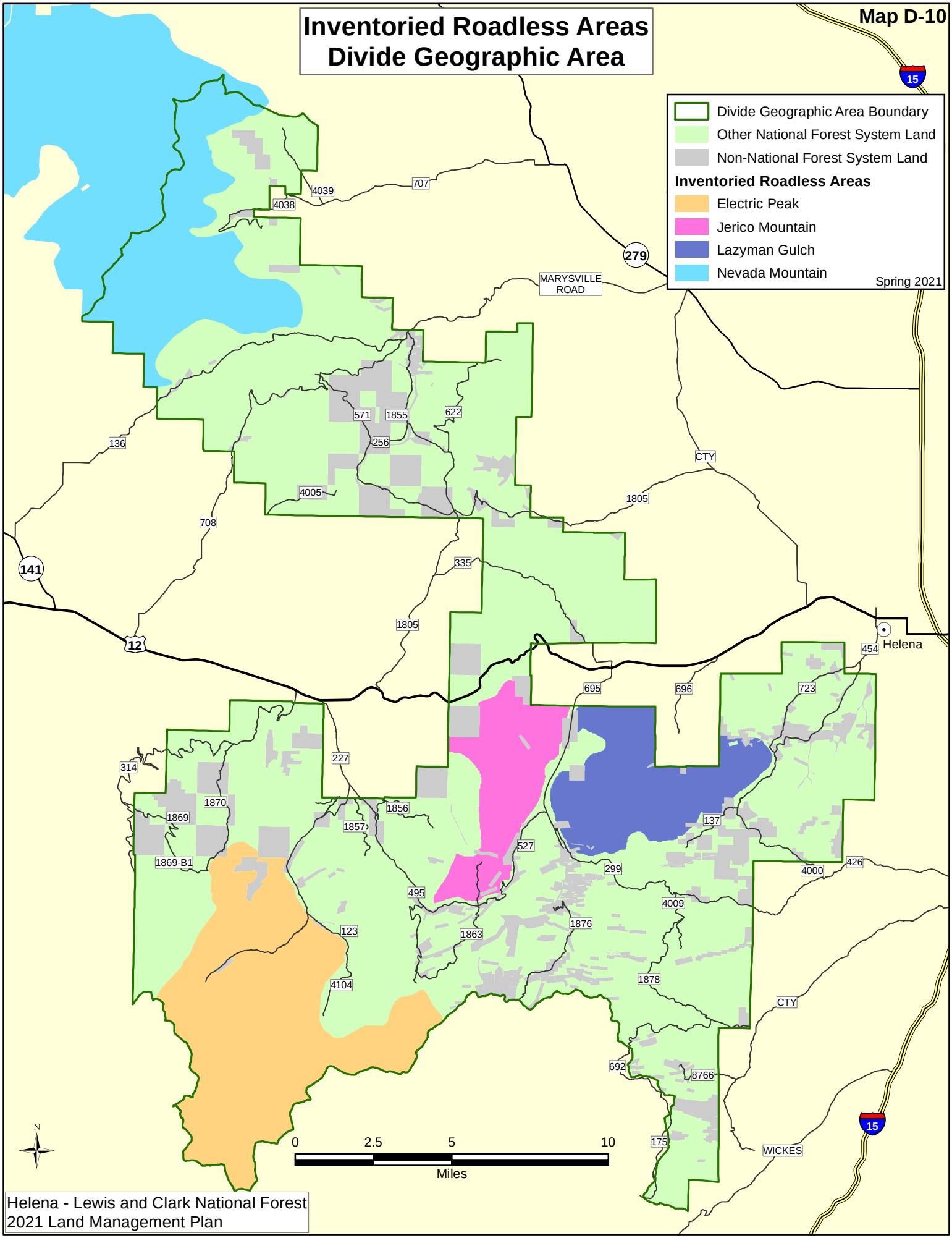
Helena - Lewis and Clark National Forest
2021 Land Management Plan

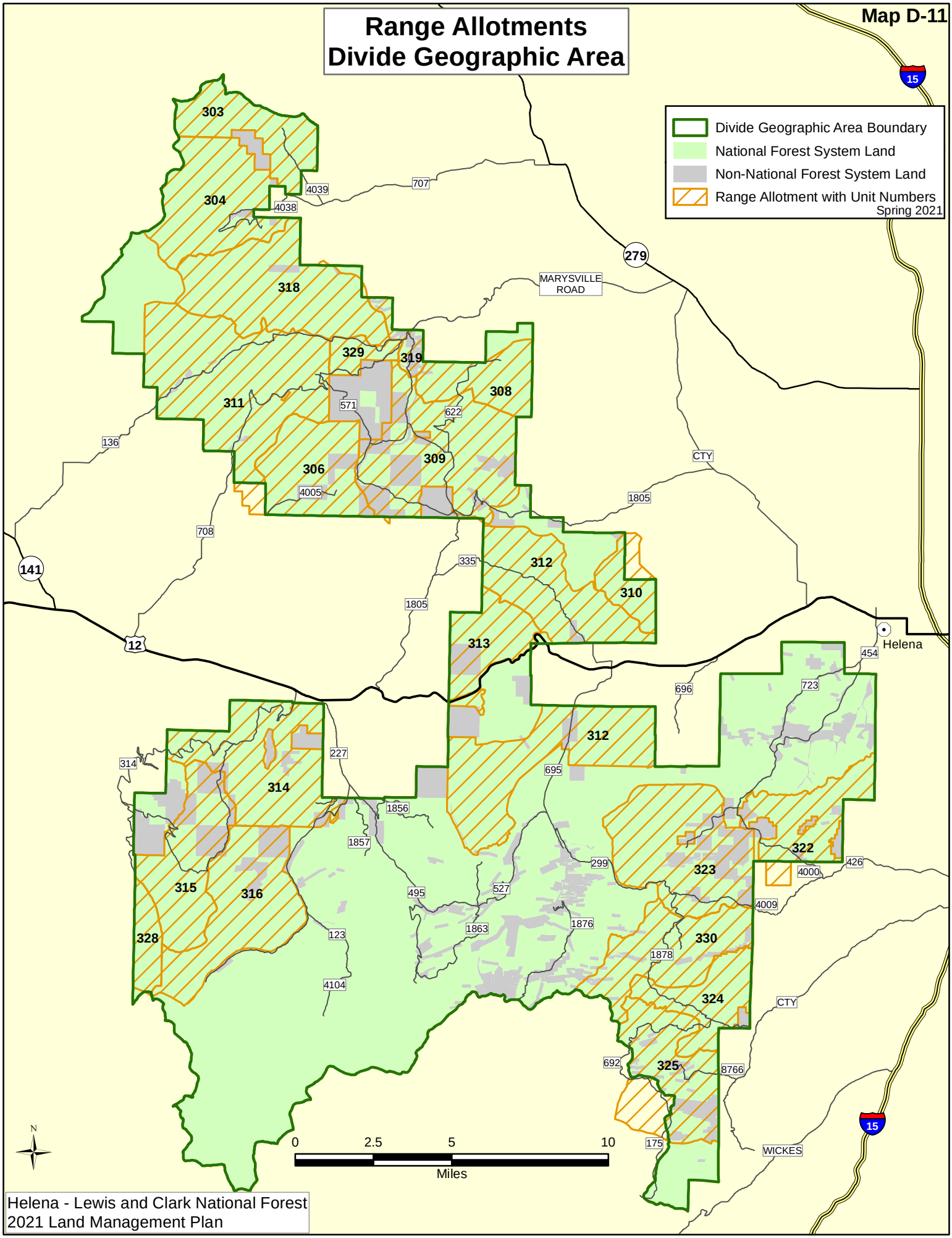
Designated Areas and Desired Winter Recreation Opportunity Spectrum
Divide Geographic Area

Map D-9



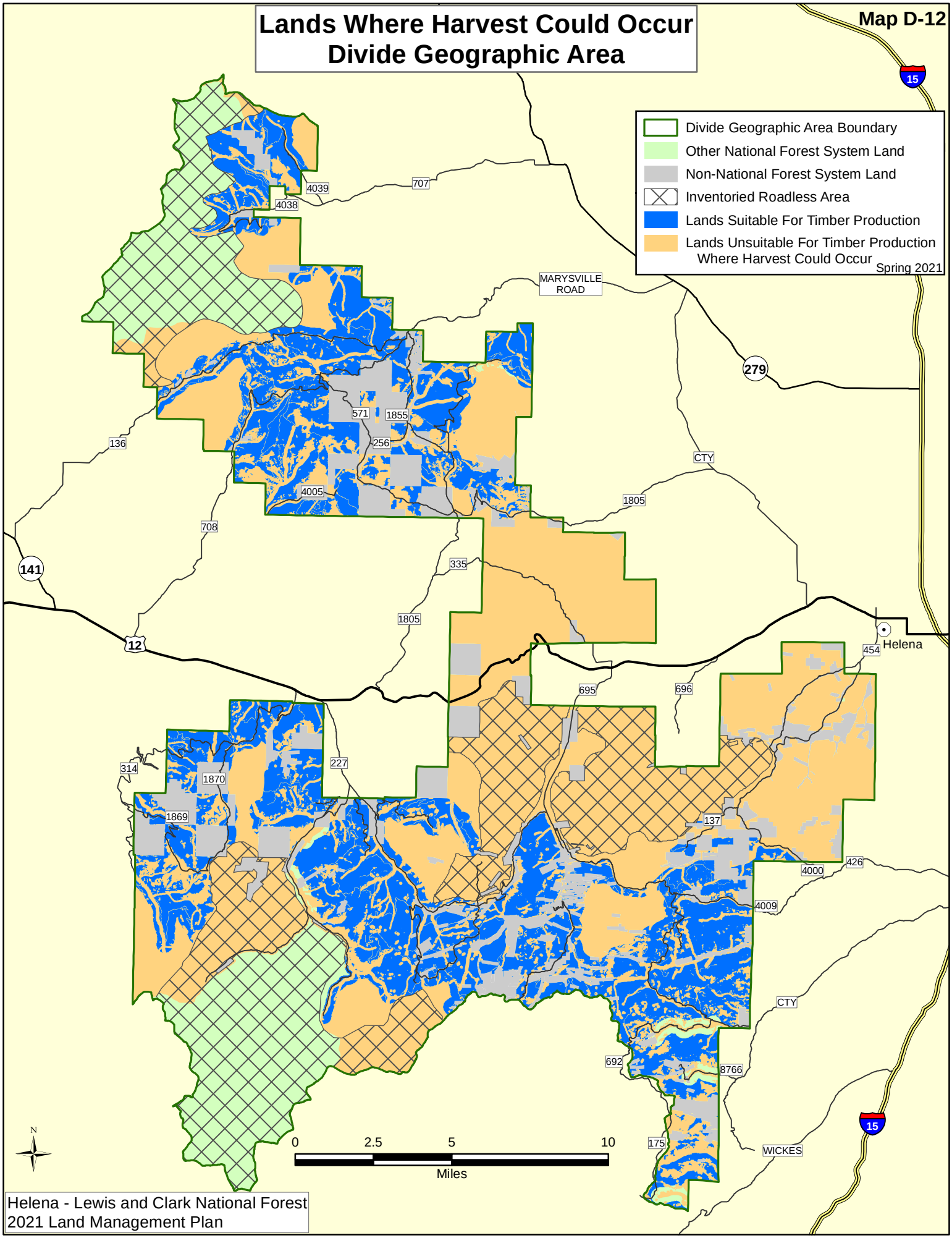
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Inventoried Roadless Areas
Divide Geographic Area
Map D-10
Divide Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Electric Peak
Jerico Mountain
Lazyman Gulch
Nevada Mountain
Spring 2021
15
279
141
12
MARYSVILLE ROAD
CTY
Helena
4039
4038
707
571
1855
622
256
136
4005
708
335
1805
454
695
696
723
227
314
1870
1869
1856
1857
137
527
1869-B1
299
426
4000
495
4009
1876
1863
123
4104
1878
692
8766
175
WICKES
0
2.5
5
10
Miles
N
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Range Allotments
Divide Geographic Area
Map D-11
Divide Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
303
304
318
329
319
308
311
571
622
306
309
4005
312
310
313
314
315
316
328
323
322
330
324
325
MARYSVILLE ROAD
Helena
WICKES
CTY
4039
4038
707
279
136
708
141
12
335
1805
454
696
723
227
314
695
1856
1857
299
426
4000
4009
495
527
1863
1876
1878
123
4104
692
8766
175
15
N
0
2.5
5
10
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Lands Where Harvest Could Occur
Divide Geographic Area

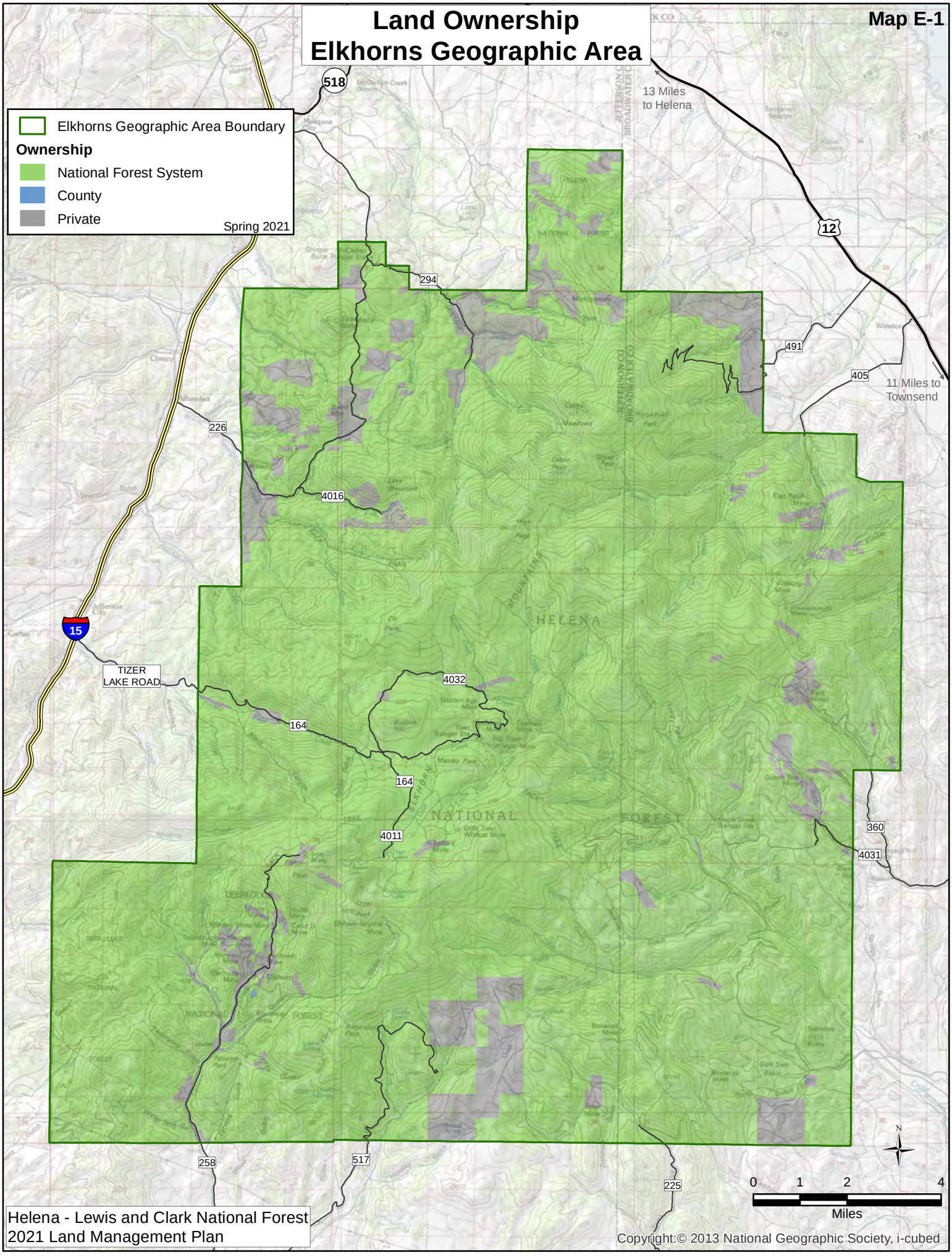
Map D-12

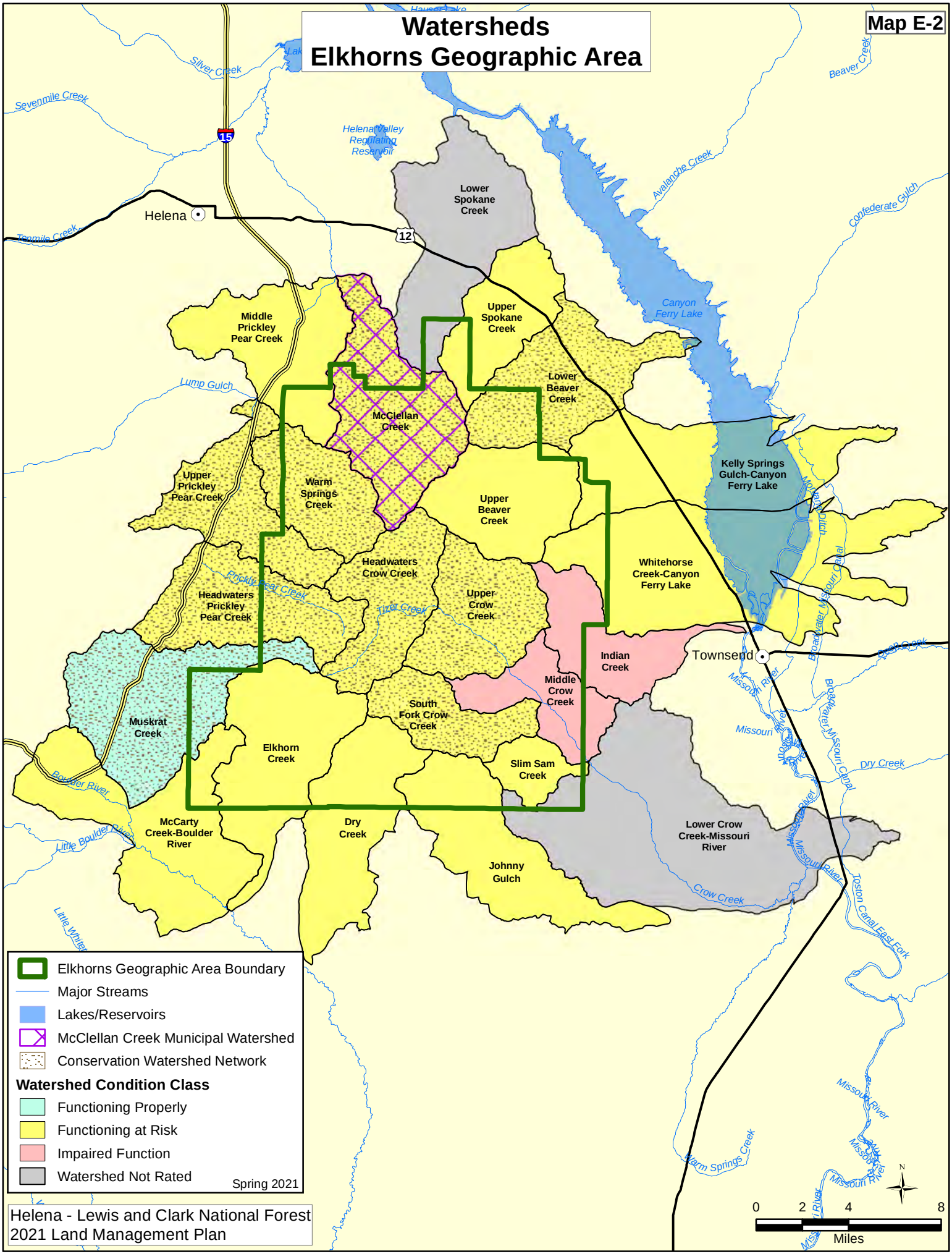


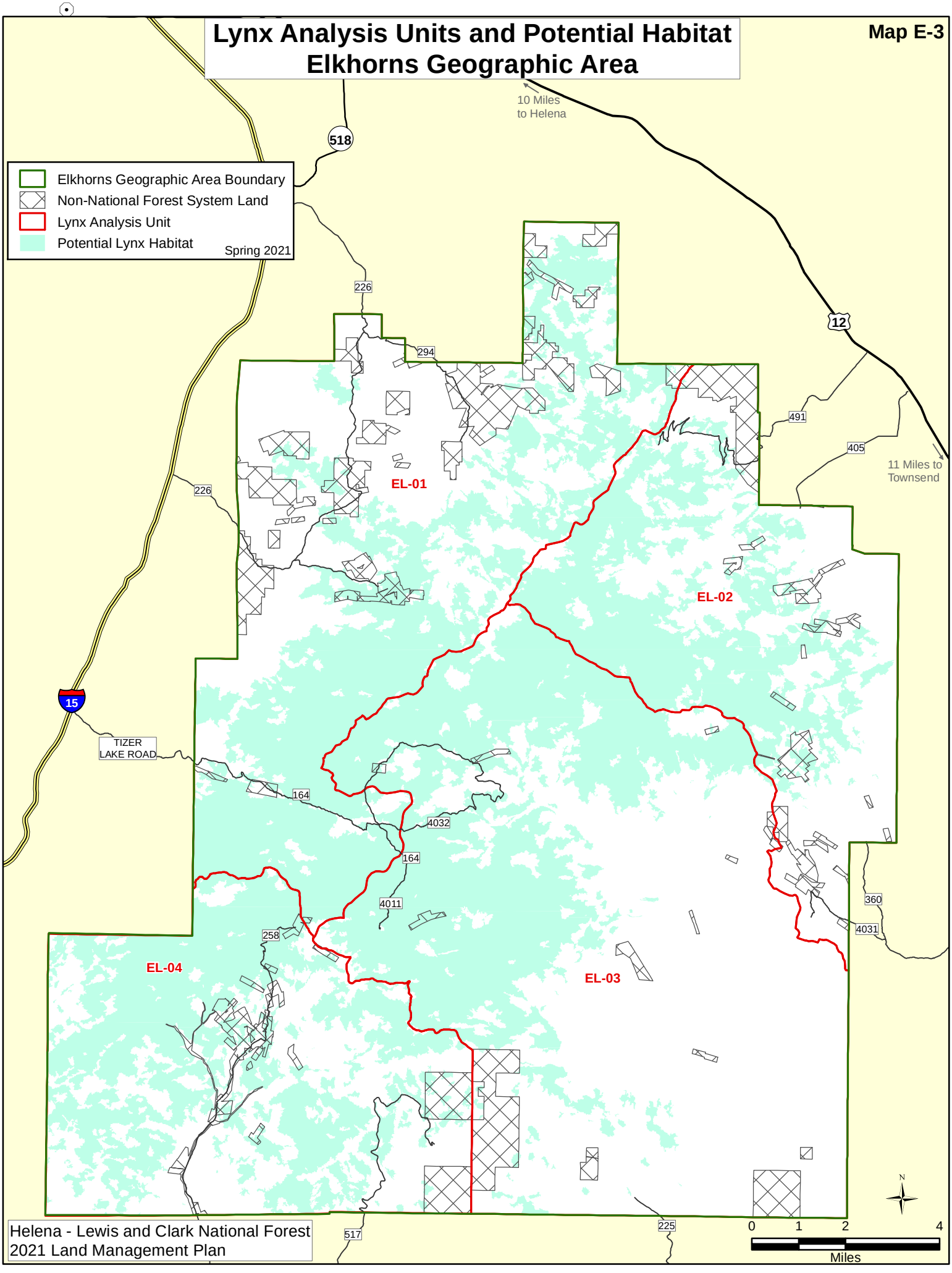
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Land Ownership
Elkhorns Geographic Area

Map E-1

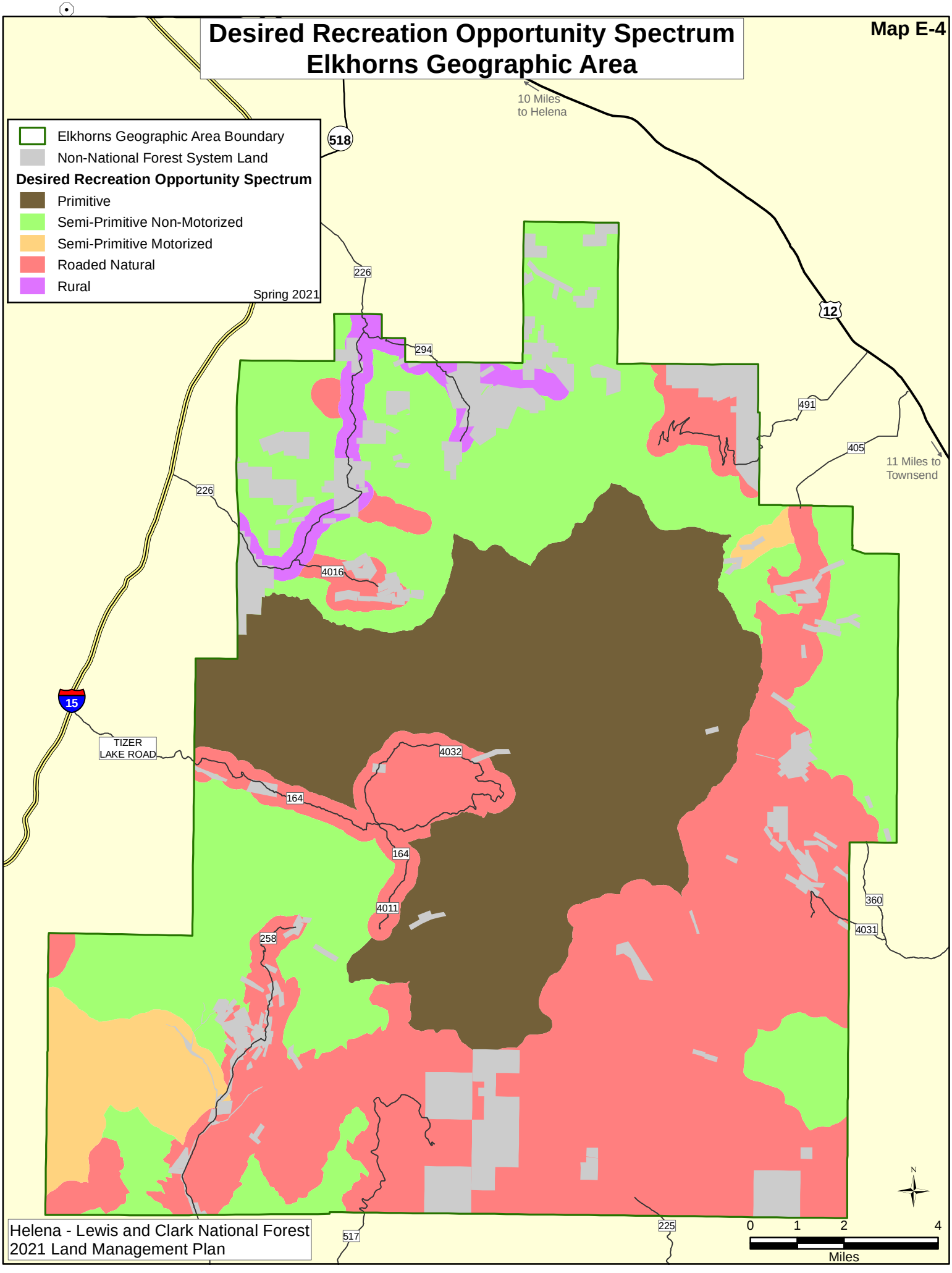



Watersheds
Elkhorns Geographic Area
Map E-2
Helena
Townsend
Lower Spokane Creek
Middle Prickley Pear Creek
Upper Spokane Creek
Lower Beaver Creek
McClellan Creek
Upper Prickley Pear Creek
Warm Springs Creek
Upper Beaver Creek
Kelly Springs Gulch-Canyon Ferry Lake
Whitehorse Creek-Canyon Ferry Lake
Headwaters Crow Creek
Headwaters Prickley Pear Creek
Upper Crow Creek
Indian Creek
Middle Crow Creek
South Fork Crow Creek
Muskrat Creek
Elkhorn Creek
Slim Sam Creek
McCarty Creek-Boulder River
Dry Creek
Johnny Gulch
Lower Crow Creek-Missouri River
Helena Valley Regulating Reservoir
Canyon Ferry Lake
Silver Creek
Sevenmile Creek
Tenmile Creek
Lump Gulch
Avalanche Creek
Beaver Creek
Confederate Gulch
Prickly Pear Creek
Tizer Creek
Boulder River
Little Boulder River
Crow Creek
Missouri River
Broadwater Missouri Canal
Toston Canal East Fork
Warm Springs Creek
Elkhorns Geographic Area Boundary
Major Streams
Lakes/Reservoirs
McClellan Creek Municipal Watershed
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Impaired Function
Watershed Not Rated
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan
0 2 4 8
Miles
N


Lynx Analysis Units and Potential Habitat
Elkhorns Geographic Area
Map E-3
10 Miles
to Helena
Elkhorns Geographic Area Boundary
Non-National Forest System Land
Lynx Analysis Unit
Potential Lynx Habitat
Spring 2021
518
226
294
12
491
405
11 Miles to
Townsend
EL-01
EL-02
EL-03
EL-04
15
TIZER
LAKE ROAD
164
4032
164
4011
258
360
4031
517
225
0 1 2 4
Miles
N
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Elkhorns Geographic Area

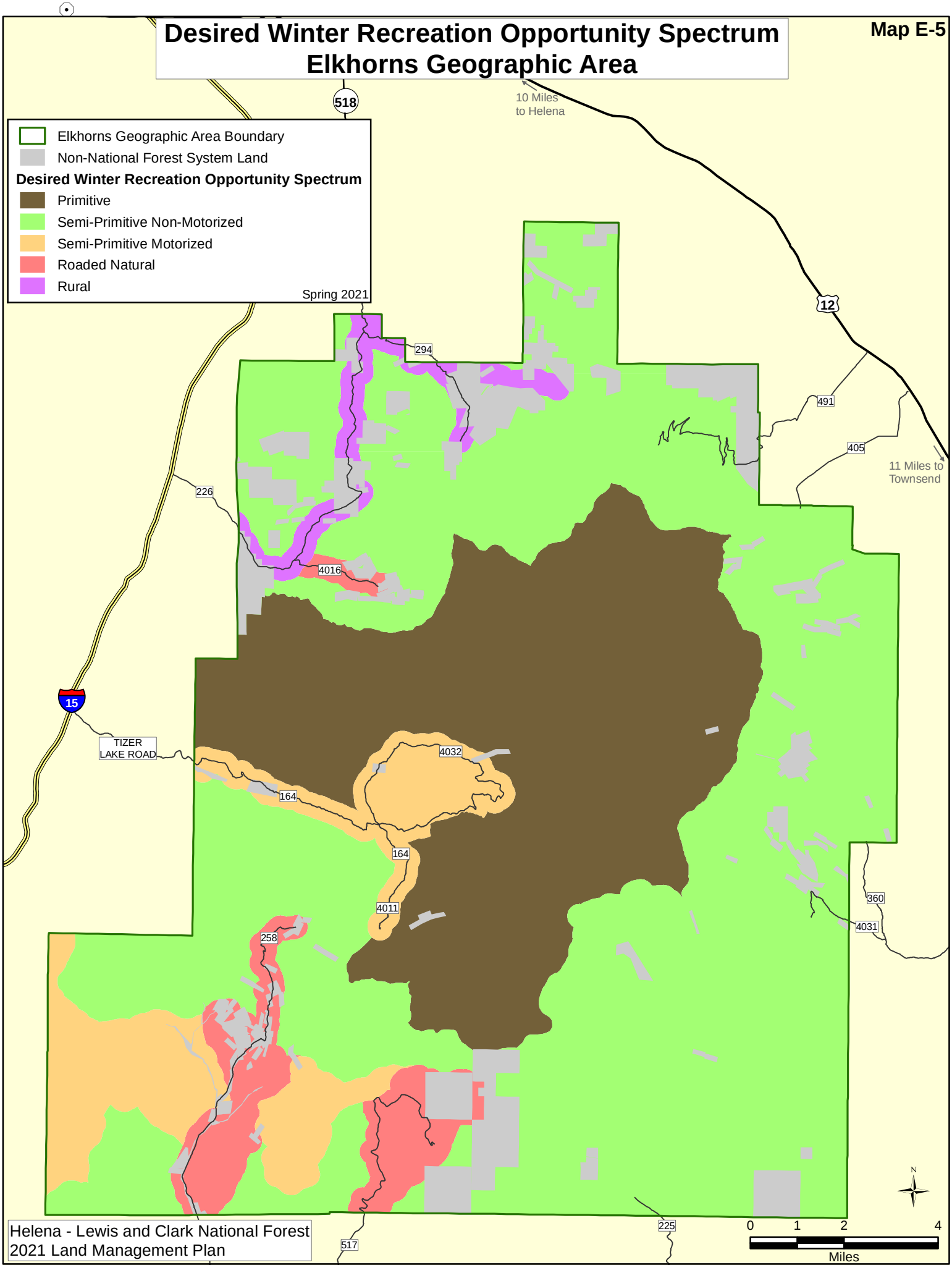
Map E-4



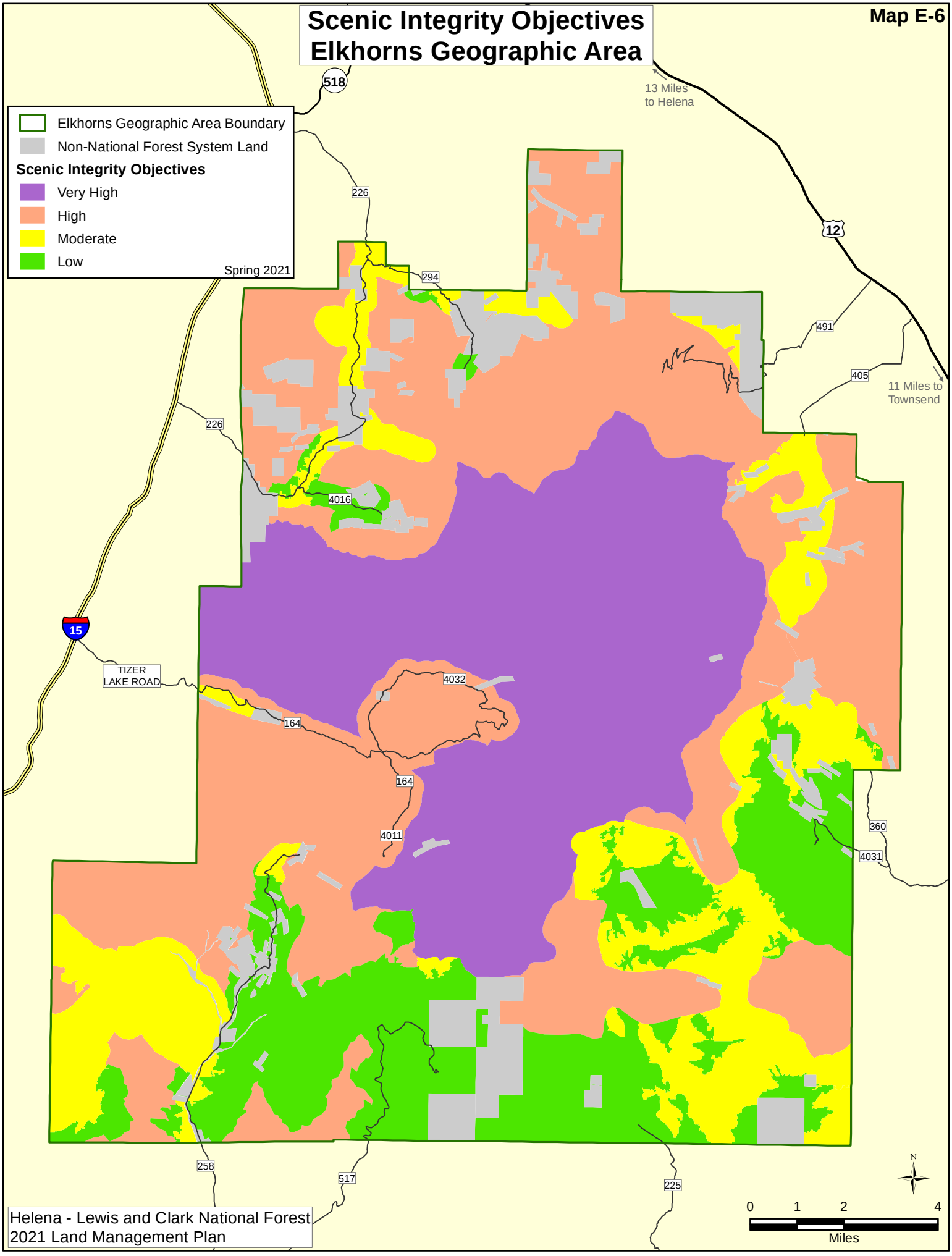
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Elkhorns Geographic Area

Map E-5

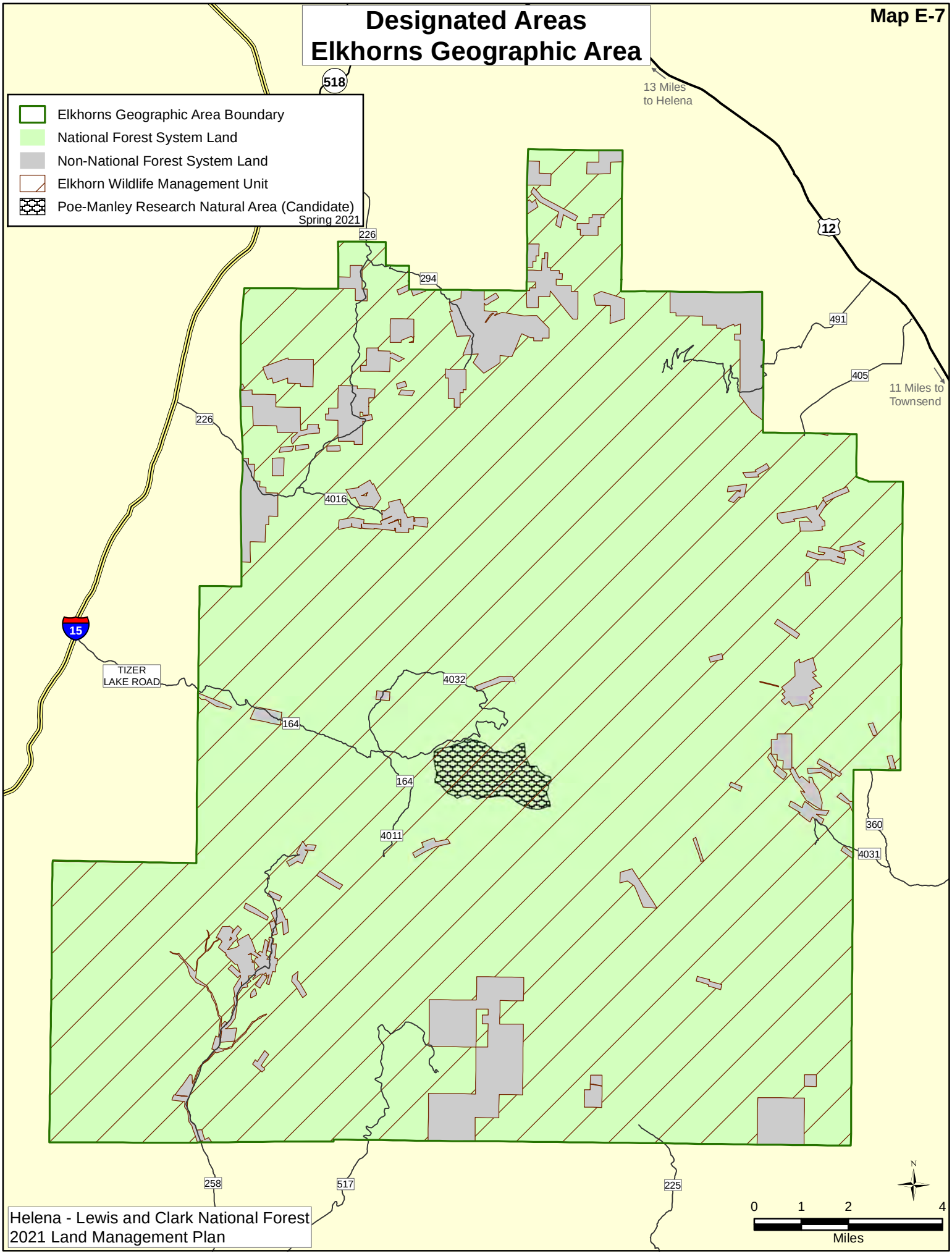


Helena - Lewis and Clark National Forest
2021 Land Management Plan


Scenic Integrity Objectives
Elkhorns Geographic Area
Map E-6
Elkhorns Geographic Area Boundary
Non-National Forest System Land
Scenic Integrity Objectives
Very High
High
Moderate
Low
Spring 2021
518
13 Miles to Helena
226
12
294
491
405
11 Miles to Townsend
226
4016
15
TIZER LAKE ROAD
4032
164
164
4011
360
4031
258
517
225
N
0 1 2 4
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas
Elkhorns Geographic Area

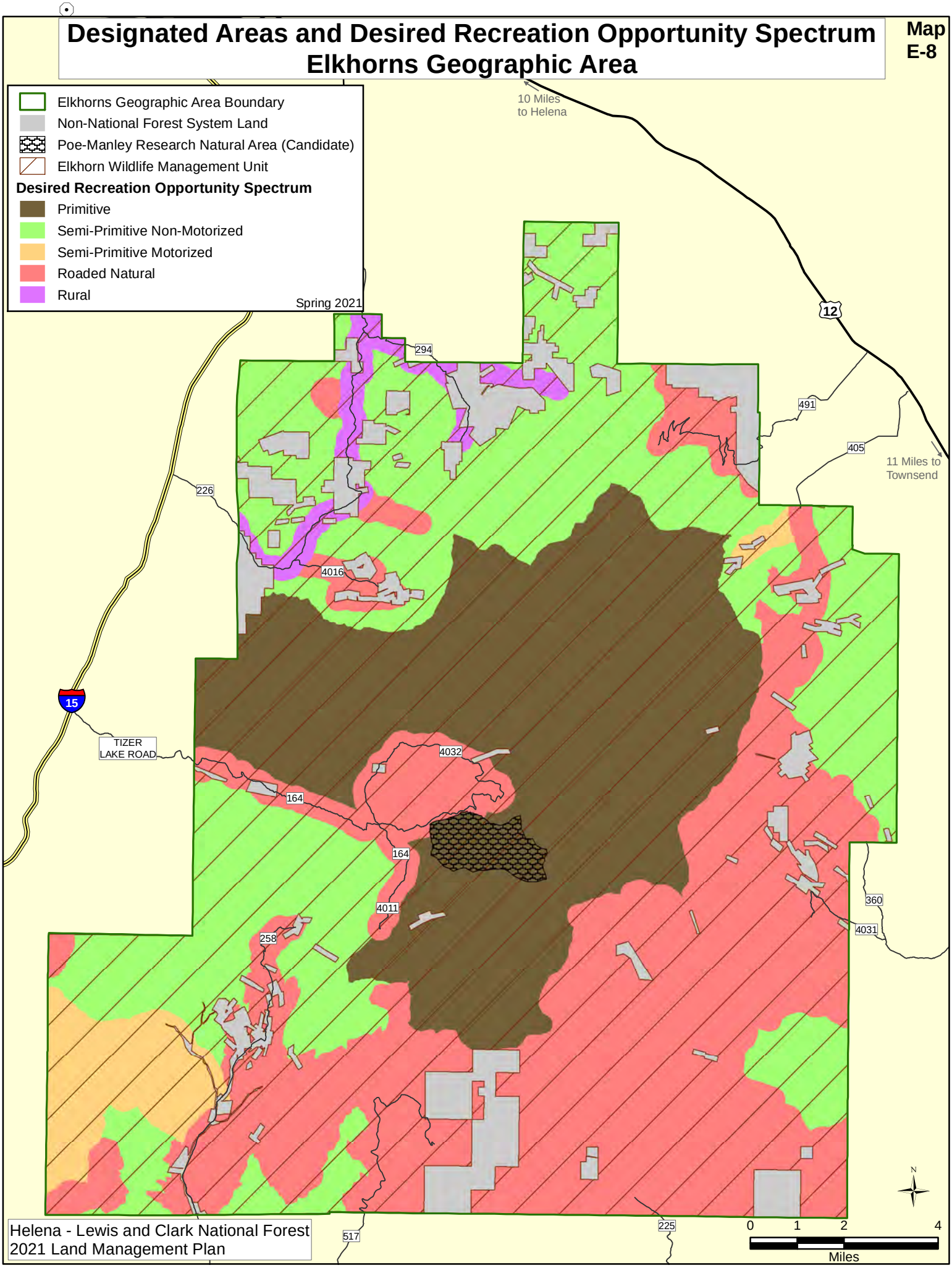
Map E-7



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Recreation Opportunity Spectrum
Elkhorns Geographic Area

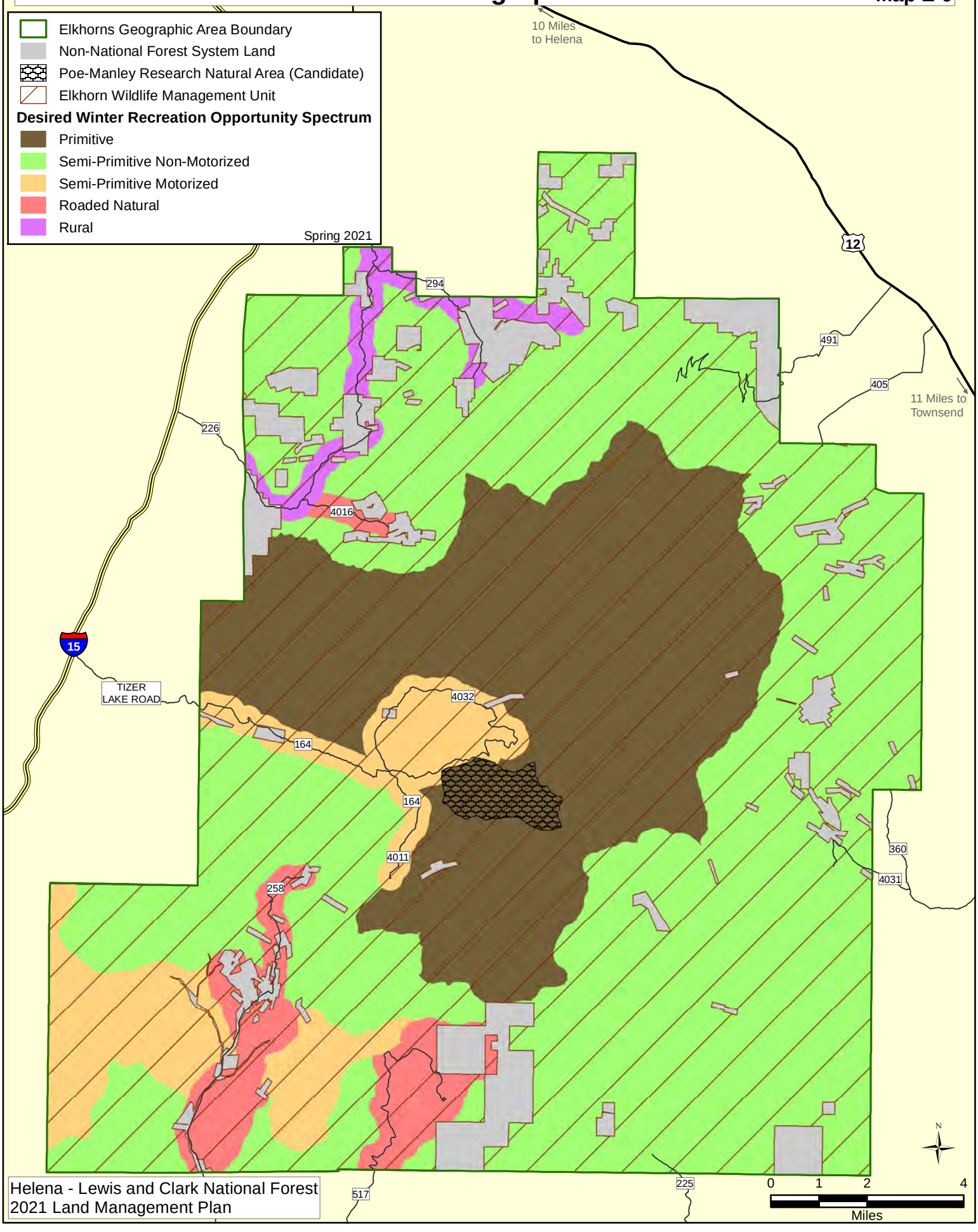
Map E-8



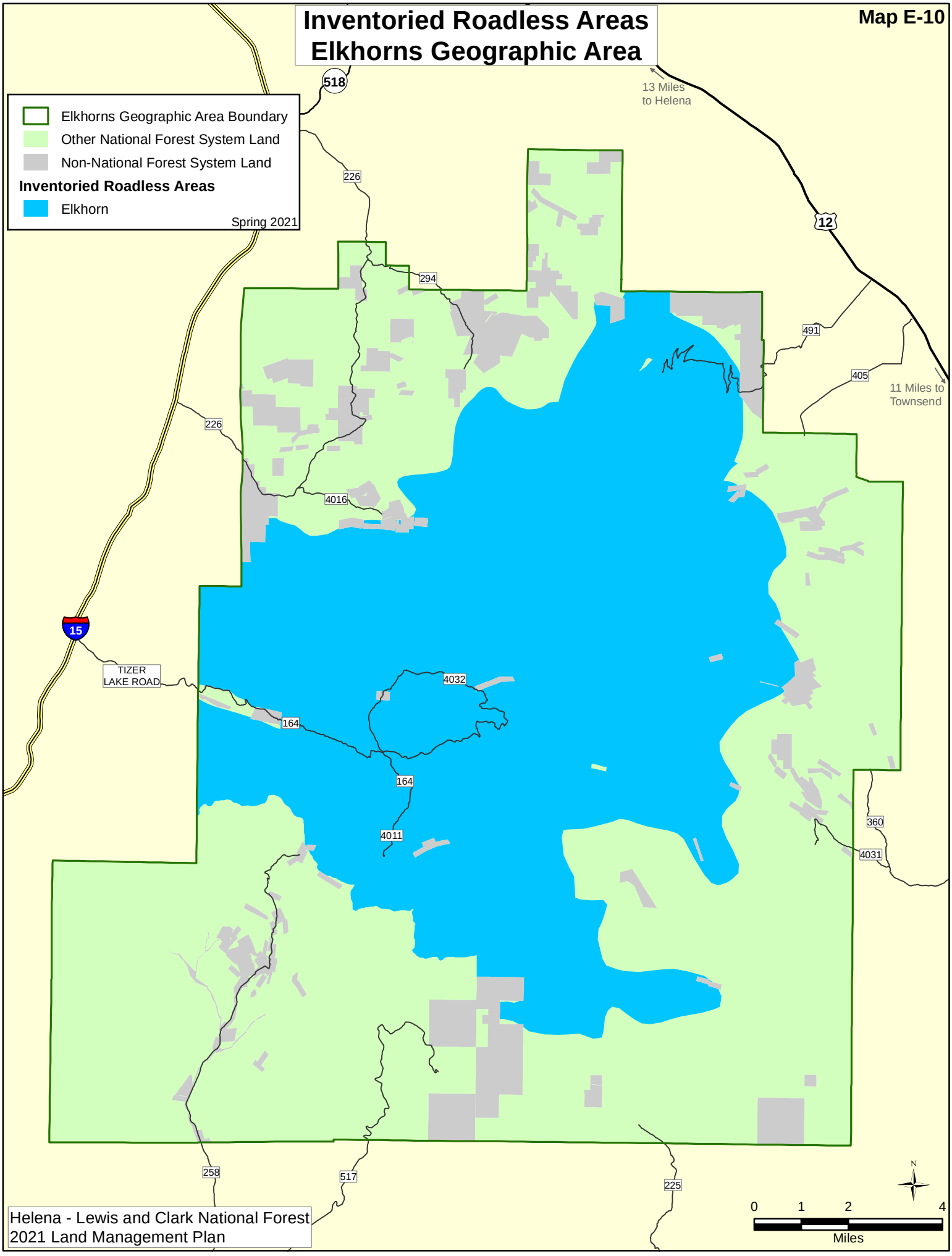
Helena - Lewis and Clark National Forest
2021 Land Management Plan

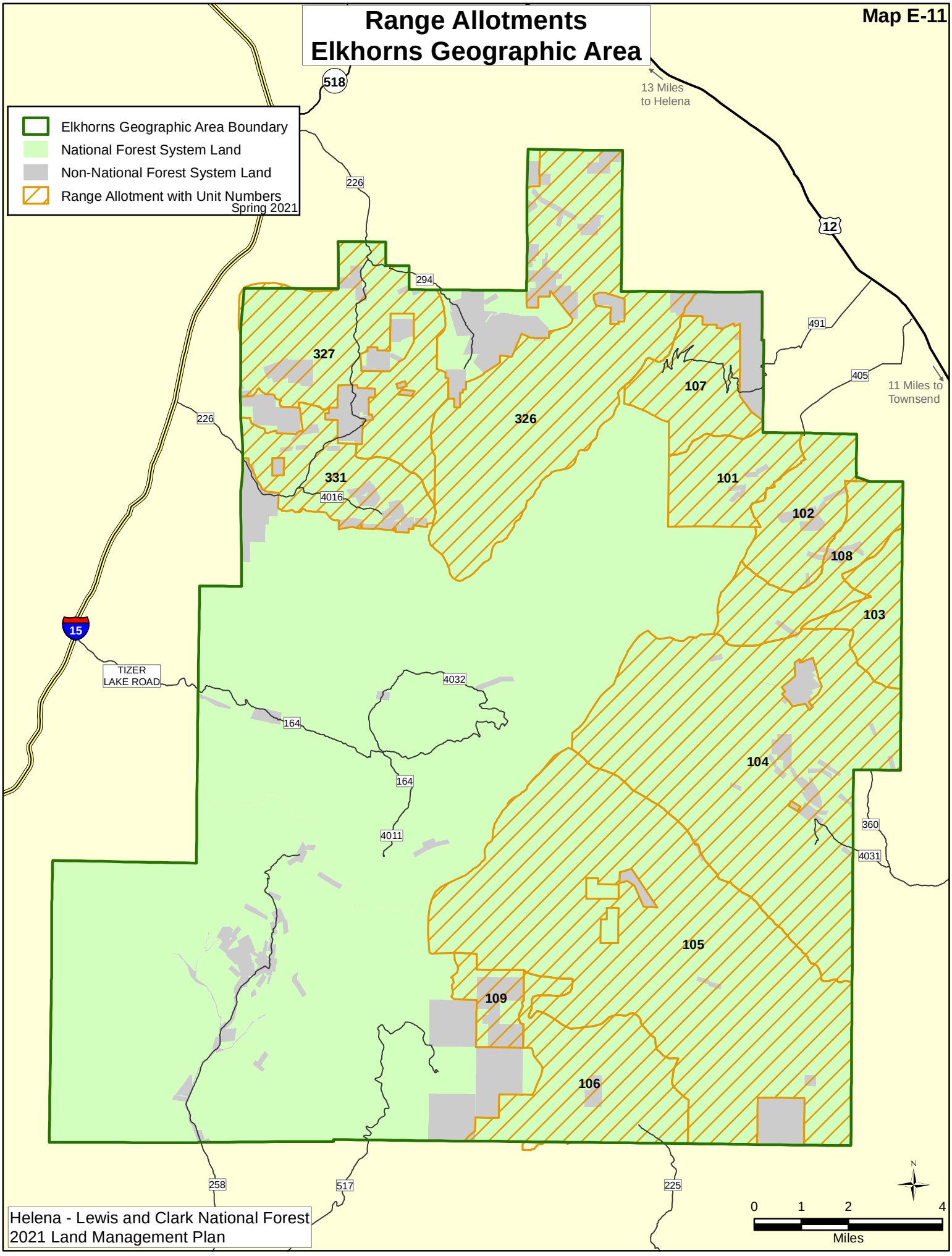
Designated Areas and Desired Winter Recreation Opportunity Spectrum
Elkhorns Geographic Area

Map E-9



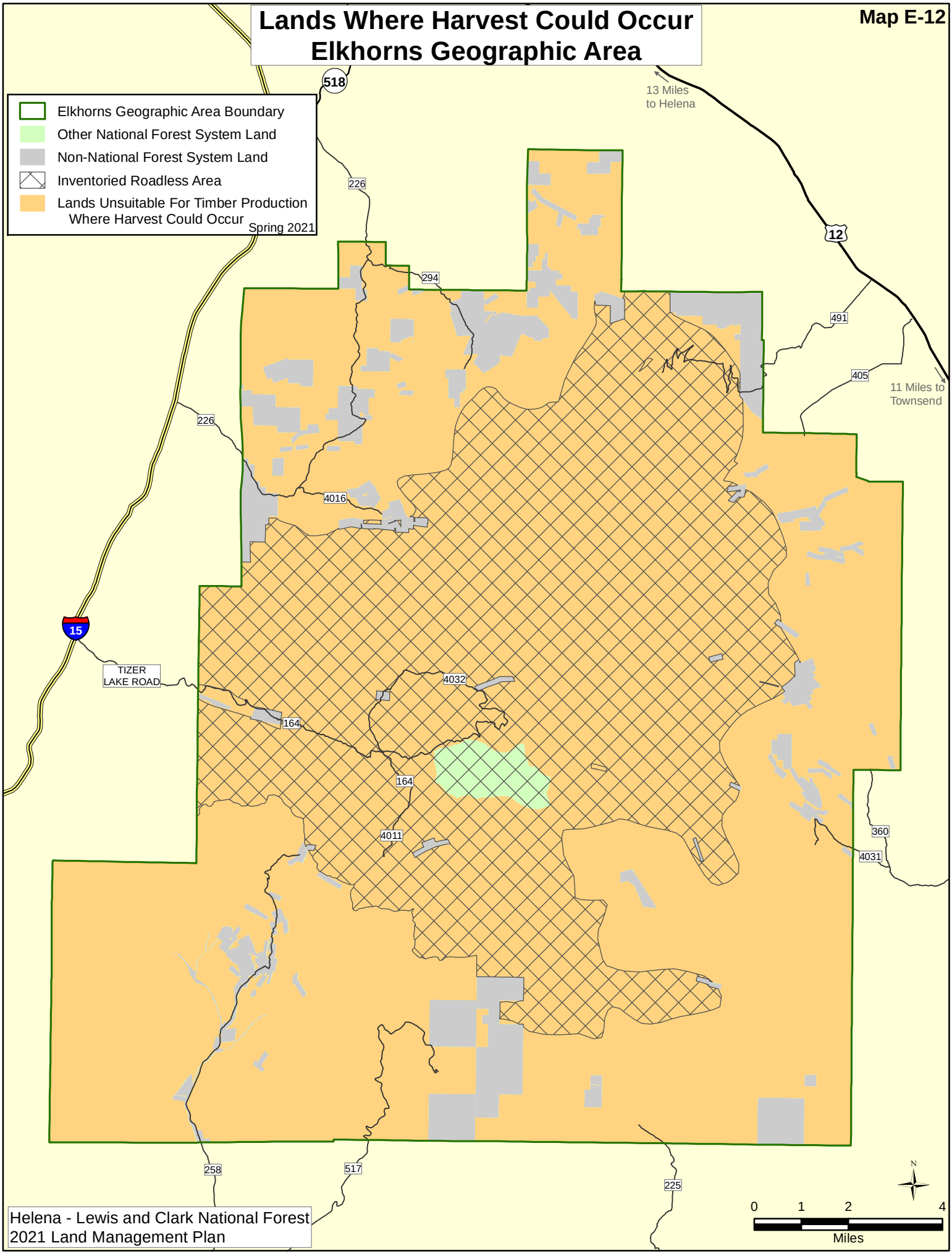
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Inventoried Roadless Areas
Elkhorns Geographic Area
Map E-10
Elkhorns Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Elkhorn
Spring 2021
518
226
294
12
491
405
13 Miles
to Helena
11 Miles to
Townsend
4016
15
TIZER
LAKE ROAD
4032
164
164
4011
360
4031
258
517
225
Helena - Lewis and Clark National Forest
2021 Land Management Plan
N
0 1 2 4
Miles


Range Allotments
Elkhorns Geographic Area
Map E-11
Elkhorns Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
13 Miles to Helena
11 Miles to Townsend
518
226
294
12
491
405
15
TIZER LAKE ROAD
4032
164
4011
360
4031
258
517
225
327
326
331
4016
107
101
102
108
103
104
105
109
106
Helena - Lewis and Clark National Forest
2021 Land Management Plan
N
0 1 2 4
Miles

Lands Where Harvest Could Occur
Elkhorns Geographic Area

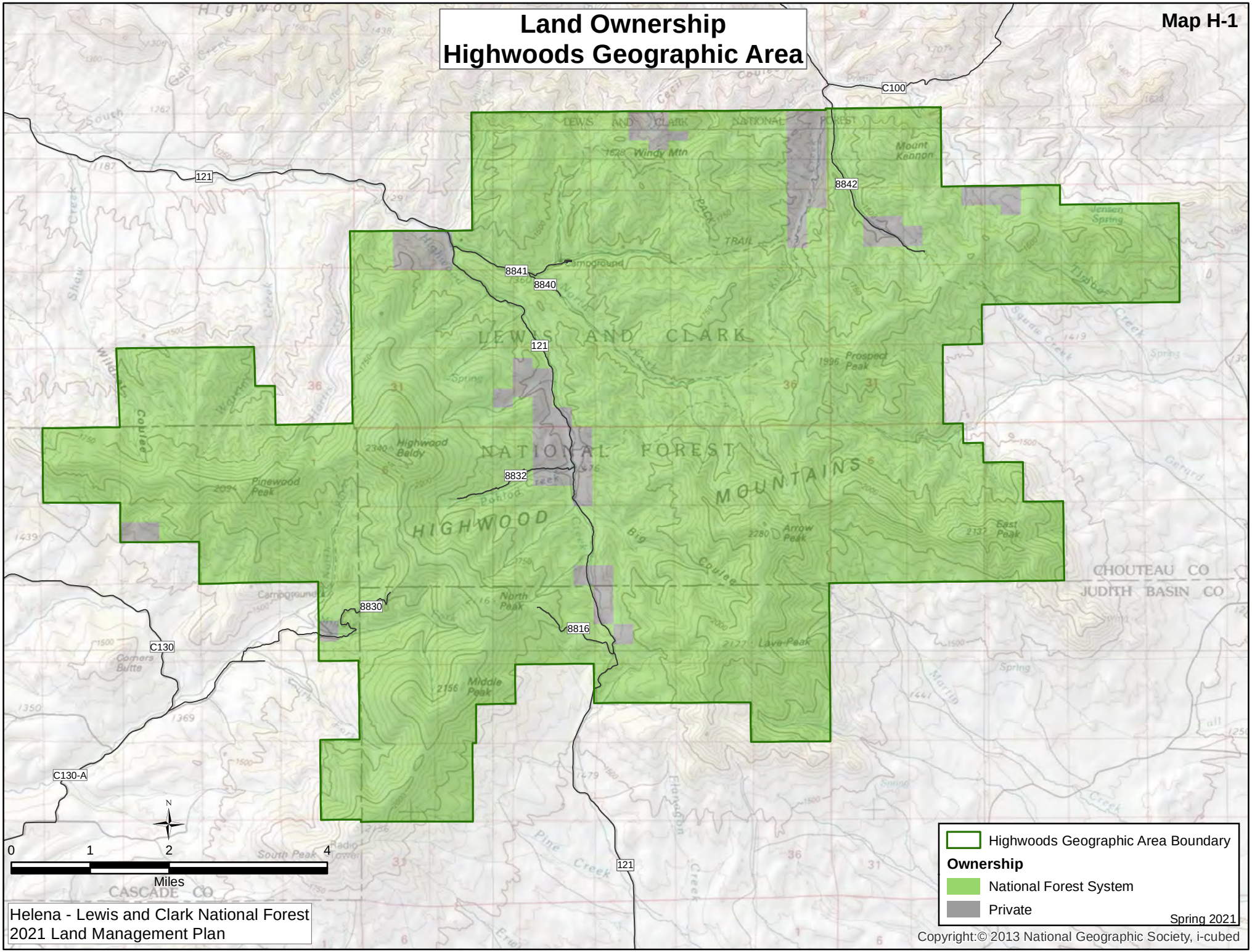
Map E-12



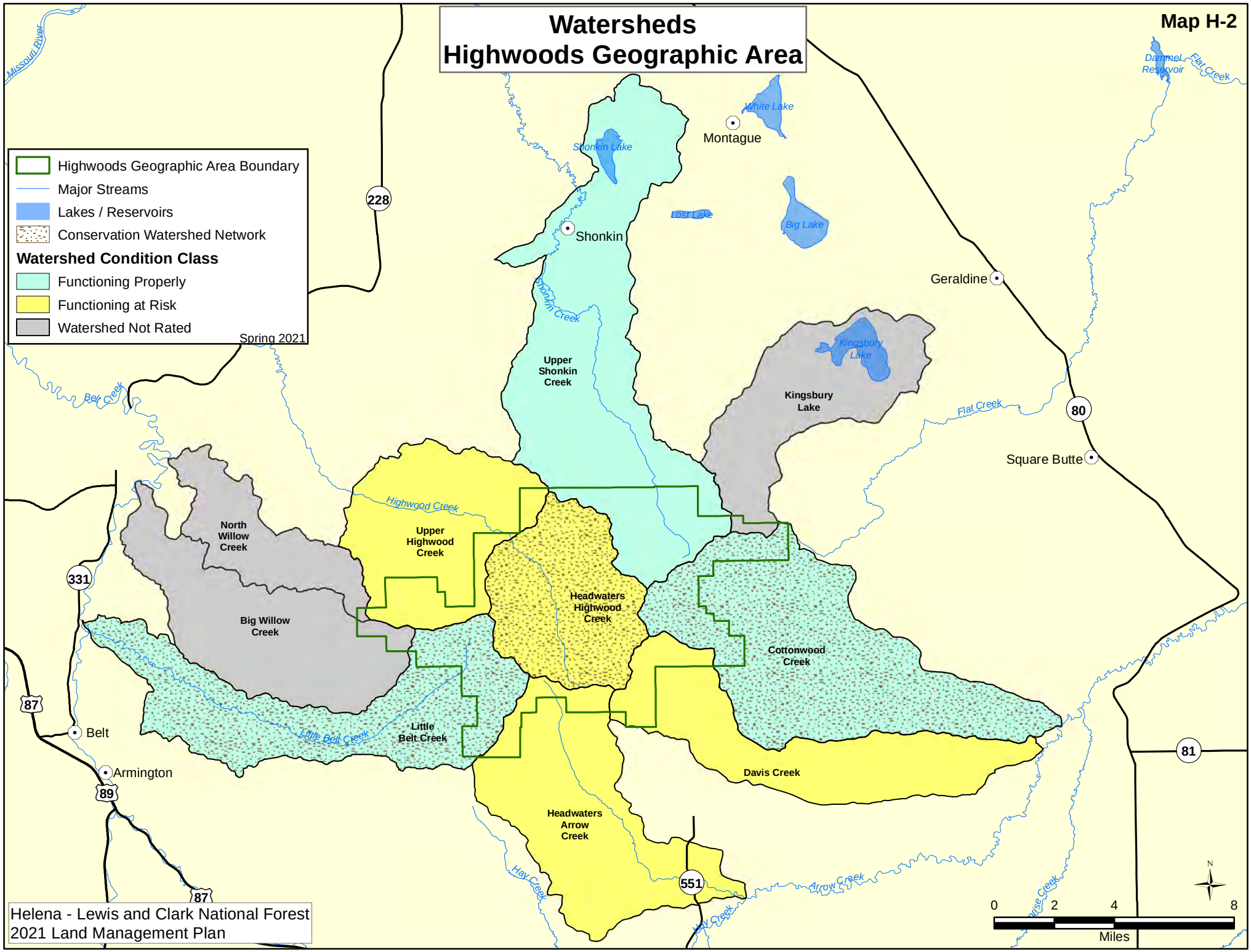
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Land Ownership
Highwoods Geographic Area

Map H-1

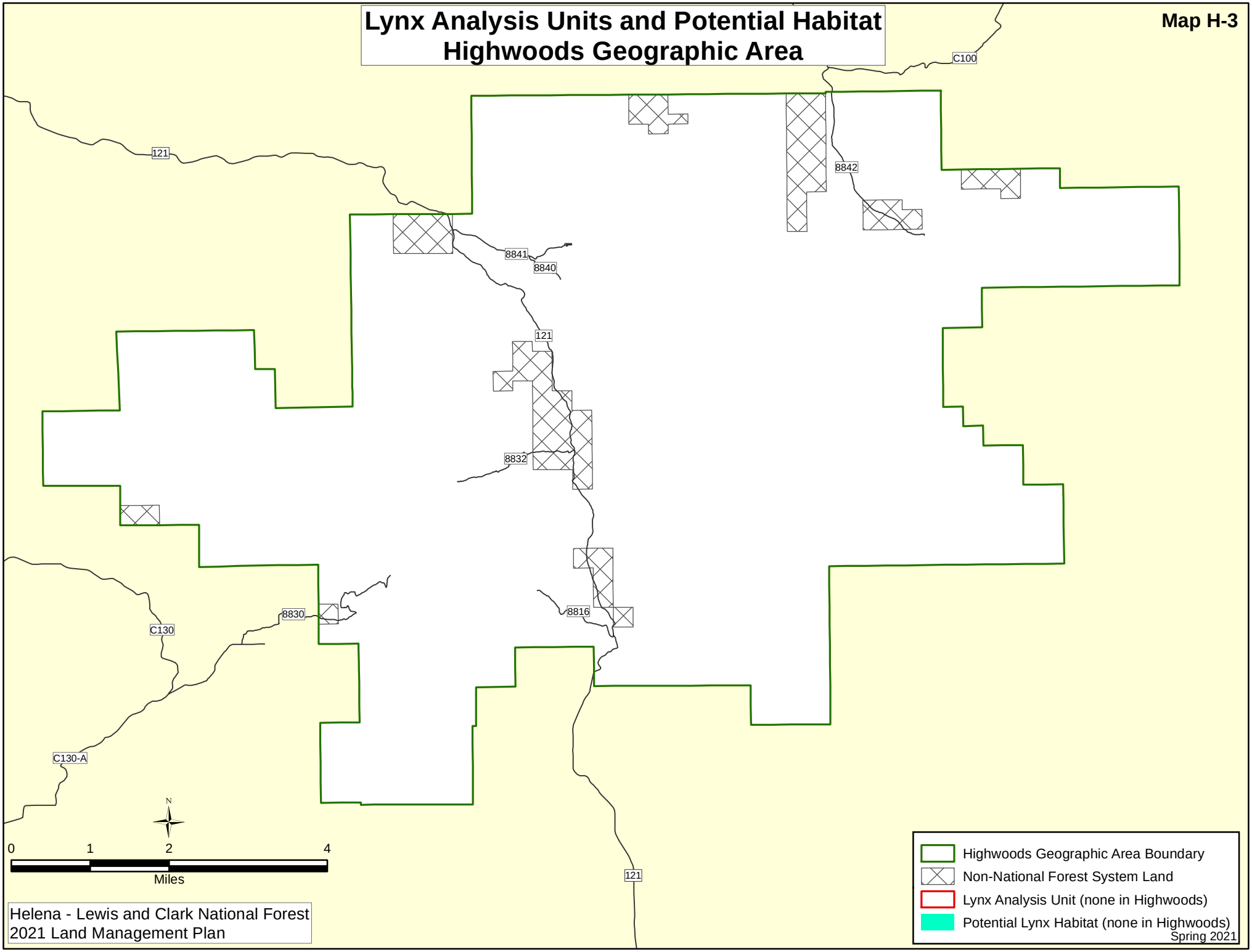


Helena - Lewis and Clark National Forest
2021 Land Management Plan


Watersheds
Highwoods Geographic Area
Map H-2
Highwoods Geographic Area Boundary
Major Streams
Lakes / Reservoirs
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Watershed Not Rated
Spring 2021
Missouri River
Belt Creek
Dammel Reservoir
Flat Creek
White Lake
Montague
Shonkin Lake
Lost Lake
Big Lake
Shonkin
Shonkin Creek
Geraldine
Kingsbury Lake
Upper Shonkin Creek
Kingsbury Lake
Flat Creek
Square Butte
Highwood Creek
Upper Highwood Creek
North Willow Creek
Big Willow Creek
Headwaters Highwood Creek
Cottonwood Creek
Little Belt Creek
Little Belt Creek
Belt
Armington
Davis Creek
Headwaters Arrow Creek
Hay Creek
Arrow Creek
228
80
331
87
89
81
551
87
N
0
2
4
8
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Lynx Analysis Units and Potential Habitat
Highwoods Geographic Area

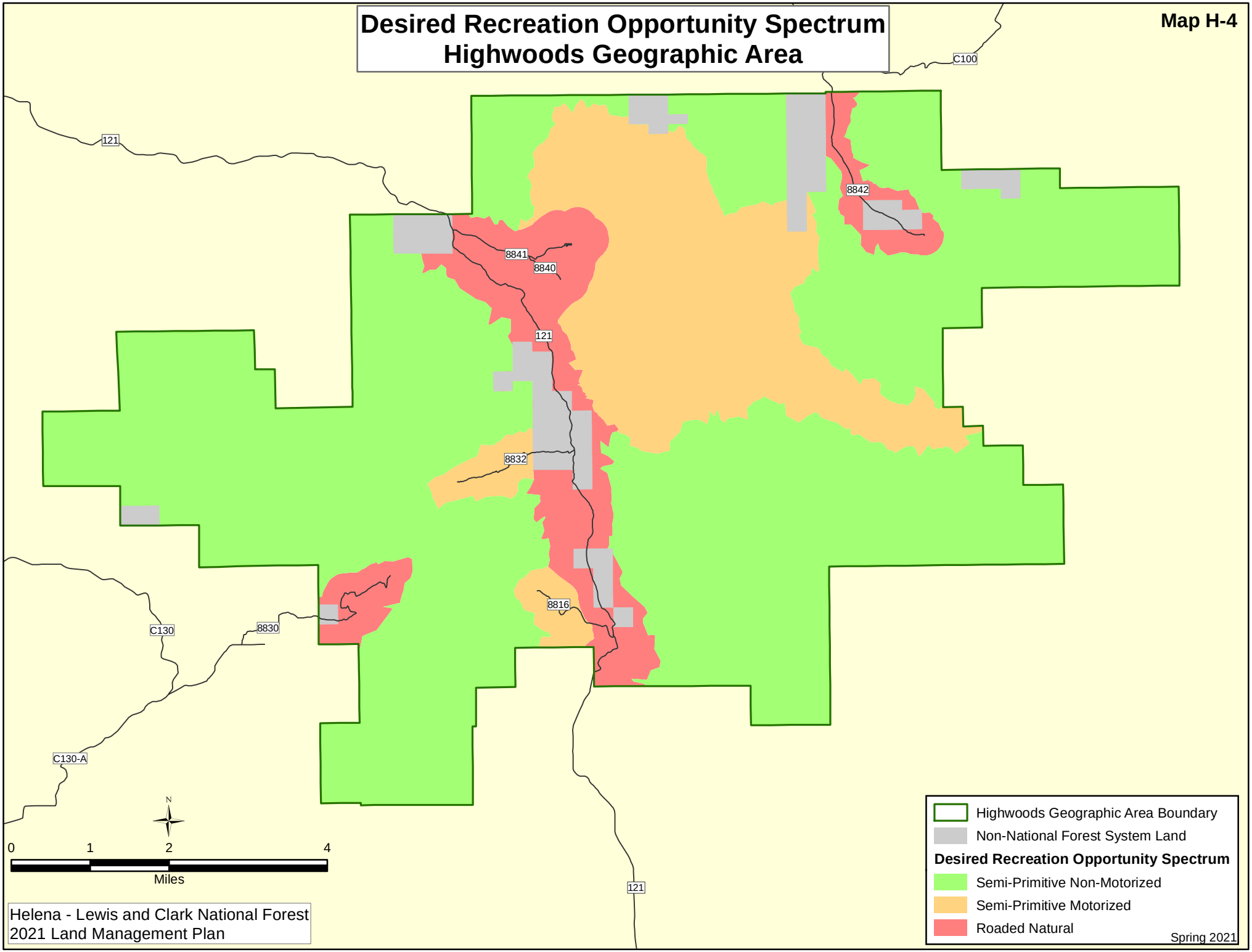
Map H-3



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Highwoods Geographic Area

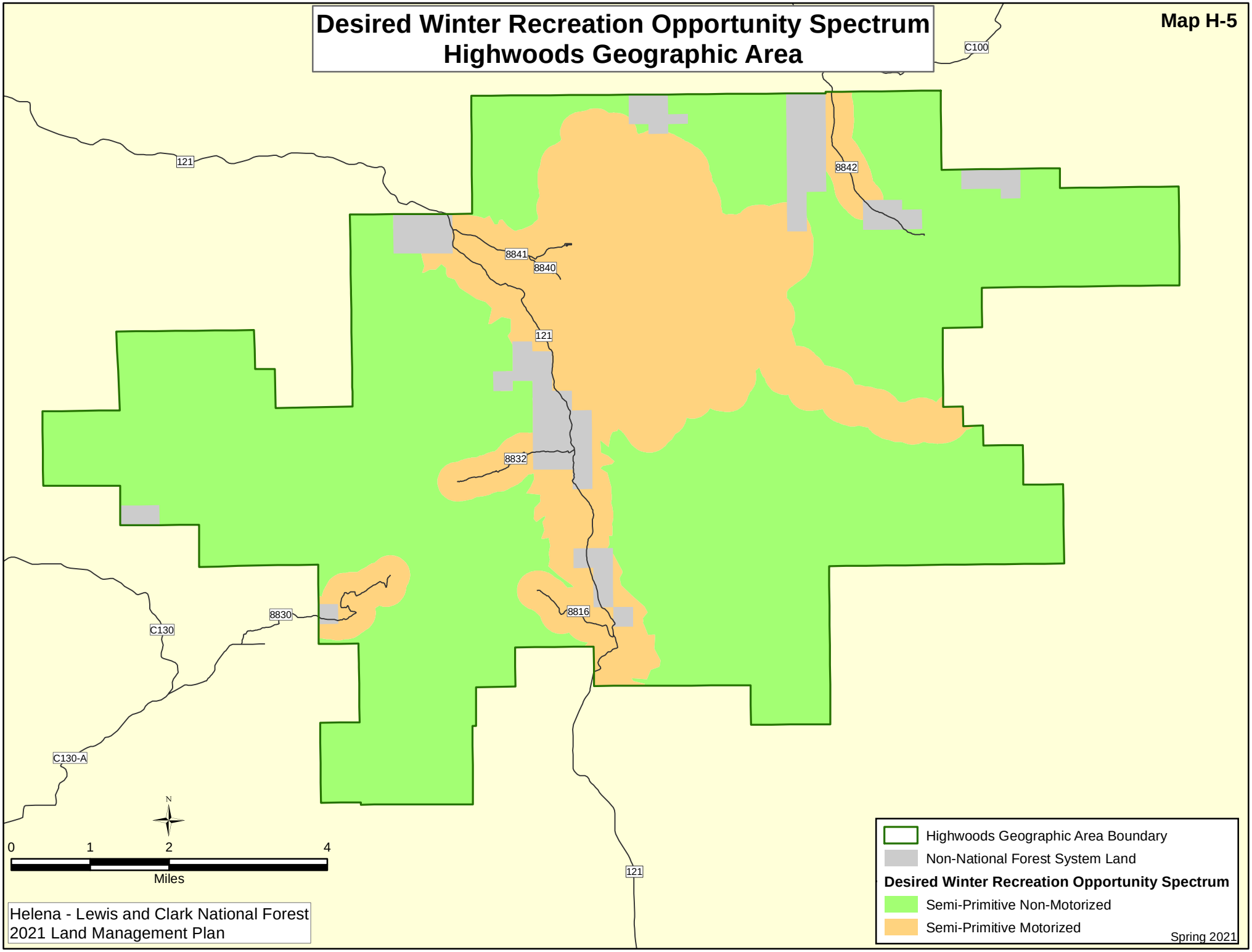
Map H-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Highwoods Geographic Area

Map H-5



Helena - Lewis and Clark National Forest
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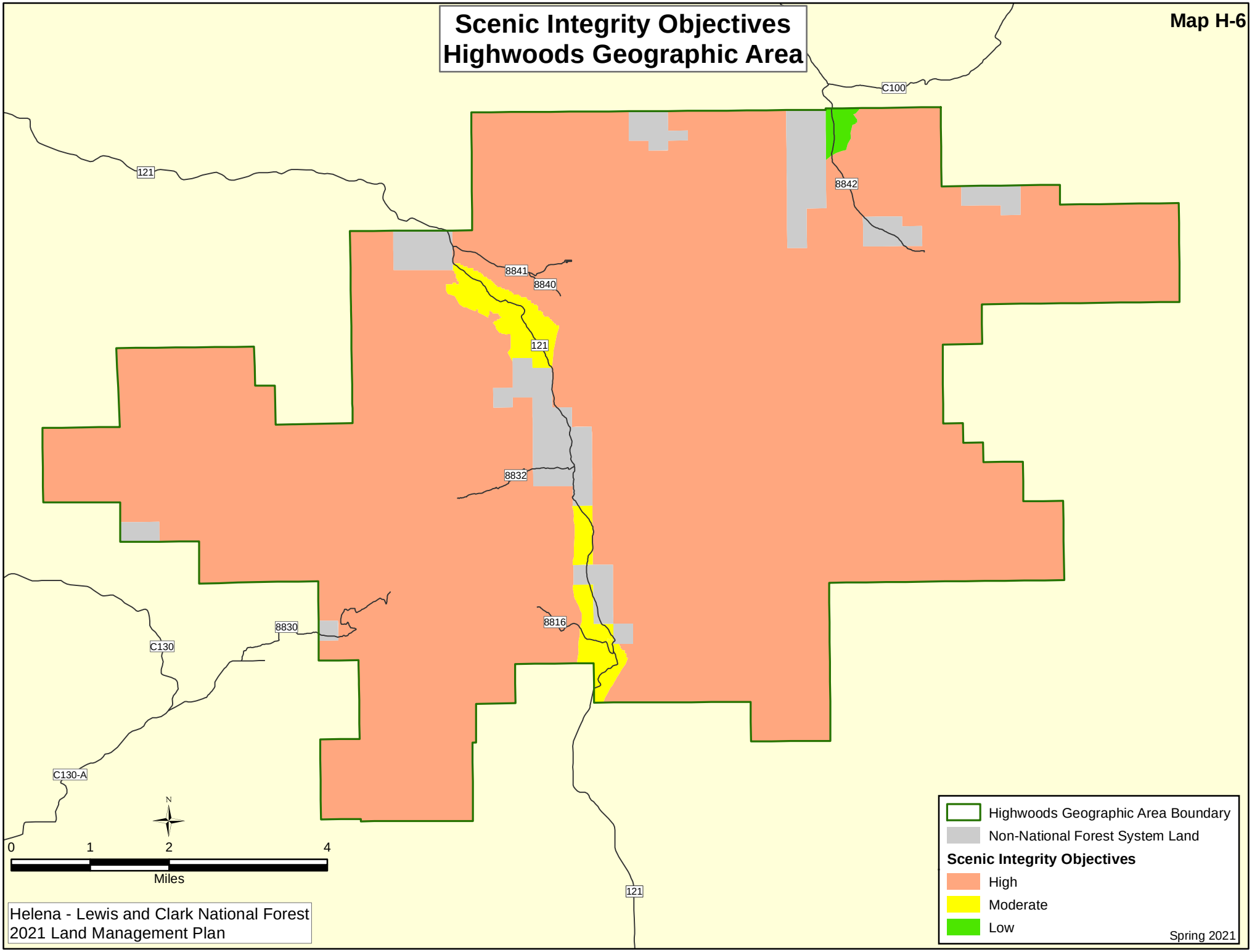
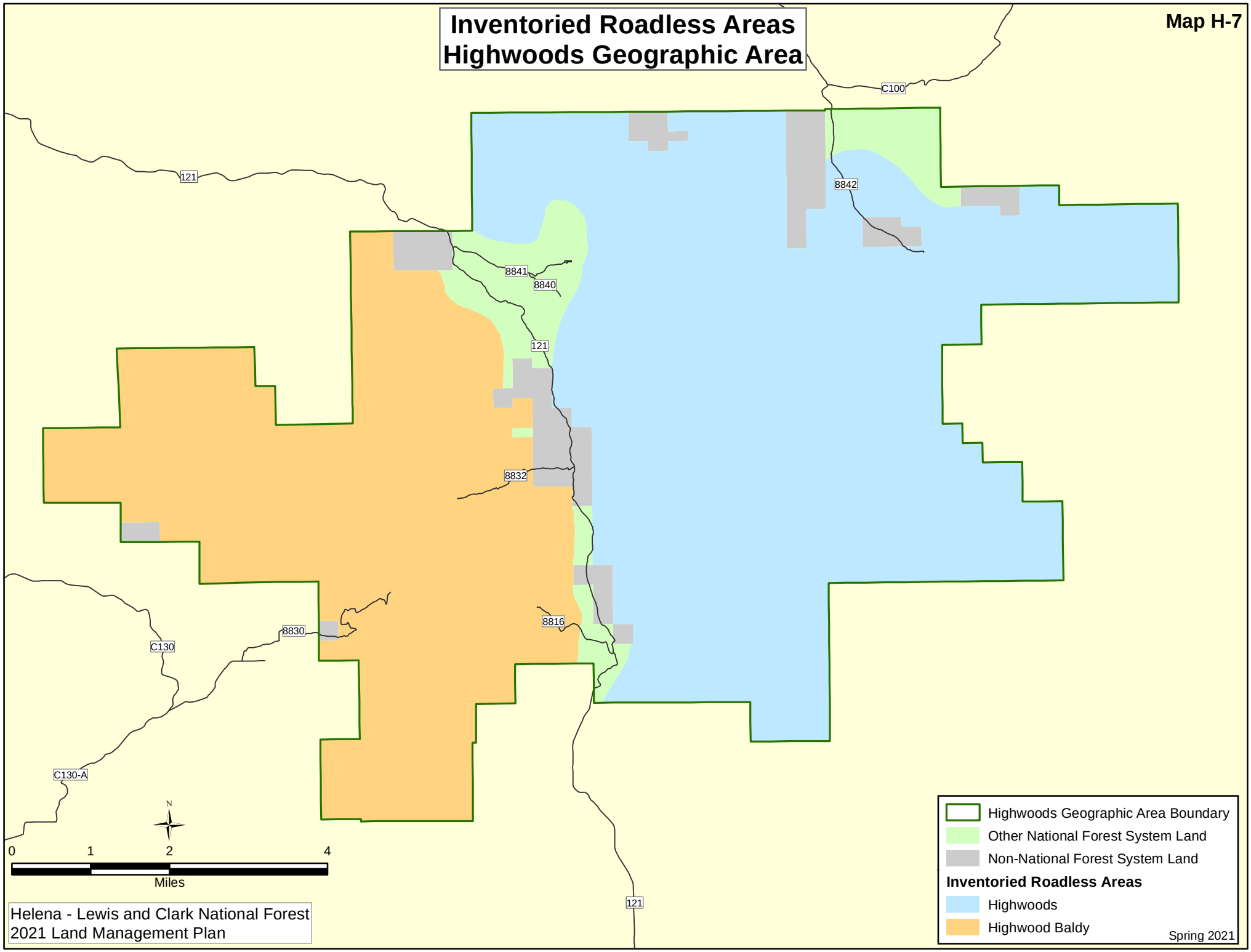
Scenic Integrity Objectives
Highwoods Geographic Area

Map H-6

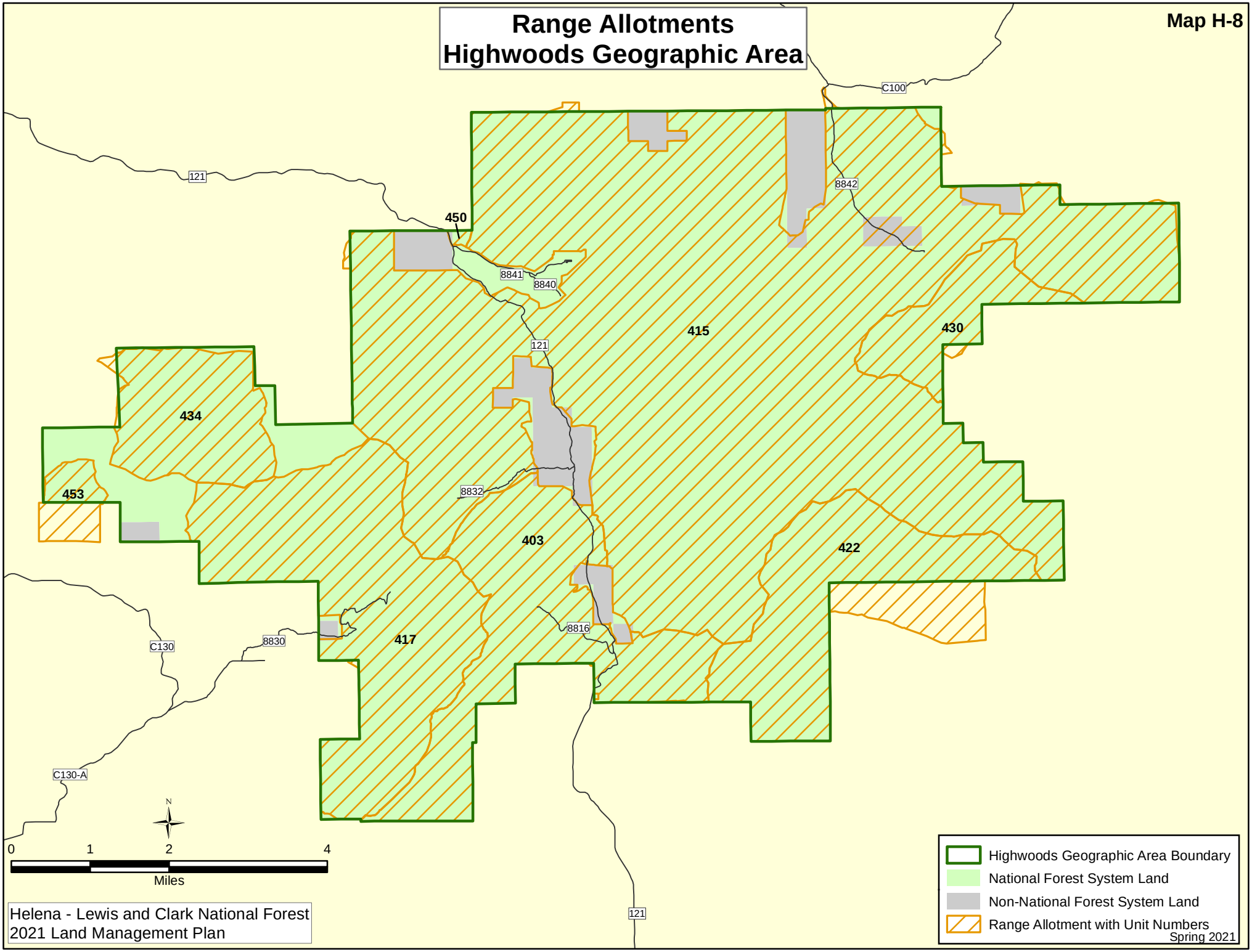


Helena - Lewis and Clark National Forest
2021 Land Management Plan


Inventoried Roadless Areas
Highwoods Geographic Area
Map H-7
C100
121
8842
8841
8840
121
8832
8816
8830
C130
C130-A
121
N
0
1
2
4
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
Highwoods Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Highwoods
Highwood Baldy
Spring 2021

Range Allotments
Highwoods Geographic Area

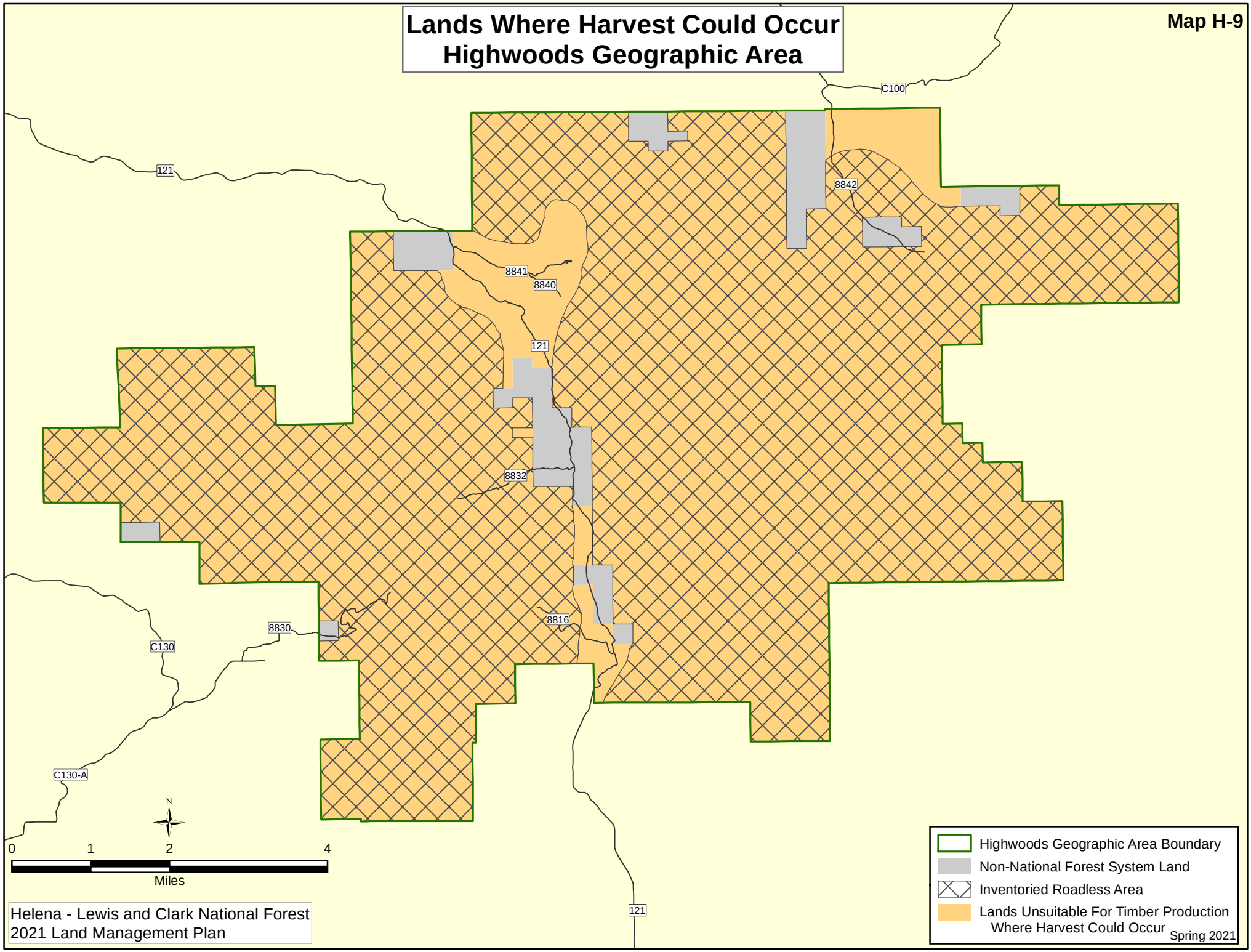
Map H-8



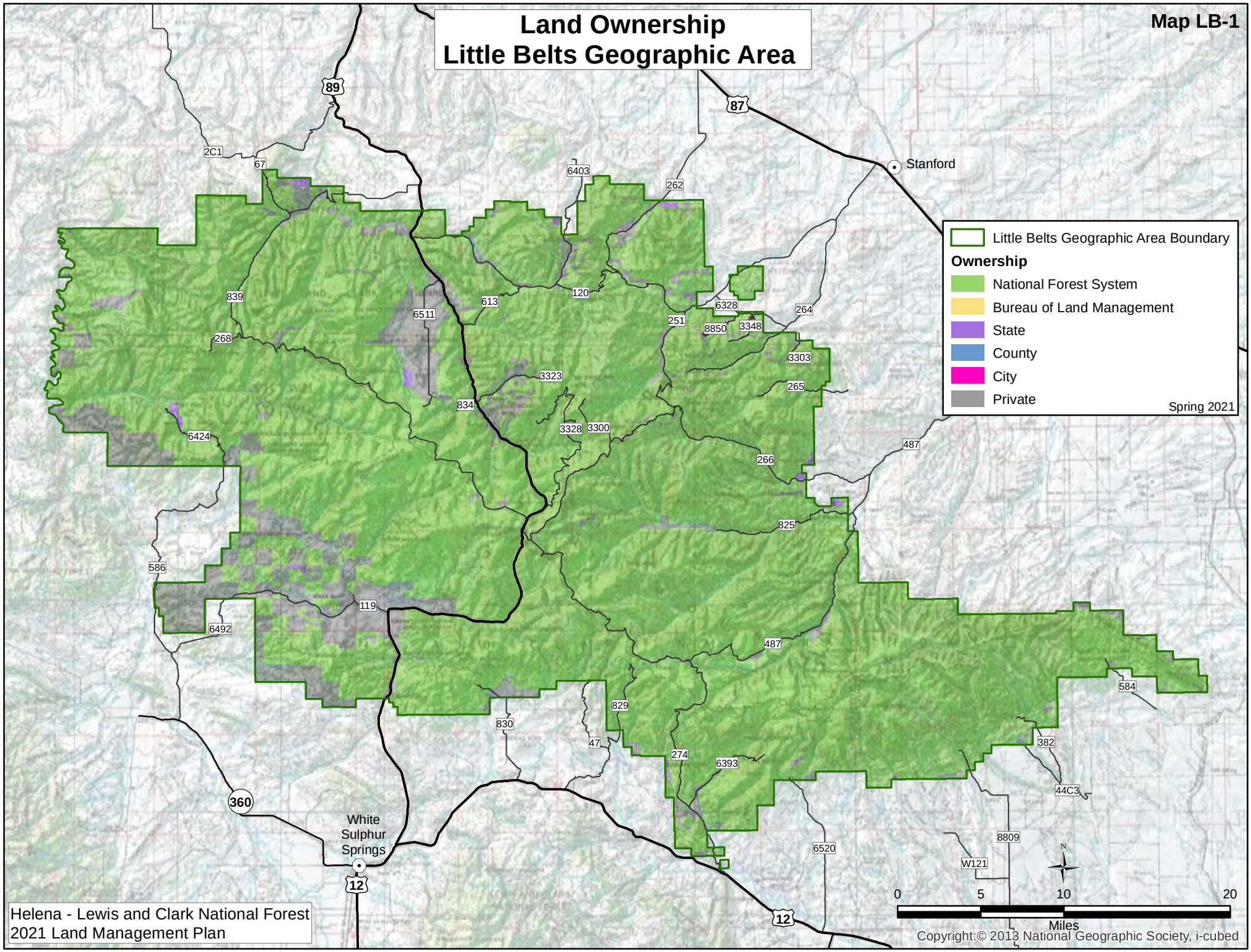
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Lands Where Harvest Could Occur
Highwoods Geographic Area

Map H-9



Helena - Lewis and Clark National Forest
2021 Land Management Plan


Land Ownership
Little Belts Geographic Area
Map LB-1
Stanford
White Sulphur Springs
Little Belts Geographic Area Boundary
Ownership
National Forest System
Bureau of Land Management
State
County
City
Private
Spring 2021
0 5 10 20
Miles
N
Helena - Lewis and Clark National Forest
2021 Land Management Plan
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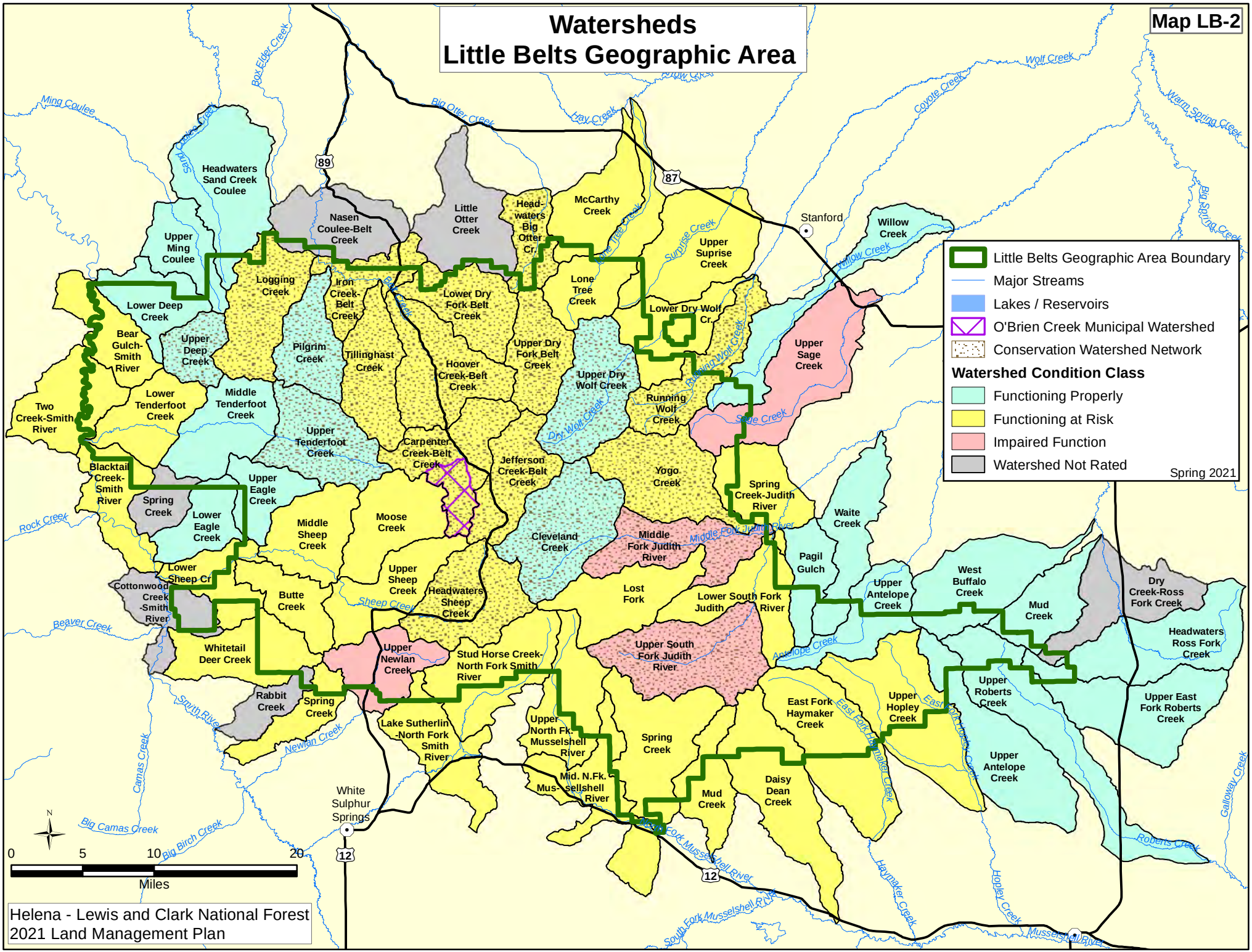
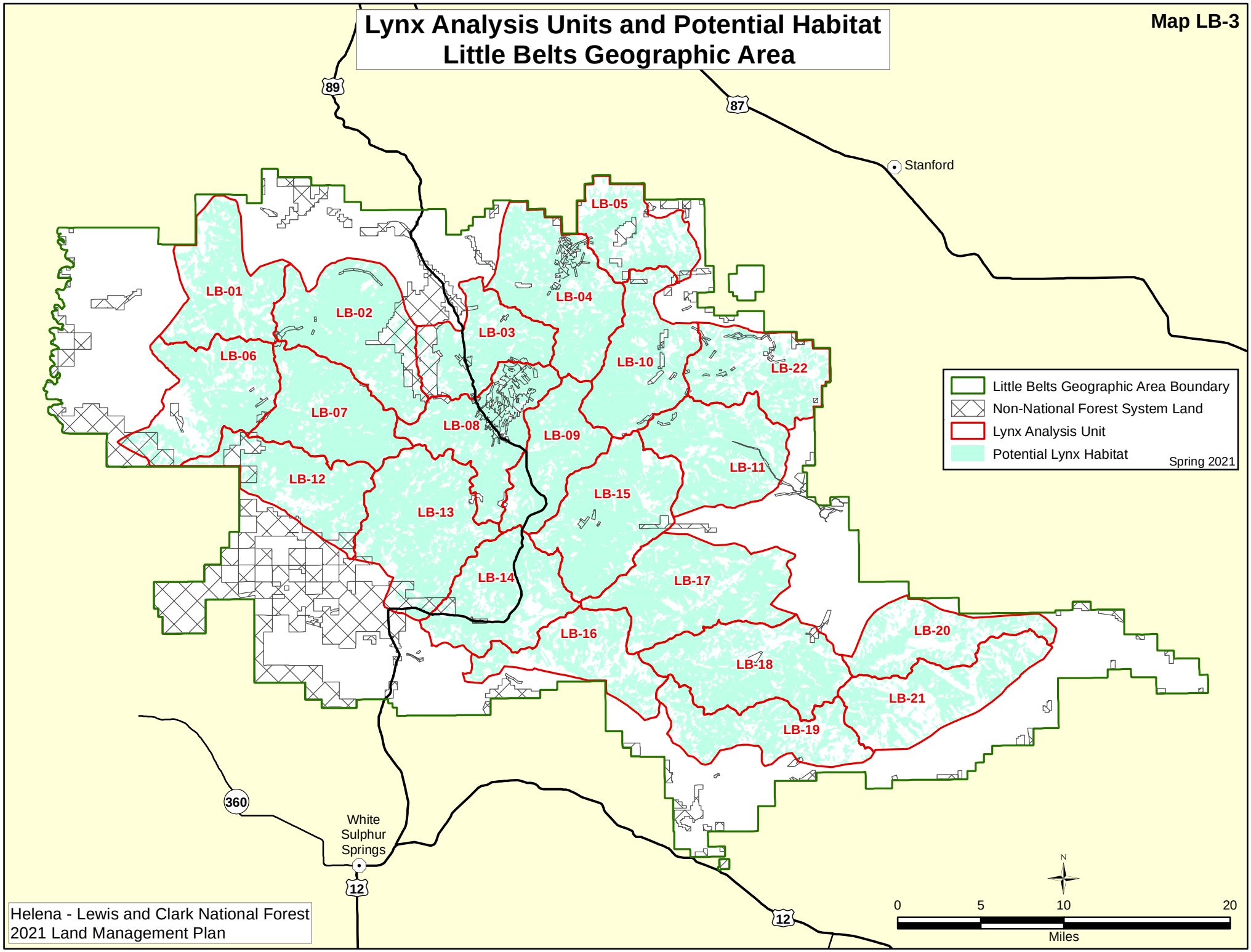

Watersheds
Little Belts Geographic Area
Map LB-2
Little Belts Geographic Area Boundary
Major Streams
Lakes / Reservoirs
O'Brien Creek Municipal Watershed
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Impaired Function
Watershed Not Rated
Spring 2021
Headwaters Sand Creek Coulee
Upper Ming Coulee
Nasen Coulee-Belt Creek
Little Otter Creek
Head-waters Big Otter Cr.
McCarthy Creek
Upper Suprise Creek
Willow Creek
Stanford
Logging Creek
Iron Creek-Belt Creek
Lower Dry Fork Belt Creek
Lone Tree Creek
Lower Dry Wolf Cr.
Upper Sage Creek
Lower Deep Creek
Bear Gulch-Smith River
Upper Deep Creek
Pilgrim Creek
Tillinghast Creek
Upper Dry Fork Belt Creek
Hoover Creek-Belt Creek
Upper Dry Wolf Creek
Running Wolf Creek
Two Creek-Smith River
Lower Tenderfoot Creek
Middle Tenderfoot Creek
Upper Tenderfoot Creek
Carpenter Creek-Belt Creek
Jefferson Creek-Belt Creek
Yogo Creek
Spring Creek-Judith River
Blacktail Creek-Smith River
Spring Creek
Upper Eagle Creek
Lower Eagle Creek
Middle Sheep Creek
Moose Creek
Cleveland Creek
Middle Fork Judith River
Waite Creek
Pagil Gulch
Lower Sheep Cr
Cottonwood Creek-Smith River
Butte Creek
Upper Sheep Creek
Headwaters Sheep Creek
Lost Fork
Lower South Fork Judith River
Upper Antelope Creek
West Buffalo Creek
Mud Creek
Dry Creek-Ross Fork Creek
Headwaters Ross Fork Creek
Whitetail Deer Creek
Upper Newlan Creek
Stud Horse Creek-North Fork Smith River
Upper South Fork Judith River
Upper Roberts Creek
Upper East Fork Roberts Creek
Rabbit Creek
Spring Creek
Lake Sutherlin-North Fork Smith River
Upper North Fk. Musselshell River
Spring Creek
East Fork Haymaker Creek
Upper Hopley Creek
Upper Antelope Creek
Mid. N.Fk. Mus-sellshell River
Mud Creek
Daisy Dean Creek
White Sulphur Springs
Box Elder Creek
Ming Coulee
Big Otter Creek
Hay Creek
Wolf Creek
Coyote Creek
Warm Spring Creek
Big Spring Creek
Sunrise Creek
Willow Creek
Rock Creek
Sheep Creek
Beaver Creek
Smith River
Newlan Creek
Camas Creek
Big Camas Creek
Big Birch Creek
Antelope Creek
East Fork Haymaker Creek
Middle Fork Musselshell River
South Fork Musselshell River
Haymaker Creek
Hopley Creek
Galloway Creek
Roberts Creek
Musselshell River
89
87
12
12
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Lynx Analysis Units and Potential Habitat
Little Belts Geographic Area

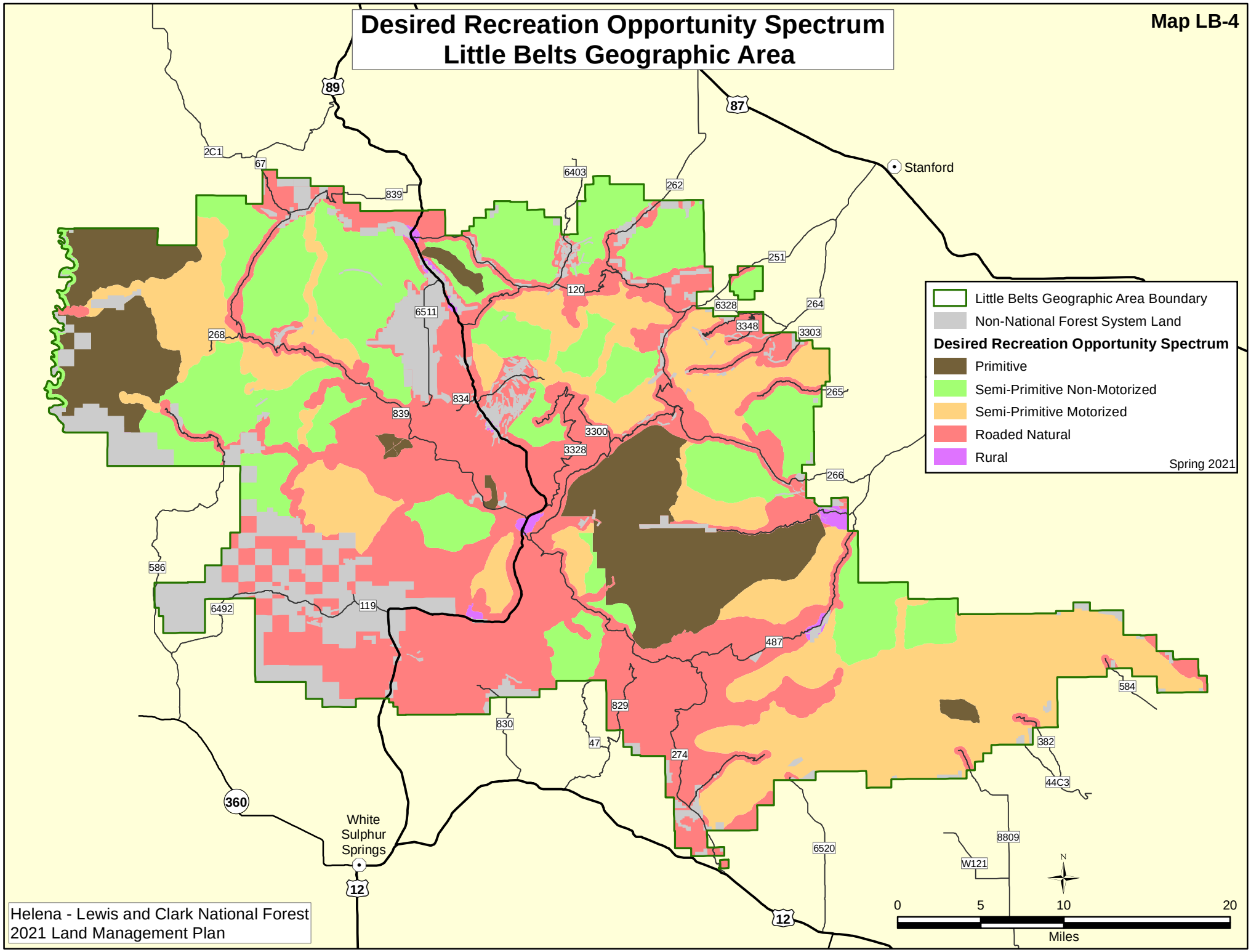
Map LB-3



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Little Belts Geographic Area

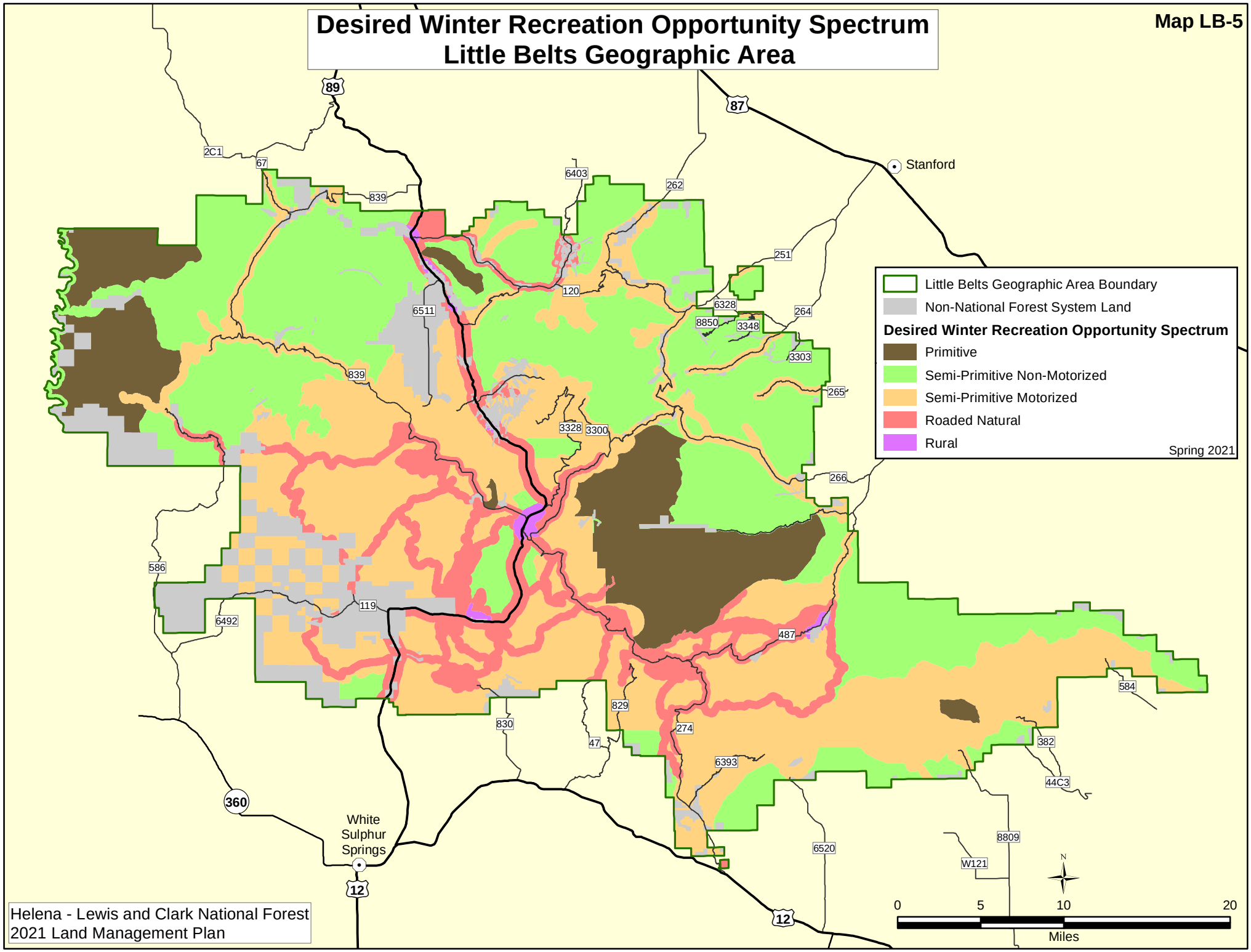
Map LB-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Little Belts Geographic Area

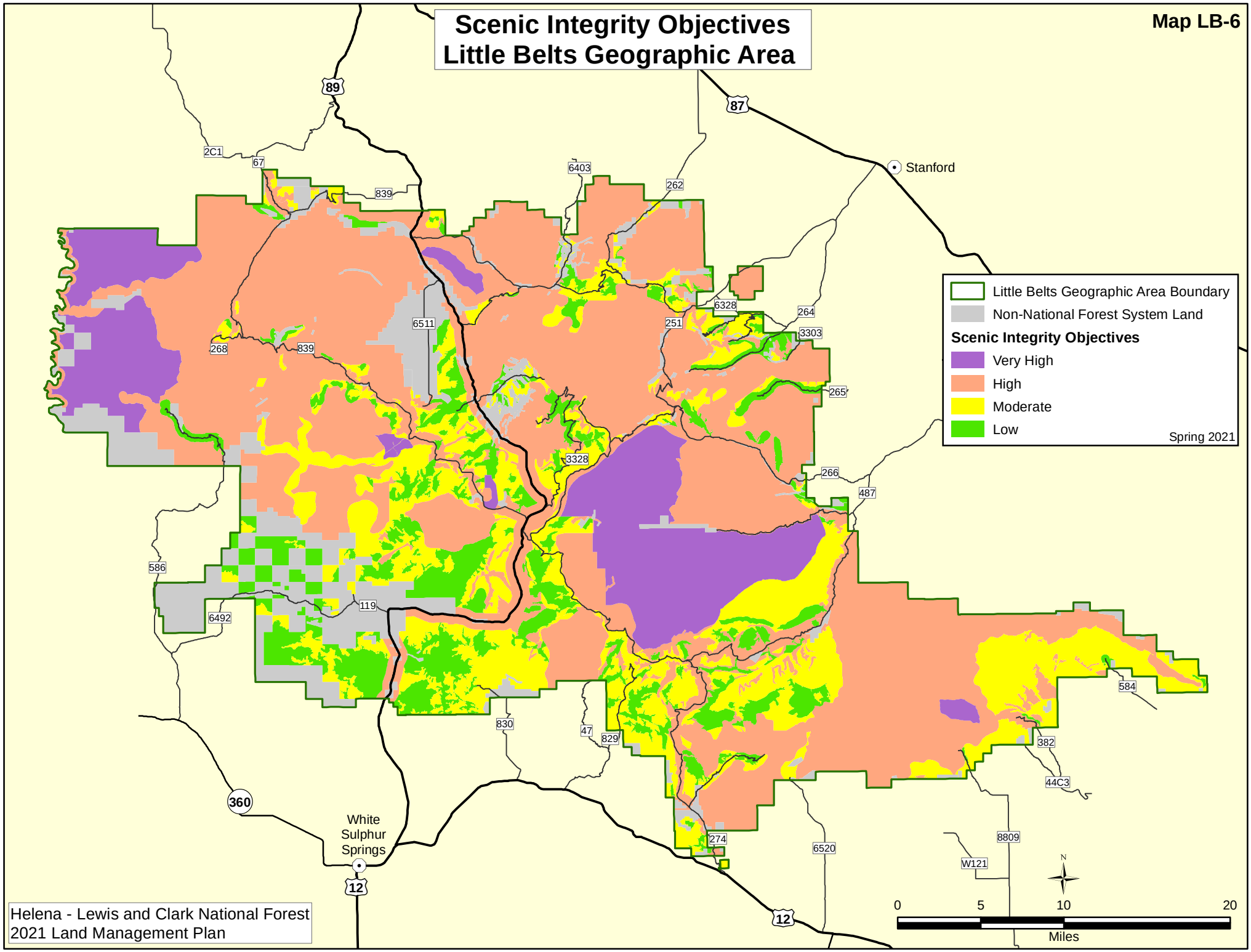
Map LB-5



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Little Belts Geographic Area

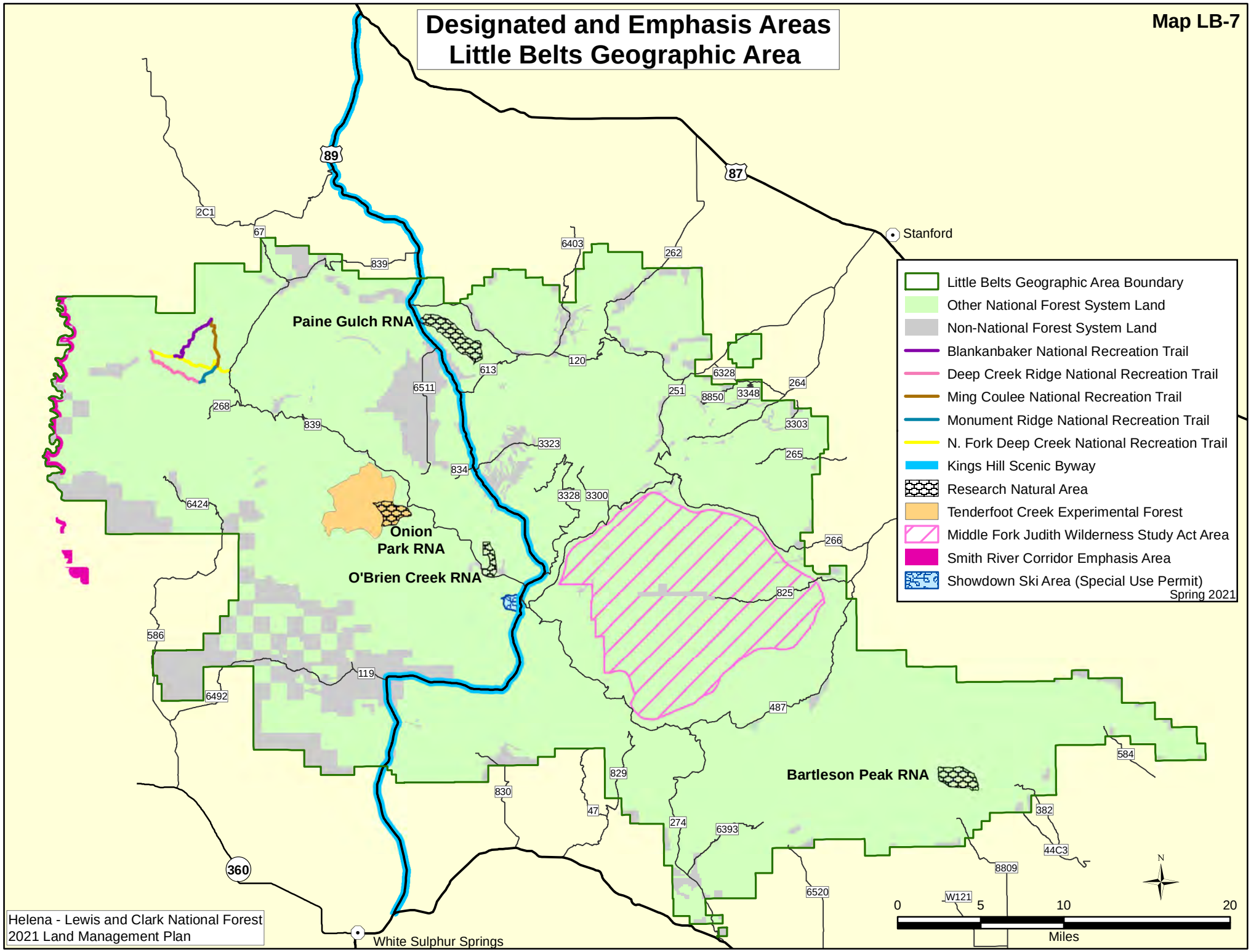
Map LB-6



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated and Emphasis Areas
Little Belts Geographic Area

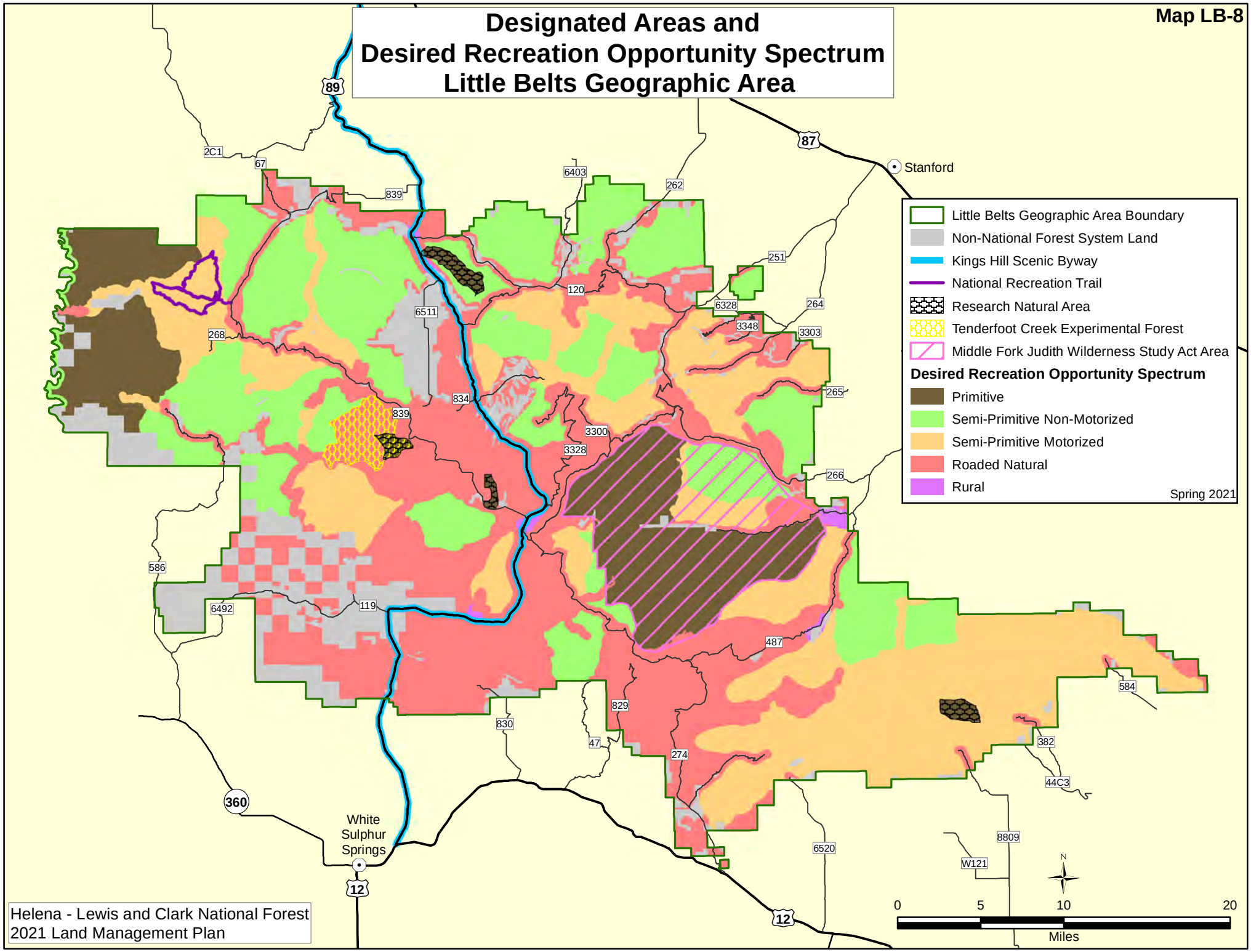
Map LB-7



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Map LB-8

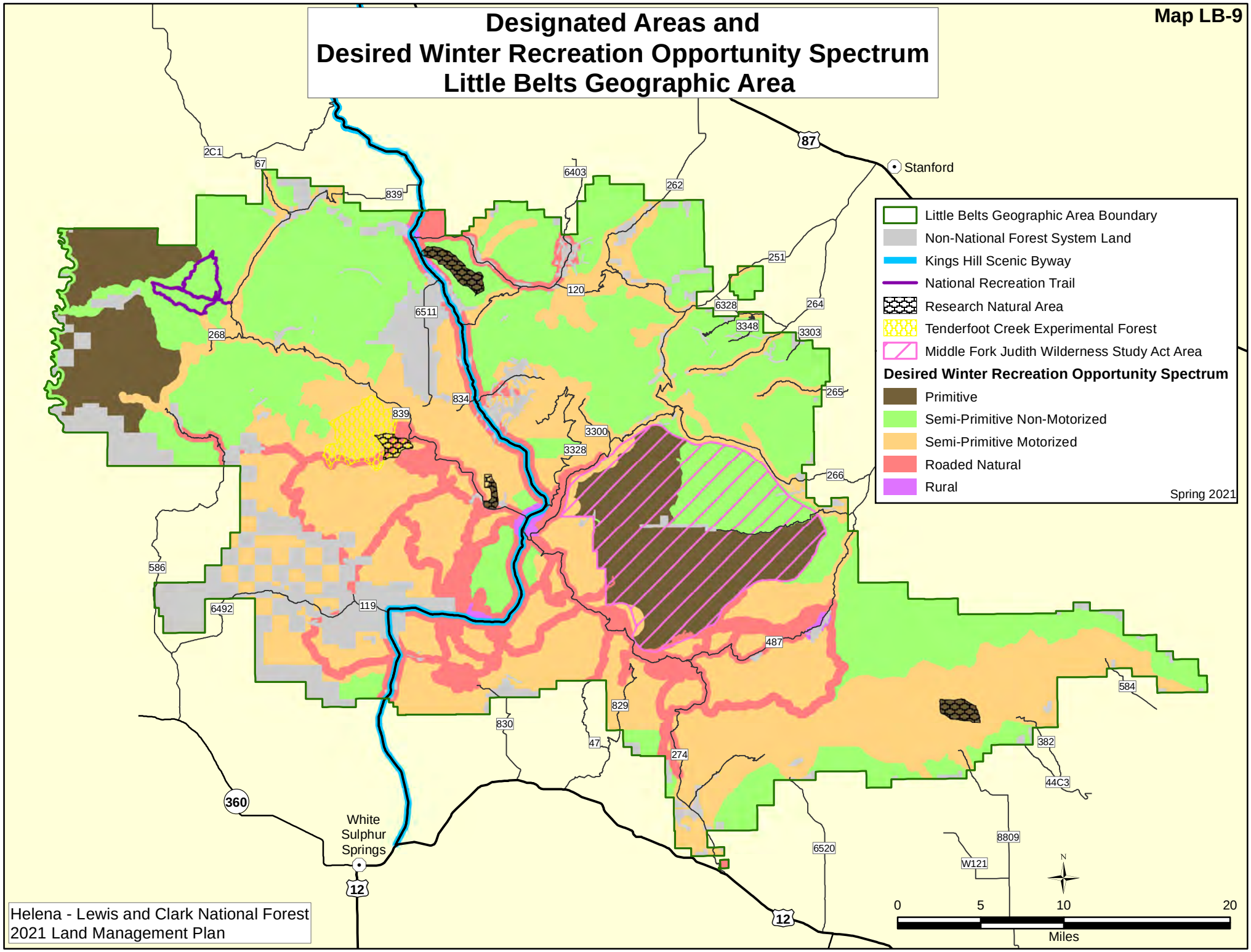
Designated Areas and Desired Recreation Opportunity Spectrum Little Belts Geographic Area



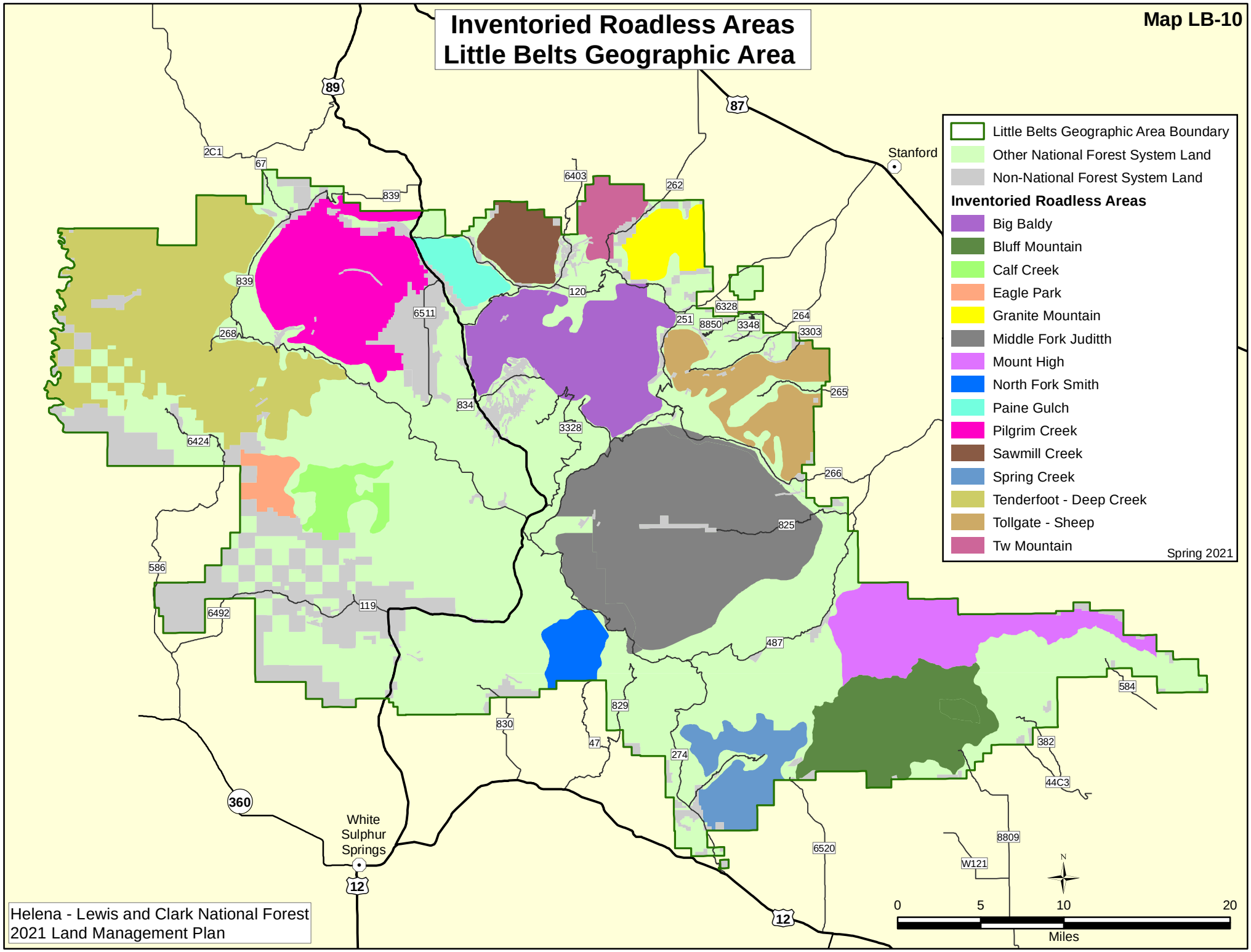
Helena - Lewis and Clark National Forest
2021 Land Management Plan

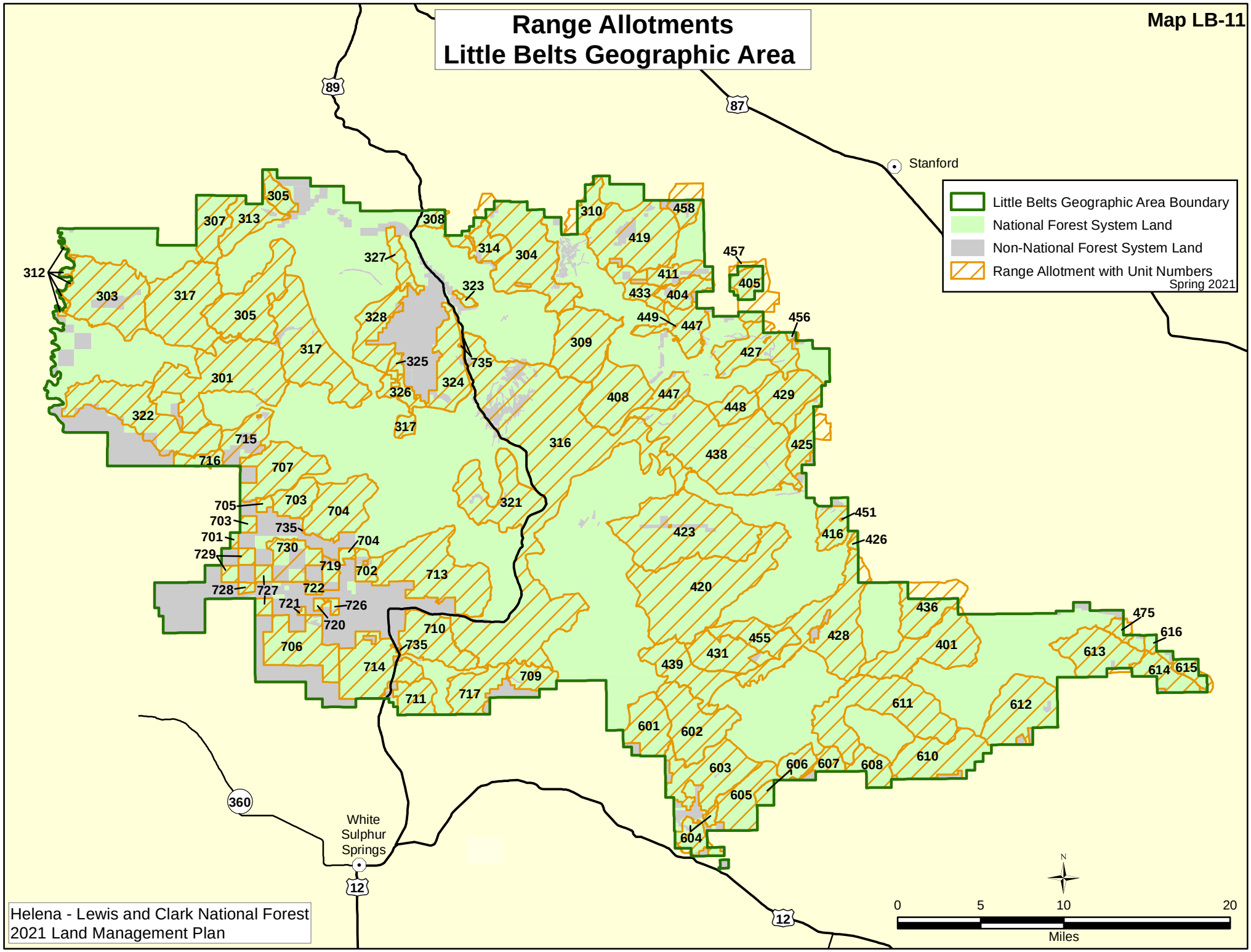
Map LB-9

Designated Areas and Desired Winter Recreation Opportunity Spectrum Little Belts Geographic Area



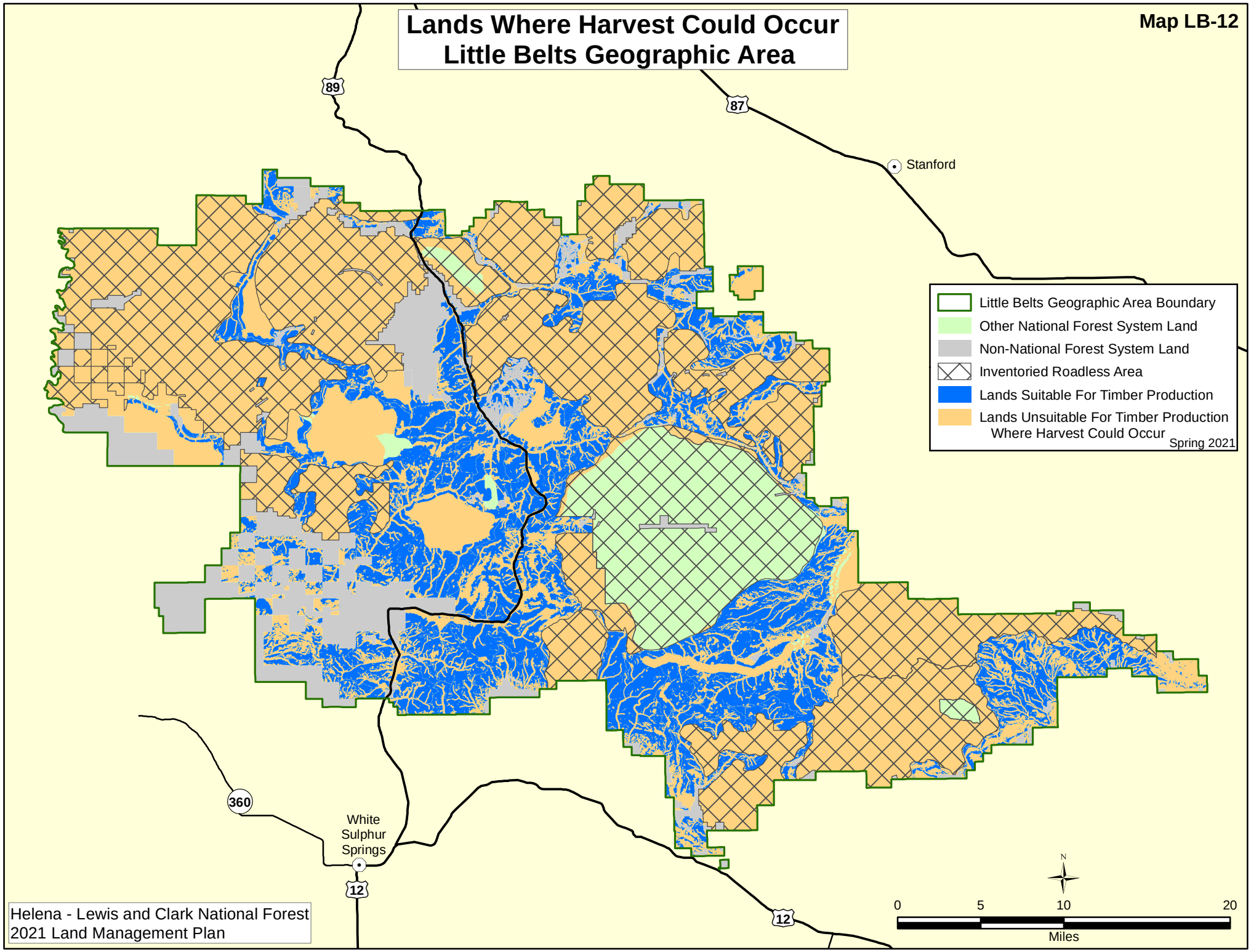
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Inventoried Roadless Areas
Little Belts Geographic Area
Map LB-10
Little Belts Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Big Baldy
Bluff Mountain
Calf Creek
Eagle Park
Granite Mountain
Middle Fork Judith
Mount High
North Fork Smith
Paine Gulch
Pilgrim Creek
Sawmill Creek
Spring Creek
Tenderfoot - Deep Creek
Tollgate - Sheep
Tw Mountain
Spring 2021
Stanford
White Sulphur Springs
89
87
360
12
2C1
67
839
6403
262
120
6511
268
6328
251
8850
3348
264
3303
265
834
3328
6424
266
825
586
6492
119
487
584
829
830
47
274
382
44C3
6520
8809
W121
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Range Allotments
Little Belts Geographic Area
Map LB-11
Little Belts Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
Stanford
White Sulphur Springs
89
87
360
12
Helena - Lewis and Clark National Forest
2021 Land Management Plan
0 5 10 20
Miles
N

Lands Where Harvest Could Occur
Little Belts Geographic Area

Map LB-12



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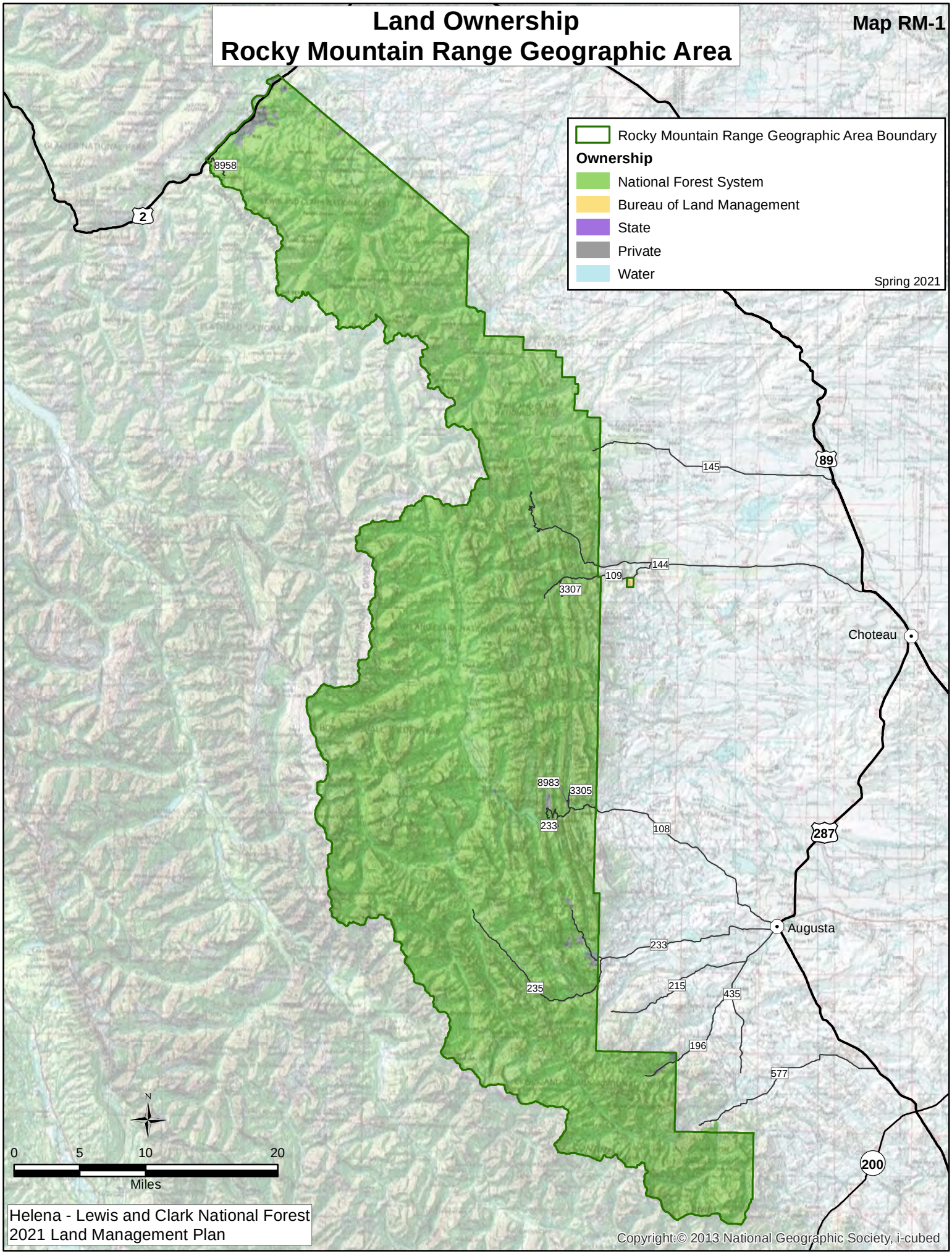
Land Ownership
Rocky Mountain Range Geographic Area
Map RM-1
Rocky Mountain Range Geographic Area Boundary
Ownership
National Forest System
Bureau of Land Management
State
Private
Water
Spring 2021
8958
2
145
89
144
109
3307
Choteau
8983
3305
233
108
287
Augusta
233
235
215
435
196
577
200
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
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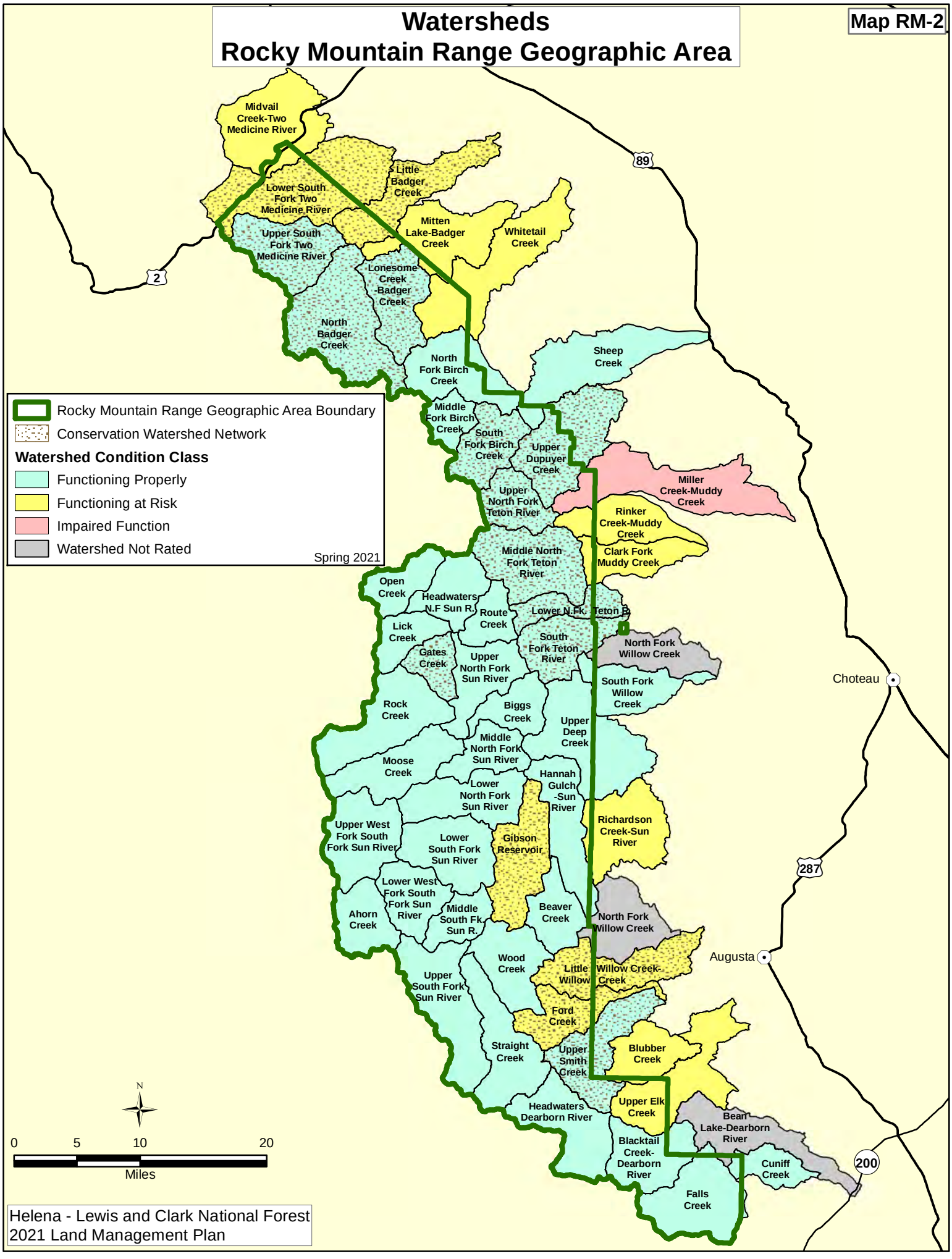
Watersheds
Rocky Mountain Range Geographic Area

Map RM-2



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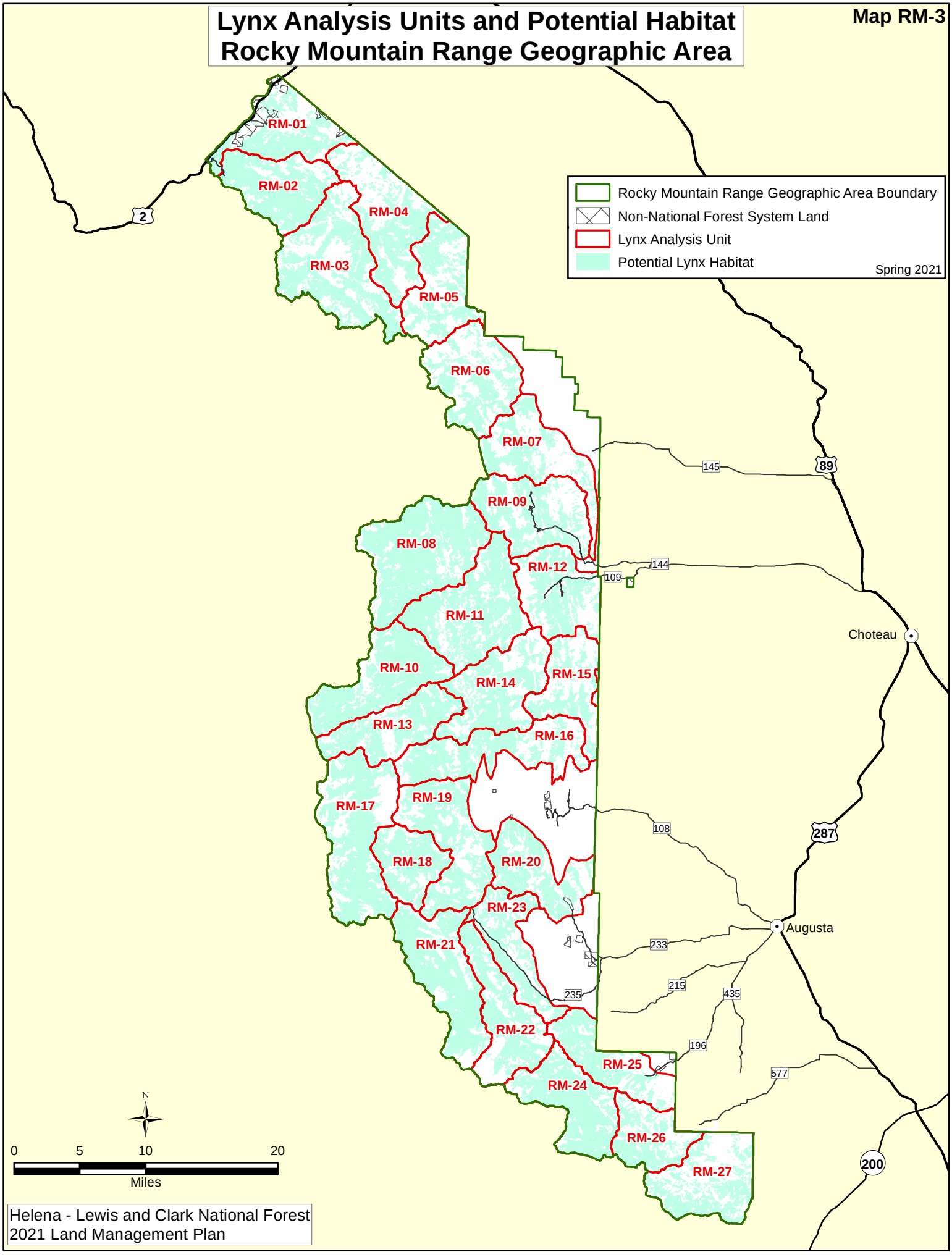
Lynx Analysis Units and Potential Habitat
Rocky Mountain Range Geographic Area

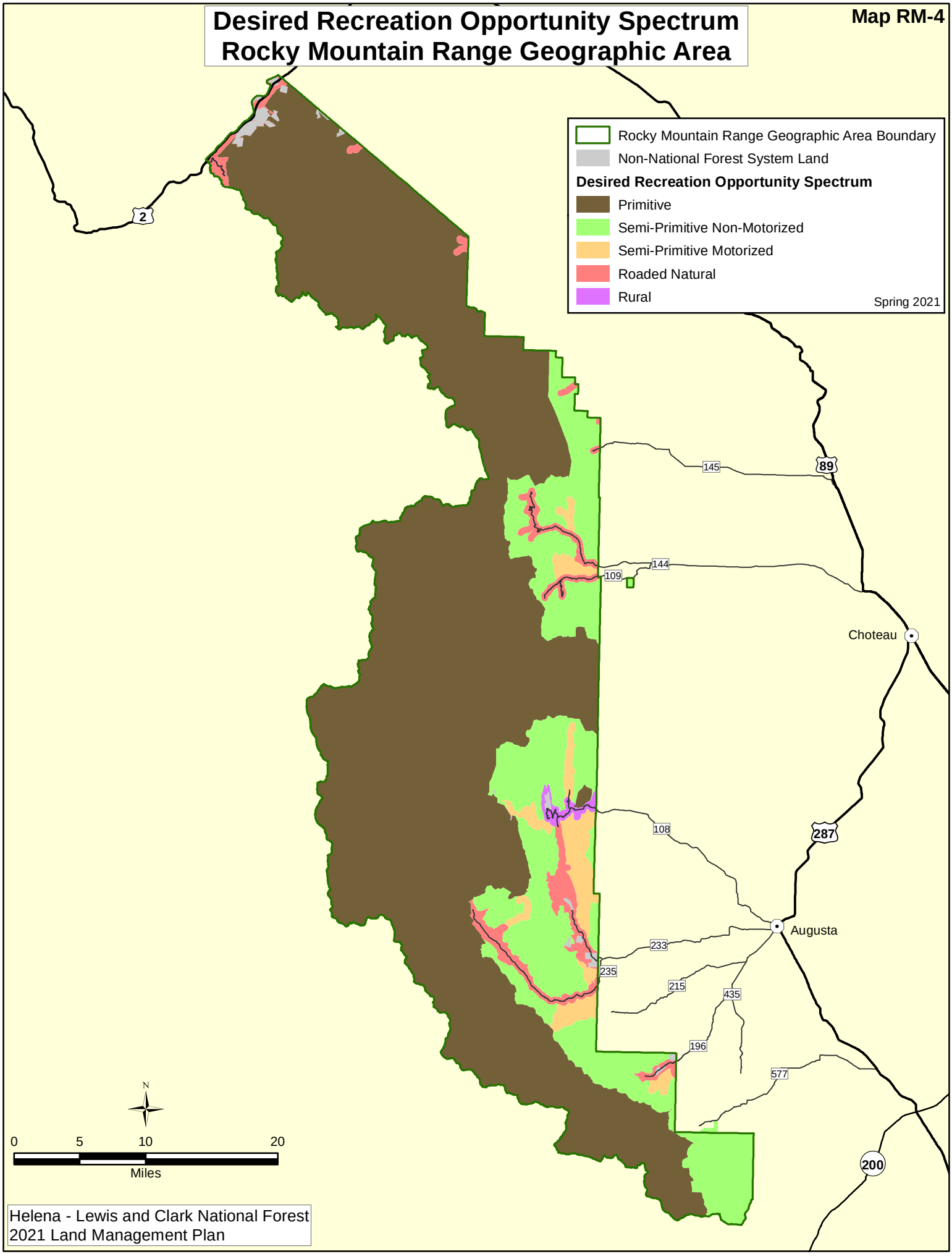
Map RM-3



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Rocky Mountain Range Geographic Area

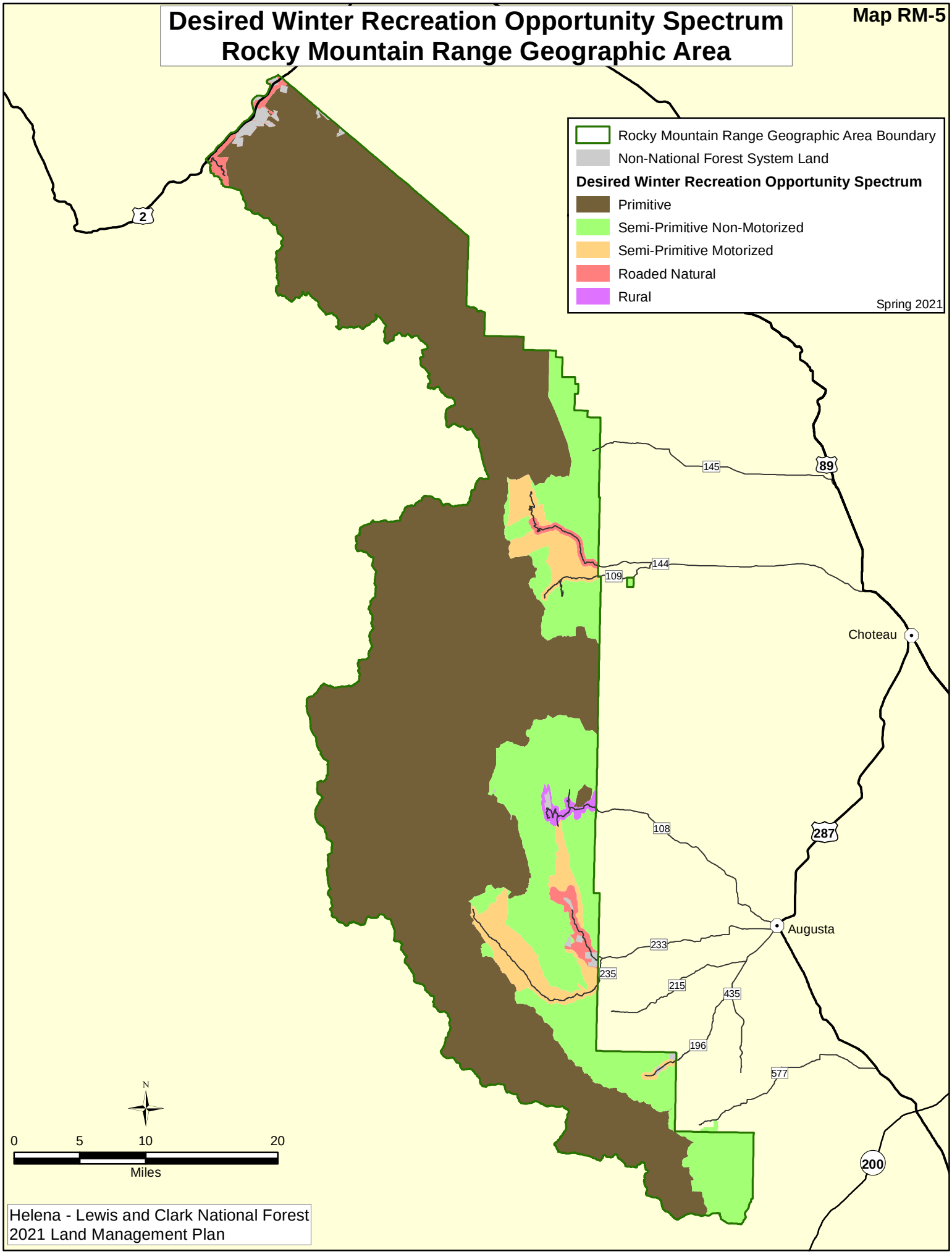
Map RM-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Rocky Mountain Range Geographic Area

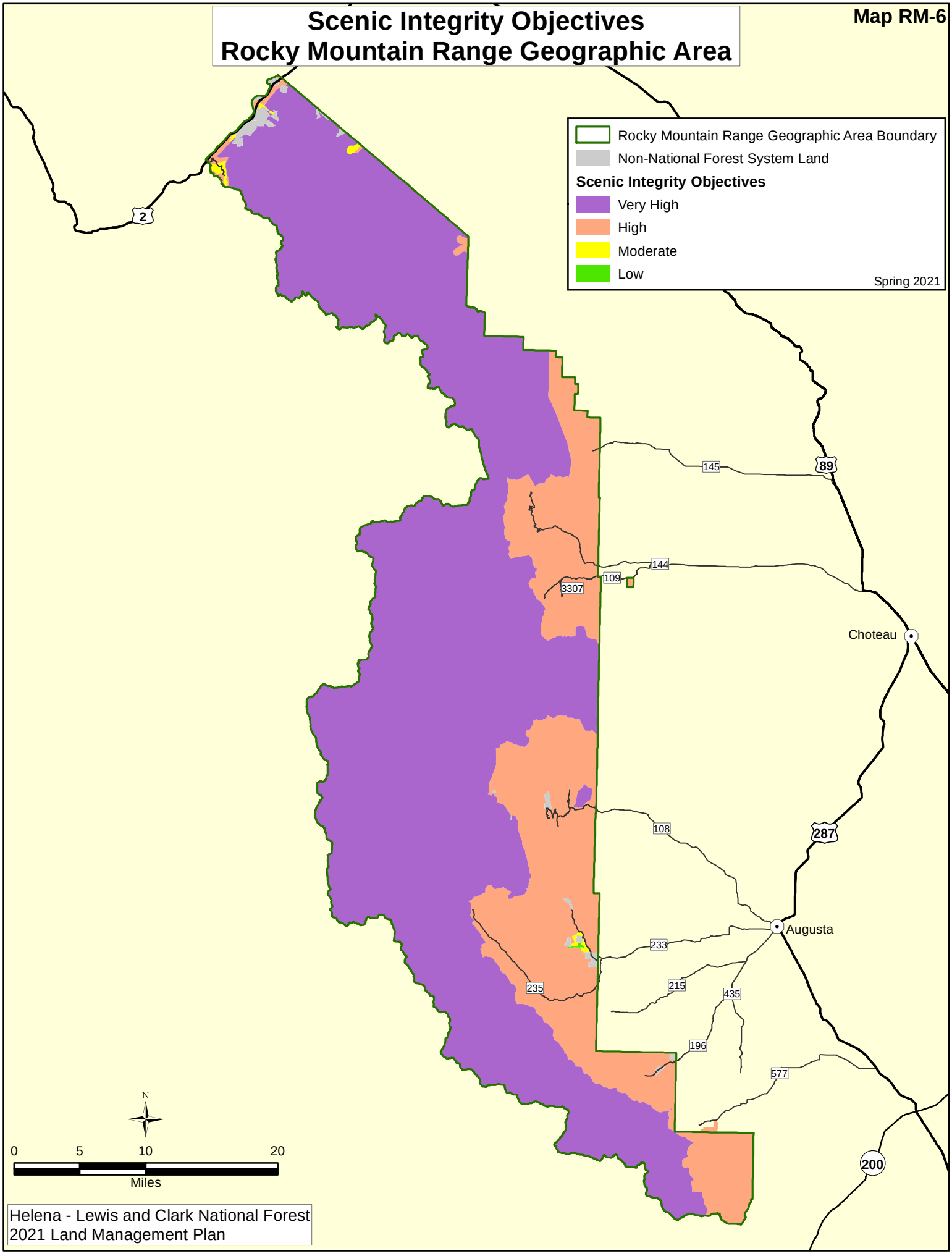
Map RM-5



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Scenic Integrity Objectives
Rocky Mountain Range Geographic Area

Map RM-6



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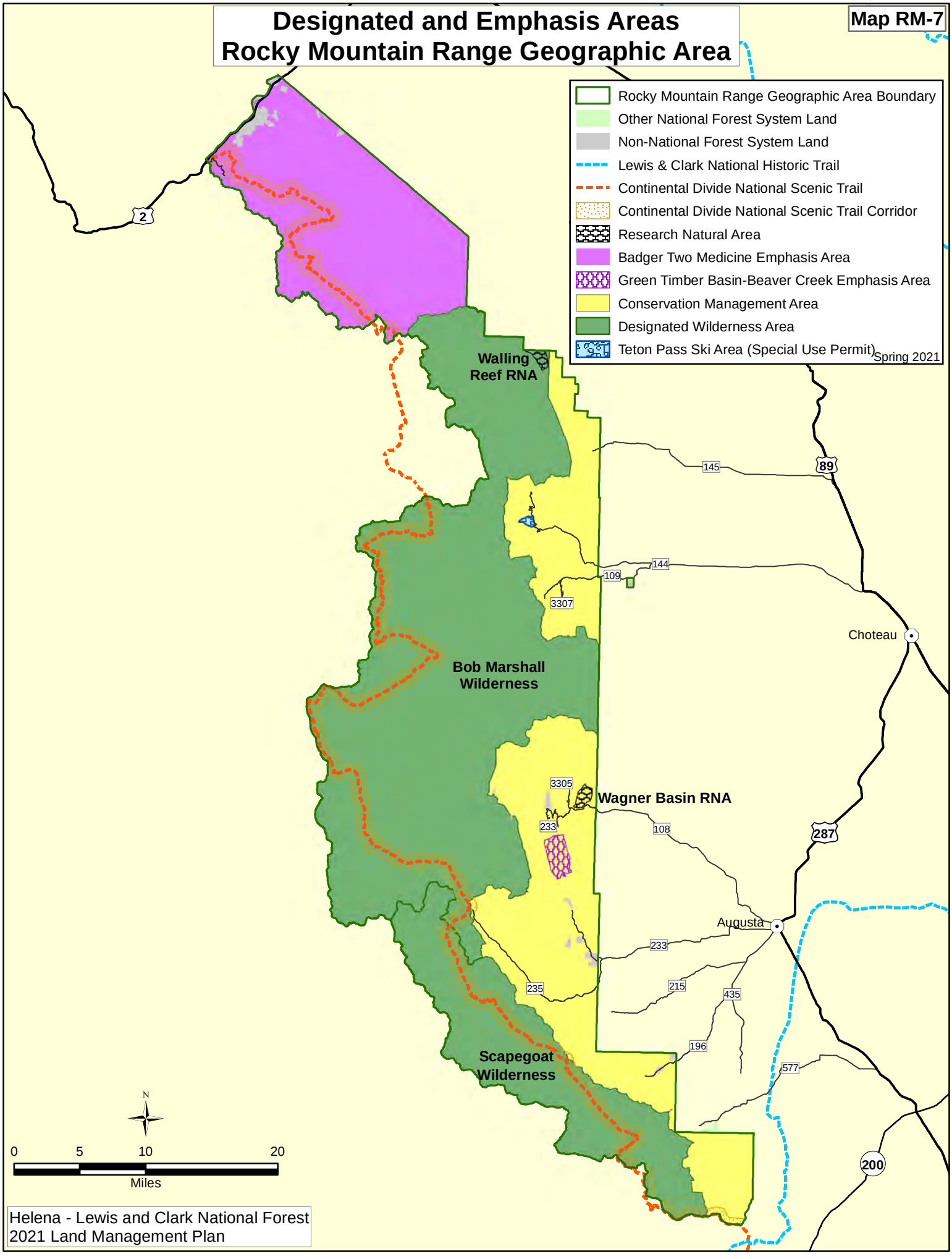
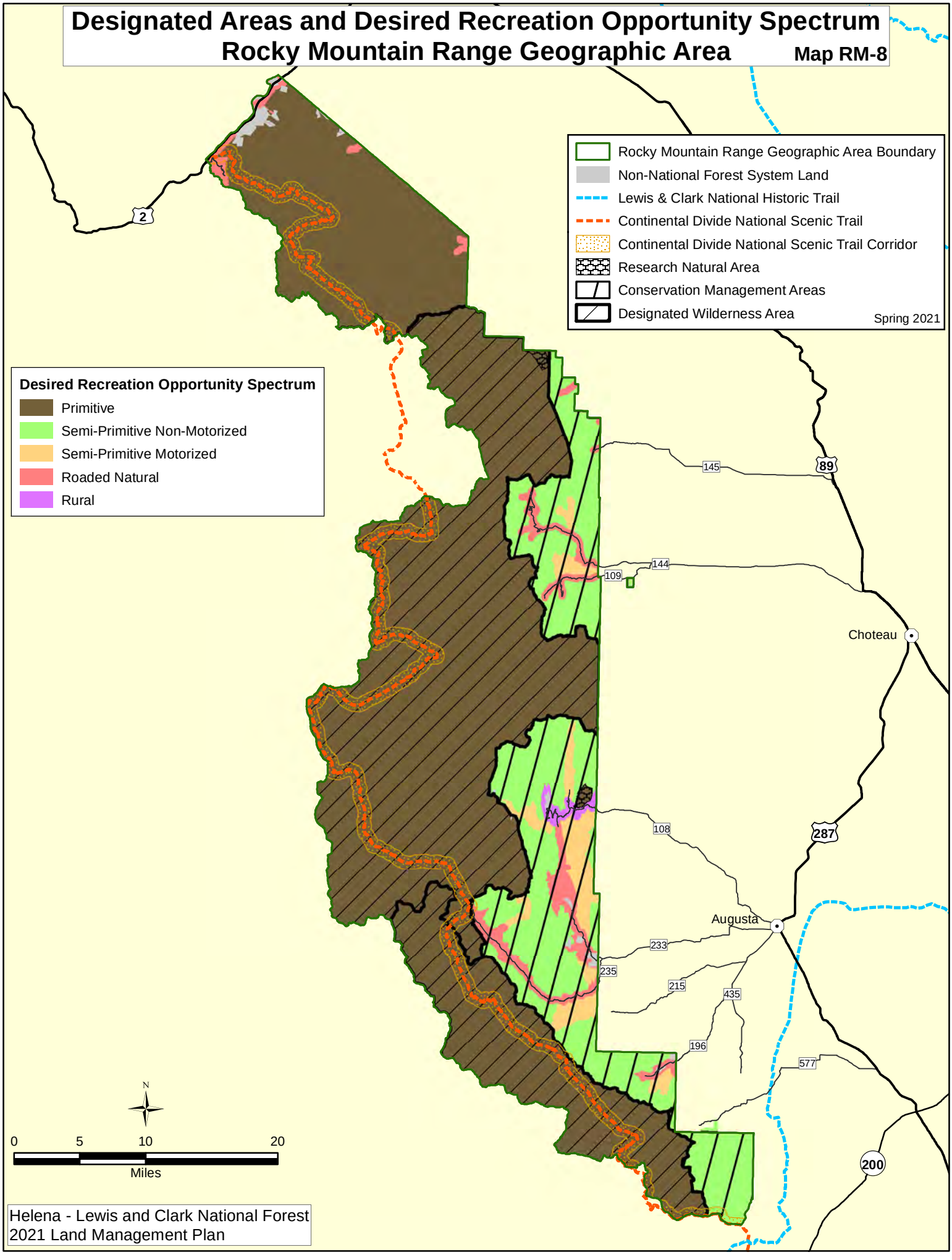

Designated and Emphasis Areas
Rocky Mountain Range Geographic Area
Map RM-7
Rocky Mountain Range Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Lewis & Clark National Historic Trail
Continental Divide National Scenic Trail
Continental Divide National Scenic Trail Corridor
Research Natural Area
Badger Two Medicine Emphasis Area
Green Timber Basin-Beaver Creek Emphasis Area
Conservation Management Area
Designated Wilderness Area
Teton Pass Ski Area (Special Use Permit)
Spring 2021
Walling Reef RNA
Bob Marshall Wilderness
Wagner Basin RNA
Scapegoat Wilderness
Choteau
Augusta
2
89
145
144
109
3307
3305
233
108
287
235
215
435
196
577
200
N
0
5
10
20
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Recreation Opportunity Spectrum
Rocky Mountain Range Geographic Area

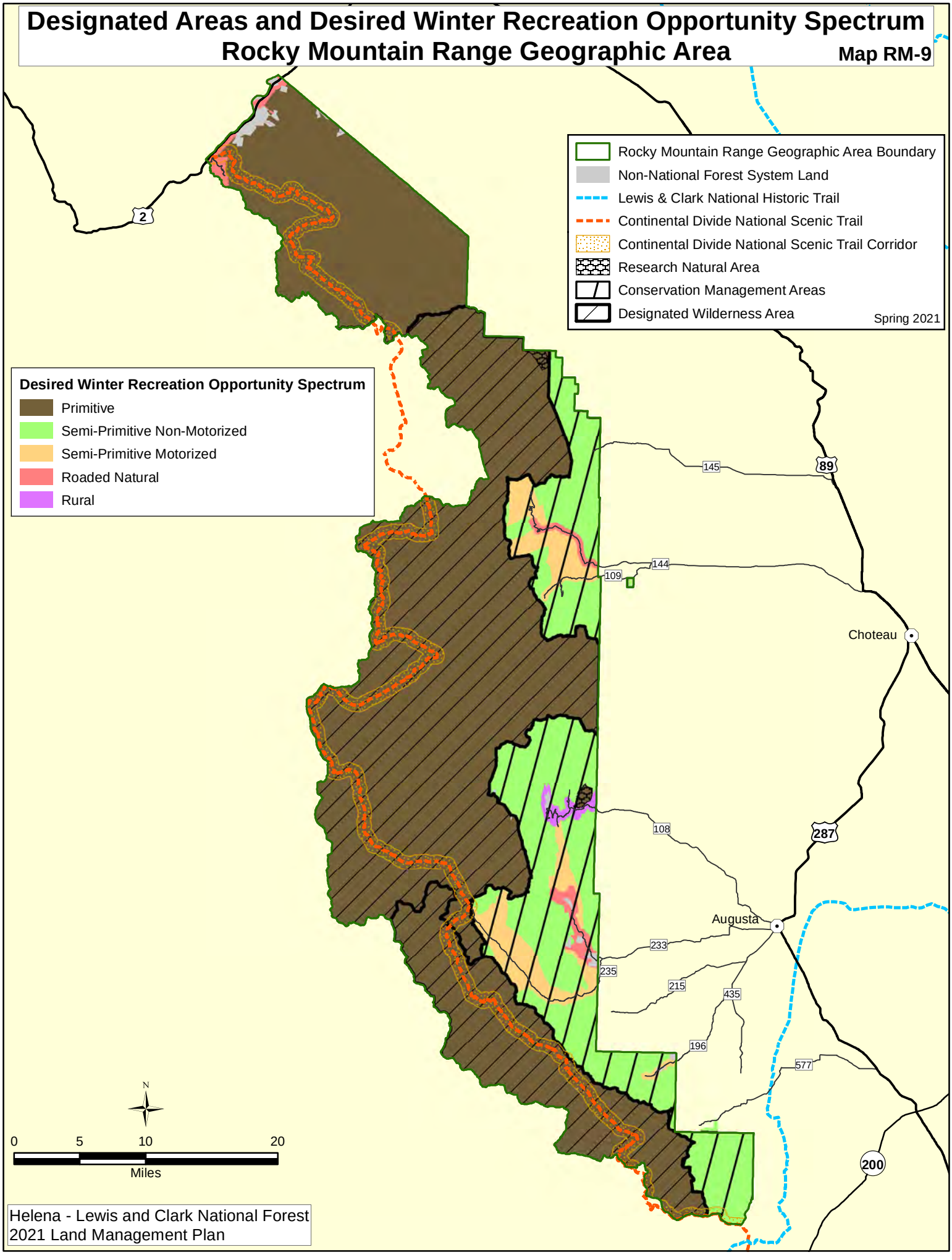
Map RM-8



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Designated Areas and Desired Winter Recreation Opportunity Spectrum
Rocky Mountain Range Geographic Area

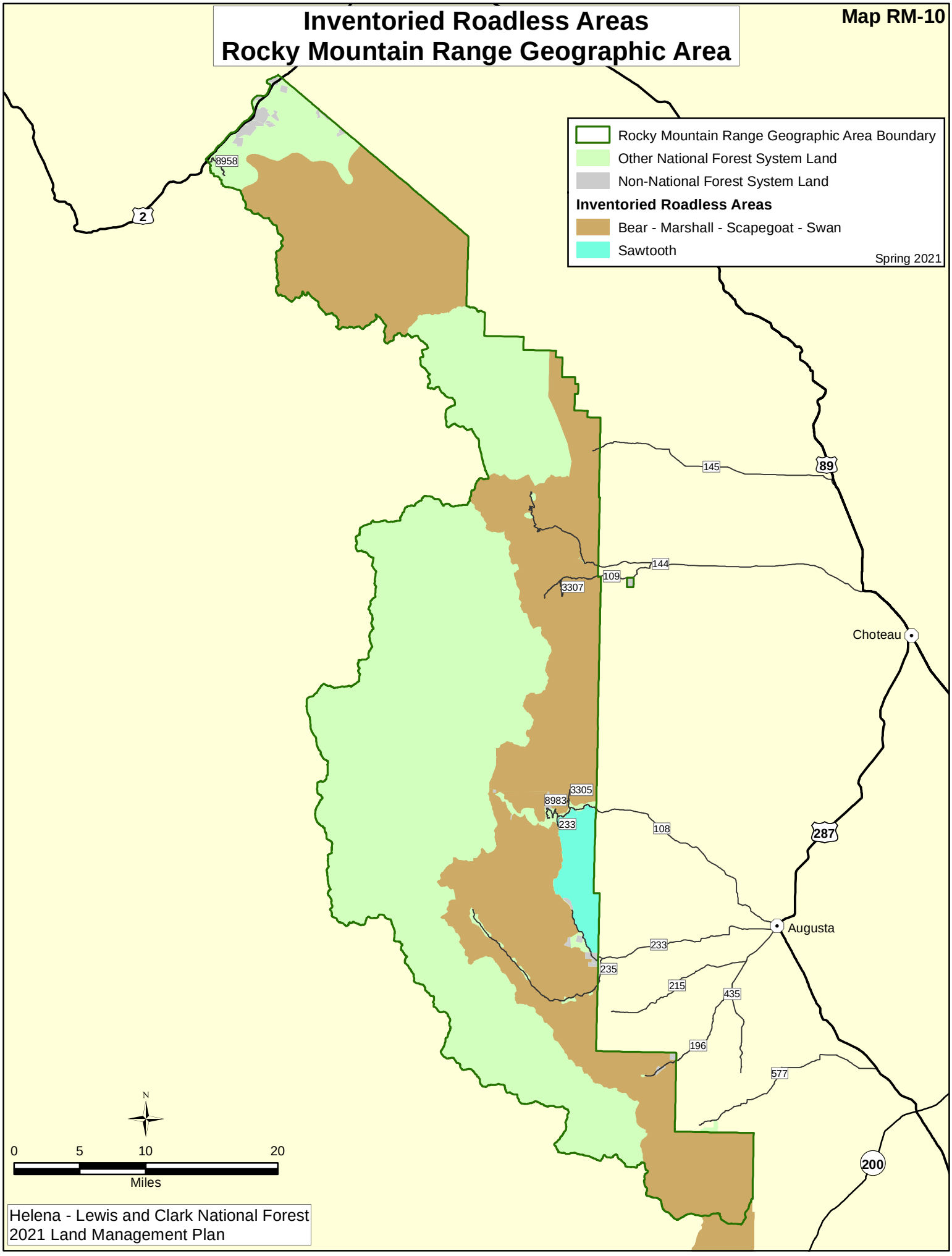
Map RM-9



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Inventoried Roadless Areas
Rocky Mountain Range Geographic Area

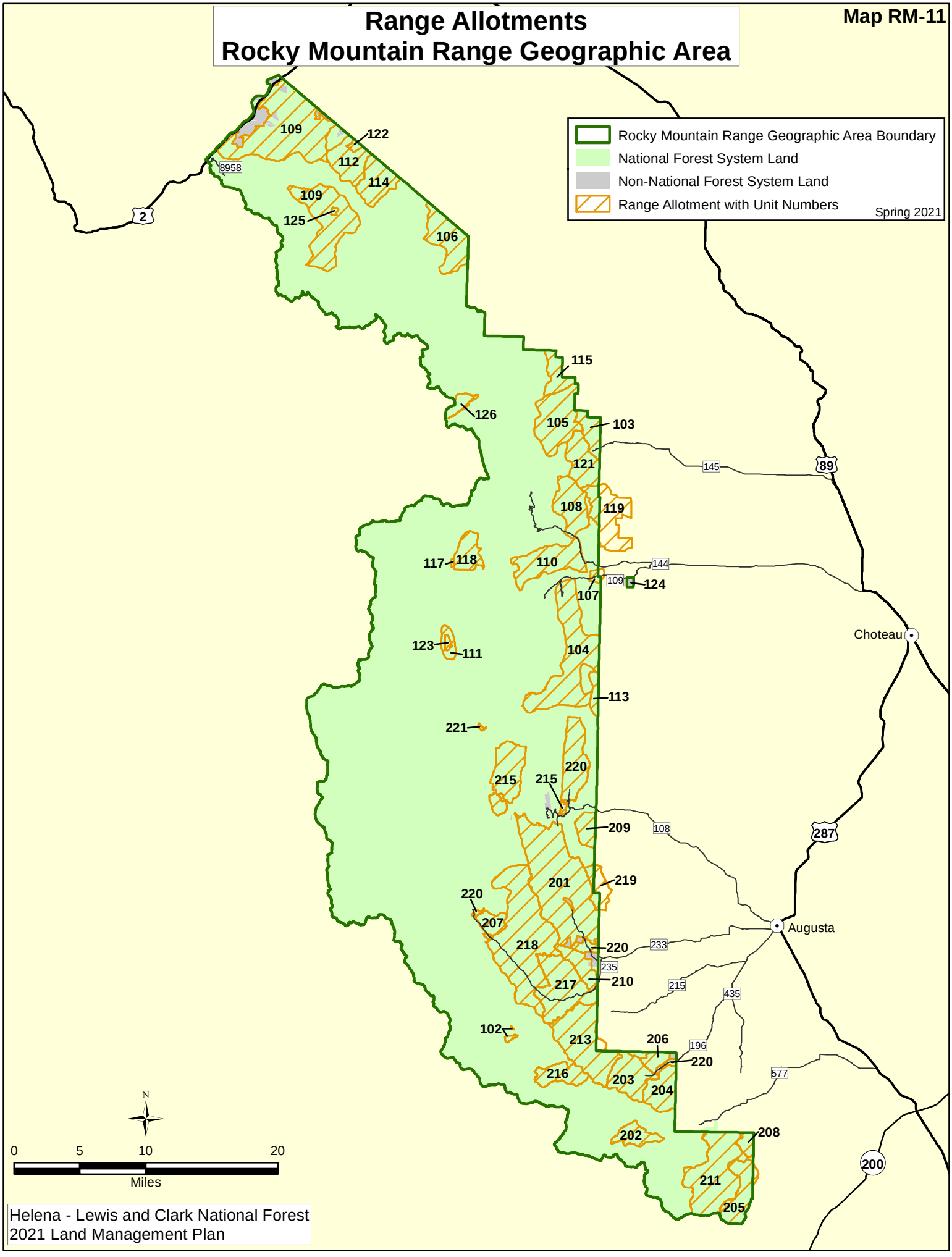
Map RM-10



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Range Allotments
Rocky Mountain Range Geographic Area

Map RM-11



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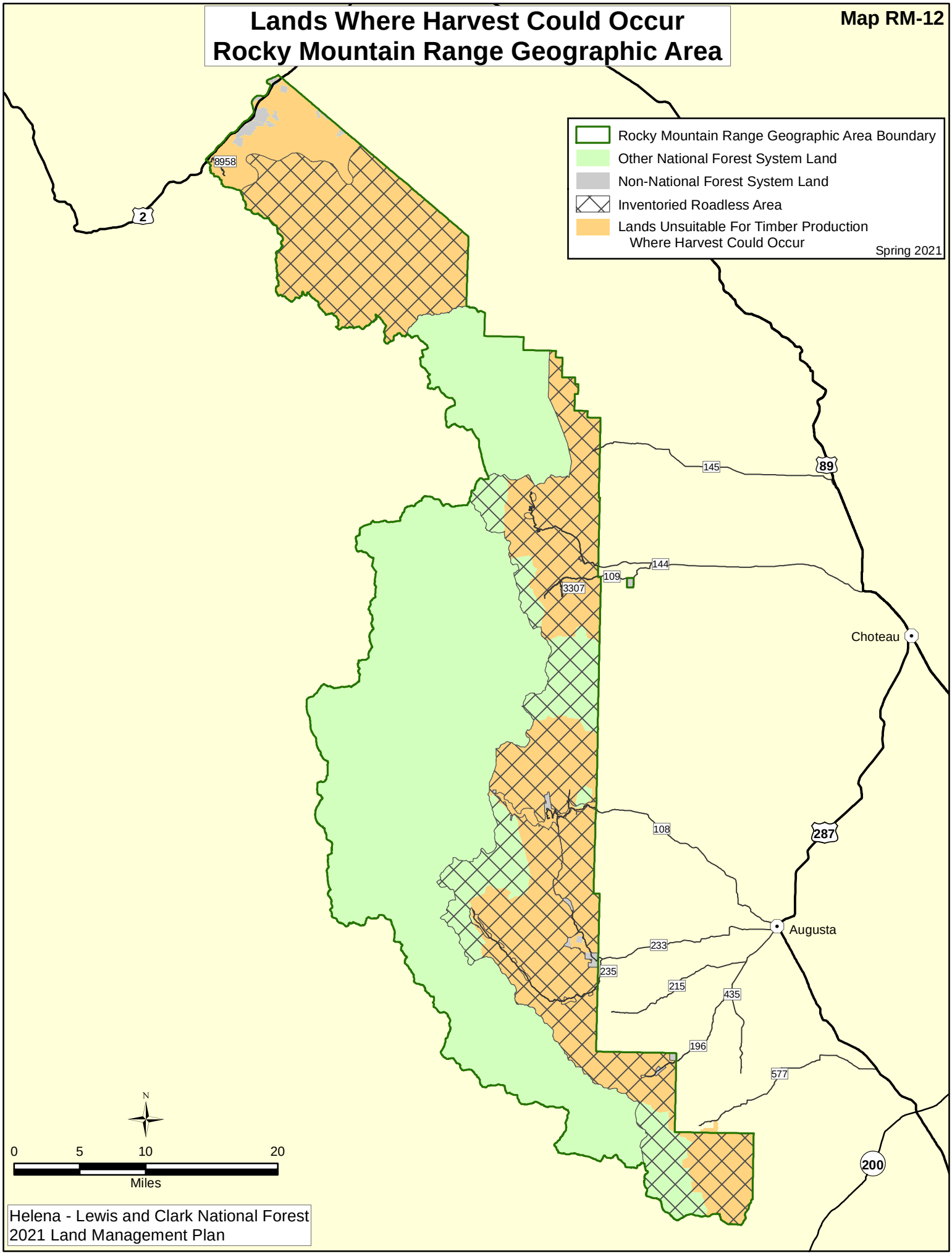
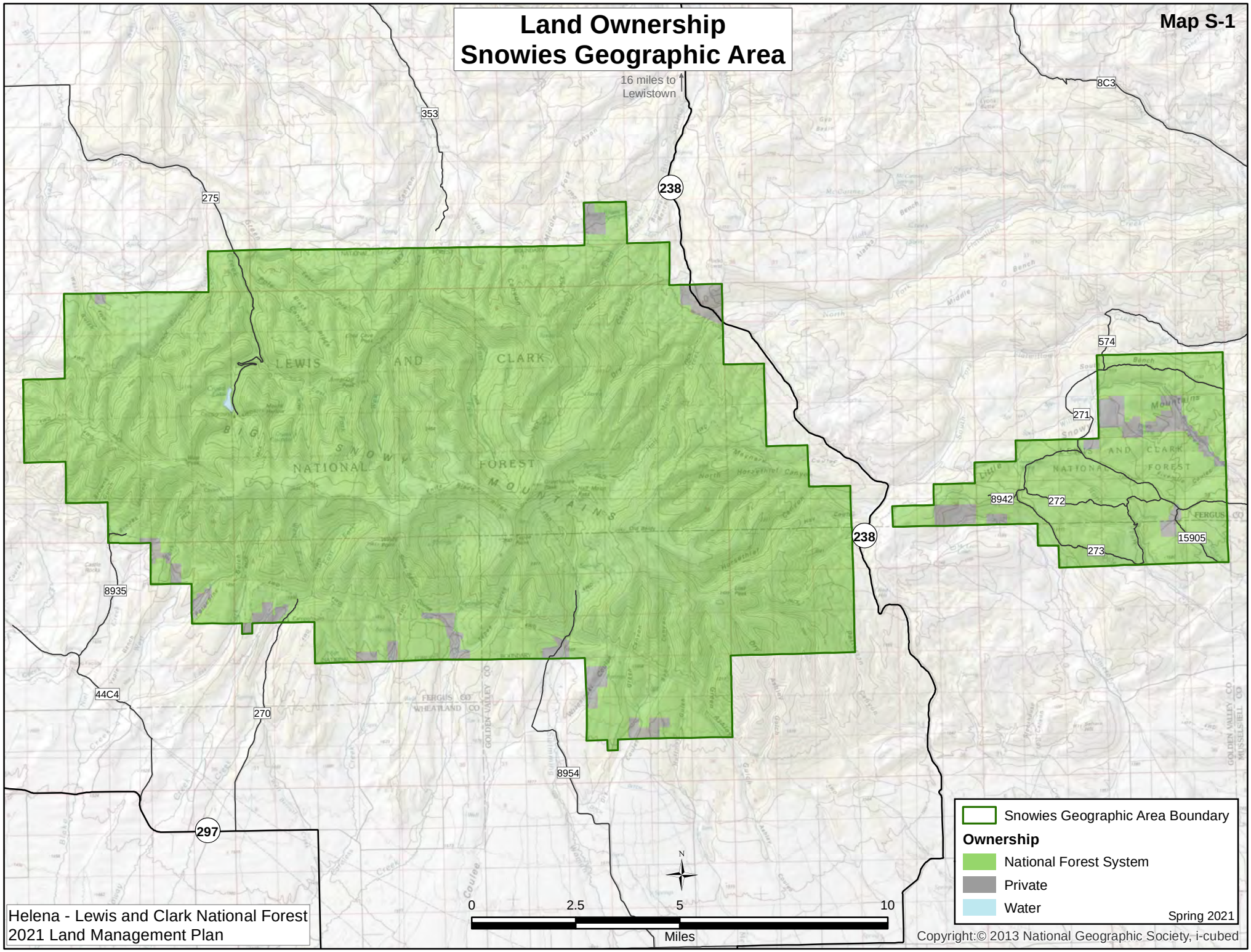
2021 Land Management Plan

Lands Where Harvest Could Occur
Rocky Mountain Range Geographic Area

Map RM-12



Helena - Lewis and Clark National Forest
2021 Land Management Plan


Land Ownership
Snowies Geographic Area
Map S-1
16 miles to Lewistown
353
275
238
8C3
574
271
272
8942
15905
273
LEWIS AND CLARK
BIG SNOWY MOUNTAINS
NATIONAL FOREST
8935
44C4
270
8954
297
FERGUS CO
WHEATLAND CO
GOLDEN VALLEY CO
Snowies Geographic Area Boundary
Ownership
National Forest System
Private
Water
Spring 2021
N
0
2.5
5
10
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
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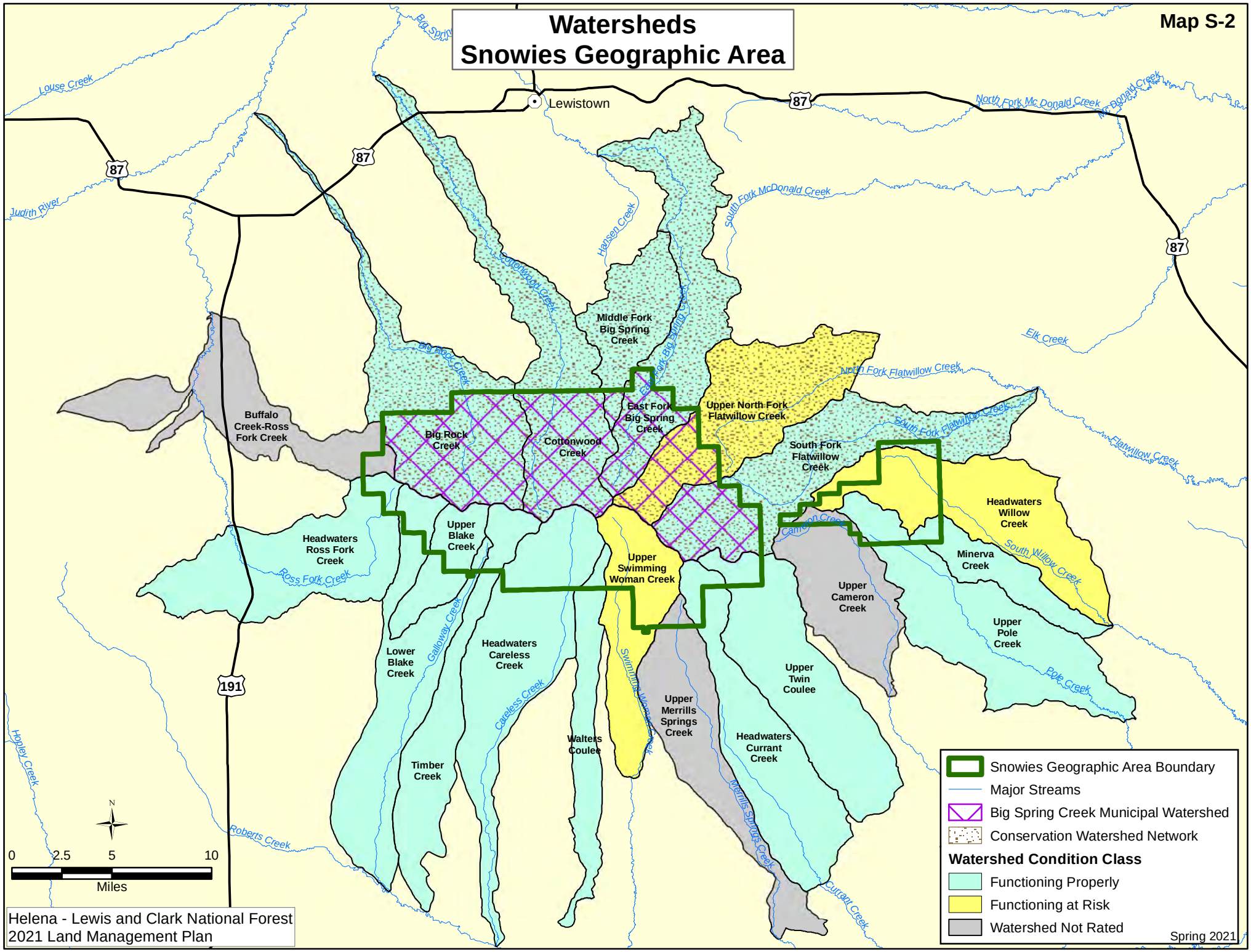
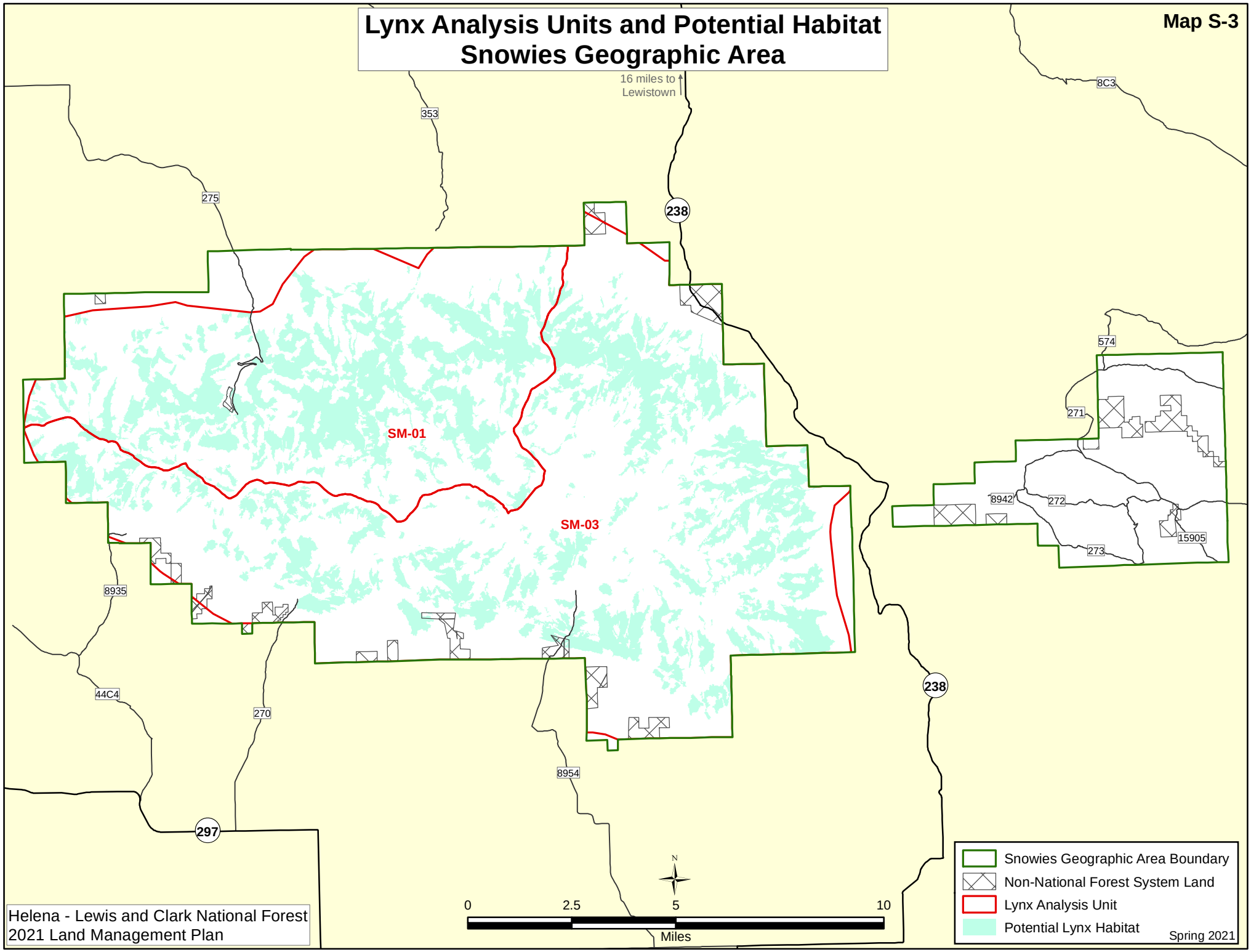
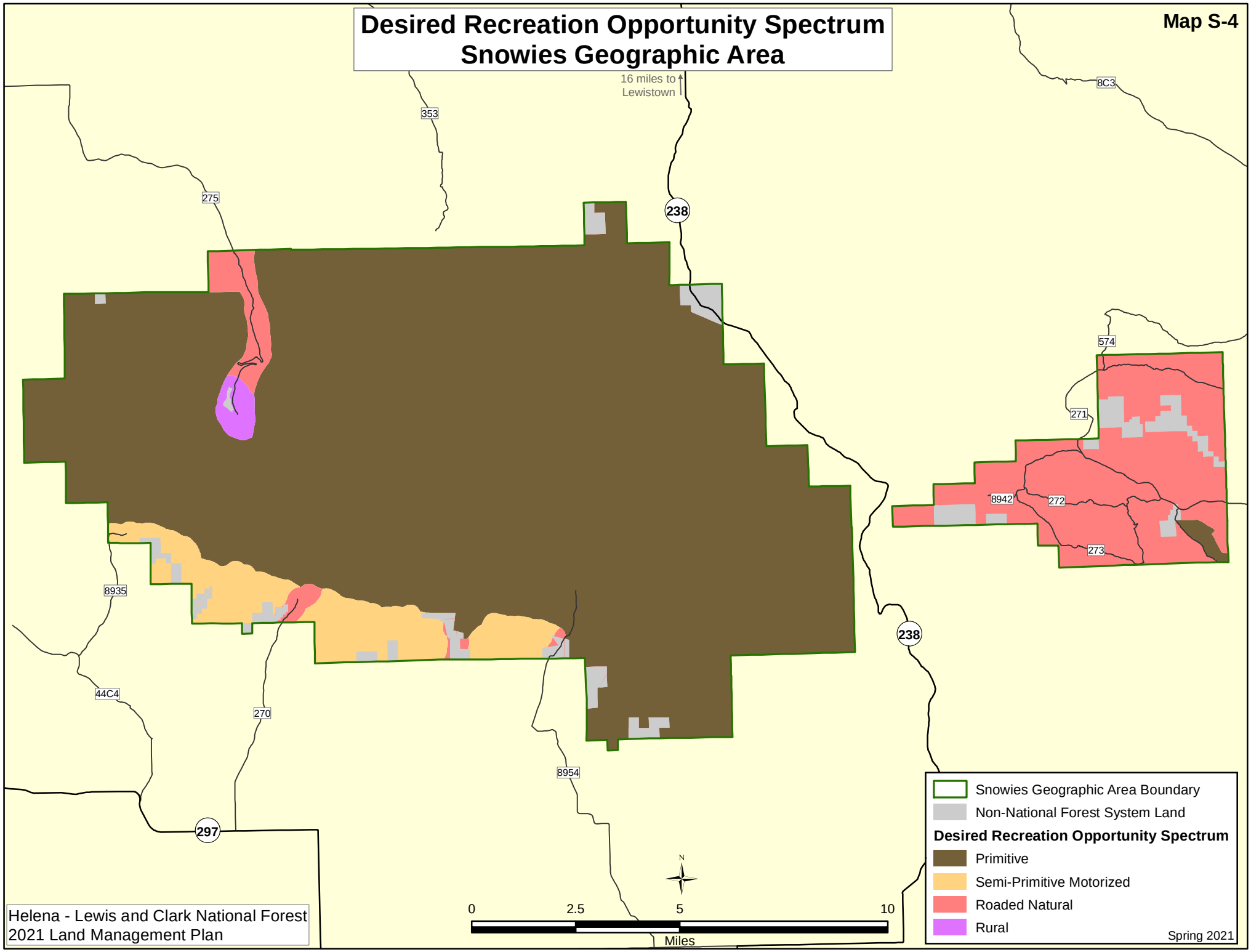

Watersheds
Snowies Geographic Area
Map S-2
Lewistown
87
Louse Creek
Judith River
Big Spring Creek
North Fork Mc Donald Creek
South Fork McDonald Creek
Hansen Creek
Cottonwood Creek
Middle Fork Big Spring Creek
Big Rock Creek
East Fork Big Spring Creek
Elk Creek
North Fork Flatwillow Creek
South Fork Flatwillow Creek
Flatwillow Creek
Buffalo Creek-Ross Fork Creek
Big Rock Creek
Cottonwood Creek
East Fork Big Spring Creek
Upper North Fork Flatwillow Creek
South Fork Flatwillow Creek
Headwaters Willow Creek
Headwaters Ross Fork Creek
Upper Blake Creek
Upper Swimming Woman Creek
Cameron Creek
South Willow Creek
Minerva Creek
Upper Cameron Creek
Upper Pole Creek
Ross Fork Creek
Galloway Creek
Lower Blake Creek
Headwaters Careless Creek
Careless Creek
Swimming Woman Creek
Upper Twin Coulee
Pole Creek
Upper Merrills Springs Creek
Walters Coulee
Headwaters Currant Creek
Timber Creek
Merrills Springs Creek
Currant Creek
Hopley Creek
Roberts Creek
191
N
0 2.5 5 10
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
Snowies Geographic Area Boundary
Major Streams
Big Spring Creek Municipal Watershed
Conservation Watershed Network
Watershed Condition Class
Functioning Properly
Functioning at Risk
Watershed Not Rated
Spring 2021


Lynx Analysis Units and Potential Habitat
Snowies Geographic Area
Map S-3
16 miles to
Lewistown
353
275
238
8C3
574
271
8942
272
15905
273
SM-01
SM-03
8935
44C4
270
8954
238
297
N
0
2.5
5
10
Miles
Snowies Geographic Area Boundary
Non-National Forest System Land
Lynx Analysis Unit
Potential Lynx Habitat
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Recreation Opportunity Spectrum
Snowies Geographic Area

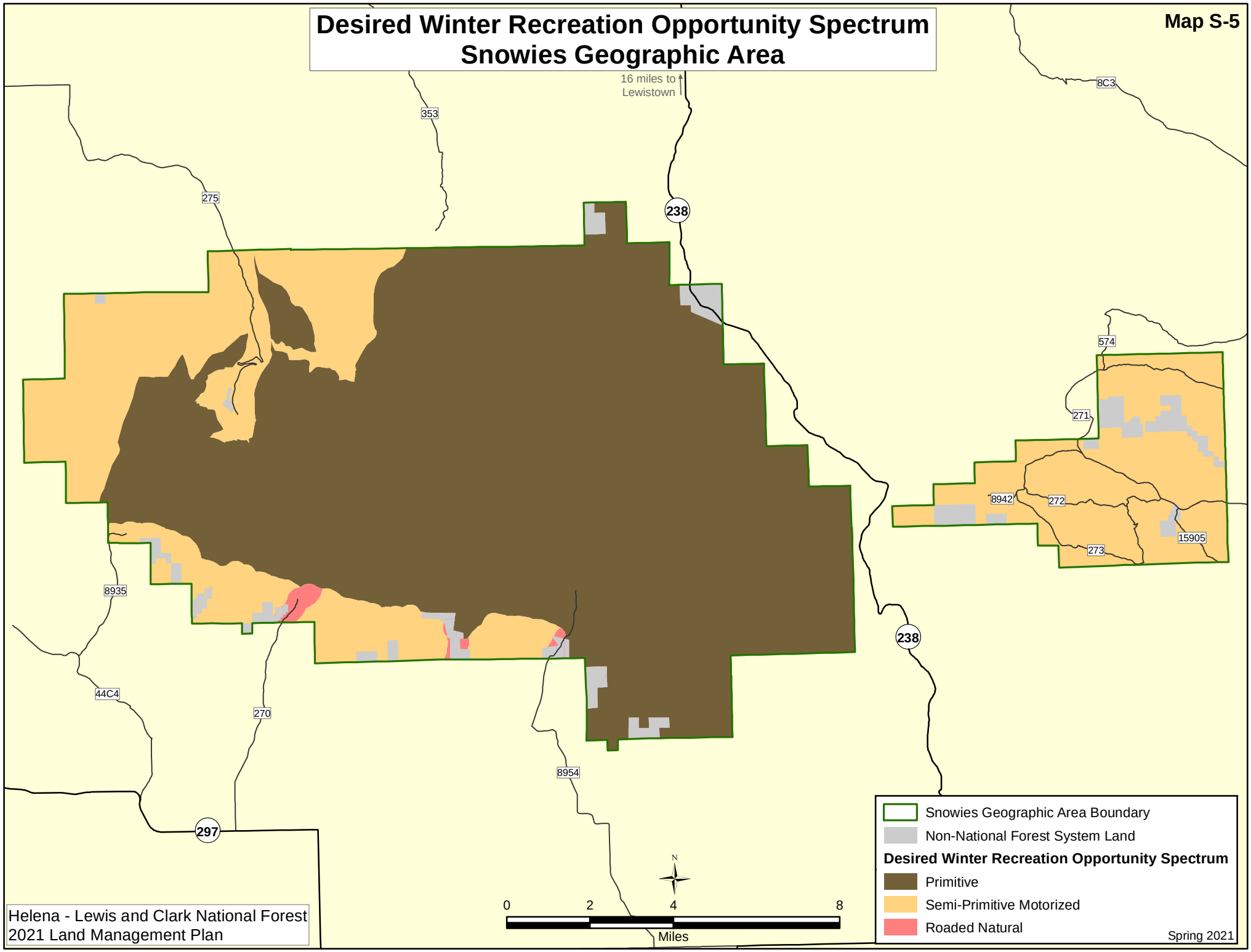
Map S-4



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Desired Winter Recreation Opportunity Spectrum
Snowies Geographic Area

Map S-5



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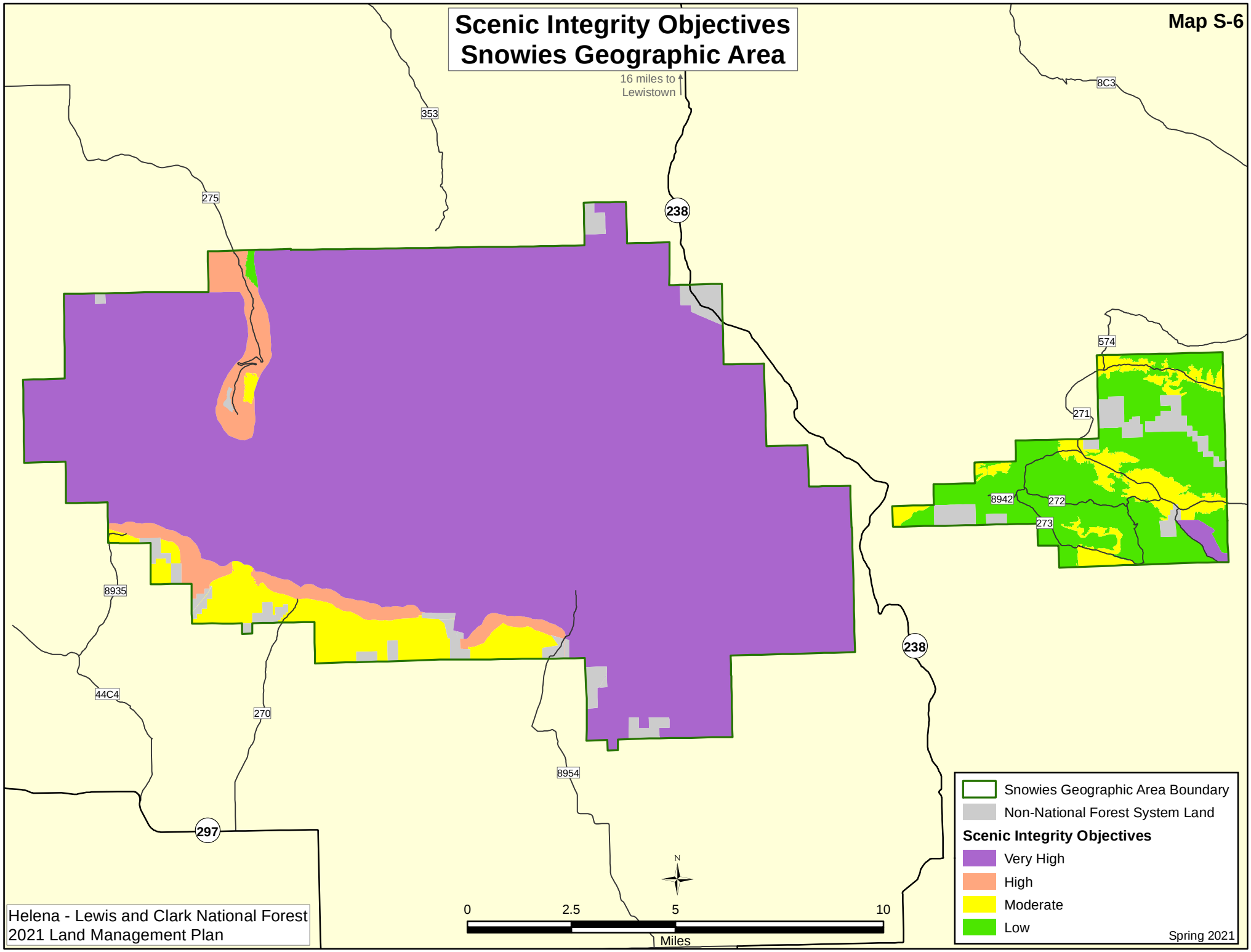
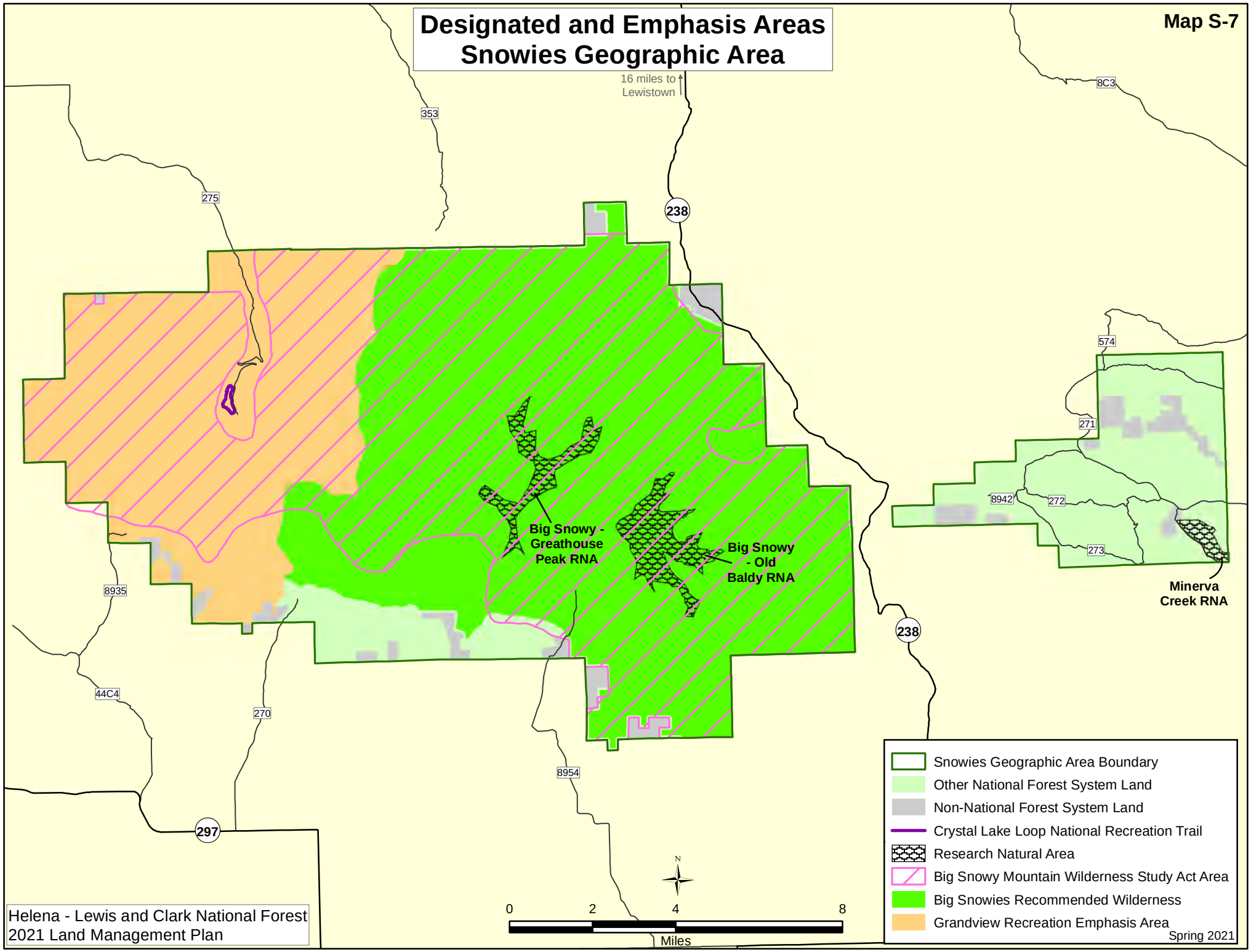
Scenic Integrity Objectives
Snowies Geographic Area

Map S-6

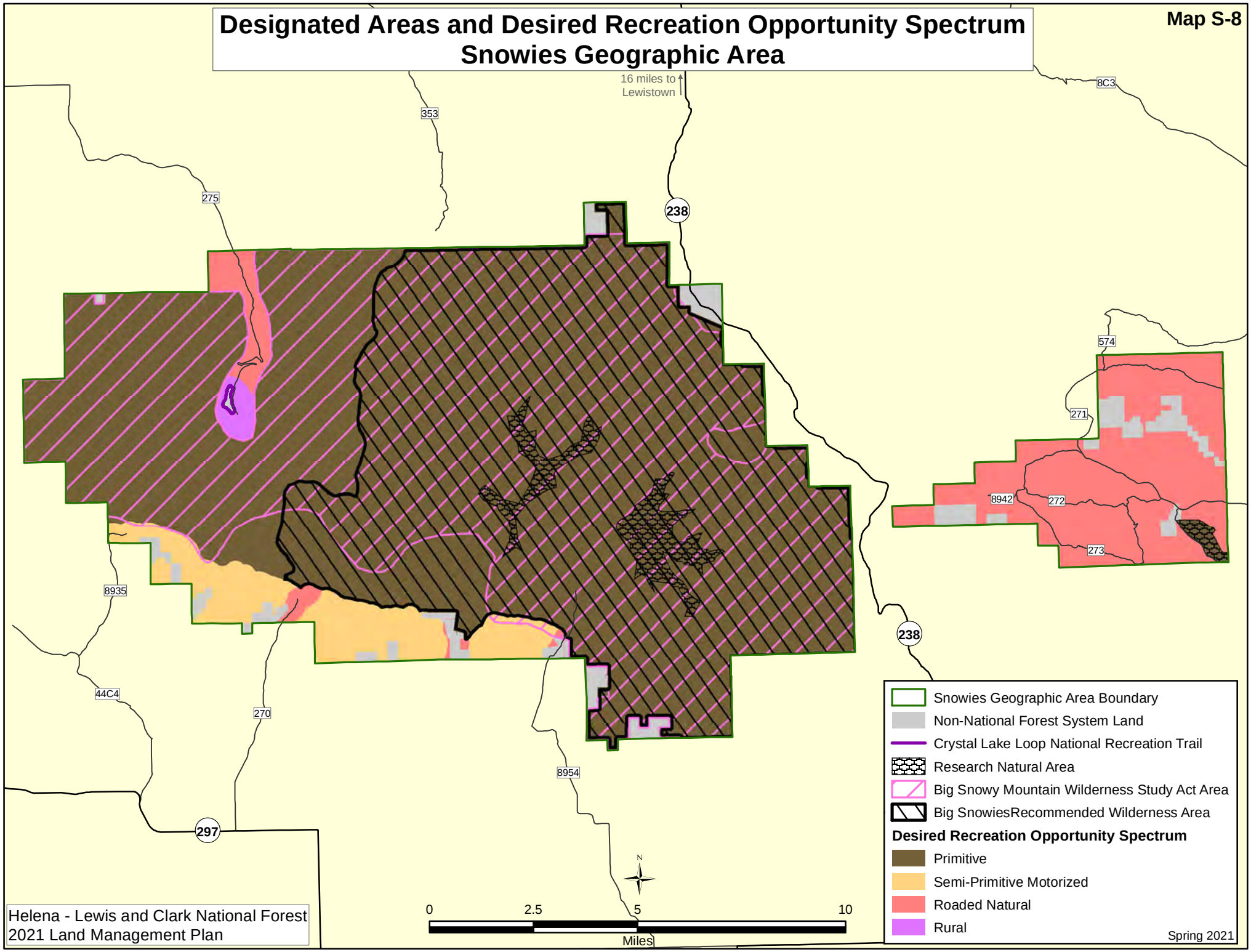


Helena - Lewis and Clark National Forest
2021 Land Management Plan


Designated and Emphasis Areas
Snowies Geographic Area
Map S-7
16 miles to
Lewistown
353
275
238
8C3
574
271
272
273
8942
Big Snowy -
Greathouse
Peak RNA
Big Snowy
- Old
Baldy RNA
Minerva
Creek RNA
8935
44C4
270
8954
297
238
Snowies Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Crystal Lake Loop National Recreation Trail
Research Natural Area
Big Snowy Mountain Wilderness Study Act Area
Big Snowies Recommended Wilderness
Grandview Recreation Emphasis Area
N
0
2
4
8
Miles
Helena - Lewis and Clark National Forest
2021 Land Management Plan
Spring 2021

Designated Areas and Desired Recreation Opportunity Spectrum
Snowies Geographic Area

Map S-8



Helena - Lewis and Clark National Forest
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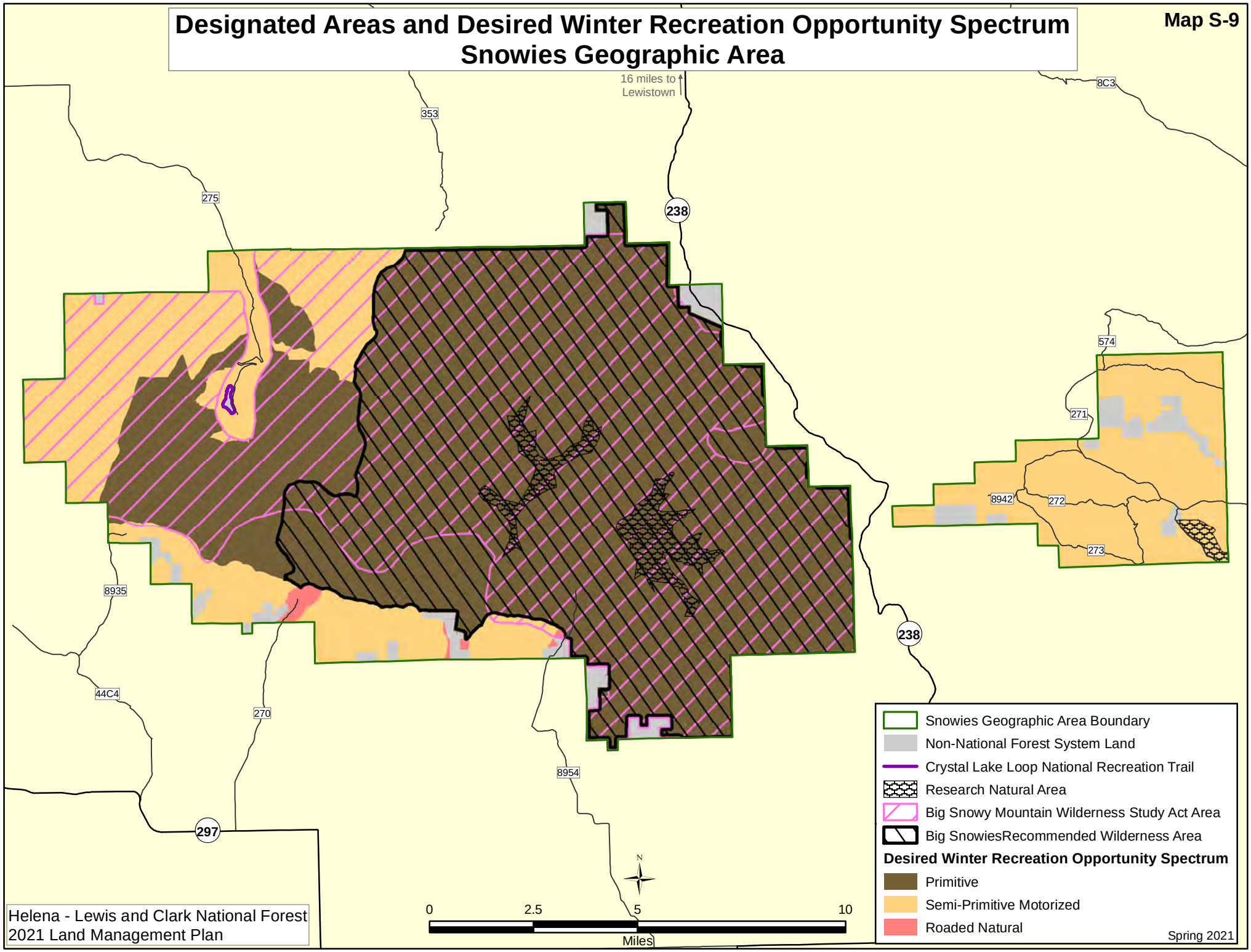
Designated Areas and Desired Winter Recreation Opportunity Spectrum
Snowies Geographic Area

Map S-9



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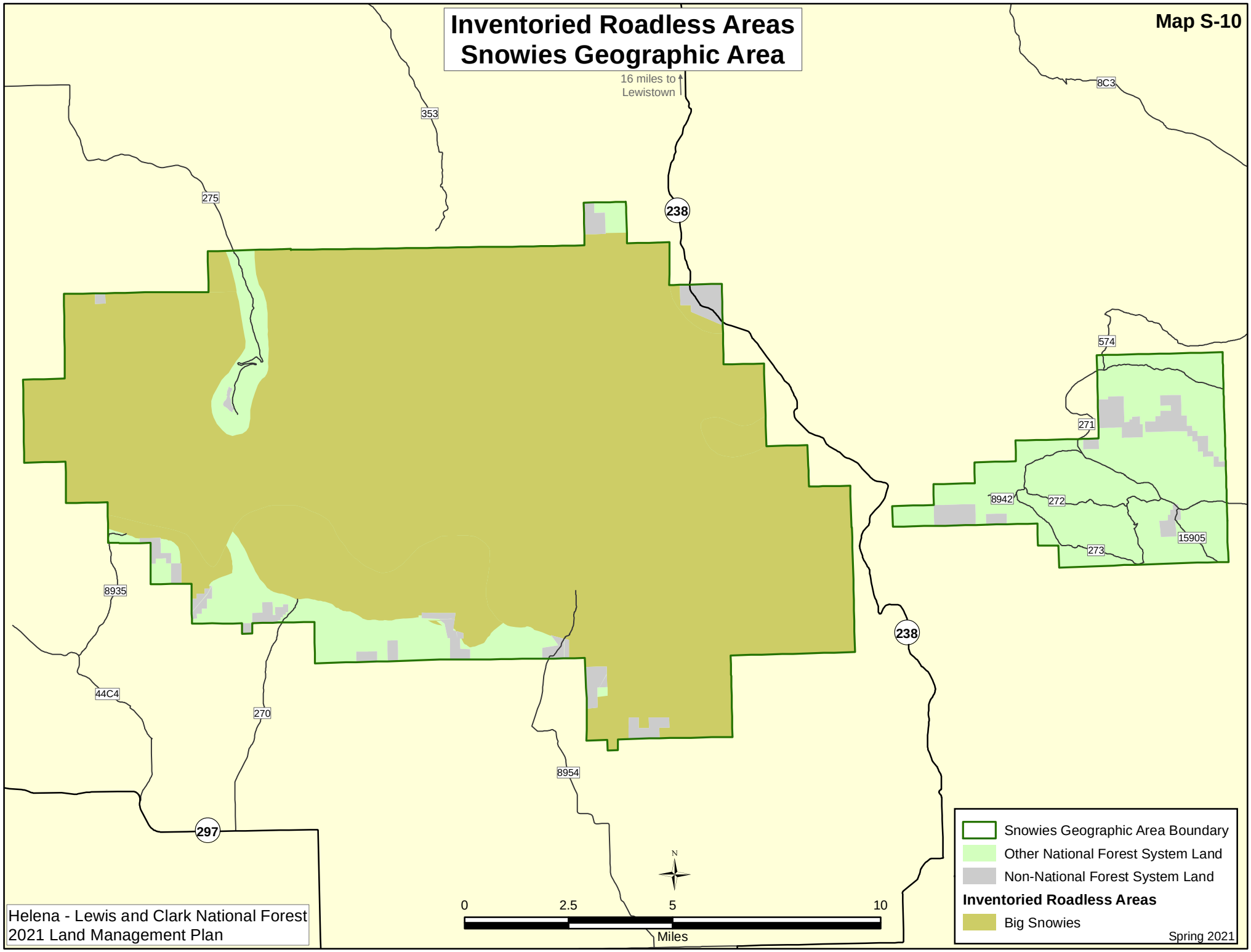
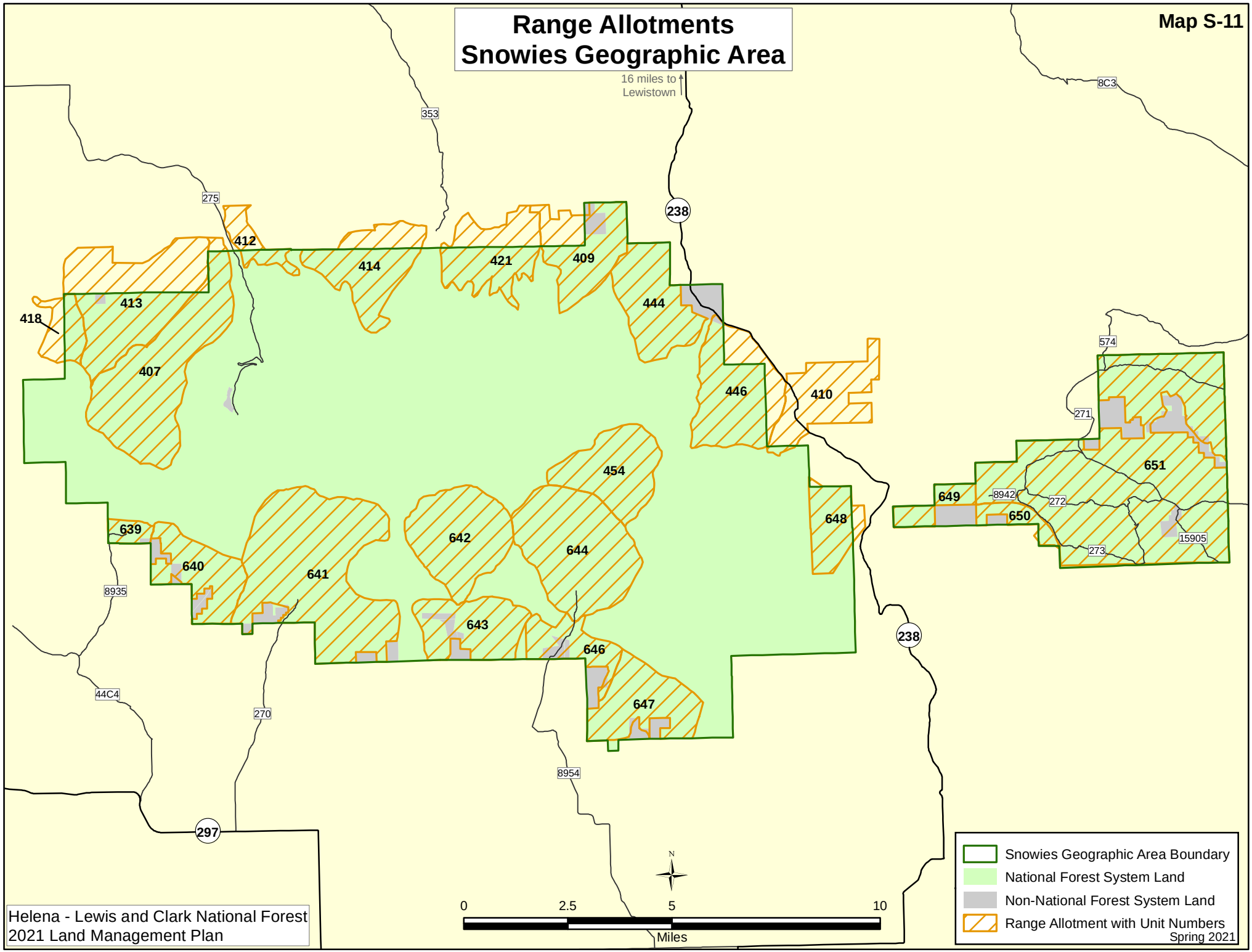
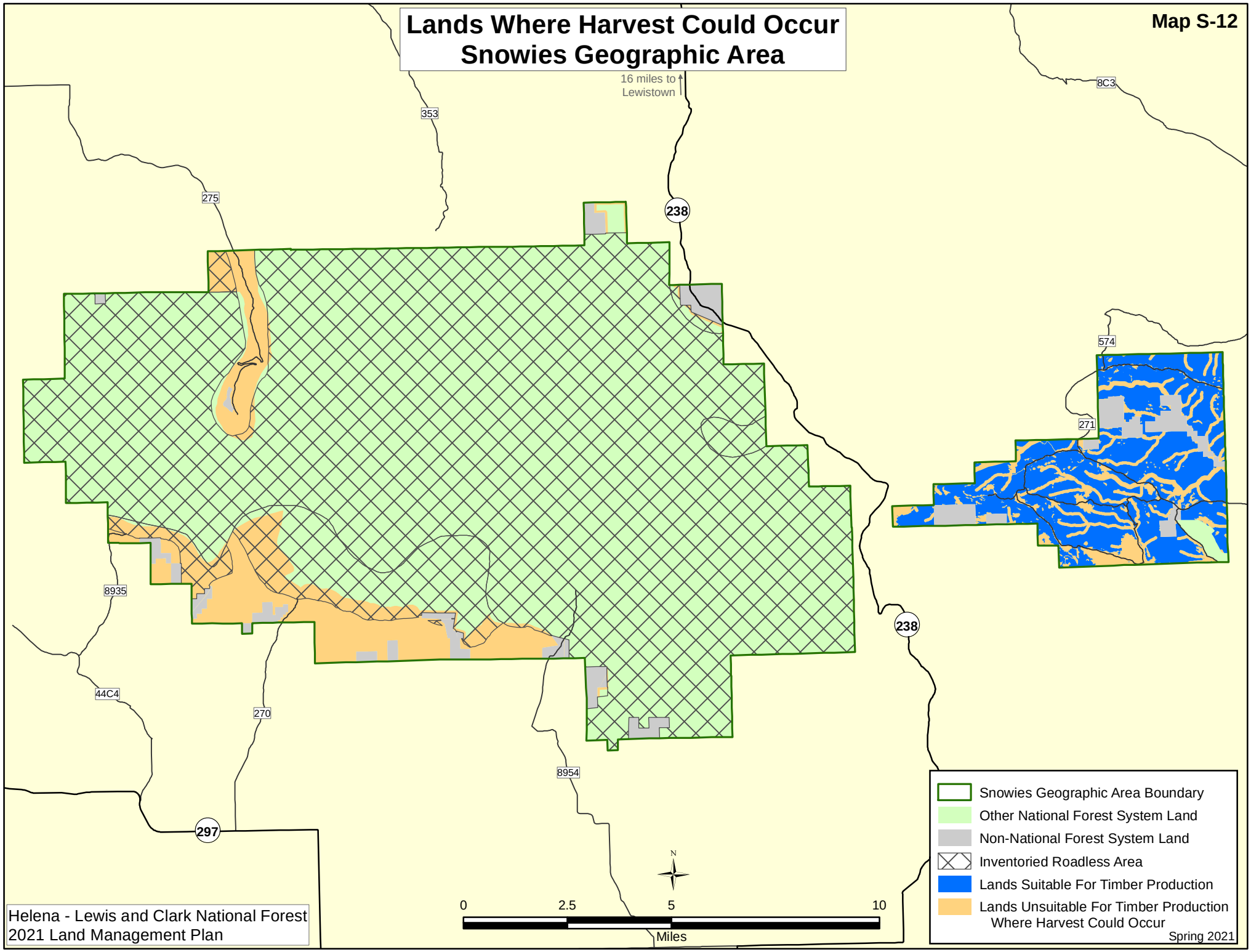
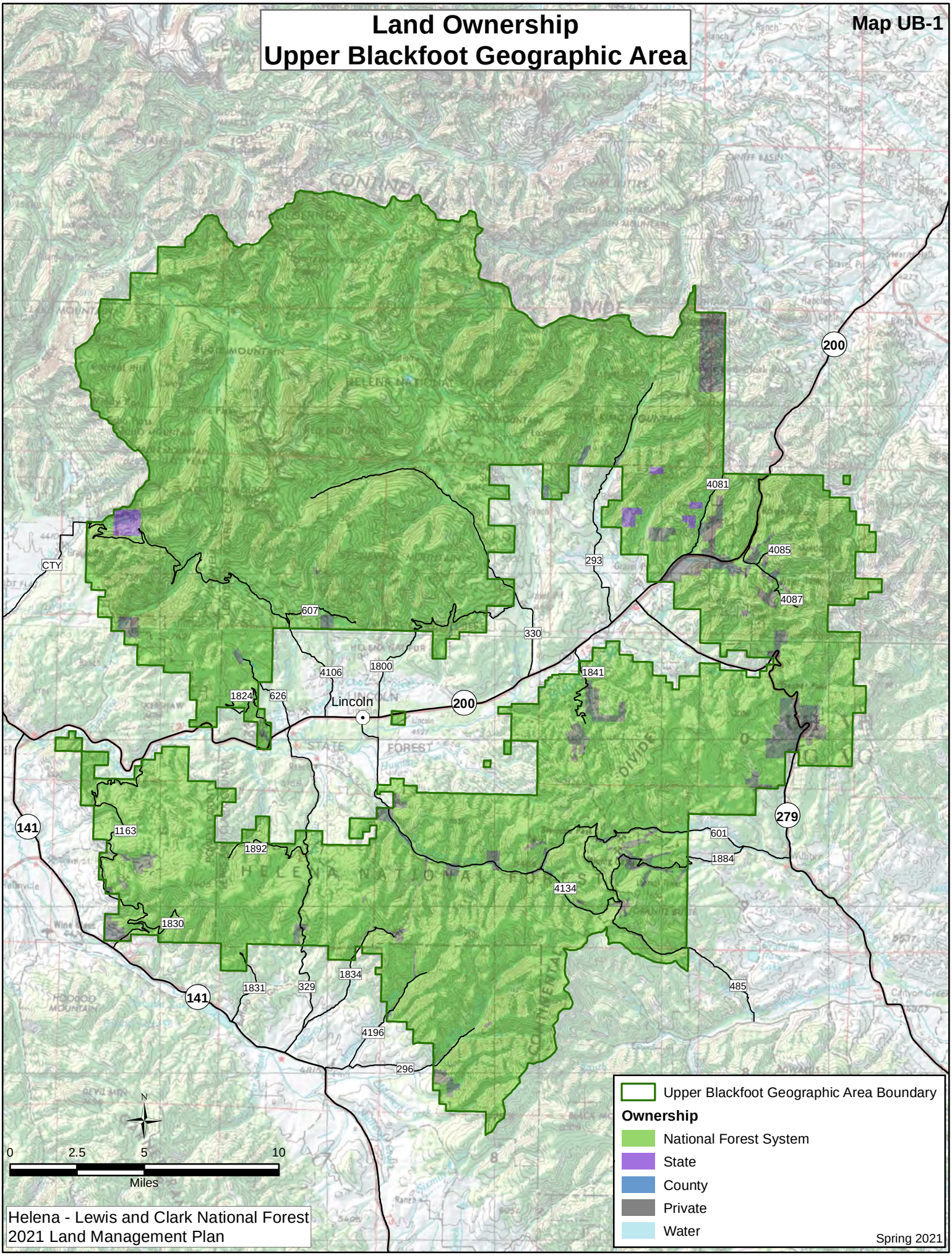

Inventoried Roadless Areas
Snowies Geographic Area
Map S-10
16 miles to
Lewistown
353
275
238
8C3
574
271
8942
272
15905
273
8935
238
44C4
270
8954
297
N
0
2.5
5
10
Miles
Snowies Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Areas
Big Snowies
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Range Allotments
Snowies Geographic Area
Map S-11
16 miles to Lewistown
353
275
238
8C3
412
414
421
409
444
413
418
407
446
410
574
271
651
649
8942
272
650
15905
273
454
648
639
642
644
640
641
643
646
8935
238
44C4
270
647
8954
297
N
0
2.5
5
10
Miles
Snowies Geographic Area Boundary
National Forest System Land
Non-National Forest System Land
Range Allotment with Unit Numbers
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan


Lands Where Harvest Could Occur
Snowies Geographic Area
Map S-12
16 miles to
Lewistown
353
275
238
8C3
574
271
8935
238
44C4
270
8954
297
N
0
2.5
5
10
Miles
Snowies Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Inventoried Roadless Area
Lands Suitable For Timber Production
Lands Unsuitable For Timber Production
Where Harvest Could Occur
Spring 2021
Helena - Lewis and Clark National Forest
2021 Land Management Plan

Land Ownership
Upper Blackfoot Geographic Area

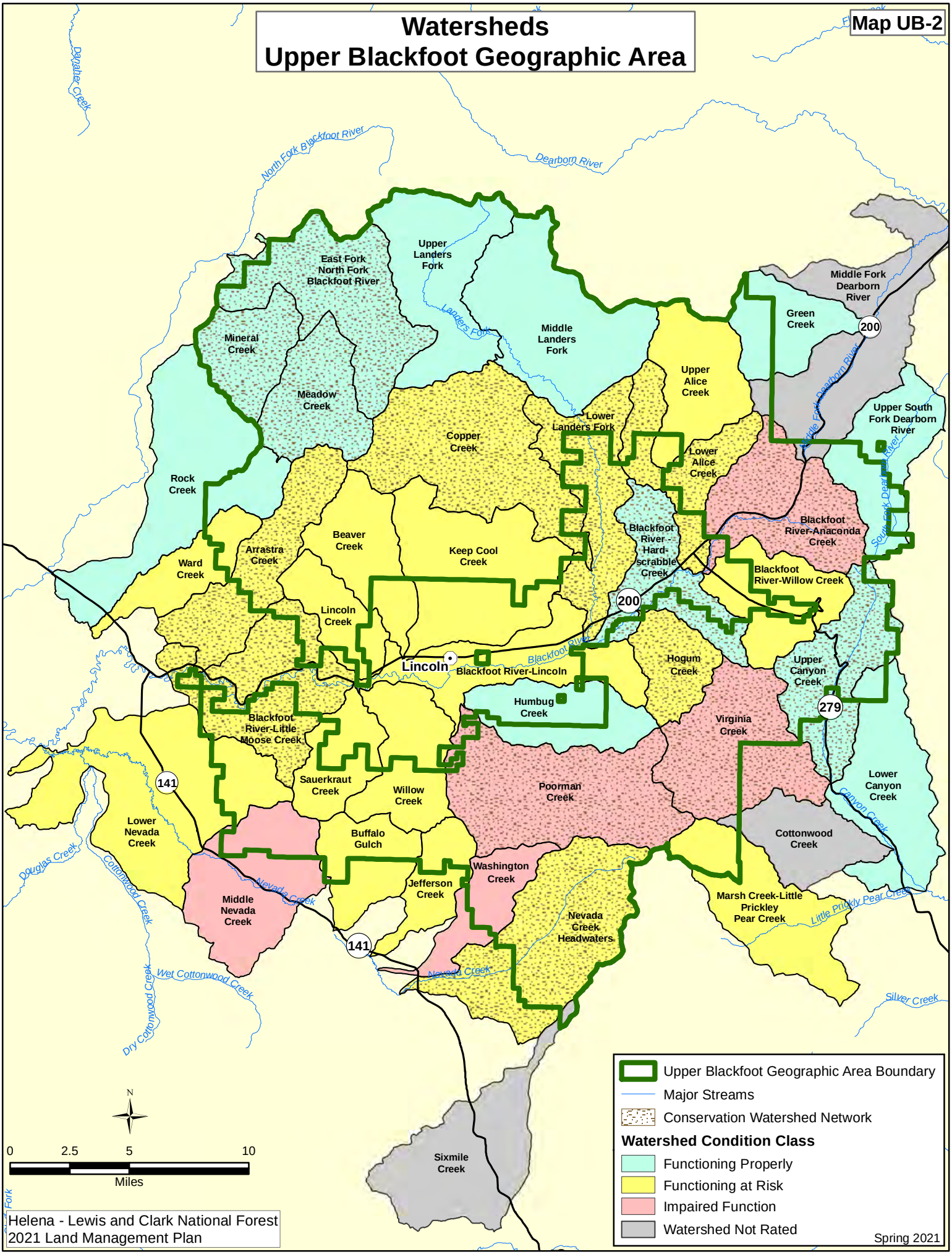
Map UB-1



Helena - Lewis and Clark National Forest
2021 Land Management Plan

Watersheds
Upper Blackfoot Geographic Area

Map UB-2



Helena - Lewis and Clark National Forest
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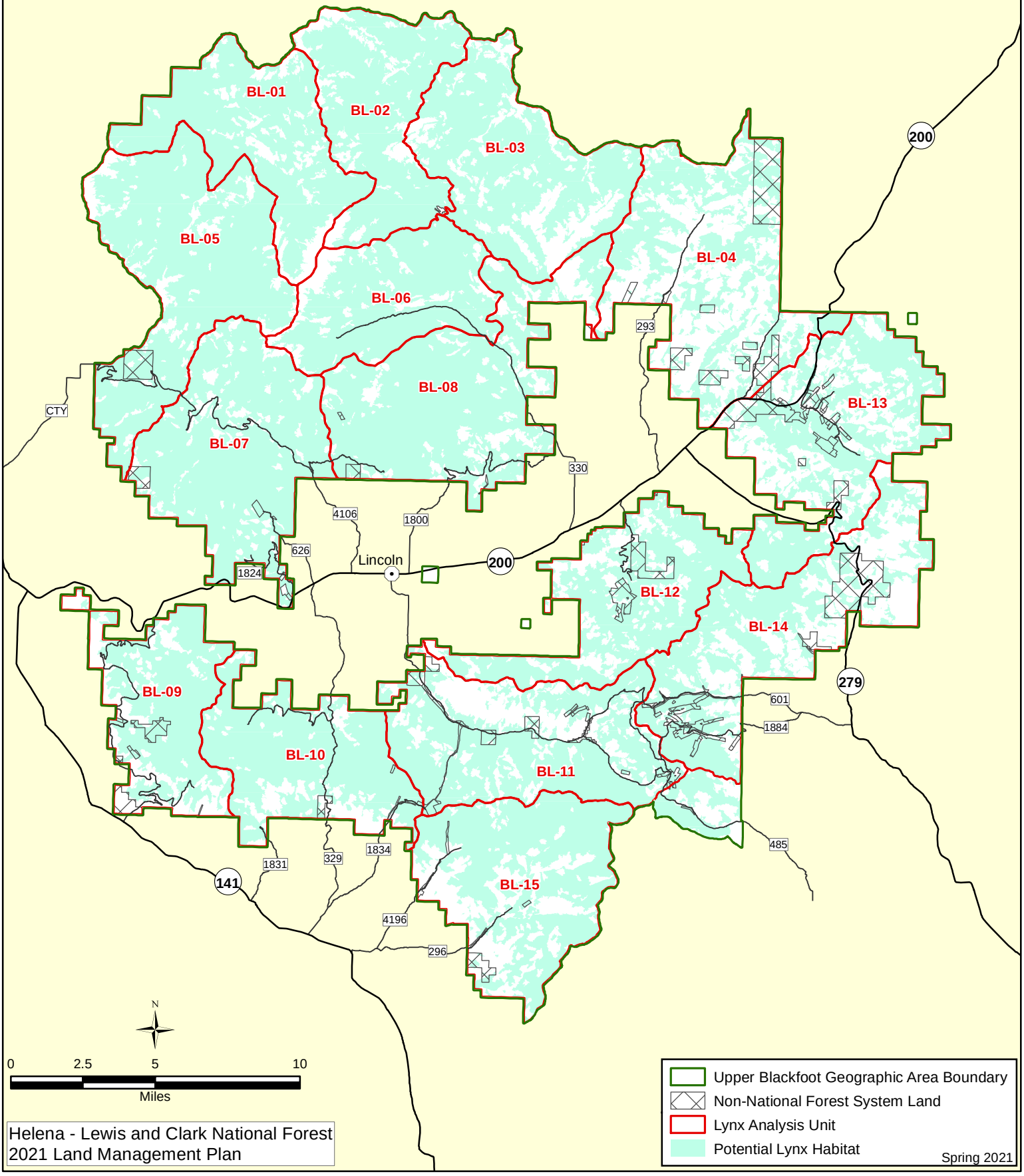
Lynx Analysis Units and Potential Habitat
Upper Blackfoot Geographic Area

Map UB-3



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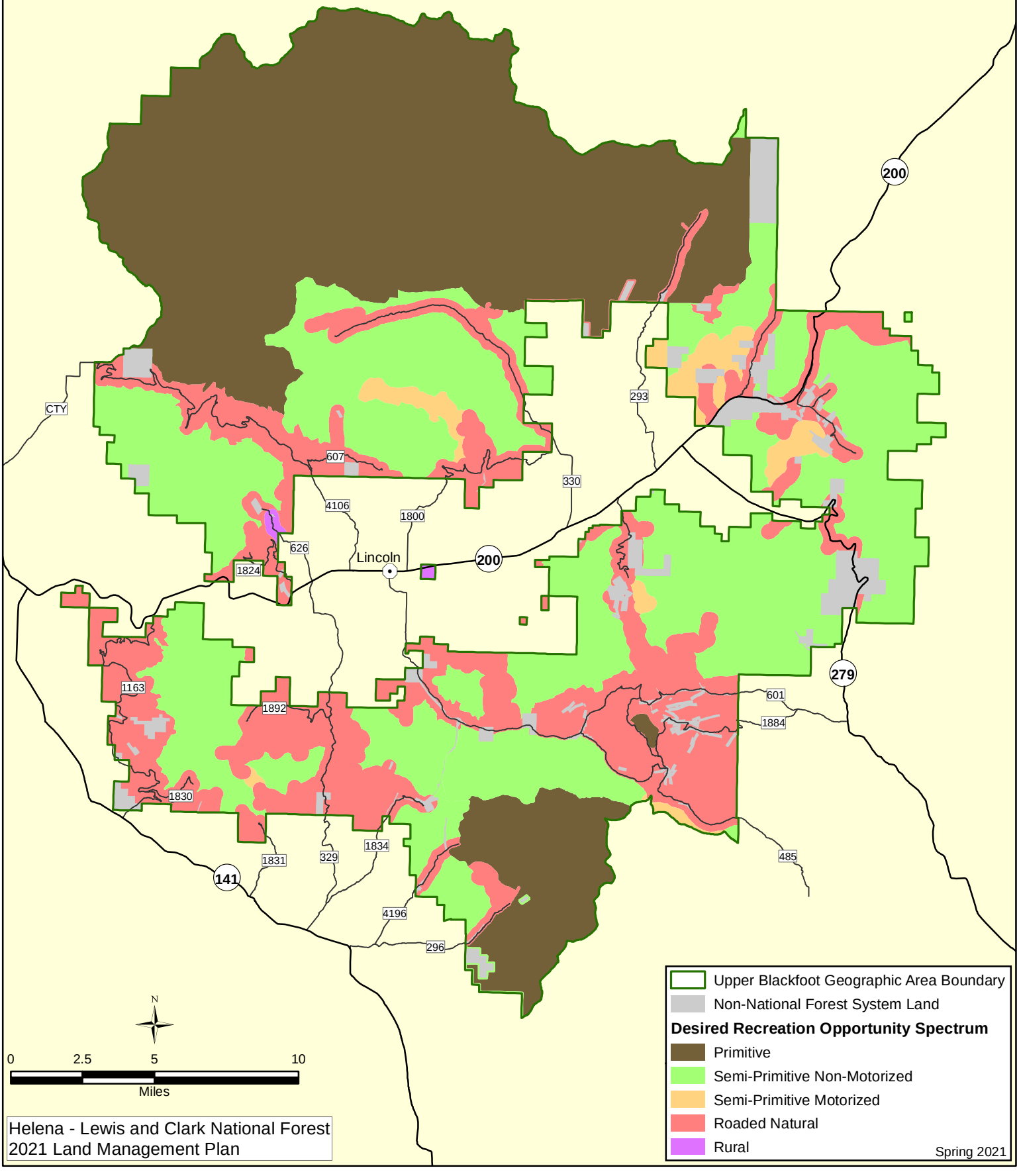
Desired Recreation Opportunity Spectrum
Upper Blackfoot Geographic Area

Map UB-4



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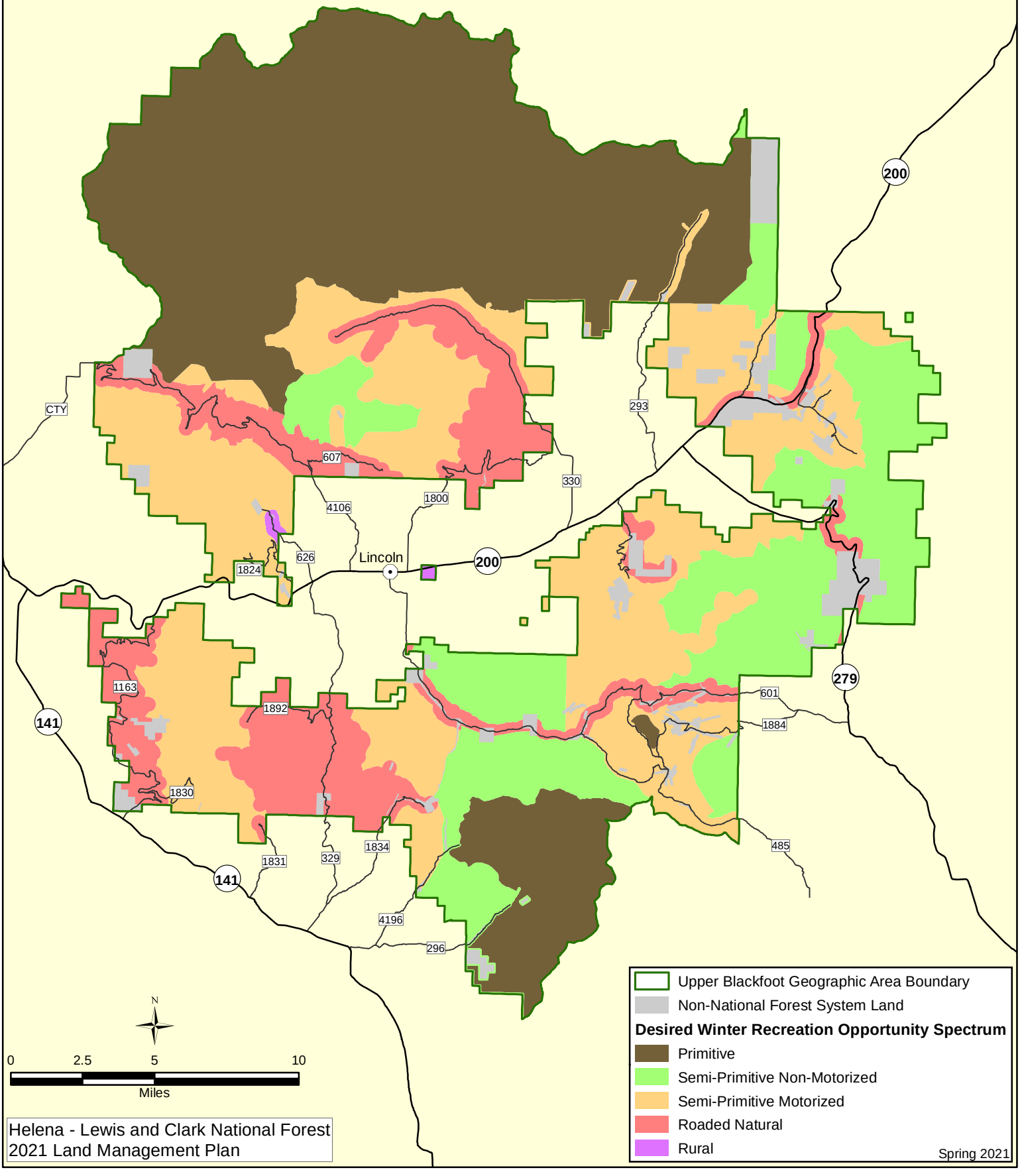
Desired Winter Recreation Opportunity Spectrum
Upper Blackfoot Geographic Area

Map UB-5



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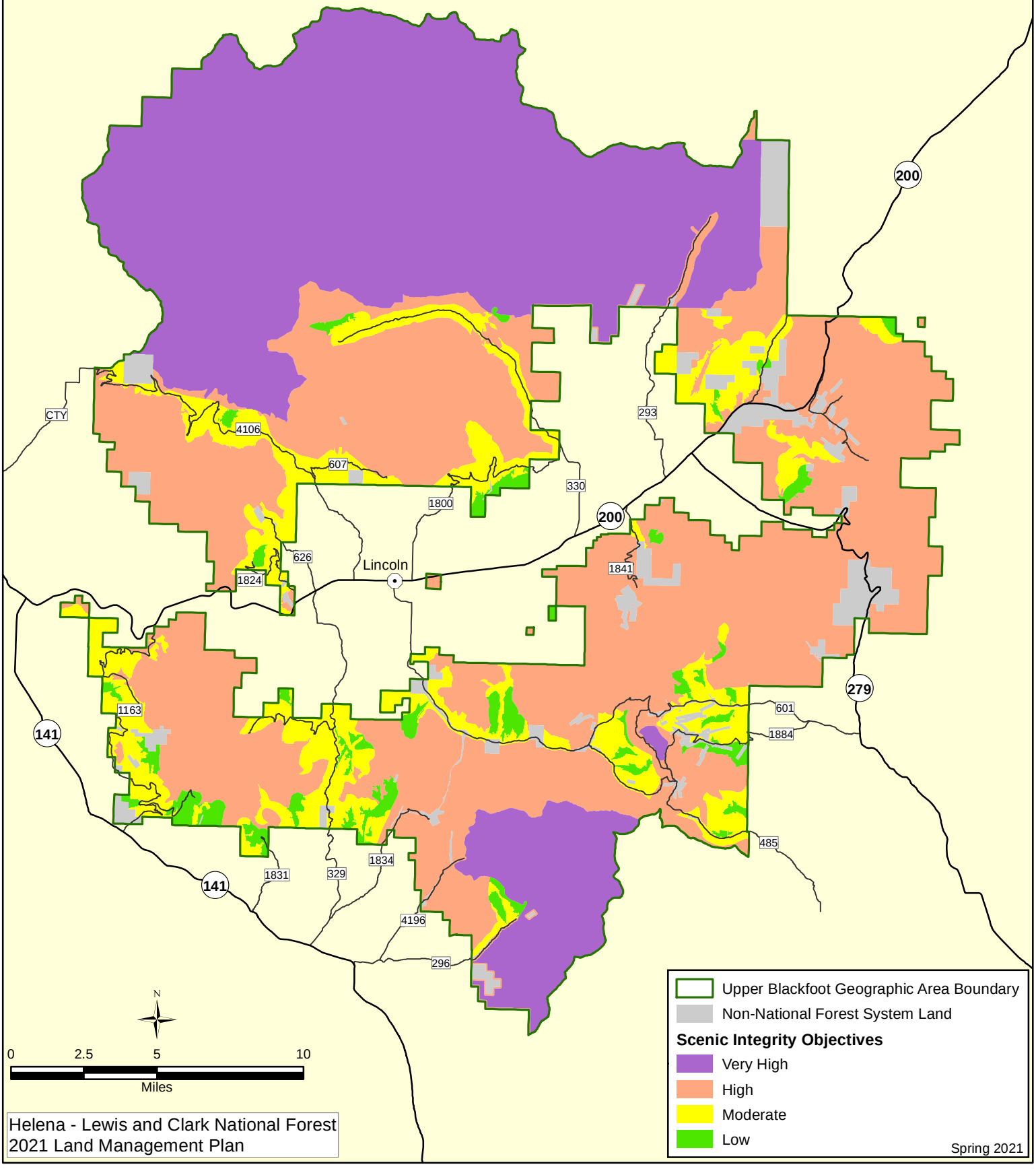
Scenic Integrity Objectives
Upper Blackfoot Geographic Area

Map UB-6



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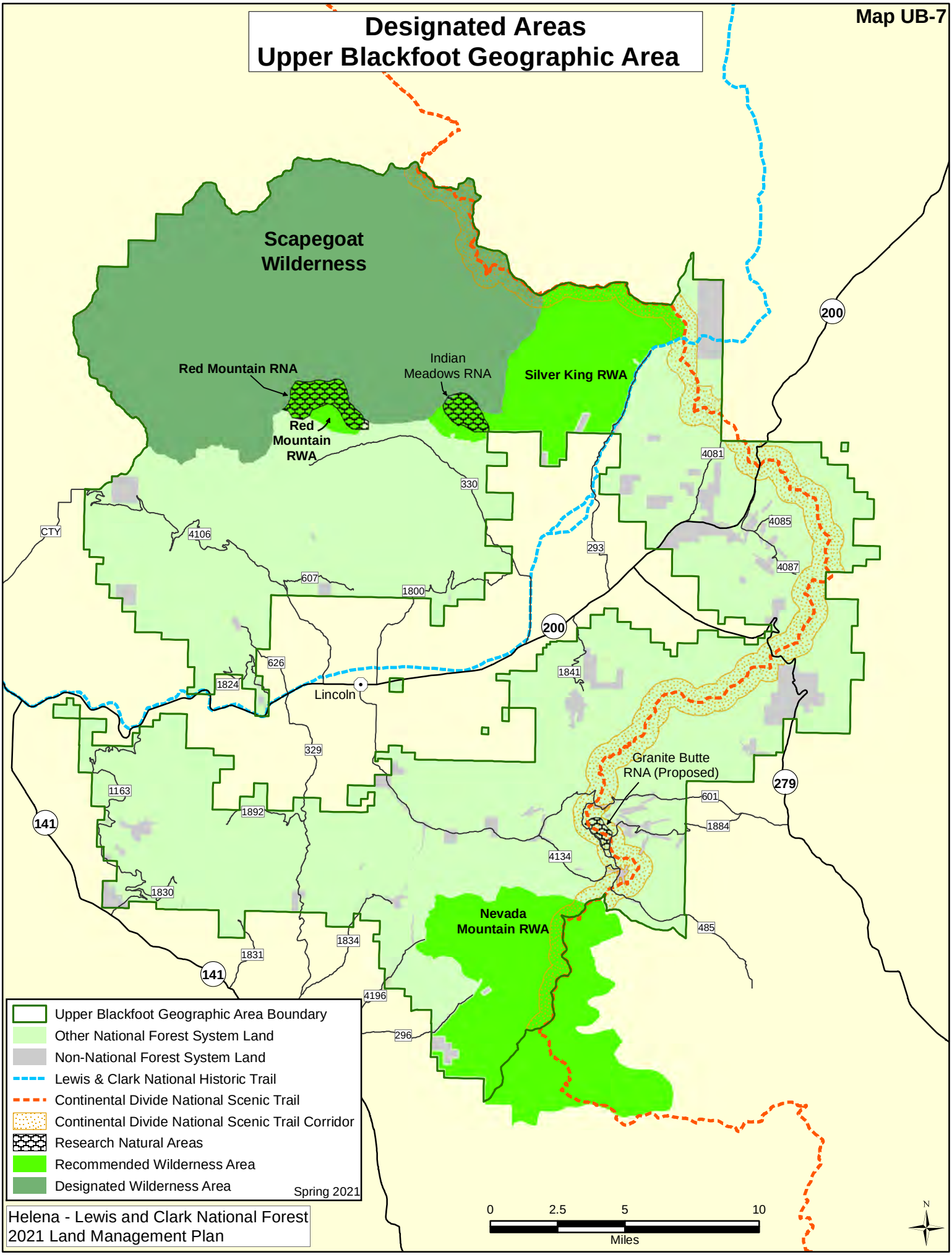
Map UB-7
Designated Areas
Upper Blackfoot Geographic Area
Scapegoat Wilderness
Red Mountain RNA
Indian Meadows RNA
Silver King RWA
Red Mountain RWA
Lincoln
Granite Butte RNA (Proposed)
Nevada Mountain RWA
200
141
279
CTY
4106
607
1800
330
293
4081
4085
4087
626
1824
1841
329
1163
1892
1830
1834
1831
4196
296
4134
1884
601
485
Upper Blackfoot Geographic Area Boundary
Other National Forest System Land
Non-National Forest System Land
Lewis & Clark National Historic Trail
Continental Divide National Scenic Trail
Continental Divide National Scenic Trail Corridor
Research Natural Areas
Recommended Wilderness Area
Designated Wilderness Area
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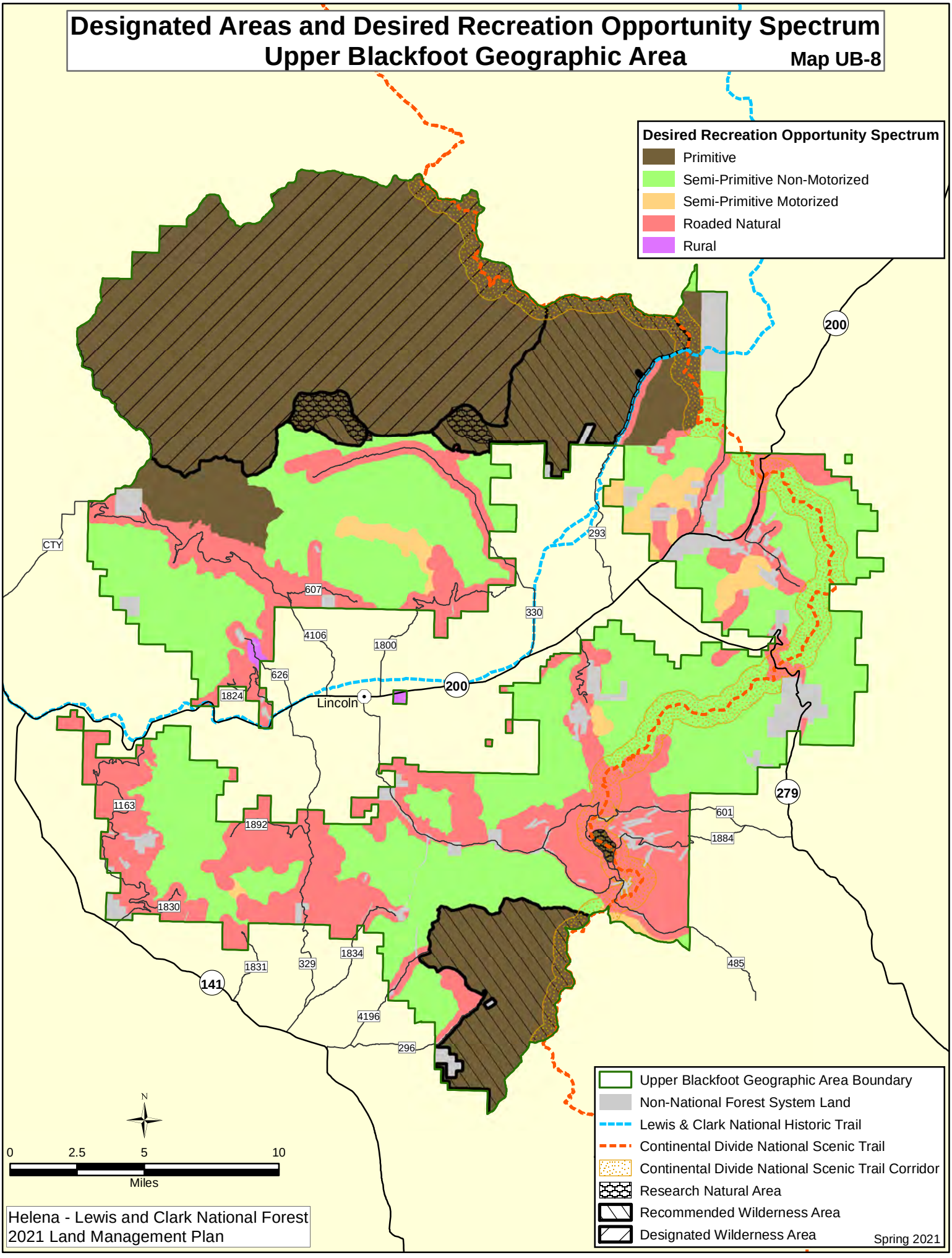
0
2.5
5
10
Miles
N

Designated Areas and Desired Recreation Opportunity Spectrum
Upper Blackfoot Geographic Area

Map UB-8



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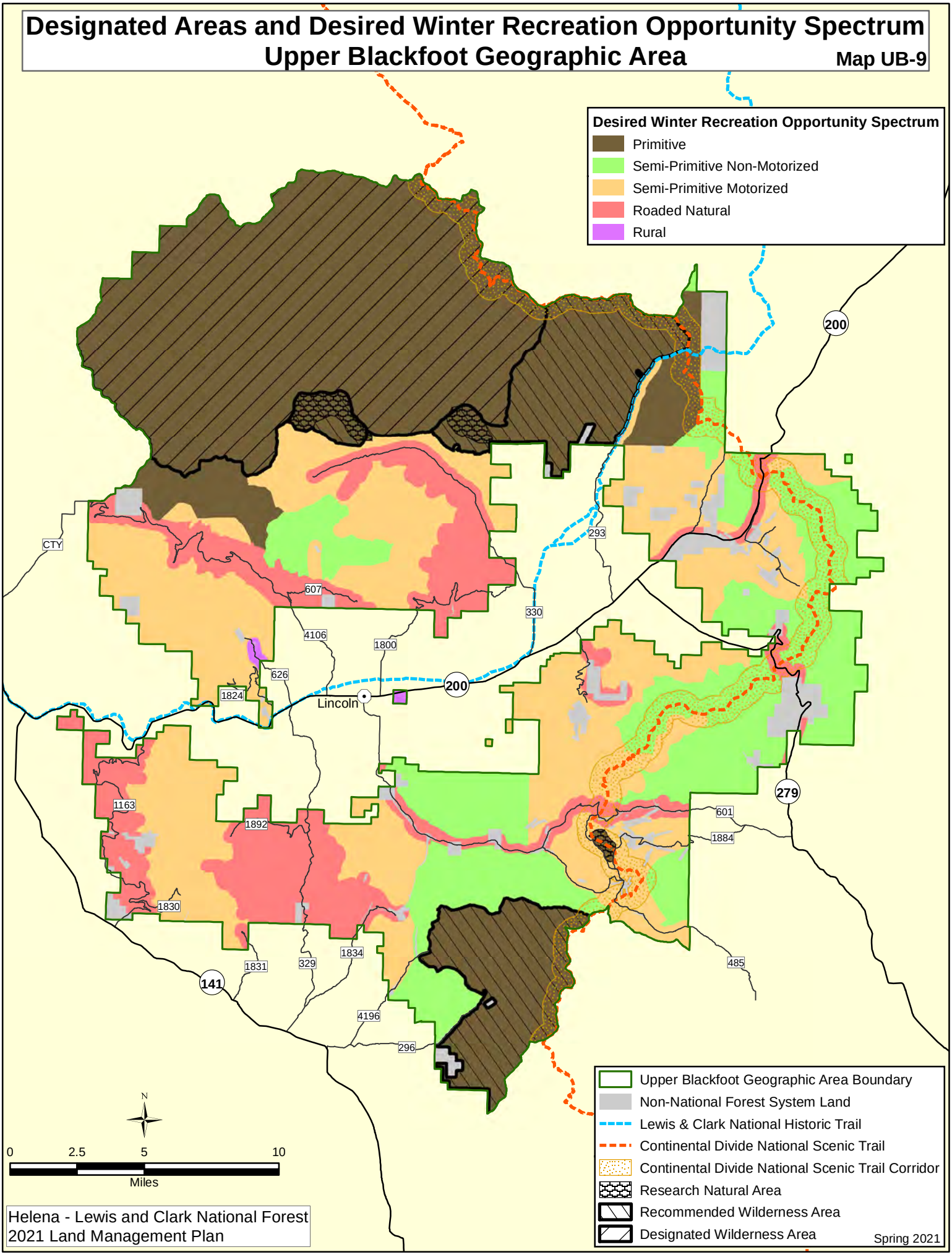
Designated Areas and Desired Winter Recreation Opportunity Spectrum
Upper Blackfoot Geographic Area

Map UB-9



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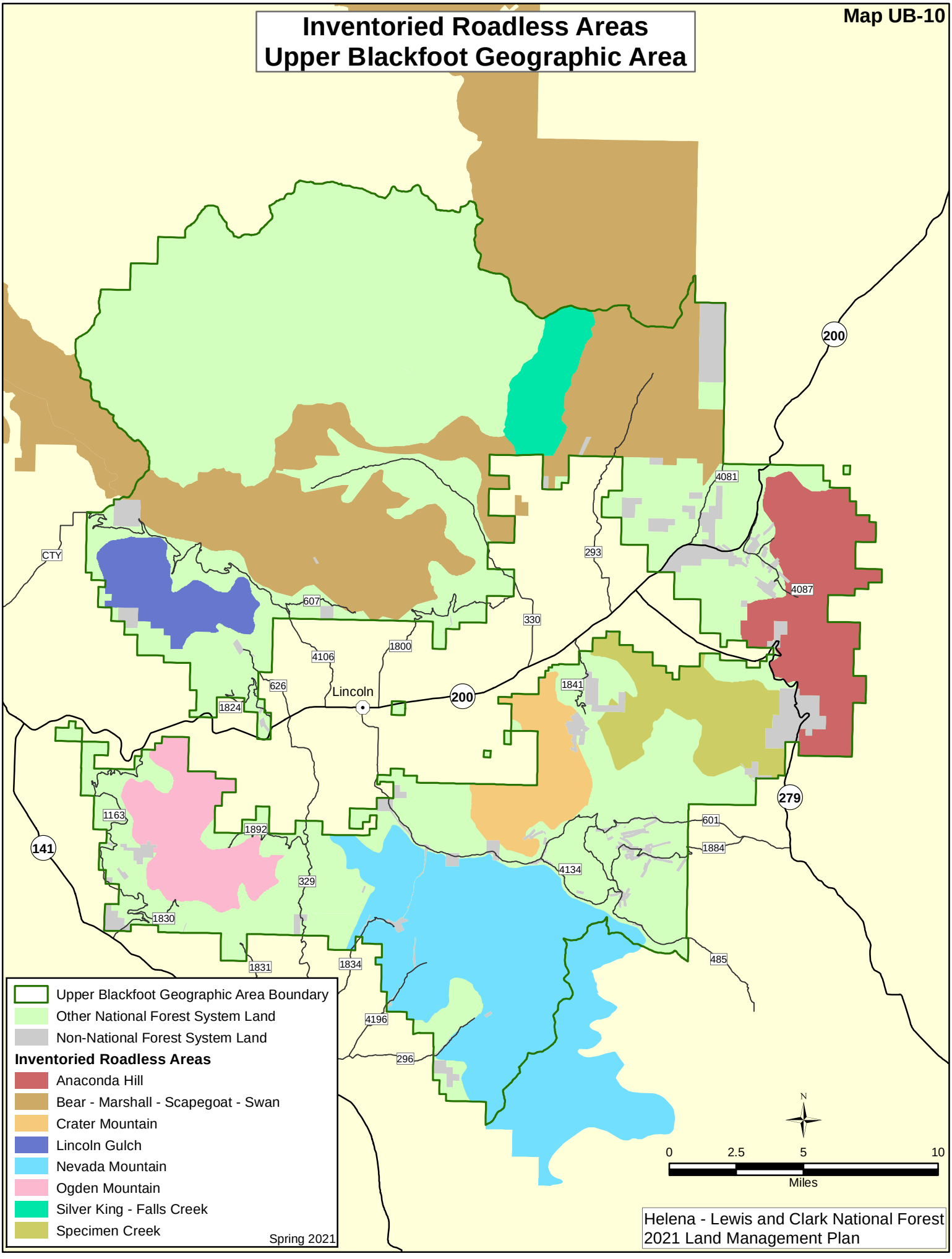
Inventoried Roadless Areas
Upper Blackfoot Geographic Area

Map UB-10



- Upper Blackfoot Geographic Area Boundary
- Other National Forest System Land
- Non-National Forest System Land

Inventoried Roadless Areas

- Anaconda Hill
- Bear - Marshall - Scapegoat - Swan
- Crater Mountain
- Lincoln Gulch
- Nevada Mountain
- Ogden Mountain
- Silver King - Falls Creek
- Specimen Creek

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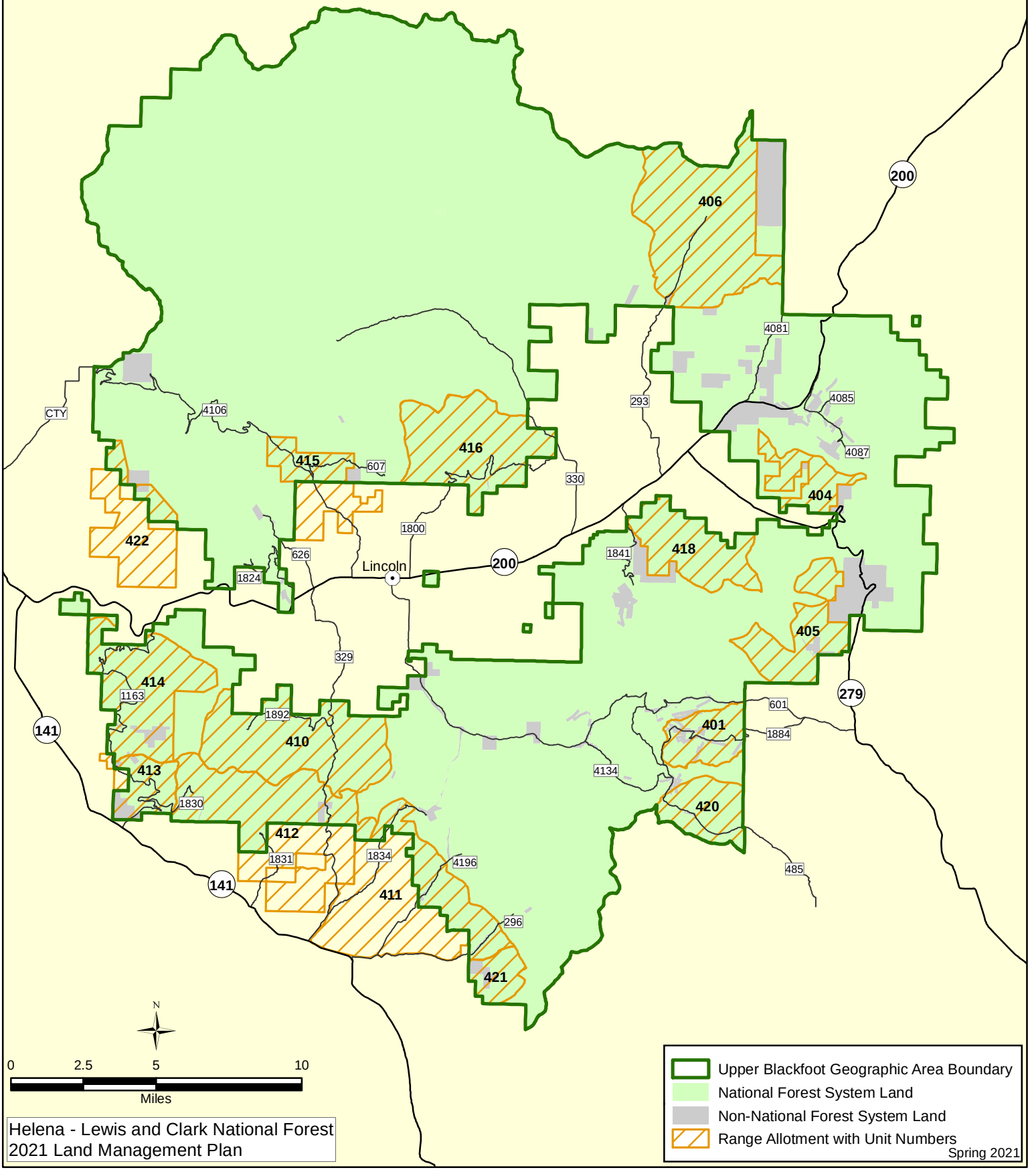
Range Allotments
Upper Blackfoot Geographic Area

Map UB-11



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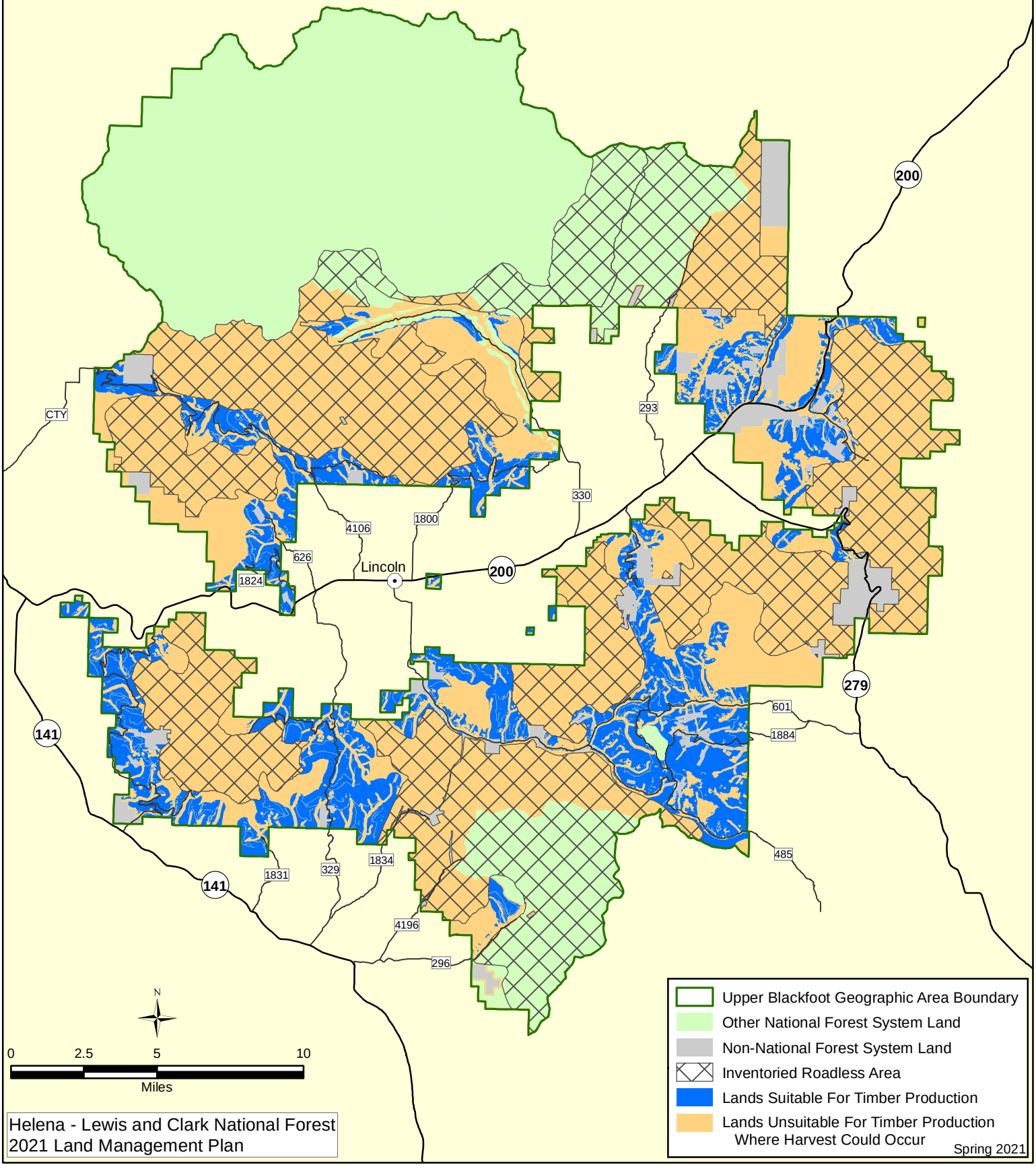
Lands Where Harvest Could Occur
Upper Blackfoot Geographic Area

Map UB-12



Helena - Lewis and Clark National Forest
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Appendix B. Monitoring Program

Table of Contents

List of abbreviations

ADS – aerial detection surveys

ALPs –automated lands project

AMP – allotment management plan

BMP – best management practice

BMU – bear management unit

CFR – Code of Federal Regulations

DBH – diameter at breast height

eSAFETY – safety incident reporting database

FACTS – forest activity tracking system database

FIA – forest inventory and analysis

FSH – Forest Service Handbook

FTEM –Fuels Treatment Effectiveness Monitoring database

GIS – geographic information systems

GYE – Greater Yellowstone Ecosystem

HLC NF – Helena – Lewis and Clark National Forest

IMPROVE – Interagency Monitoring of Protected Visual Environments

INFRA – Infrastructure database

LAC – Limits of Acceptable Change

MOU – memorandum of understanding

MT - Montana

MTBS – monitoring trends in burn severity

MTDFWP – Montana Department of Fish, Wildlife, and Parks

NAAQS – National Ambient Air Quality Standards

NCDE – Northern Continental Divide Ecosystem

NICE – NatureWatch, Interpretation, and Conservation Education database

NVUM – National Visitor Use Monitoring

PALS – Planning, Appeals, and Litigation system

PIBO – PACFISH/INFISH biological opinion

PVT – potential vegetation type

RMZ – riparian management zone

Rx - prescribed

TESP-IS –Threatened, Endangered, and Sensitive Plants, and Invasive Species database

TIM – Timber Information Manager database

VMap – Vegetation Map (geospatial database)

WCF – Watershed Condition Framework

WIT – Watershed Improvement Tracking database

Introduction

The monitoring program includes monitoring, or the collection of data and information, followed by the evaluation of that information. Monitoring and evaluation are separate, sequential activities required by the National Forest Management Act. Effective land management plan monitoring fosters adaptive management and more informed decisions.

Monitoring and evaluation are conducted at several scales and for many purposes, each of which has different objectives and requirements. Monitoring occurs at the scale of the Forest, the Region, and even larger areas. Monitoring may be the responsibility of the Forest Service, another agency, or may involve multiple agencies and organizations.

Monitoring provides the feedback for the forest planning cycle by testing assumptions, tracking relevant conditions over time, measuring management effectiveness, and evaluating effects of management practices. Monitoring information should enable the Forest to determine if a change in plan components or other plan management guidance may be needed, forming a basis for continual improvement and adaptive management. Direction for the monitoring and evaluation of forest plans is found under the 2012 planning rule at 36 Code of Federal Regulations 219.12 and in the directives at 1909.12 Chapter 30.

The plan monitoring program addresses the most critical components for informed management of the Forest's resources within the financial and technical capability of the agency (see 6 considerations below used to select plan components). Every monitoring question links to one or more desired conditions, objectives, standards, or guidelines. However, not every plan component has a corresponding monitoring question.

The monitoring program is not intended to depict all monitoring, inventorying, and data gathering activities undertaken on the Forest. Consideration and coordination with broad-scale monitoring strategies, multi-party monitoring collaboration, and cooperation with state agencies where practicable will increase efficiencies and help track changing conditions beyond the forest boundaries to improve the effectiveness of the plan monitoring program. In addition, project and activity monitoring may be used to gather information for the plan monitoring program if it will provide relevant information to inform adaptive management. Monitoring also provides feedback to prioritize and improve the plan monitoring program and broader-scale monitoring strategy.

The monitoring plan sets out the plan monitoring questions and associated indicators and measures. The Forest used the best available scientific information in the development of the monitoring plan, giving consideration to expected budgets and agency protocols. For example, Forest Inventory and Analysis data is the most accurate, reliable, and relevant data source for monitoring terrestrial vegetation conditions because it follows nationwide, statistically based protocols. Similarly, Pacific Fish Strategy/Inland Native Fish Strategy biological opinion (PIBO) data is the most accurate, reliable, and relevant data for monitoring aquatic ecosystem conditions because it uses a probabilistic sampling design. The program was initiated to evaluate the effect of land management activities on aquatic and riparian communities at multiple scales and to determine whether management practices are effective in maintaining or improving the structure and function of riparian and aquatic conditions.

The monitoring program will include a biennial monitoring evaluation report. The status of all monitoring questions will be reported biennially and only evaluated when new information is collected or available. It is important to note that monitoring questions will have variable data collection intervals that will not correspond with the biennial monitoring evaluation report interval. Some monitoring indicators will require longer time frames for thorough evaluation of results, but a biennial review of what information has been collected will ensure timely evaluation to inform planning.

The biennial monitoring evaluation report will summarize the results of monitoring, evaluate the data, consider relevant information from broad-scale or other monitoring efforts, and make recommendations to the responsible official. The monitoring evaluation report will indicate whether a change to the Plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information. The monitoring evaluation report is used to inform adaptive management of the planning area and will be made available to the public.

Modifying a plan's monitoring program does not require any other change to the plan; that is, a plan need not be amended nor revised simply to facilitate monitoring pursuant to the Rule.

A change to a monitoring question or an indicator may be made administratively, but only after the public has had an opportunity to comment. A change to a monitoring guide or annual monitoring work plan does not require public notification. In addition, because the broader-scale monitoring strategy is comprised of questions and indicators from plan monitoring programs, a change of the broader-scale monitoring strategy questions and indicators may require a change of the relevant plan monitoring programs.

Required 2012 Planning Rule Monitoring Items

The Forest Service has discretion to set the scope, scale, and priorities for plan monitoring within the financial and technical capabilities of the administrative unit. However, they are required to include one or more monitoring question(s) and associated indicator(s) for the eight items set out in the 2012 Planning Rule at 36 CFR 219.12(a)(5) Each monitoring question responds to one or more of the following (*indicated in the tables below):

i. The status of select watershed conditions.

ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

iii. The status of focal species to assess the ecological conditions required under 36 CFR 219.9.

iv. The status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threated and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.

v. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area.

vii. Progress toward meeting the desired conditions and objectives in the plan, including providing for multiple use opportunities.

viii. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)). (36 CFR 219.12(a).

Social, economic, and cultural sustainability must also be addressed in the monitoring program (FSH 1909.12 Section 32.13f).

The following was also considered to help determine the need to track information related to the plan components.

1. Required by law – collection of information is required through Biological Opinion Terms and Conditions, court orders, settlement agreements, etc.
2. Magnitude of departure from desired condition (if of concern) - Is there a high degree of disparity between existing and desired conditions? Examples: (1) a particular habitat component is at a much lower level than desired; (2) the amount of use of a particular resource or use at a particular location is much higher than desired.
3. Degree of uncertainty regarding the available data or uncertainty due to lack of data (FSH 1909.12 Section 32.1, 32.11). Is available information incomplete or inconclusive?
4. Long standing management assumptions that need to be verified or re-verified? (FSH 1909.12 Section 32.1, 32.11). Is there a high degree of uncertainty associated with management assumptions? Examples: (1) a new way of doing something where there is limited experience with the new technique; (2) actions taken in response to an unprecedented situation; (3) a lack of information or out dated information on the effects of a management action on specific habitat needs
5. The risk and consequences to the resource for not having information to reduce the uncertainty/knowledge gap/assumption.

   i. Risk of action/event occurring - Are management activities AND/OR other drivers and stressors (climate change, invasives, insect diseases, flooding events, etc.) likely to occur that would have discernable outcomes to the resource? Is the parameter responsive to changed conditions (climate, insect/disease, invasives, management activities, etc.?)

   ii. Consequences to resource – What are consequences to resource for not having this information? I.e. collection of this information will make a difference in how we manage for sustainability of the resource.

6. Distinctive roles and contributions within the broader landscape (FSH 1909.12 Sec. 32.1). Will monitoring respond to a key public issue? Key issues identified through scoping may warrant monitoring even if they are (1) well understood, (2) the existing condition is good and (3) management activities will have little impact. Monitoring may be necessary for educational and/or accountability purposes.

Focal Species

The following focal species have been identified for the HLC NF. Monitoring for these species is indicated in the applicable resource monitoring sections.

Invasive Annual Grasses

Invasive annual grass species have been selected as a focal species for monitoring to help assess the habitat integrity of nonforested vegetation types across the HLC NF. Species of invasive annual grasses are extremely competitive, crowding out native vegetation, and have exhibited the ability to rapidly expand in multiple habitat types. Once annual grasses establish, they present a direct threat to ecosystem function by decreasing native plant community diversity, altering fire return intervals, diminishing the quality of wildlife habitat, and reducing livestock carrying capacity.

Species such as downy brome (*Bromus tectorum*), Japanese brome (*Bromus japonicus*), ventenata (*Ventenata dubia*), and bulbous bluegrass (*Poa bulbosa*) are present or have been recently found in the planning area. Medusahead rye (*Taeniatherum caput*) is another species of concern that could significantly alter ecosystem function if the species were to establish. Many other invasive grass species are also present in the Pacific Northwest, with a high likelihood of eastern expansion. Monitoring for invasive annual grasses can gauge native vegetation communities' resistance from invasion and resiliency after disturbance.

Monitoring Elements by Resource Area

In the following tables, you may see abbreviations or acronyms for various databases used during the monitoring process. These are spelled out on page ii of this appendix.

Aquatic Ecosystems – Watershed (WTR)

Table 1. Aquatic ecosystems – Watershed (WTR), Fisheries and Aquatic Habitat (FAH), RMZ, CWN

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-WTR-DC-03; FW-WTR-DC-04; FW-WTR-DC-08; FW-WTR-DC-10; FW-FAH-DC-02; FW-FAH-DC-03; FW-RMZ-DC-01	MON-WTR-01 What is the trend in instream physical characteristics for managed watersheds as compared to unmanaged? * 36 CFR 219.12(a)(5) – i, ii, vi, vii, viii	Instream physical habitat data collected through Pacfish/Infish Biological Opinion monitoring • Woody debris, bank angle, pooltail fines, percent pool and residual pool depth, pebble count data (D50)
FW-WTR-DC-05; FW-WTR-DC-11; FW-WTR-STD-01; FW-WTR-STD-02	MON-WTR-02 What BMPs are implemented in wetlands in order to not impede the sustainability of wetland characteristics and diversity? * 36 CFR 219.12(a)(5) – i, ii, iv, vii	BMP implementation for projects with wetlands • Number and types of BMPs implemented • Quality at which the BMP are implemented
FW-WTR-DC-06; FW-WTR-DC-07; FW-WTR-DC-08	MON-WTR-03 What is the status of 303 and 305 State listed streams? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii	State listed stream segments forestwide and by conservation watershed network • Number and locations of stream reaches on 303 and 305 list • Acres, miles, and types of actions that improve the reasons for which the stream reach was listed • MT State assessment of Beneficial Uses status (fully supporting, not fully supporting, threatened) for each listed stream segment
FW-CWN-GDL-02; FW-CWN-GDL-03 FW-WTR-OBJ-01; FW-WTR-OBJ-02	MON-WTR-04 Are watershed restoration projects occurring in priority watersheds? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Watershed restoration projects • Number, type, and location of projects in priority watersheds (Conservation Watershed Framework and priority watersheds as identified in the Watershed Condition Framework) • Number, type, and location of projects NOT in priority watersheds (Conservation Watershed Framework and priority watersheds as identified in the Watershed Condition Framework)
FW-CWN-DC-01; FW-FAH-OBJ-01; FW-FAH-OBJ-02	MON-WTR-05 What stream habitat improvement actions have occurred? * 36 CFR 219.12(a)(5) – i, ii, iv, vii, viii	Stream habitat improvements • Miles, types, and locations of stream habitat improvements

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-CWN-GDL-01; FW-CWN-GDL-02 FW-CWN-OBJ-01: FW-CWN-OBJ-02	MON-WTR-06 What road and access improvements have been completed in Conservation Watershed Network areas? * 36 CFR 219.12(a)(5) – i, ii, iv, vii	Road management in conservation watershed networks • Number, types, miles or road management actions/decisions in watershed conservation network
FW-FAH-GDL-04; FW-CWN-GDL-03	MON-WTR-07 Are new and revised livestock management plans designed to maintain or improve water quality? * 36 CFR 219.12(a)(5) – i, ii, iv, vii, viii	Water quality maintained or improved forestwide and by conservation watershed network • Miles of intermittent and perennial streams moving towards desired condition within allotments • Number of improved management strategies expected to move RMZs towards desired conditions within allotments

Aquatic Ecosystems – Fisheries and Aquatic Habitat (FAH)

Table 2. Aquatic ecosystems – Fisheries and Aquatic Habitat (FAH)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-FAH-DC-01; FW-FAH-DC-04 FW-FAH-DC-05; FW-FAH-DC-08	MON-FAH-01 What is the status of westslope cutthroat trout? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Presence and abundance of genetically pure westslope cutthroat trout populations • Number of fish per mile, or miles of occupied stream reaches • Locations of populations
FW-RT-STD-02; FW-RT-STD-03; FW-RT-STD-04; FW-BRDG-DC-01	MON-FAH-02 Are culverts and bridges on fish-bearing streams being constructed/upgraded/removed to allow aquatic organism passage? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Infrastructure for aquatics systems • Number of culverts and bridges on fish-bearing streams that comply with standards • Number of culverts and bridges on fish-bearing streams that DO NOT comply with standards.

Aquatic Ecosystems – Riparian Management Zones (RMZ)

Table 3. Aquatic ecosystems – Riparian Management Zones (RMZ)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-RMZ-DC-01; FW-RMZ-DC-02; FW-RMZ-OBJ-01	MON-RMZ-01	Acres of riparian management areas improved through activities including but not limited to:

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	How many acres of riparian management zones have been improved? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	• Road obliteration • Riparian planting • Reconstruction of flood plains through removal of roads or berms

Soils (SOIL)

Table 4. Soils (SOIL)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-SOIL-STD-02; FW-SOIL-GDL-04; FW-SOIL-GDL-05	MON-SOIL-01 Are post management activities conserving forest floor and coarse woody debris at levels that maintain dynamic soil quality? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Post-treatment forest floor conditions: • Detrimental soil disturbance *(% areal extent)* • Course woody debris *(tons/acres)* • Visual ground cover estimates • Soil burn severity
FW-SOIL-GDL-06; FW-SOIL-GDL-07	MON-SOIL-02 Were road or trails restored to provide for soil quality to trend towards improvement? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Number/acres and types of road/trail treatment

Air Quality (AQ)

Table 5. Air Quality (AQ)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-AQ-DC-01	MON-AQ-01 Is air quality in compliance with and maintained per Clean Air Act and Wilderness Act requirements? * 36 CFR 219.12(a)(5) – ii, vi, vii, viii	Air quality, forestwide: • National Ambient Air Quality Standards • Regional Haze Rule – State of Montana Regional Haze 5 Year Progress Report (are the State's goals met) • Air quality related values

Fire and Fuels Management (FIRE)

Table 6. Fire and Fuels Management (FIRE)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-FIRE-DC-01	MON-FIRE-01 What is the extent and severity of wildfire burned areas? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Burn severity, forestwide • Acres burned by wildfire and by severity class (low, moderate, high) by R1 Broad PVT (Only for fires >1000 acres.)
FW-FIRE-GDL-02	MON-FIRE-02 Are fire management strategies supporting ecosystem function resulting in becoming self-regulating? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Fire management efficacy, forestwide • Acres of re-burn • Fire severity on those re-burned acres • Fire spread limited by previous fires
FW-FIRE-OBJ-01	MON-FIRE-03 To what extent are fuels management activities occurring to meet the objective of at least 15,000 acres of treatment per decade within the WUI? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Hazardous fuels management, forestwide • Acres of prescribed fire • Acres of wildfire • Acres of other fuels treatments (rearrangement of fuels, pile burning, chipping, mastication)
	MON-FIRE-04 Are treated fuel management areas being maintained? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii	Maintenance of treated acres, forestwide • Acres and locations of existing fuel treatments • Acres of maintenance treatments completed
FW-FIRE-STD-01	MON-FIRE-05 Did reportable injuries occur on any wildfires? * 36 CFR 219.12(a)(5) –vii, SEC	Wildfire-related injuries, forestwide • Number of wildfire related injuries
FW-FIRE-DC-02 FW-FIRE-GDL-03	MON-FIRE-06 Are fuels treatments helping to protect high value resources and assets, and control and/or management of the fire? * 36 CFR 219.12(a)(5) –vii, SEC	Fuel treatment effectiveness, forestwide • Number of fuel treatments that changed fire behavior

Vegetation – Terrestrial (VEGT)

Table 7. Vegetation - Terrestrial (VEGT)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-VEGT-DC-01	MON-VEGT-01 What management activities have promoted shade intolerant trees (i.e., promoted resiliency)? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Vegetation management activities that promote shade intolerant trees, forestwide. • Acres of regeneration harvest • Acres of natural regeneration and plantings • Acres of intermediate harvest • Acres of stand improvement • Acres of mechanical fuels treatments • Acres of prescribed burning • Acres of artificial and natural regeneration after wildfire
FW-VEGT-DC-02; BB-VEGT-DC-01, CA-VEGT-DC-01, CR-VEGT-DC-01; DI-VEGT-DC-01; EH-VEGT-DC-01; HW-VEGT-DC-01; LB-VEGT-DC-01, RM-VEGT-DC-01; SN-VEGT-DC-01; UB-VEGT-DC-01	MON-VEGT-02 What is the abundance of R1 cover types, (forested and nonforested)? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Cover type proportions forestwide, by broad potential vegetation type, and by geographic area • Percent of each cover type: ponderosa pine, Douglas-fir, lodgepole pine, aspen/hardwood, spruce/fir, whitebark pine, and nonforested.
FW-VEGT-OBJ-01	MON-VEGT-03 To what extent have vegetation management treatments been applied on the landscape? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Vegetation management treatments, forestwide • Acres of timber harvest • Acres of planned ignitions • Acres of unplanned ignitions • Acres of planting • Acres of precommercial thinning or other noncommercial stand tending • Acres of fuel reduction treatments (re-arrangement of fuels, pile burning, chipping, mastication, etc)

Vegetation – Forested (VEGF)

Table 8. Vegetation - Forested (VEGF)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-VEGF-DC-01	MON-VEGF-01 What is the distribution of individual tree species? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Tree species distribution forestwide and by broad potential vegetation type. • Percent presence of each tree species (at least 1 tree any size; at least 1 tree <5" DBH; and at least 1 tree >5" DBH)
FW-VEGF-DC-02; BB-VEGF-DC-02; CA-VEGF-DC-02; CR-VEGF-DC-02; DI-VEGF-DC-02; EH-VEGF-DC-02; HW-VEGF-DC-02; LB-VEGF-DC-02; RM-VEGF-DC-02; SN-VEGF-DC-02; UB-VEGF-DC-02	MON-VEGF-02 What is the abundance of size classes? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Size class proportions, forestwide, by broad potential vegetation type, and by geographic area • Percent of each size class (0 to 4.9" DBH; 5 to 9.9" DBH; 10 to 14.9" DBH; 15 to 19.9" DBH; and 20"+ DBH)
FW-VEGF-DC-03	MON-VEGF-03 What is the abundance of forest density classes? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Density class proportions, forestwide and by broad potential vegetation type • Percent of each density class (<40% canopy cover; 40-59.9% canopy cover; 60% + canopy cover)
FW-VEGF-DC-04	MON-VEGF-04 What is the distribution of large-tree structure? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Large-tree structure, forestwide and by broad potential vegetation type. • Percent presence of large-tree structure (large and very large)
FW-VEGF-DC-05	MON-VEG-05 What is abundance of old growth? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Old growth forestwide and by broad potential vegetation type • Percent and total acres of old growth
FW-VEGF-DC-06 FW-POLL-DC-01	MON-VEGF-06 What is the quantity and distribution of snags?	Snags by snag analysis groups, by size class (10"+ dbh; 15"+ dbh; and 20"+ dbh) • Percent presence of at least 1 snag • Number of snags per acre

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	* 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	
FW-VEGF-DC-07 FW- POLL-DC- 01	MON-VEGF-07 What is the quantity of coarse woody debris? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Coarse woody debris (>3" diameter) by broad potential vegetation types • Tons per acre
FW-VEGF-DC-09	MON-VEGF-08 What is the hazard to forest insects? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Hazard to insect and pathogen (low, moderate, high), forestwide and by broad potential vegetation types • Percent of mountain pine beetle hazard • Percent of Douglas-fir beetle hazard • Percent of western spruce budworm hazard
FW-VEGF-GDL-04	MON-VEGF-09 Do old growth stands retain minimum old growth criteria post-treatment? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Stand characteristics in old growth treated with vegetation management • Use stand-level criteria to determine if old growth definition is met 1 year after treatment occurs. Monitor all treated old growth stands, if fewer than 5 are treated during the biennial monitoring period; or on a representative sample if more than 5 are treated.

Vegetation – Nonforested (VEGNF) and Pollinators (POLL)

Table 9. Vegetation – Nonforested (VEGNF) and Pollinators (POLL)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-VEGT-DC-01; FW-VEGNF-DC-01; FW-VEGNF-DC-02; FW-POLL-DC-01; FW-WL-GDL-01	MON-VEGNF-01 What is the condition of nonforested plant communities? See also MON-VEGT-02 and MON-FOCAL-01 * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii	Rangeland condition and trend forestwide • Composition of shrubs, grasses, and forbs on rangeland sites over time, compared to the estimated natural range of variability for the rangeland site. • Changes in percent bare ground, litter and invasive species cover in nonforested cover types
FW- POLL-DC- 01	MON-POLL-01 Do plant communities contain pollinator-attractive species and species which bloom at different	Plant (forb, graminoids, and shrub) diversity in rangelands, forestwide • Similarity index by allotment or pasture (w*eight of plant species within dominant sites in a pasture/allotments*)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	times including both early and late season species? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	• Species composition/richness in nonforested PVTs. • Number of projects implemented that improved pollinator habitat forestwide *(beneficial seed mix, habitat improvements, etc).*
	MON-POLL-02 Do both non-forested and forested plant communities provide structural diversity? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Mosaic of vegetation structures forestwide • Size class proportions, forestwide, by broad PVT, and GA (see MON-VEGF-02) • Acres of regeneration harvest (see MON-VEGT-01) • Acres of high severity fires (see MON-FIRE-01) • Spatial distribution of transitional VMap class

Threatened, Endangered, Proposed and Candidate Plant Species; and Plant Species of Conservation Concern (PLANT)

Table 10. Vegetation – Threatened, endangered, proposed and candidate plant species; and plant species of conservation concern (PLANT)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-PLANT-DC-01	MON-PLANT-01 What is the status of the known occurrences of Plant Species of Conservation Concern (SCC) species? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	At-risk plant distribution and condition forestwide • Presence/absence of existing occurrences • Population trends and response to threats, evaluated at species specific level using species specific methods (e.g. # stems, # individuals, acres of occupied habitat)
FW-PLANT-DC-01	MON-PLANT-02 What is the distribution and condition of whitebark pine? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Whitebark distribution and condition forestwide, by broad PVT, and by GA • Percent presence of whitebark pine (at least 1 tree present, any size; at least 1 tree present <5” DBH; and at least 1 tree present >5” DBH) • Number of whitebark pine snags by size class
FW-PLANT-OBJ-01	MON-PLANT-03 What management actions help restore whitebark pine, and what is the success of established seedlings?	Whitebark pine restoration actions forestwide • Acres treated for the purpose of sustaining or restoring whitebark pine • Survival of planted whitebark pine seedlings

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	* 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	

Vegetation – Invasive Plants (INV)

Table 11. Vegetation – Invasive Plants (INV)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW- VEGNF-DC- 02 FW-INV-DC-02	MON-INV-01 What is the extent of nonnative plant species? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii	Invasive plant presence and abundance forestwide • Net infested acres by species • Percent invasive species cover in inventoried areas
FW-INV-DC-01	MON-FOCAL-01 What is the status of non-forested ecosystems? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii	Non-native annual in non-forested systems • Net infested acres (percent cover as feasible) and/or presence/absence of invasive annual grasses (focal species)
FW-INV-OBJ-01	MON-INV-02 What is the status of invasive plant treatments? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii	Acres of the following treatment types • Biocontrol, herbicide, cultural, sheep grazing, or other types • Efficacy percentage
FW-INV-GDL-03 FW-PLANT-DC-01	MON-INV-03 Are non-detrimental weed treatments occurring in areas that overlap with known populations of at-risk plant species? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii	Invasive weed treatments that occur in at-risk plant populations • Number of at-risk plant occurrences that receive beneficial weed treatments • Invasive plant treatments used in at-risk plant communities

Wildlife (WL)

Table 12. Grizzly bear

Selected plan components	Monitoring question	Indicator(s) and measure(s)
PCA-NCDE-DC-01 PCA-NCDE-STD-01 PCA-NCDE-STD-02 PCA-NCDE-STD-03 PCA-NCDE-STD-04	MON-NCDE-01 Within the HLC NF portion of the NCDE primary conservation area, have levels of motorized access or secure core changed compared to the established baseline? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Motorized access and secure core in PCA The following measures are to be calculated as described in PCA-NCDE-STD-01 and compared to established baseline: • Percent of each BMU Subunit in >1 mile per square mile open motorized route density • Percent of each Subunit with>2 miles per square mile total motorized route density • Percent of each Subunit in secure core • Ten-year running average of the above measures for each project area • Number and duration of 'projects' (per NCDE definition of 'project')
Z1-NCDE-DC-01 Z1-NCDE-STD-01	MON-NCDE-02 Within the HLC NF portion of Zone 1, has the level of motorized access changed compared to the established baseline? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Motorized access in Zone 1 • For Zone 1 on the HLC NF, density of motorized routes open for public use during the non-denning season on NFS lands, calculated as total miles divided by total area (HLC NF portion of Zone 1 only, and to be compared with established baseline)
PCA-NCDE-DC-01 PCA-NCDE-DC-02 PCA-NCDE-DC-03 PCA-NCDE-STD-06	MON-NCDE-03 Within the HLC NF portion of the NCDE primary conservation area, has the amount of developed recreation changed compared to the established baseline? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Developed recreation sites and capacity in PCA The following measures are to be calculated for each Bear Management Unit (BMU) in the PCA for comparison to established baseline: • Number of developed recreation sites (per NCDE definition) • Capacity of developed sites managed for public overnight use • Number of day-use recreation sites and trailheads
PCA-NCDE-DC-06 PCA-NCDE-STD-10 PCA-NCDE-STD-11	MON-NCDE-04 Within the HLC NF portion of the NCDE primary conservation area, has the amount of permitted livestock grazing changed compared to the established baseline? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Grazing allotments and sheep grazing use in PCA The following measures are to be calculated within the PCA, for comparison with the established baseline: • Number of commercial livestock grazing allotments • Number of permitted sheep animal unit months
PCAZ1-NCDE-DC-01 PCAZ1-NCDE-STD-01 PCAZ1-NCDE-STD-02 PCAZ1-NCDE-STD-04	MON-NCDE-05 Within the HLC NF portion of the NCDE primary conservation area and Zone 1, have there been conflicts between	Grizzly bear-livestock conflicts The following measure is to be calculated Within the PCA and Zone 1: • Number of grizzly bear–livestock conflicts occurring on NFS lands

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	grizzly bears and livestock on NFS lands? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	
PCAZ1-NCDE-DC-01 PCAZ1-NCDE-STD-09 PCAZ1-NCDE-STD-10 PCAZ1-NCDE-GDL-05	MON-NCDE-06 Within the HLC NF portion of the NCDE primary conservation area and zone 1, what measures have been taken to monitor and mitigate potential impacts of leasable or locatable minerals activities? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Monitoring and mitigation plans for leasable and locatable minerals activities The following measures are to be reported for the PCA and Zone 1: • Number of monitoring plans for leasable or locatable mineral activities • Changes to habitat resulting from leasable or locatable activities (including land surface and vegetation disturbance, road construction, work camp construction, etc.) • Measures used to mitigate for habitat changes, disturbance, or displacement • Costs of and funding sources for monitoring and mitigation measures
PCA-NCDE-STD-09	MON-NCDE-07 Within the HLC NF portion of the NCDE primary conservation area, have there been changes in the amount of area where late-season over-snow motorized use occurs compared to the established baseline? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Denning habitat with late-season motorized over-snow use The following measure is to be reported for areas within the PCA, for comparison with the established baseline: • Percentage of modeled grizzly bear denning habitat (as updated by Montana Fish, Wildlife, and Parks) where public motorized over-snow vehicle use is allowed during the den emergence time period (as defined by NCDE Science Team)

Table 13. Canada lynx

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-WL-DC-09 DI-VEGF-DC-04 RM-VEGF-DC-04 UB-VEGF-DC-04 NRLMD Biological Opinion (dated 3/27/2007) Term and Condition #4	MON-LYNX-01 What is the status of lynx habitat forestwide? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Lynx habitat structural mosaic • Acres, and percent, of lynx habitat in the early stand initiation, stand initiation, multi-story mature, other, stem exclusion, and non-forested structural stages, by LAU.
NRLMD, Plan appendix F, Standard VEG S2	MON-LYNX-02 How much lynx habitat has been regenerated by vegetation management projects?	Lynx habitat affected by regeneration harvest • Percentage of lynx habitat on NFS land in each LAU that has been affected by regeneration harvest within the past decade.

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	* 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	
NRLMD, Plan appendix F, Required Monitoring item 1a, Required Monitoring item 1b, Required Monitoring item 1c	MON-LYNX-03 How much lynx habitat has been affected by fuels treatment projects and how much of that is/was not in compliance with NRLMD standards? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Fuel Treatments • Acres of fuel treatment in lynx habitat by LAU, and whether the treatment was within or outside the WUI as defined by HFRA. • Whether or not the fuel treatment met the NRLMD vegetation standards or guidelines. If standard(s) are not met, report which standard(s) are not met, why they were not met, and how many acres were affected. • Whether or not 2 adjacent LAUs exceed Standard VEG S1 (30% in a stand initiation structural stage that is too short to provide winter snowshoe hare habitat), and what event(s) or action(s) caused the standard to be exceeded.
NRLMD, Plan appendix F, Standard VEG S5; Required Monitoring item 2	MON-LYNX-04 What changes to lynx habitat have occurred as a result of pre-commercial thinning? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Application of exception in Standard VEG S5 • For areas where any of the exemptions 1 through 6 listed in Standard VEG S5 were applied: Report the type of activity, the number of acres, and the location (by LAU) and whether or not Standard VEG S1 was within the allowance.
NRLMD, Plan appendix F, Standard VEG S6; Required Monitoring item 3	MON-LYNX-05 What changes to multi-story mature or late successional snowshoe hare habitat have resulted from vegetation management projects? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Application of exceptions in Standard VEG S6 • For areas where any of the exemptions 1 through 3 listed in Standard VEG S6 were applied: Report the type of activity, the number of acres, and the location (by LAU) and whether or not Standard VEG S1 was within the allowance
NRLMD, Plan appendix F, Guidelines; Required Monitoring item 4	MON-LNX-06 To what extent have vegetation management projects, grazing activities, and human use projects incorporated lynx habitat management guidelines? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Application of guidelines • Document the rationale for deviations to guidelines. Summarize what guideline(s) was not followed and why.
NRLMD, Plan appendix F Required Monitoring	MON-LYNX-07 What changes to snow compacting activities have occurred? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Snow compaction in lynx habitat • Map the location and intensity of snow compacting activities (per definition in the NRLMD glossary) and groomed routes that occurred inside LAUs then monitor any changes to that condition every five years.

Table 14. Wildlife (WL)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
DI-WL-DC-01 UB-WL-DC-01 DI-WL-GO-01 DI-WL-GDL-01 UB-WL-GDL-01	MON-WL-01 Have there been changes to landscape-scale connectivity in the Divide and Upper Blackfoot GAs? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Landscape scale connectivity • Changes in mileage of motorized access in identified areas of Divide GA and Upper Blackfoot GA (per descriptions in DI-WL-DC-01 and UB-WL-DC-01) • Miles of new trail constructed in identified areas of Divide GA and Upper Blackfoot GA (per descriptions in DI-WL-DC-01 and UB-WL-DC-01) • Number and acreage of land acquisitions in Divide GA
FW-WL-DC-05 FW-WL-GDL-02 FW-NCDE-DC-01 PCAZ1Z2-DC-01 PCAZ1Z2-STD-01 FW-REC-GDL-07	MON-WL-02 Are wildlife-human conflicts being minimized? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Human-wildlife conflicts • Number, type, and cause of conflict incidents • Number of food storage violations
BB-WL-DC-02; DI-WL-DC-02; EH-WL-DC-03; UB-WL-DC-02	MON-WL-03 What is the status of habitat conditions that support flammulated owls during the nesting season? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Ponderosa pine and snag habitat The following measures should be reported for the warm-dry biophysical setting forestwide and for GAs within known flammulated owl distribution (Big Belts, Divide, Elkhorns, and Upper Blackfoot): • Percent of area with ponderosa pine dominance types • Percent of warm dry biophysical setting with ponderosa pine trees ≥ 15 inches dbh • Within ponderosa pine dominance types, proportion of low/medium (<40%) canopy cover classes • Within ponderosa pine dominance types, number of acres burned (via wildfire or prescribed fire) in the past 2-20 years
FW-WL-DC-06 FW-WL-GDL-06 EH-ACCESS-SUIT-01	MON-WL-04 What actions have been taken to minimize potential disturbances to ungulates and other wildlife on winter range? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Management actions and motorized travel on winter range • Miles of route open to public motorized use and acres of area open to public motorized over-snow use from the end of hunting season through early spring on identified winter ranges, by GA • Number, type, and timing of vegetation management actions with implementation occurring between the end of hunting season and early spring on identified winter ranges, by GA

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-WL-GDL-04 FW-WL-GDL-10	MON-WL-05 What management actions are occurring to prevent the spread of diseases and pathogens to and among wildlife populations? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Preventative actions • Number, type, and location of actions taken to prevent or reduce potential spread of white-nose syndrome or other diseases • Number, type, and location of actions taken to prevent or reduce potential spread of pathogens to western toads at known breeding sites
FW-WL-DC-04 EH-WL-DC-01	MON-WL-06 Have there been changes in the amount of area most likely to provide seclusion and habitat security for wildlife? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Available area with nonmotorized or nonmechanized designations • Total acres in and percent of each GA that is in primitive or semi-primitive nonmotorized ROS category • Total acres in and percent of each GA in which both motorized and mechanized travel are not allowed • Miles of new permanent road constructed in the Elkhorns GA
BB/EH/LB/RM-WL-DC 01 BB/EH/LB -WL-STD 01 RM-WL-STD-02 FW-GRAZ-STD-03 FW-GRAZ-STD-04	MON-WL-07 What management activities have occurred in bighorn sheep occupied habitat that address the potential for contact between domestic sheep and goats and bighorn sheep? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Potential for contact between bighorn sheep and domestic sheep and goats • Number of domestic sheep and/or goat grazing allotments with completed risk analyses and management actions implemented per best available agency/interagency recommendations • Number of permits for pack goat use in GAs with bighorn sheep occupied habitat • Number of reported occurrences of comingling or contact between domestic sheep and/or goats with bighorn sheep on NFS lands
Biological Opinion for Terrestrial Species	MON-WL-08 Is illegal motorized use affecting grizzly bears and is the Forest correcting illegal uses when it is discovered? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii	Provide an up-to-date record of known illegal motorized access that occurred during the preceding two calendar years and how the Forest responded. Include information such as (but not limited to): • The location of illegal motorized access, • The type of barrier breached, • How the barrier was breached, • The date the Forest became aware of the illegal motorized access, • How the Forest responded to the illegal motorized access, and the date the Forest carried out its response

Recreation Opportunities (REC)

Table 15. Recreation Opportunities (REC)

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-REC-DC-01 FW-REC-DC-03	MON-REC-01	Developed recreation site conditions • Number, type, and location of developed recreation and interpretive sites.

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-REC-DC-05 FW-REC-DC-06	What is the status of developed recreation site management (including interpretive sites)? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	• Number of changes/improvements to developed recreation and interpretive sites. • Deferred maintenance needs at developed recreation and interpretive sites.
FW-REC-DC-04 FW-REC-DC-07	MON-REC-02 What is the status of social and resource conditions at dispersed recreation sites, trailheads, and airstrip facilities? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Dispersed recreation site conditions • Number and type of dispersed recreation sites • Number of reported social conflict or resource damage incidents.
FW-REC-OBJ-01 FW-REC-OBJ-02 FW-REC-OBJ-03	MON-REC-03 What is the progress toward meeting developed recreation objectives in the plan? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Developed recreation objectives • Number of dispersed recreation sites on the forest that have been rehabilitated to correct erosion or sanitation issues. • Number of developed and/or dispersed recreation facilities that have been removed or relocated outside of riparian management zones or have undergone other measures to improve the conditions of aquatic or riparian resources. • Number of facilities or programs at developed recreation sites that have been improved to meet National accessibility requirements.

Recreation Special Uses (RSUP)

Table 16. Recreation Special Uses (RSUP)

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-RSUP-DC-01	MON-RSUP-01 What is the status of recreation special use permits? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Recreation special use permits • Number, type, and location of recreation SUPs

Designated Areas

Designated areas are both administratively designated through the Plan and congressionally designated by law. Administratively designated areas are recommended wilderness, the Grandview Recreation Area, the Badger Two Medicine area, and research natural areas. Congressionally designated areas are wilderness, wilderness study areas, and nationally designated trails.

Table 17. Designated Areas

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-WILD-DC-01	MON-WILD-01 Do management activities in designated wilderness areas protect and maintain wilderness character? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC MON-WILD-02 Are natural process and disturbance the primary forces affecting the composition, structure, and pattern of vegetation? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Designated wilderness • Wilderness character monitoring • Number of authorized motorized and mechanized entries into designated wilderness • Number, kind, and extent of vegetation treatments (including prescribed fire) that has occurred in designated wilderness areas.
FW-RECWILD-DC-01 FW-WSA-DC-02	MON-RWA/WSA-01 Do management activities in recommended wilderness and wilderness study areas maintain and protect the ecological and social characteristics that provide the basis for wilderness recommendation? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Recommended wilderness areas and wilderness study areas • Number, kind, and extent of vegetation treatments (including prescribed fire) that has occurred in recommended wilderness and wilderness study areas. • Number of reported social conflict or resource damage incidents within recommended wilderness and wilderness study areas.
SN-GVRA-SUIT-02	MON-GVRA-01 Are unauthorized trails created by mechanized means of transportation (mountain bike) present within the GVRA? How do mechanized means of transportation within the GVRA affect the primitive recreation setting?	Within the Grand View Recreation area • Number, mileage, and extent of unauthorized trails created for mountain bike trails within the GVRA. • Number and kind of reported social conflict or resource damage incidents within the GVRA.

Selected plan components	Monitoring question	Indicator(s) measure(s)
	* 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	
FW-NRT-DC-01	MON-NRT-01 Is access to national recreation trails provided and maintenance conducted? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	National recreation trails • Miles maintained to standard • Miles improved to standard
EH-ACCESS-DC-01	MON-EH-01 How do mechanized means of transportation (including mountain bikes) within the Elkhorns affect the primitive recreation setting? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Elkhorns core • Number of reported social conflict incidents within the core area of the Elkhorns.
RM-BTM-DC-02	MON-BTM-01 How do mechanized means of transportation (including mountain bikes) within the BTM affect the primitive recreation setting? * 36 CFR 219.12(a)(5) – v, vi, vii, viii, SEC	Badger Two Medicine • Number of reported social conflict incidents within the Badger Two Medicine area.

Cultural and Historic Resources (CR) and Areas of Tribal Importance (TRIBAL)

Table 18. Cultural and Historic Resources (CR) and Areas of Tribal Importance (TRIBAL)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-CR-GDL-01	MON-CRT-01 What is the progress toward preservation and conservation of significant cultural resources? * 36 CFR 219.12(a)(5) – vii, SEC	Cultural resources conservation actions by forest and geographic area • Number of new sites recorded • Number of significant evaluations • Number of sites nominated • Number of scientific excavations • Number of public education events about sites • Number of damages • Number of 106 (project driven) vs 110 (non-project driven)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-CR-DC-03 FW-CONNECT-DC-01 FW-CONNECT-DC-02	MON-CRT-02 What public cultural resource learning opportunities are provided? * 36 CFR 219.12(a)(5) –vii, SEC	Cultural resources outreach • Number of education and interpretation outreach events • Number of publications
FW-CR-DC-04	MON-CRT-03 What opportunities are provided for volunteers to participate in cultural resource conservation activities? * 36 CFR 219.12(a)(5) –vii, SEC	Cultural resource volunteer opportunities • Number of volunteers by site or cultural project
FW-CR-GO-02	MON-CRT-04 What consultations have occurred with Native America tribes to aid in the protection and enhancement of cultural resources? * 36 CFR 219.12(a)(5) –vii, SEC	Tribal consultations • Number of consultations (with whom and what projects)

Land Status and Ownership (LAND) and Land Uses (LAND USE)

Table 19. Land Status and Ownership (LAND) and Land Uses (LAND USE)

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-LAND-DC-02	MON-LAND-01 To what extent are management actions occurring to provide road and trail easements? * 36 CFR 219.12(a)(5) –vii, SEC	Easements • Number and location of new and existing easements • Number and location of existing temp easements at risk • Number and location of access/easement needs

Infrastructure – Roads and Trails (RT), Bridges (BRDG), and Facilities (FAC)

Table 20. Infrastructure – Roads and Trails (RT), Bridges (BRDG), and Facilities (FAC)

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-RT-DC-01	MON-INFRA-01 To what extent are road status changes occurring to provide a safe and cost-effective transportation system?	Road status conversion • Number of miles decom or converted • Percent of decom road that were ID by subpart A (by forest)

Selected plan components	Monitoring question	Indicator(s) measure(s)
	* 36 CFR 219.12(a)(5) –vii, SEC	
FW-RT-DC-03 FW-RT-OBJ-03 FW-RT-OBJ-04 FW-RT-OBJ-05 FW-ACCESS-DC-01	MON- INFRA -02 What is the status of road and trail improvement and maintenance? * 36 CFR 219.12(a)(5) –vii, SEC	Road improvement and maintenance • Miles of maintained roads • Miles of maintained trails • Miles of improved roads • Miles of improved trails

Benefits to People –Public Information, Interpretation, and Education (CONNECT)

Table 21. Benefits to People –Public Information, Interpretation, and Education (CONNECT)

Selected plan components	Monitoring question	Indicator(s) measure(s)
FW-CONNECT-DC-01, FW-CONNECT-DC-02 See also Cultural Resources and Areas of Tribal Importance section.	MON-CONNECT-01 To what extent is the Forest providing opportunities for public information, interpretation and education? * 36 CFR 219.12(a)(5) –vii, SEC	• Percent change in the # of education and interpretation programs offered (since the previous monitoring cycle) • Percent change in the # of people who attended education and interpretation programs (since the previous monitoring cycle)

Benefits to People – Livestock Grazing (GRAZ)

Table 22. Benefits to People – Livestock Grazing (GRAZ)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-GRAZ-DC-01; FW-GRAZ-DC -02; FW-GRAZ-DC-03; FW-GRAZ-STD-02	MON-GRAZ-01 Are rangelands maintaining or moving towards desired resource condition in response to livestock grazing management? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii, SEC	Long-term effectiveness monitoring • Changes in bare ground and litter • Changes in vegetation composition and cover
FW-GRAZ-DC-02; FW-GRAZ-GDL-01	MON-GRAZ-02 How are riparian plant communities responding to grazing by domestic livestock? * 36 CFR 219.12(a)(5) – i, ii, iv, vi, vii, viii, SEC	Long-term condition and trend • Permanent riparian vegetation transects • Hydrology cross-sections • Riparian photo points

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-GRAZ-GDL -05	MON-GRAZ-03 What adaptive actions are being implemented and how are resources trending as a result of management changes? * 36 CFR 219.12(a)(5) – ii, iii, iv, vi, vii, viii, SEC	• Range vegetation acres improved • Range betterment funds expended
• Also see Aquatics section for FW-FAH-GDL-03; FW-CWN-GDL-03		

Benefits to People – Timber (TIM)

Table 23. Benefits to People – Timber (TIM)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-TIM-DC-02	MON-TIM-01 What is the severity of natural disturbances on lands suitable for timber production? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Disturbances in lands suitable for timber production, forestwide • Acres of wildfire in lands suitable for timber production, by severity • Acres of insect and disease infestations in lands suitable for timber production
FW-TIM-OBJ-01 FW-TIM-OBJ-02 FW-TIM-STD-07	MON-TIM-02 What is the quantity of wood products sold by the Forest? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Volume wood sold forestwide • Timber sale quantity (products that meet utilization standards) in MMBF and MMCF. • Wood sale quantity (all wood products, including firewood, biomass, post/poles, non-saw material) in MMBF and MMCF
FW-TIM-STD-02	MON-TIM-03 What is the restocking status of stands that have had a regeneration harvest in the last 5 years? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Reforestation certification status forestwide • Number of stands and acres that were harvested in the last 5 years by reforestation status: certified, progressing, or failed
FW-TIM-STD-08 FW-TIM-STD-09 FW-TIM-STD-10	MON-TIM-04 What are the patch sizes of regeneration harvest, and to what extent are maximum patch size exceptions being implemented?	Patch size of regeneration harvest units by broad potential vegetation types • Number of regeneration harvest units less than 40 acres; between 40 acres and 75 acres; and greater than 75 acres

Selected plan components	Monitoring question	Indicator(s) and measure(s)
	* 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	

Benefits to People – Other Forest Products and Wood for Fuel (OFP)

Table 24. Benefits to People – Other Forest Products and Wood for Fuel (OFP)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-OFP-DC-01 FW-OFP-DC-02 FW-TRIBAL-DC-01	MON-OFP-01 What quantities of other forest products are sold by the Forest? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Other forest products sold forestwide • Number of Christmas tree permits sold • Quantity of mushrooms sold

Benefits to People – Fish and Wildlife (FWL)

Table 25. Benefits to People – Fish and Wildlife (FWL)

Selected plan components	Monitoring question	Indicator(s) and measure(s)
FW-FWL-DC-01, FW-FWL-DC-03, FW-FWL-DC-04	MON-FWL-01 Is the Forest continuing to provide opportunities for fish and wildlife related activities (including fishing, hunting, photography and wildlife viewing)? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Visitors engaged in fish and wildlife activities • Percent change in # of visitors engaged in fishing, hunting, photography and wildlife viewing (since previous monitoring cycle)
FW-FWL-DC-01 FW-FWL-DC-05 FW-FWL-GDL-01	MON-FWL-02 What management actions have been taken to influence big game availability on NFS lands during the hunting season? * 36 CFR 219.12(a)(5) – ii, iv, vi, vii, viii, SEC	Management actions specifically related to big game habitat during the archery and rifle hunting seasons • Number, type, and location by GA and species-specific analysis unit (where available) of management actions taken specifically for the purpose of providing or maintaining big game habitat security or influencing distribution of big game species during archery and rifle seasons

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Appendix C. Potential Management Approaches and Possible Actions

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Tables

Introduction

The 2012 Planning Rule requires land management plans to "…contain information reflecting proposed and possible actions that may occur on the planning area during the life of the plan, including, but not limited to: the planned timber sale program; timber harvesting levels; and the proportion of probable methods of forest vegetation management practices expected to be used" (16 United State Code (U.S.C.) 1604(e) (2) and (f)(2)). Such information is not a commitment to take any action and is not a 'proposal' as defined by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (40 CFR 1508.23, 42 U.S.C. 4322(2)(C)) (36 CFR 219.7(f)(1)). Management approaches and strategies presented may include suggestions for on-the-ground implementation, analysis, assessment, inventory or monitoring, and partnership and coordination opportunities the Forest is proposing as helpful to make progress in achieving its desired conditions. The potential approaches and strategies are not all-inclusive, nor commitments to perform particular actions.

The 2021 Land Management Plan employs a strategy of adaptive management in its decision-making and achievement of the Plan desired conditions and objectives. An adaptive management strategy emphasizes the learning process. It involves using the best current knowledge to design and implement management actions, followed by monitoring and evaluating results and adjusting future actions on the basis of what has been learned. This is a reasonable and proactive approach to decision making considering the degree of uncertainty in future ecological, social, and economic factors.

This appendix describes possible actions, potential management approaches, and strategies the HLC NF may undertake to make progress in achieving desired conditions and objectives.

This appendix does not serve as a "to do" list of projects. The potential management approaches may be used to inform future proposed and possible actions. These strategies and actions provide guidance for plan implementation, and represent possibilities, preferences, or opportunities, rather than obligatory actions. Under an adaptive management approach, proposed strategies and actions are dynamic. They are changeable, augmentable, or replaceable to be responsive to results of new research, practical experience, and other information and observations.

This appendix also provides information intended to clarify and provide additional information that may help managers interpret and implement plan components. Not all plan components are addressed, but only those for which additional information is warranted. This approach recognizes the highly variable site conditions and management situations that are best addressed at the level of project analysis.

This appendix does not commit the HLC NF to perform or permit activities. Information included does not direct or compel processes such as analysis, assessment, consultation, planning, inventory, or monitoring.

Possible Forest Management Actions and Timber Harvest

As required by the 2012 Planning Rule, this section identifies the possible actions and proportion of probable methods of forest vegetation management practices expected to be used to achieve desired timber harvesting levels and outputs. The identification of possible actions includes an estimate of timber harvesting levels anticipated over the next 1 to 2 decades, as well as the probable methods of vegetation management practices, but does not include speculation about the specific amount, frequency, location, magnitude, or numbers of actions during the life of the Plan. Estimated acres of treatment and associated timber product outputs [reported in million cubic feet (mmcf) and million board feet (mmbf)] were determined through use of the PRISM model. This model is an analytical tool used to evaluate vegetation

management scenarios that achieve resource objectives. Among other things, the model provides an estimate of the level of timber products expected and the management practices applied to achieve that level, given a set of inputs that includes existing and desired vegetation conditions, budget and resource constraints, and expected vegetation change.

Table 1 displays the acres of harvest expected for the first and second decades of plan implementation. Production of sawtimber and other wood products is expected through commercial timber harvest, which includes even-aged regeneration harvests (e.g., clearcut, seedtree, shelterwood) and other harvests (e.g., thinning and uneven-aged harvests). The appropriate harvest methods would be based upon site-specific determinations made during project planning and documented in a silvicultural prescription. Expected harvest levels are shown with and without a constraint based on reasonably foreseeable budget levels.

Table 1. Vegetation management practices for timber harvest (annual average acres for the first and second decades of plan implementation)

Type of Harvest	Decade	With budget constraint	Without budget constraint
Even-aged Regeneration	1	2,300	3,300
	2	1,800	1,500
Other Harvest	1	<500	1,700
	2	1000	2,000
Total Harvest	1	2,300	5,000
	2	2,700	3,400

Table 2 displays the projected timber sale quantity (PTSQ), for products meeting utilization standards and the projected wood sale quantity (PWSQ), for all wood products including fuelwood or biomass that do not meet timber product utilization standards. Volumes include harvest that occurs on lands suitable for timber production as well as lands that are not suitable. As required by the 2012 Planning Rule, the estimates take into account the fiscal capability of the planning unit and are consistent with all plan components. Timber outputs may be larger or smaller on an annual basis, or over the life of the Plan, if budget or other constraining factors change in the future. To provide context for the levels that may be possible if budgets increase in the future, Table 3 displays the potential timber quantities that may be possible without a reasonably foreseeable budget constraint, but still consistent with all plan components.

FW-TIM-OBJ-01 and FW-TIM-OBJ-02 are based on a reasonable range around these projected values, to encompass the variability across decades and potential fluctuations in a reasonably foreseeable budget. A footnote to each OBJ displays the unconstrained volume projection.

All projected timber outputs are below the sustained yield limit (SYL), which is the volume that can be produced in perpetuity on lands that may be suitable for timber production. The calculation of the sustained yield limit is not limited by land management plan desired conditions, other plan components, or the planning unit's fiscal capability and organizational capacity. A sustained yield limit of 5.75 mmcf (31.21 mmbf) was calculated for the proclaimed Helena NF; and 4.95 mmcf (26.36 mmbf) for the proclaimed Lewis & Clark NF, totaling 10.7 mmcf (57.57 mmbf) for the combined HLC NF.

Table 2. Projected timber sale program, annual average volume outputs for the first and second decades of plan implementation, constrained by reasonably foreseeable budget

Category and Decade	Decade 1 (mmcf)	Decade 1 (mmbf)	Decade 2 (mmcf)	Decade 2 (mmbf)
Timber Products (A1). Lands suitable for timber production	3.9	19.0	4.2	19.9
Timber Products (A2) Lands not suitable for timber production	1.7	8.3	1.5	7.0
Projected Timber Sale Quantity[1] (A1 + A2)	**5.7**	**27.3**	**5.7**	**27.0**
Other Wood Products (B). All lands	2.2	4.1	2.2	4.1
Projected Wood Sale Quantity[2] (A1 + A2 + B)	**7.9**	**31.4**	**7.9**	**31.1**

1. Potential Timber Sale Quantity (PTSQ) – Volume, other than from salvage or sanitation treatments, that meet timber product utilization standards, from lands suitable and not suitable for timber production.
2. Volume of all Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

Table 3. Projected timber sale program, annual average volume outputs for the first and second decades of plan implementation, unconstrained by reasonably foreseeable budget

Category and Decade	Decade 1 (mmcf)	Decade 1 (mmbf)	Decade 2 (mmcf)	Decade 2 (mmbf)
Timber Products (A1). Lands suitable for timber production	5.7	26.8	5.3	25.4
Timber Products (A2) Lands not suitable for timber production	2.3	10.8	2.7	12.6
Projected Timber Sale Quantity[1] (A1 + A2)	**7.9**	**37.6**	**7.9**	**37.9**
Other Wood Products (B). All lands	2.5	5.6	2.5	5.7
Projected Wood Sale Quantity[2] (A1 + A2 + B)	**10.5**	**43.2**	**10.5**	**43.7**

1. Potential Timber Sale Quantity (PTSQ) – Volume, other than from salvage or sanitation treatments, that meet timber product utilization standards, from lands suitable and not suitable for timber production.
2. Volume of all Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

Possible Management Strategies and Approaches

Aquatic Ecosystems

Watershed

Strategies and possible management options that could be employed to help achieve the desired conditions in the 2021 Land Management Plan for watershed resources include the following:

- Restoring riparian habitats to aid in the reestablishment of beavers into stream segments where they historically occurred.
- Restoring water quality and stream habitats by improving watershed scale processes and through direct riparian and in-channel treatments.
- Working toward the delisting of impaired water bodies in cooperation with Montana Department of Environmental Quality and Environmental Protection Agency through water quality assessment, total maximum daily loads, restoration plans, implementation of best management practices, and monitoring.
- Cooperating with private landowners and other agencies to improve water quality and restore aquatic ecosystems across multiple ownerships.
- Removing, reconstructing, or improving maintenance of roads located in riparian areas to improve watershed health and reduce sediment delivery to the aquatic ecosystem.

- Treating upland roads to reduce water interception and reduce landslide risk.
- Completing the development of watershed restoration action plans for all identified priority watersheds and its implementation. Identify essential projects in the watershed improvement tracking database.
- Considering the use of remote sensing surveys to provide more information about high priority watersheds.
- Evaluating condition of groundwater dependent ecosystems, especially within project areas and priority watersheds.

Fisheries and Aquatic Habitat/ Conservation Watershed Network

The desired condition to work cooperatively to recover bull trout and westslope cutthroat trout sets the stage for management. Strategies and possible management options that could be employed to help achieve the desired conditions in the 2021 Land Management Plan for aquatic habitat and Conservation Watershed Network include the following:

- Cooperating with USFWS, tribes, state agencies, other federal agencies, and interested groups to assist in bull and westslope cutthroat trout through the Bull Trout Conservation Strategy and the Bull Trout Recovery Plan.
- Following direction within the *U.S. Forest Service Bull Trout Conservation Strategy* that would move the current baseline condition to an upward trend for each local bull trout population for indicators (temperature, barriers, pools, and sediment). Restoration activities such as barrier removal and road decommissioning are listed for each local population.
- Consulting the *Recovery Plan for the Coterminous United States Population of Bull Trout (Salvelinus confluentus)* (also known as the Bull Trout Recovery Plan), which includes recovery goals, objectives and criteria that the Forest would cooperate with partners to achieve. By doing this, threats can be managed, and a sufficient distribution and abundance of bull trout would be ensured across the forest.
- Referring to the *Columbia Headwaters Recovery Unit Implementation Plan for bull trout (Salvelinus confluentus)* (also known as the Recovery Unit Implementation Plan), which is a subset of the recovery plan that identifies threats and actions within each core area.
- Considering existing conditions, factors limiting aquatic species populations, resource risks, restoration options, and available recovery planning information when planning management activities.
- Considering basin, subbasin, watershed, and reach scale conditions including habitat conditions from the PACFISH/INFISH biological opinion and other stream surveys, factors limiting aquatic species (including non-native species), resource risks, management requirements, restoration opportunities, and interagency coordination with Montana Fish, Wildlife and Parks and the USFWS. For more information, please see appendix E, Conservation Watershed Network section.
- Prioritizing road maintenance and obliteration to travel routes that directly affect streams verses roads that are ecologically disconnected from streams.
- Reducing aquatic habitat fragmentation through removal of man-made, native fish migration barriers. Where appropriate, create barriers to prevent invasion of non-native species.

Riparian Management Zones

Strategies and possible management options that could be employed to help achieve the desired conditions in the 2021 Land Management Plan for RMZs include the following:

- Considering habitat conditions and the function and processes of riparian areas when proposing activities in order to provide shade, minimize nutrients and sediment and the potential impacts that may occur. Consider which species occur within the stream and the strength of that population.

- Mapping and characterization of priority RMZs, based on the watershed restoration plans (or their equivalent).

Soil and Geology

Strategies and possible management options that could be employed to help achieve the desired conditions in the 2021 Land Management Plan for soils and geology include the following:

- Improving soil quality by implementing "National Best Management Practices for Water Quality Management on National Forest System Lands", "Montana Best Management Practices" and "Soil and Water Conservation Practices." In geologically hazardous areas, consider limiting ground disturbances to sensitive soils and geologically hazardous landscapes.
- Completing the development of watershed restoration action plans for all identified priority watersheds and continue Watershed Restoration Action Plan implementation and identification of essential projects in the Watershed Improvement Tracking database.
- Collaborating with Natural Resources Conservation Service to complete soil inventory and ecological site descriptions.

Fire and Fuels

Fire management approaches are designed to maintain and restore fire-adapted landscapes and reduce risk to people, communities, and values. These approaches would also support the three objectives of the National Cohesive Wildland Fire Management Strategy; restore resilient landscapes, maintain fire adapted communities, and provide for effective, safe fire response.

Wildland fire and vegetation management strategies within the wildland-urban interface take a strategic approach for achievement of desired fuel conditions integrating, where feasible, desired conditions for wildlife habitat and other ecological values. Hazardous fuels reduction to mitigate the risk of wildfire to communities and important social values is emphasized in the wildland-urban interface.

Wildland fire objectives are based on factors such as maintaining or moving vegetation types toward desired conditions, resource availability, and values to be protected. Social and economic considerations (e.g., smoke) may also affect objectives, as well as adjoining jurisdictions having similar or differing missions and directives. Fuels specialists and silviculturists, along with other resource specialists, could work to ensure land management objectives are met.

Potential strategies for fire management (unplanned ignitions, wildfire) could include risk assessments that can occur at multiple scales, both spatial and temporal. These assessments would be grounded in experience and analyzed with data and models appropriate to the scale of analysis. A possible approach would be to look at risk in three tiers:

- Long-term - analyzing existing conditions that change typically in the 5–10 year time frame, informing broad questions and decisions for programmatic risk assessments. Items may include Highly Values Resources and Assets (HVRA) such as structures, infrastructure, commercial timber, and wildlife habitat.
- Annual - analyzing factors such as seasonal weather, fuels condition, and drought impacts to inform decisions pre-season to identify areas that with reduced large fire/long-duration risk may have the opportunity for short-term fire management.
- Incident – when an ignition occurs utilizing now known specific condition, location, etc., to specifically analyze the situation for incident risk assessments.

Utilization of this three-tiered risk analysis would allow managers to make informed decisions that respond to our various desired conditions.

Wildland fire is one tool for restoring and maintaining the forests' fire-adapted ecosystems. Management of wildland fire is often most effective when combined with mechanical treatments that further restore forest structure. Mechanical treatments are costly, so the capacity to implement such treatments across the landscape is limited. Strategic placement and design of mechanical treatments increases their effectiveness in protecting values.

Wildland fire may be the only viable tool in areas such as steep rugged terrain or remote areas where mechanical treatments are not feasible. Objectives in these areas may include higher fire intensities and higher levels of mortality to achieve vegetation structural changes that would not occur through other means to move toward desired conditions.

Wildfires may be concurrently managed for one or more objectives (e.g., protection, resource enhancement) that can change as fire spreads across the landscape. Strategies chosen for wildfires include interdisciplinary input to assess site-specific values to be protected. These strategies may be used to develop incident objectives and courses of action to enhance or protect values, and to minimize costs and resource damage.

Management of wildland fire may be coordinated across jurisdictional boundaries whenever there is potential for managing a wildfire or a prescribed fire on more than one jurisdiction (e.g., other national forests, tribal lands, State lands). This is done with the understanding that fire-adapted ecosystems transcend jurisdictional boundaries.

The following strategies related to air quality and fire management could be considered for application at a programmatic or project-level stage to support the maintenance or achievement of desired conditions, standards and guidelines.

- Completing effectiveness evaluations of fuel treatments to help understand how hazardous fuel treatments affect wildfire behavior, fire severity, and fire suppression effectiveness.
- Utilizing minimum impact suppression tactics (MIST) in sensitive areas, such as designated wilderness areas, designated wild and scenic river corridors, research natural areas, botanical areas, riparian management areas, cultural and historic sites, developed recreation areas, special use permit areas that have structures, and historic and recreational trails. MIST techniques could also be used for post fire restoration activities.
- Integrating terrestrial ecosystem desired conditions into spatial patterns for fuel reduction treatments. Heterogeneity could be addressed by increasing variation in tree spacing, enhancing tree clumps, creating canopy gaps, promoting fire resilient tree species, increasing the ratio of large to small trees, and using topographic variation (e.g., slope, aspect, and position) to guide treatment prescriptions.

Terrestrial Vegetation

Applying Desired Conditions

The desired conditions for vegetation describe, to the best of our ability, conditions that would provide for ecosystem integrity, while contributing to social and economic sustainability (as required by the 2012 Planning Rule). Analysis of natural range of variation is the underpinning for the desired conditions, with integration of additional factors and best available scientific information.

The Forest Inventory and Analysis (FIA) data is the source for most of the quantified existing conditions for vegetation components. The exception is forest density. Here, we relied on R1 Vegetation Map (VMAP – see appendix H of the FEIS for more information) as it is a more direct and accurate measurement of canopy cover. For all attributes, field verification of vegetation conditions is expected to occur at the project level using a variety of methods.

The narrative component of some desired conditions includes words such as "maintain, increase, or decrease". This language was used to clarify the vision for the forest by indicating the desired trajectory relative to the existing condition at the time of plan development. The desired condition would be met if and when the component moves within the range, as measured through the monitoring plan. The existing condition would change through time, and therefore the direction (or magnitude) of change needed relative to the desired condition would also change.

Table 4 describes considerations and factors for applying desired conditions at the project level.

Table 4. Considerations for applying vegetation desired conditions at the project level

Consideration	Description and Examples
Desired conditions help shape the purpose and need of projects. The 2021 Land Management Plan does not prioritize desired conditions.	***The 2012 Planning Rule requires that projects do not preclude the achievement of any desired condition.*** Individual projects may focus on contributing to one or more vegetation desired conditions, but a project is not expected to simultaneously move towards all desired conditions – some are mutually exclusive in time and/or space. Given the nature of forest ecosystem dynamics, progress towards one desired condition may result in a short-term or localized movement away from another. However, implementation of treatments that achieve one or more desired conditions at the project level would not necessarily foreclose the opportunity to maintain or achieve any other desired condition over the long term. The particular vegetation desired conditions that might be a focus for a project could be determined based on the unique ecological opportunities and capabilities of each project area as well as other resource considerations and direction provided by the deciding official.
Most vegetation desired conditions are expressed as ranges.	***Desired conditions are presented as ranges to allow that variation is natural and flexibility is needed to incorporate other resource needs.*** Managing vegetation characteristics at any level within the range would be consistent with the 2021 Land Management Plan. Fluctuations in vegetation conditions over time are expected. Managing a particular vegetation characteristic at the upper, lower or mid-point of the desired range may be appropriate, as influenced by other ecological, social or economic objectives. Monitoring assists in evaluation of vegetation change over time and supports an adaptive management approach to forest management. For example, in a GA where the WUI is prevalent, it may be appropriate to target the high end of the desired range for nonforested communities and low-density forests.
Temporal and spatial scale are important factors when interpreting and applying desired conditions at the project level.	***It may take substantially longer than the life of the Plan to achieve desired conditions for some components.*** Vegetation change can be rapid (such as with fire) or slow and gradual (such as with succession). Direction and degree of change in vegetation can vary substantially over the short term (for example, a few decades), but over the long term may be trending in the right direction. This is due not only to the nature of vegetation change, but also because of the discrete classifications used to enumerate desired conditions, when in reality vegetation conditions change over time on a continuum. Vegetation desired conditions apply at the forestwide or Geographic Area scale, not at the scale of the individual project, and are not necessarily appropriate to apply at smaller scales. Stand level decisions and treatments are made at the site-specific level and would be designed to contribute to desired conditions at the broader scales. At the forestwide level, desired conditions are provided by broad PVT. The forestwide PVT breakdowns provide context as to where certain components should be emphasized in GAs as well.
Natural disturbance processes are the primary drivers of vegetation change on the HLC NF.	***Desired conditions can be achieved through management actions and natural disturbances.*** Natural disturbances will likely cause more substantial movement towards or away from desired conditions than management. The FS is not in control of these events to a large degree; however, they must be taken into account when planning activities within FS control. For example, if a wildfire were to burn most of the ponderosa pine stands in a GA, a treatment that converted remaining ponderosa pine stands to a different type would not be consistent with the 2021 Land Management Plan. There are portions of the forest (such as the wildland urban interface or suitable timber base) where the effects of management actions have a greater opportunity to influence vegetation conditions.

Consideration	Description and Examples
Focusing on a particular desired vegetation condition for a project may appear to conflict with another desired condition.	***Projects would need to place all desired conditions into context to ascertain whether achieving movement towards one would preclude achievement of another.*** For example, large diameter shade tolerant trees may be harvested from a high-density forest and the site planted to a desired, shade intolerant species to meet desired conditions for increasing early seral species, reducing high density forests, and providing timber outputs. The removal of large trees to meet these desired conditions might appear to conflict with FW-VEGF-DC-04. However, forestwide, tree growth through vegetation succession is the primary means by which large trees develop. Management actions that promote forest densities, species and structures that are resilient to disturbances and that facilitate more rapid growth rates may ensure that large trees can be developed over the long term. Harvest of larger trees achieves other desired conditions but does not preclude the attainment of desired conditions related to large tree sizes and may even facilitate or improve the probability of their persistence over the long term. In another example, a GA may have a desired condition that indicates increases in limber pine distribution is needed, as well one calling for more nonforested communities. On a given acre, these two goals may conflict. When developing a project, selecting which desired conditions are appropriate to target in a given area can remove that conflict either in time or space. Promoting nonforested communities in a hot, dry forested ecotone by cutting limber pine would not necessarily preclude the achievement of the limber pine desired condition, provided suitable sites for limber pine are present elsewhere at the GA scale.
Forestwide and GA-level desired conditions may indicate different desired ranges and contradictory trends.	***When a vegetation project utilizes a GA-level desired condition that may differ from a forestwide desired condition, the resultant movement towards the desired condition at the GA scale would not necessarily preclude achievement of the Forestwide desired condition.*** For example, a project that contributes toward a GA-level desired condition by decreasing lodgepole pine would likely not preclude the achievement of a forestwide desired condition that calls for broader distribution, provided that lodgepole is abundant or increasing on other GAs.
An existing condition that indicates too little of a given component exists does not mean that management actions cannot influence it.	***Some conditions are below the desired condition; however, this does not necessarily indicate that management should never impact that specific attribute.*** For example, the extent of ponderosa pine tree presence is below the desired range. Harvesting a ponderosa pine/Douglas-fir mixed stand and replacing it with vigorous ponderosa pine seedlings or thinning an existing ponderosa pine stand to promote resilience, could be consistent with moving toward a desired condition to increase ponderosa pine, even though individual ponderosa pine trees would be cut.
The tree species presence attribute warrants special considerations.	***Shifts in tree species presence would not always reflect tradeoffs with the presence of other species, because multiple species can occur in the same area.*** For example, thinning a mixed lodgepole/Douglas-fir stand to contain only Douglas-fir would result in a decrease in the presence of lodgepole pine, but would not cause a change to the presence of Douglas-fir. Tree species presence is determined based on the presence of 1 tree; the density or size class of these trees is not reflected. For example, in the NRV, there may be areas with only 1 or 2 trees per acre of a given species (such as juniper in a savanna). Today, that same area may contain a high density of trees. The tree species presence would be accounted for the same for both scenarios. Therefore, tree species presence should be considered along with other desired conditions such as cover type and density class to inform implementation of the 2021 Land Management Plan.

General Strategies for Vegetation and Climate Change

To meet terrestrial vegetation desired conditions over time, consider referencing documents produced by the Northern Rockies Adaptation Partnership, the Reforestation-Revegetation Climate Change Primer for the Northern Region, and other publications as they become available, to help design vegetation treatments and strategies. Relevant strategies (Halofsky et al., 2018a, 2018b) may include the following:

- Vegetation adaptation strategies could focus on conserving native tree, shrub, and grassland systems. This may include managing landscapes to reduce the severity and size of disturbances, encouraging

fire to play a natural role, and protecting refugia where fire-sensitive species can persist. Consider increasing species, genetic, and landscape diversity. Consider reducing fuel continuity and populations of non-native species; and using multiple genotypes in reforestation. Rare and disjunct species (such as whitebark pine and aspen) may require strategies focused on regeneration, preventing damage, and establishing refugia.

- Nonforested vegetation adaptation strategies may focus on increasing resilience through non-native species control and prevention. Consider using ecologically based non-native plant management to repair damaged ecological processes and seeding of desired natives. Preventing the establishment of non-native species could be addressed through weed-free policies, education, and collaboration. Livestock grazing may be managed to allow for enhancement of plant health.

Additional factors that may be considered in the development of prescriptions include:

- Considering drought and site suitability when selecting planting species, stock type, and density.
- Promoting the development of large fire-resistant trees.
- Reducing stand densities and inter-tree competition.
- Providing for retention of biological legacies and connectivity with respect to the genetic flow.
- Focusing improvement, restoration, or protection on species that are vulnerable to climate change (e.g. ecotones, ponderosa pine, Douglas-fir, western larch, aspen, and whitebark pine).

General Strategies for Vegetation Management

The following strategies could be considered to support the achievement of desired conditions.

- Developing a set of target stands that provide a consistent basis for prescriptions that integrate vegetation with wildlife, fire and fuels, soil and water, and socioeconomic aspects.
- Utilizing authorities such as stewardship contracting and partnerships as appropriate.
- Considering opportunities to utilize livestock grazing to achieve desired conditions; for example, reducing fine fuels.

Table 5 describes possible management approaches for plant species of local management interest. These strategies may be considered in stand and landscape level prescriptions.

Table 5. Considerations for plant species of local management interest

Common name	Possible management approaches
mountain big sagebrush	Managers may consider methods such as the removal of colonizing conifers to promote resilient sagebrush communities in a variety of age classes. Strategies for burning may include maintaining unburned adjacent areas to supply a seed bank, burning during periods of high humidity, burning and/or mechanically treating areas with competing conifers, and maintaining low fire intensity to promote re-establishment following fire.
antelope bitterbrush	Areas that support bitterbrush and do not typically carry fire well (e.g. rocky soils, dry sites) may be avoided; and/or low intensity fire may be used to reinvigorate deteriorating sites.
mountain mahogany	Management strategies may include reducing the spread of invasive species, managing grazing allotments to maintain native bunchgrasses, replanting or seeding in areas of high severity fire, removing colonizing conifers, and/or protecting or avoiding during prescribed burning.
willow	Management strategies may include preventing excessive grazing, browsing, and trampling; maintaining hydrology characteristics at riparian sites; reducing impacts of timber harvesting; removing colonizing conifers; and promoting sprouting with fire.
Rocky mountain juniper	Consider that the density and location of juniper could be designed so as not to detract from the resilience of nonforested and forested communities.

Common name	Possible management approaches
ponderosa pine	Consider promoting the extent and resilience of ponderosa pine communities through actions such as removal of competing conifers and ladder fuels, re-introduction of fire, and planting.
limber pine	Consider enhancing resilience by removing competing conifers and ladder fuels, re-introducing fire; and developing a program of seed collection, storage, and planting.
quaking aspen	Consider promoting aspen through actions such as removing competing or understory conifers, re-introducing fire, altering grazing practices, installing wildlife exclosures, root-cutting or burning to promote suckering, allowing beavers to flood area to maintain and regenerate riparian areas, and/or planting seedlings or cuttings.
western larch	In the Upper Blackfoot GA, consider promoting the extent and health of western larch by removing of competing conifers, re-introducing fire, and planting on suitable sites.
grasslands, shrublands, and savannas	Consider management actions such as removal of small conifers to maintain and increase extent and resilience; and employing appropriate livestock grazing practices.

Terrestrial Vegetation - Strategies for Specific Plan Components

Vegetation Management Treatments (FW-VEGT-OBJ-01)

The purpose of this objective is to encompass all vegetation treatments (with the exceptions of livestock grazing and weed management) that may be used to move towards terrestrial vegetation desired conditions. Activities may be conducted mechanically or by hand and may include both commercial and noncommercial methods. Strategies could include the use of single methods or practices, or combinations. The treatments listed may meet more than one objective; for example, hazardous fuels treatments (FW-FIRE-OBJ-01), restoration of whitebark pine (FW-PLANT-OBJ-01) and providing commercial timber products (FW-TIM-OBJ-01 and FW-TIM-OBJ-02). Possible activities to meet this objective include (but are not limited to):

- Planned or unplanned fire ignitions
- Fuel reduction actions such as thinning, piling, chipping, and mastication
- Removing encroaching conifers in nonforested ecosystems
- Timber harvest, including regeneration harvest, intermediate harvest, salvage and sanitation.
- Tree planting and re-vegetation of native plants
- Non-commercial thinning or other stand tending activities
- Treating insects and disease infestations with integrated pest management practices.

Vegetation removal (FW-VEGT-GDL-01)

This guideline recognizes that vegetation removal may be necessary to meet the purpose and need of some projects (such as but not limited to trail or road construction, installation of improvements such as fences or culverts, and permitted mining or recreation activities). Management strategies that may help minimize vegetation removal to meet the intent of this guideline may include:

- Using an excavator bucket to scoop up vegetation and set aside to reapply in clumps after the ground disturbance.
- Collecting native seeds, shrubs, and trees from the site to be disturbed and using those materials to re-establish the vegetation.
- Using excavator buckets to break up the soil without removing topsoil and vegetative material, by inserting and shaking the teeth of the bucket instead of scraping.
- Using effective equipment that can operate with the least impact to vegetation.
- Minimizing vegetation removal on side slopes and steep ground.

Reforestation/revegetation (FW-VEGT-GDL-03 and FW-VEGT-GDL-04)

The intent of these guidelines is to ensure that appropriate stock and seed are used for reforestation and revegetation. Possible management strategies to meet these guidelines include:

- Using Regional seed transfer zones and seed collection procedures for cones and native plants.
- Trained silviculturists and/or botanists reviewing reforestation and revegetation prescriptions.

Forested Vegetation – Strategies for Specific Plan Components

Large-tree structure (FW-VEGF-DC-04 and FW-VEGF-GDL-01)

Possible management strategies and approaches to help achieve the desired condition and meet the intent of these plan components may include:

- Promoting individual large and very large trees by thinning to providing additional growing space for mature trees to grow to larger sizes.
- Improving the resilience of large and very large trees by removing ladder fuels and reducing stand densities, thereby lowering susceptibility to bark beetle and wildfire mortality.
- Increasing the large size class by removing small and medium trees in a stand while retaining the large trees, resulting in an increase in the average stand diameter.
- Designing unit boundaries to avoid patches of large trees; and/or including specifications to retain large trees in silvicultural prescriptions. Consider retaining large trees in clumps and/or on inoperable areas, such as riparian/wetlands or rocky outcrops, to reflect natural disturbance patterns; consider those that are co-located with desirable snags.
- Retaining as many large trees as possible, if the required minimum amounts are not present; and encouraging the development of large trees through species selection and density management.
- Avoiding dysgenic effects by not retaining large trees that are infested, diseased, or their likelihood of persistence is low (e.g., shallow rooted on a windy site if there is no opportunity to retain other trees to protect them).
- Leaving large trees that are felled onsite (when consistent with coarse woody debris goals) and retaining smaller replacement trees if practicable.
- Identifying and compensating for losses of large trees that may occur due to operational limitations (e.g., fire lines, private property lines, essential harvest corridors, safety hazards).
- Retaining more large trees to account for potential mortality in prescribed burning units; and/or designing burn treatments and fuel placement to minimize potential mortality of large trees.

Old growth (FW-VEGF-DC-05 and FW-VEGF-GDL-04)

The function of the desired condition is to promote the development and retention of old growth. To achieve this, possible management strategies may include:

- Protecting and/or improving the resilience of stands that were identified as future old growth or late successional habitat under previous project analyses.
- Treating old growth stands to restore structure/function and/or improve resiliency while maintaining old growth characteristics, including downed wood and broken-topped trees.
- Developing future old growth where it is uncommon; where old growth patches are linear, narrow, and/or small; where connectivity of old growth patches is poor; and/or where the existing old growth does not represent a diversity of forest types. This could be accomplished by:
  - Improving younger stands to hasten the development of old growth (e.g., reducing densities, retaining large trees and downed wood, and promoting long-lived species).

  - Emphasizing retention or improvement of younger stands in riparian areas; areas away from open roads or where patch size is large enough to limit the impact of potential firewood cutting along roads; and/or areas important for wildlife species that prefer late successional forest habitat.

- Protecting old growth stands through the strategic placement of treatments. Examples include:
  - Designing treatments near old growth to reduce fire hazard, alter potential fire spread or fire severity, or reduce potential insect or disease outbreak that may spread to old growth.
  - Considering the spatial location of old growth when designing projects that have a purpose of altering fire behavior at the landscape scale.
  - Retaining leave tree buffers of higher density in treatment units to limit edge effects such as wind-throw in adjacent old growth.
- Managing old growth at the stand scale, with larger stands or contiguous patches being more valuable than small, fragmented stands.

Guideline FW-VEGF-GDL-04 contributes toward the desired old growth condition by 1) not removing existing old growth by actions within FS control except in limited cases and 2) allowing for treatments within old growth for specific purposes. To meet this guideline, management approaches may include:

- Identifying if proposed treatment areas include old growth, using a reasonable and accurate approach based on data collection or validation. Consider delineating old growth stands based on the FSH 2409.17, or other current direction.
- Considering all of the quantitative and qualitative factors used in old growth definitions (Green et al 1992, errata corrected 2011) or new best available science, to identify old growth.
- Maintaining a map of old growth stands found during project design to promote consistent management of those areas; although old growth is dynamic through time and such mapping would not be static or all-inclusive.
- Considering the ecology of the old growth type, purpose and need of the project, and all resource values associated with old growth when determining whether old growth should be treated. Management actions that may be appropriate in old growth include (but are not limited to) hand slashing of ladder fuels, daylighting key species, commercial removal of smaller trees to restore resilient composition and structure, and/or or burning piles or low severity prescribed burning.
- Striving to retain habitat characteristics such as downed wood, snags, and broken tops when treating in old growth.
- Modifying the fuels in and adjacent to old growth stands, altering ignition patterns, or modifying unit boundaries to retain old growth in landscape prescribed burning areas.
- Promoting future old growth and/or the retention of other old growth stands in a project area where old growth is removed.
- Removing some lodgepole pine old growth on landscapes that contain abundant late seral lodgepole forests, especially those at imminent risk of fire or bark beetle-caused mortality, where an increase in landscape-level age class diversity may increase the likelihood that quality old growth patches are retained in the event of a large-scale disturbance.

Snags (FW-VEGF-DC-06 and FW-VEGF-GDL-02)

The desired condition recognizes that an array of snag sizes is important across the landscape, and that quantities and spatial distribution are variable depending on disturbance regimes and vegetation types. The guideline helps ensure the snag desired condition can be met. Possible management strategies and approaches to help achieve these plan components may include:

- Identifying and mapping snag analysis groups at the project level.

- Designing treatment units and snag retention strategies to best meet the unique conditions across a project area. Considerations may include:
  - Designing treatment units to exclude concentrations of the best snags on the landscape, if present, such as groves of large snags, when consistent with the purpose and need.
  - Retaining the sizes and species of snags that reflect the natural variability of the area.
  - Considering snag retention in treatment units, when safe and feasible, particularly in large units or when the most desirable snags in the project area are located there.
  - Identifying areas where snag retention may be unsafe or infeasible particularly (e.g., along fire lines, private property lines, and essential harvest corridors).
  - Leaving snags in clumps, particularly where mixed with large trees, in desirable locations such as rocky outcrops, riparian areas, and/or near wildlife foraging areas.
- Developing snag prescriptions to consider: safety and operational feasibility; the proportion of area influenced by management; disturbances that may provide snags in the short term (for example, fire) or long term (such as, root disease, dwarf mistletoe); snag characteristics (species, size, condition) within treatment units relative these characteristics across the landscape; the expected longevity of snags; the role of live trees in future snag recruitment; and other resource desired conditions or associated plan components.
- Leaving very large snags that are felled onsite, if consistent with coarse woody debris goals.
- Selecting live tree replacements that contain decay or other desirable qualities for wildlife; and/or that meet other resource purposes (e.g., large trees, desirable seed sources, desirable species, etc).

Coarse woody debris (FW-VEGF-DC-07 and FW-GDL-VEGF-05)

The desired condition recognizes a wide variability in the quantity and distribution, encompassing both areas with little to no downed wood and those with high amounts. The values in the guideline represent minimum thresholds to ensure managed areas contribute to the desired condition, while recognizing that more downed wood is likely present in unmanaged areas. Possible management approaches to help achieve these plan components may include:

- Retaining the largest pieces of wood possible due to their value to wildlife and low contribution to fire hazard.
- Felling live trees or snags that are not identified for retention, and/or distributing material from landing piles, when more downed wood is needed on a site.
- Developing site specific prescriptions for coarse woody debris, especially when one of the stated exceptions apply. These prescriptions may consider the condition and abundance of coarse woody debris at the landscape scale; the condition of snags, which represent the short-term contribution to woody debris; the proportion of area influenced by management; and other resource desired conditions.
- Specifying an upper limit for downed wood in project-level design when downed wood is abundant, which may be based on resource needs such as fire/fuel loading, wildlife habitat, and riparian functions.
- Monitoring for compliance of the guideline after all project activities are complete; for example, a timber harvest unit may contain less downed wood at the completion of the logging activity if subsequent activities such as prescribed burning result in the desired amount.

General Strategies for Threatened, Endangered, Proposed, Candidate and Plant Species of Conservation Concern

The following strategies related to threatened, endangered, proposed, and candidate plant species, and plant species of conservation concern, could be considered at a programmatic or project-level stage to support the maintenance or achievement of desired conditions, standards and guidelines.

- Evaluating areas proposed for ground disturbing activities for the presence of occupied or suitable habitat for these species, including conducting pre-field review and field surveys when necessary. Providing opportunities for mitigation and protection to maintain occurrences and habitats that are important for species sustainability.
- Botanist works to increase known information when possible about other native plant species that may warrant species of conservation concern status in the future but are currently lacking sufficient information.
- Monitoring known occurrences of threatened, endangered, proposed, and candidate plant species, and plant species of conservation concern, within project areas and forestwide to determine trend data of individual occurrences, to contribute to trend data at the species-range level, and to document impacts of project activities (noxious weed treatments, vegetation treatments, restoration treatments, etc.), prioritizing those project activities for which species specific data is currently lacking.

Whitebark pine (FW-PLANT-DC-02, FW-PLANT-OBJ-01)

Desired condition FW-PLANT-DC-02 is designed to sustain or restore whitebark pine and minimize potential threats. Objective FW-PLANT-OBJ-01 is included to acknowledge that restoration activities are needed to achieve the desired condition. Vegetation treatments that contribute to this objective may also contribute toward FW-VEGT-OBJ-01. Possible restoration strategies may include:

- Pruning and/or daylight thinning whitebark pine to reduce incidence of blister rust and competition from other tree species.
- Planting rust-resistant white pine to reforest areas after harvest or fire.
- Harvesting or prescribed burning to create suitable sites for natural or artificial reforestation.
- Reducing fuels in whitebark pine stands to increase their resilience to fire.
- Protecting high value trees, such as blister rust resistant trees and large healthy cone producing trees from bark beetle mortality during outbreaks, using pheromones or insecticide applications.
- Collecting seed from whitebark pine trees exhibiting rust resistant traits. Participate in the Regional breeding program as necessary by collecting cones and scion as needed.
- Developing a whitepaper that describes the whitebark pine strategy for the HLC NF that supports analysis for restoration activities (including those in recommended wilderness areas) that includes information such as: conditions of whitebark pine, relevant factors (exotic disease, fire suppression, and mountain pine beetle) and the ecological consequences; documentation of inventories, research, studies, professional and local knowledge, and publications or other information that supports the importance of restoration for local populations; whitebark pine restoration program goals, objectives, methods, strategies and priorities; and present and future needs, expectations, and uncertainties.

General Strategies for Pollinators

Management approaches that would help meet the desired condition for pollinators include:

- Considering impacts (positive, negative, or neutral) to pollinators in project design, analysis, and implementation.
- Applying the latest best available science and policy direction, such as the guidelines in the Pollinator Friendly Best Management Practices for Federal Lands, to provide habitat elements.

- Designing projects to maintain or improve pollinator habitat while meeting resource objectives.
- Including local pollinator friendly native plant species in project seed mixtures.
- Including creation or maintenance of pollinator habitat in project rationale.

General Strategies for Invasive Plants

Management approaches and strategies that may be used to meet the desired conditions, standards, and guidelines for invasive plant species include:

- Conducting inventory of portions of the Forest in a prioritized and systematic manner to document the distribution and abundance of target invasive species, identify un-infested areas, and locate and treat any new infestations.
- Striving to maintain an up-to-date map of known infestations and plant densities.
- Shifting emphasis to establishing a new desired plant community within large, heavy weed infestations, rather than attempting to restore to a pre-invasion community.
- Prioritizing areas designated for invasive plant management activities according to the criteria outlined within the latest guiding Invasive Species document for the Forest.
- Managing grazing on portions of allotments to avoid new invasive plant species infestations (specifically priority 1a and 1b species on the Montana State Noxious Weeds List) until treatment and/or control efforts are completed. Examples of economically damaging species include ventenata, medusahead rye, Dyer's woad, rush skeletonweed, yellow starthistle, etc.
- Prioritizing weed treatments to follow guidance in the weed control decision notice, using an adaptive strategy to determine where, when, and how to treat weeds/weed-infested sites. This strategy and its implementation include consideration of such factors as:
  - Weed category – potential invader, new invader, widespread invader;
  - Relative invasive nature of the species and its potential to displace native vegetation;
  - Relative ecological importance or rarity of the site that could be damaged by the presence of the weed;
  - Potential for off-site movement of seeds;
  - Determination of control method, which is dependent on the species and site;
  - Site monitoring to determine the need to repeat or alter treatment; and
  - Available funding.
- Using weed management strategies outlined in in FSM 2900 Invasive Species Management or other recommended documents for Region 1.
  - Providing education for forest field personnel as well as the general public in weed identification.
  - Pursuing and coordinating cooperative multi-ownership weed control efforts, such as sharing resources and information, setting treatment priorities, and applying for and sharing grants.
  - Using prevention efforts, for example, use of weed seed-free hay and straw by users of NFS lands and for reseeding projects.
  - Using native plants to revegetate disturbed areas where appropriate.
  - Using contract provisions to require that off-road equipment be washed before entering and moving between sites on the forest.

Wildlife

General Strategies

The plan components for terrestrial vegetation represent most of the coarse-filter components that will "support the persistence of native species within the plan area, subject to the extent of FS authority and the inherent capability of the plan area" (FSH 1909.12, Chapter 20, Section 23.1). Therefore, most of the possible management strategies and actions described in the previous section to manage for desired vegetation would provide for most of the habitat needs of wildlife species. Additional possible management strategies and actions that could be used to achieve wildlife-related desired conditions are described here.

Connectivity

Desired condition FW-WL-DC-03 addresses habitat connectivity and movement between habitat patches and FW-WL-GO-04 addresses identifying linkage areas between NFS parcels. Desired conditions in the Big Belts, Crazies, Divide, Elkhorns, Rocky Mountain Range, and Upper Blackfoot GAs address habitat connectivity for wide-ranging species across broad landscapes, and guidelines in the Divide and Upper Blackfoot GAs address connectivity through specific areas where fragmentation is currently a concern. Specific management actions and strategies for maintaining connectivity may include:

- Working with other agencies and, where appropriate with private organizations or landowners to review data or other information or carry out fieldwork to identify linkage areas and other important wildlife movement areas.
- Restricting vegetation management or motorized use in important identified wildlife corridors and retaining hiding cover and other needed habitat elements in those areas.
- Restricting construction of new trails (motorized or nonmotorized), trailheads, roads, developed recreation sites, or other features that could increase human use or presence or that could create or increase disturbance to wildlife or displacement from habitats in areas identified as important wildlife corridors or linkage areas.
- Working with other agencies and, where appropriate, with private organizations or landowners to purchase, develop cooperative management plans, support easements, or identify other means to maintain or improve habitat connectivity in areas identified through BASI as having value to wildlife for movement among separate parcels of NFS lands.

Management of Key Seasonal Wildlife Habitats

Desired condition FW-WL-DC-06 and guidelines FW-WL-GDL-05 and 06 concern key seasonal habitats, including winter range, and the need to minimize human disturbance during times those habitats are in use by wildlife. A variety of methods may be used to achieve this desired condition, some of which may include:

- Working with other agencies and using BASI to update habitat maps and identify areas used by wildlife during winter, breeding, or other key seasons, and determining the dates during which those habitats are used or during which it may be most important to minimize disturbance.
- Working with other agencies and using BASI to identify potential management actions that would help achieve the desired condition.
- Restricting motorized travel and other recreation opportunities in those habitats during those times, as needed based on the above.
- Restricting vegetation management activities in time and space based on the above, and designing vegetation management projects to maintain or increase forage, cover, or other habitat features used by wildlife in those areas.

Availability and Distribution of Elk and Other Big Game Species

Desired condition FW-FWL-DC-01 addresses the availability and distribution of elk and other big game species for harvest opportunity on NFS lands. A variety of methods may be used to achieve that desired condition, possibly including:

- Working with MTDFWP (per FW-FWL-GO-01, FW-WL-GO-01 and 02) to identify habitat issues and management concerns related to big game distribution and availability at an appropriate scale, such as at the scale of elk analysis units.
- Working with MTDFWP to identify actions that would address those issues and concerns, possibly including development of habitat improvement projects.
- Retaining hiding cover during vegetation management projects where and when doing so may contribute to achieving the desired conditions.
- Restricting motorized travel where and when doing so may contribute to achieving the desired conditions (also see below).

Guideline FW-FWL-GDL-01 addresses the need to reduce displacement of elk and other big game species from NFS lands during hunting seasons specifically as a result of actions that would alter the timing or pattern of motorized travel during those seasons. The guideline directs managers to apply the best available science, such as the USDA Forest Service and Montana Fish, Wildlife and Parks Collaborative Overview and Recommendations for Elk Habitat Management on the Custer, Gallatin, Helena, and Lewis and Clark National Forests (2013 or subsequent versions) to identify needs and manage for elk security at an elk herd unit scale. Possible management actions and strategies for implementing this guideline and influencing elk distribution and use of NFS lands may include some of the following:

- Working with MTDFWP to identify areas where enhancing or restoring habitat security on NFS land may help achieve the desired condition for availability and distribution of elk and other big game species.
- Restricting the timing and use of motorized routes during the archery and rifle seasons in specific identified areas.
- Retaining hiding cover (as defined in the BASI) at an appropriate scale in specific, identified areas.
- Creating, maintaining, or enhancing "security areas" as defined by the BASI (e.g. the 2013 FS-FWP collaborative recommendations, subsequent versions, or other) through combinations of motorized travel restrictions and hiding cover.
- Retaining or promoting hiding cover adjacent to motorized routes open during the archery and rifle hunting seasons, to reduce potential disturbance and displacement of elk or other big game species in specific identified areas where possible without compromising public safety.

Bighorn Sheep

Several plan components address concerns regarding separation of domestic sheep and goats and bighorn sheep on NFS lands: desired conditions FW-WL-DC-10, BB-WL-DC-01, EH-WL-DC-04, and LB/RM-WL-DC-02, and standards FW-GRAZ-STD-03, FW-GRAZ-STD-04, BB/EH/LB/RM-WL-STD-01, and RM-WL-STD-02. Management to achieve separation of domestic sheep and goats from bighorn sheep may include some of the following:

- Applying the Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat (2012), or subsequent versions or other agency or interagency recommendations) to minimize contact between domestic sheep and goats and bighorn sheep.
- Conducting a risk assessment using BASI for activities such as grazing allotment planning, weed control, permitted or recreational pack goat stock, or other uses that involve domestic sheep and goats

in bighorn sheep occupied habitat, in order to assess the potential for contact between domestic sheep and goats and bighorn sheep, evaluate associated risks, and identify actions required to minimize contact.

Harlequin Duck

Specific management actions and strategies for harlequin duck may include some of the following, which would support RM/UB-WL-DC-03 and RM/UB-WL-GDL-02:

- Minimizing human disturbance along nesting stream reaches during the breeding season, particularly when broods are young and may be easily separated (June-late July); and encouraging recreational boating and floating use on streams other than harlequin duck breeding streams during this time period.
- Constructing new trails, bridges and fords, campgrounds, or other facilities away from harlequin duck breeding streams or in areas not known to be used by harlequins.
- Where possible, maintaining vegetation (dense tree and/or shrub cover) as a buffer between harlequin duck nesting stream reaches and potential sources of disturbance (such as trails, campgrounds, dispersed campsites that are routinely used, etc.).
- Carrying out surveys of known and potential breeding streams; and coordinating surveys, monitoring, and data with the Montana Natural Heritage Program or other entities that may be involved in harlequin duck monitoring or research.

Western Toad

Specific management actions and strategies for western toad (see FW-WL-GDL-03, FW-WL-GDL-04, FW-WL-GDL-13) may include some of the following:

- Monitoring known breeding sites at an appropriate interval to detect changes in use by breeding toads, and to detect site changes due to altered hydrology or disturbance.
- Coordinating surveys, monitoring, and data with the Montana Natural Heritage Program or other entities that may be involved in western toad monitoring or research.
- Using information from the Montana Natural Heritage Program or other entities or conducting surveys following accepted protocols to detect potential toad (or other amphibian) breeding presence in waterbodies prior to application of piscicides.
- Adhering to the most current protocols recommended for decontaminating equipment used when carrying out toad surveys or other work in known toad breeding sites.
- At western toad breeding sites that are heavily used by livestock and that show evidence of heavy trampling and/or significant loss of emergent vegetation, considering partial fencing, use of complete exclosures, changes in timing of pasture use, or other measures to reduce impacts caused by livestock.

Bats

Specific management actions and strategies for bats (see FW-WL-DC-08, FW-WL-GDL-10, FW-WL-GDL-11, FW-WL-GDL-12 may include some of the following:

- Working cooperatively with other agencies, researchers, and recreational cavers to inventory caves for bats, and to monitor adjacent aquatic and riparian areas for bats (such as using mist nets, acoustic detectors, etc).
- Working cooperatively with other agencies, researchers, and recreational cavers to monitor bats for the presence of white-nose syndrome.
- Using recommended techniques, such as decontamination procedures, and bat-friendly cave and mine closures as appropriate to minimize the potential spread of white-nose syndrome.

- Limiting disturbances to hibernacula or maternity roosts by restricting entry to those areas.

Goals

In order to move toward the goals described in FW-WL-GO-01 (interagency coordination in project planning), FW-WL-GO-02 as well as guideline FW-WL-GDL-14 (coordination of some habitats across NFS boundaries), the following actions could be taken:

- Updating, maintaining and sharing maps, databases, and other information regarding wildlife distribution, seasonal ranges, key habitats, etc. among the FS and other agencies responsible for managing wildlife and wildlife habitat on or adjacent to NFS lands.
- Scheduling periodic and/or recurring meetings among FS and MTDFWP biologists and, as needed, other staff to review upcoming projects and discuss potential wildlife and habitat issues and needs in proposed or potential project areas.
- Participating in cooperative efforts (for example with US FWS and MTDFWP to survey or monitor wildlife species and habitats and to develop habitat improvement projects (see also above under the heading 'Availability and distribution of elk and other big game species').
- Working with MTDFWP or other land or wildlife management agencies as appropriate to identify habitat needs on ungulate winter ranges that occur on adjoining FS and state-owned Wildlife Management Areas and jointly develop habitat improvement projects.

In order to move toward the goal described in FW-WL-GO-03 (information about living and recreating in wildlife habitats), the following actions could be taken:

- Making information available to forest visitors, permittees, and contractors about the presence of wildlife species and how to avoid negative wildlife-human interactions. This information could emphasize how to work and recreate safely in bear habitat, and how to reduce the risk of bear-human encounters. Methods may include portal signs, kiosks, brochures, websites, social media messages, and collaboration on workshops and other public presentations and events.
- Providing field-going employees with training and information about the presence of wildlife species and how to avoid negative wildlife-human interactions. Incorporating the dissemination of this information into the regular duties of seasonal personnel such as recreation guards, wilderness guards, and other employees who have regular contact with forest visitors.

Threatened, Endangered, Proposed, and Candidate Wildlife Species

General Strategies

Specific management actions and strategies to move towards the desired conditions for threatened, endangered, proposed, and candidate wildlife species may include some of the following:

- Adhering to conservation strategies or other guidance. Using any additional informal guidance and working with the USFWS to inform planning and implementation of management activities on NFS lands.
- Working with the USFWS at the FS Regional level to develop and review consultation processes and guidance for analysis of FS projects.

Canada Lynx Habitat and/or Critical Habitat

Specific plan components regarding management of Canada lynx habitat are detailed in the Northern Rockies Lynx Management Direction Record of Decision, which is retained in the Plan (appendix F). The Plan also includes a desired condition (FW-WL-DC-09) supporting management of lynx habitat needs at a forestwide scale, and GA-specific (DI, RM, UB) desired conditions regarding management of lynx habitat to support recovery and persistence of lynx in the planning area. A partial listing of possible

management actions and strategies that could occur in lynx habitat and that are consistent with those plan components may include, but may not be limited to the following:

- Using the best available scientific information to determine the amount, distribution, and mosaic of structural stages in lynx habitat that would support lynx presence throughout the planning area, and that would support lynx reproduction in core lynx habitat where lynx are resident.
- Using regeneration, group selection, or intermediate harvest methods in the stem exclusion structural stage of lynx habitat or in other forested stands that do not currently have a dense understory providing snowshoe hare habitat. Prescriptions may be designed to favor dense regrowth of coniferous tree species that provide food for snowshoe hares.
- Using precommercial thinning in some seedling/sapling stands that have established after harvest or fire, in order to promote development of future multi-story mature winter snowshoe hare habitat where it is lacking, provided such treatment does not reduce winter snowshoe hare habitat should it be present. The location, amount, and type of thinning could be based on analysis of vegetation at the scale of the lynx analysis unit, guided by the best available scientific information, and finalized through appropriate consultation with USFWS.
- Designing additional vegetation management projects to specifically move forest composition and structure to achieve desired conditions for lynx habitat, particularly the multi-story mature or late successional habitat preferred by snowshoe hare in winter.

Grizzly Bear

Plan components from the December 2018 Forest Plan Amendments to Incorporate Relevant Direction from the Northern Continental Divide Ecosystem Draft Grizzly Bear Conservation Strategy are retained in the 2021 Land Management Plan and provide specific direction for managing various activities that may occur in grizzly bear habitat. A partial listing of possible management actions and strategies that could occur in grizzly bear habitat and that are consistent with those plan components include, but may not be limited to the following:

- Restricting vegetation management activities in time and space within the PCA in order to reduce the potential for disturbance or displacement of grizzly bears, as determined by environmental analysis. This may include, where possible, restrictions on activities occurring during spring in mapped grizzly bear spring habitat.
- Using the best available scientific information, along with interagency recommendations as available, to manage mountain bike use to reduce the risk of grizzly bear-human conflicts. Actions may include designing trails where mountain bike use is allowed to facilitate maximum sight distances in areas where bike speed may be high, and by eliminating or reducing design features that promote high speeds in areas without good sight distances.
- Working with other agencies and, where appropriate, with private organizations or landowners to provide for habitat connectivity in zones 1 and 2 through purchases, management agreements, support for easements, and other means.

Wildlife Species of Conservation Concern

Specific management actions and strategies to help move toward the desired conditions for wildlife species of conservation concern may include some of the following:

General Strategies

- Using BASI to evaluate potential impacts of management actions on SCC when planning, analyzing, and implementing management actions.
- Using project design features or mitigations that would minimize potentially negative impacts to SCC and that would support persistence of viable populations of SCC in the planning area.

Flammulated Owl and Lewis's Woodpecker

- Using vegetation management techniques that promote the growth and retention of large (greater than 15" diameter at breast height), old ponderosa pine and Douglas-fir trees in ponderosa pine habitat types.
- Using prescribed burning to maintain an open canopy structure and development of large snags in areas adjacent to closed-canopy forest and shrub-dominated openings.

Recreation Settings, Opportunities, Access, and Scenic Character

Potential management strategies are those that (1) assist in providing a range of recreation opportunities across the Forest, (2) minimize visitor impacts to natural resources and conflicts between user groups, and (3) construct and maintain facilities and trails to address capacity issues and meet visitor needs. Potential strategies may include the following:

Settings – Recreation Opportunity Spectrum

- Developing a recreation vision and a strategic prioritization process that provides direction for maintenance of existing recreation facilities, construction of new facilities, and reconstruction of and/or additions to existing facilities.

Opportunities – Developed Recreation Sites

- Improving developed campgrounds to address accessibility, health and safety issues, types of use, size of recreational vehicles, and reduction of bear-human interactions.
- Considering the protection/maintenance of historic character, while meeting public needs, when identifying cabins to place on the reservation system.
- Developing vegetative management plans for all developed recreation sites. Each plan will provide details about the health and longevity of existing vegetation as well plans for future plantings and vegetative management.

Opportunities – Dispersed Recreation

- Addressing dispersed campsites with erosion and/or sanitation issues, especially rehabilitation of dispersed campsites located near river or stream corridors.
- Developing closure orders for dispersed recreation areas where visitor safety is at risk or changes need to be made to avoid or rehabilitate environmental impacts.
- Informing and educating users about Leave No Trace techniques for responsible, outdoor activities with minimal impacts on NFS lands.

Opportunities – Recreation Special Uses

- Completing a needs assessment to determine new outfitter, guide, and livery services on the Forest, outside of designated wilderness areas.

Designated Areas

Inventoried Roadless Areas

In addition to the 2021 Land Management Plan direction for inventoried roadless areas, the following considerations may apply to vegetation management that is designed to meet one or both of the emphasized purposes in inventoried roadless areas as discussed in 36 CFR 294.13 (b)(1)(i) or (ii):

- Determining the natural range of variation for vegetation and habitat conditions at the scale of the inventoried roadless area or project area and placing it into the context of the broader landscape.
- Considering the contribution of natural processes to achieving wildlife habitat, connectivity, and other vegetation or habitat desired characteristics within the inventoried roadless area.
- Considering that inventoried roadless areas may provide valuable vegetation components such as snags, old growth, and habitat connectivity, especially if surrounded by a more heavily managed or fragmented landscape.
- Emphasizing tools such as prescribed fire where feasible to meet project objectives.
- Utilizing mechanical (noncommercial or commercial) tree removal when it is the most effective and efficient method to meet project objectives and can be conducted to preserve the desired roadless area characteristics.
- Defining the size of tree that constitutes "small diameter timber" and explaining the rationale for that definition in the context of the landscape and associated vegetation communities. Consider using the definition of the seedling/sapling and small tree size classes in the R1 Vegetation Classification System (less than 10" diameter) as a general guide, although it could vary depending on the landscape and ecosystem context.

Wilderness

When working toward meeting the plan components for Designated Wilderness (see FW-WILD section), consider:

- Revising and/or updating the existing wilderness management plan for the Bob Marshall Wilderness complex.
- Developing a wilderness management plan for the Gates of the Mountains Wilderness.
- Implementing the national wilderness stewardship performance measures and wilderness character monitoring.

Continental Divide National Scenic Trail

When working towards meeting the plan components for the CDNST (see FW-CDNST section), the following actions could be taken:

- Developing a unit plan for the segments of the CDNST that are on the HLC NF.
- Completing trail location surveys for the CDNST within the HLC NF. Prioritizing sections to be completed and sections to be relocated off of roads where feasible and desirable.
- Identifying and pursuing opportunities to acquire lands or rights-of-way within the CDNST corridor.
- Considering how activities outside the visible foreground may affect CDNST view sheds and user experiences and mitigating potential impacts to the extent possible.
- Evaluating proposed relocations or new segment locations for the CDNST by using defined optimal location criteria.
- Using design criteria to minimize impacts to the CDNST trail infrastructure and prioritizing any necessary post-activity trail restoration for the project's rehabilitation plan.
- Providing consistent signage along the trail at road and trail crossings to adequately identify the trail and providing interpretive signs at key trail entry points and limited historic and/or cultural sites to orient visitors and enhance the visitor experience.
- Emphasizing the unique intersection of the CDNST with the LCNHT.
- Developing appropriate measures to protect high-potential CDNST segments from deterioration due to natural forces, visitor use, vandalism, and other impacts.

- Ensuring incident commanders are aware of the CDNST as a resource to be protected during wildfire suppression activities and clearly identifying fire suppression rehabilitation and long-term recovery of the trail corridor as high priorities for incident commanders, Burned Area Emergency Rehabilitation team leaders, and post-fire rehabilitation efforts.
- Establishing appropriate carrying capacity for specific segments of the CDNST, monitoring use and conditions, while taking appropriate management actions to maintain or restore the nature and purposes of the trail if the results of the monitoring or other information indicate a trend away from desired conditions.
- Considering the use of vegetation management to create vistas, protect natural resources, and promote threatened and endangered species habitat conditions.

Research Natural Areas

- Identifying, prioritizing, and designating potential additions to the research natural area network through the process that has been cooperatively developed by the FS and the Rocky Mountain Research Station.

Lewis and Clark National Historic Trail Interpretive Center

- Developing a management plan for the Lewis and Clark National Historic Trail Interpretive Center that provides guidance for the center and outlines both short- and long-term plans for interpretive programming, educational programming, exhibit hall, and maintenance needs.
- Ensuring that interpretive and educational programming and exhibits at the Lewis and Clark National Historic Trail Interpretive Center accommodate current and anticipated changes to visitor use and changes in interpretation and education methods for message delivery.

Cultural and Historic Resources and Uses

The following management strategies may apply to help meet the desired conditions for cultural resources and areas of tribal importance:

- Developing and implementing a program and schedule to complete an inventory of cultural resources on all NFS lands within the planning area which are likely to contain cultural resources in accordance with the National Historic Preservation Act, Archaeological Resource Protection Act, and Executive Order 11593.
- Preparing historic property plans for highly significant historic properties with an emphasis on priority heritage assets, as per the guidance in FSM 2362.4.
- Updating annually a forest heritage program plan that is tiered to the FS Heritage Program Managed to Standard measures. The Heritage Program Managed to Standard measures reflects the Agency's guidance for Heritage Program Management as outlined in Forest Service Manual 2360 and responsibilities in fulfillment of Section 110 of the National Historic Preservation Act. The forest heritage program plan includes a synthesis of known cultural resources, a synthesis of projected cultural resources (i.e. predictive modeling and site identification strategies), protocols for responding to unanticipated discovery of cultural resources or human remains as required by the Native American Graves Protection and Repatriation Act, protocols for responding to damage to or theft of cultural resources, and direction for the protection of cultural resources vulnerable to catastrophic fires or other natural or human-caused damaged.

Lands Status and Ownership, Land Uses

The following management strategies may apply to meet the desired conditions for land status and ownership, land uses, and access patterns:

Land Status and Ownership

Adjust land ownership through purchase, exchange, or other authority, to protect resources and improve efficiency of management. Consider the following criteria when evaluating lands for acquisition:

- Lands that can contribute to recovery of threatened or endangered species.
- Lands important for wildlife connectivity and big game winter range.
- Lands needed for the protection of important historical or cultural resources.
- Lands that enhance recreation, public access, and protection of aesthetic values.
- Lands within designated wilderness.
- Lands that contain rivers with potential for Wild and Scenic designation.
- Other environmentally sensitive lands.
- Lands that reduce expense and support logical and efficient management.

Consider the following criteria when evaluating lands for conveyance:

- Lands and administrative buildings adjacent to communities that are chiefly valuable for non-National Forest uses.
- Inaccessible, isolated, or intermingled ownership parcels.
- Lands with long-term, special use permits that are not consistent with national forest purposes and character.
- Lands not logical or efficient to manage.
- Lands eligible under the Small Tracts Act.

Prioritize National Forest land boundary surveys to areas where trespass is most likely.

Land Uses

The strategy for prioritizing the workload for land uses could include the following:

- Process renewals and re-issuances in a timely fashion. Environmental analysis should be commensurate and minimal for those uses where the decision to allow the use has already been made and the new permit is simply an administrative function.
- Emphasize processing new proposals that contribute to the greater public good (utility projects, public highways, reciprocal access cases).
- For utility authorizations that do not have current operation and maintenance plans, work with holders to develop and implement those plans.
- Prioritize and facilitate vegetation management activities within and adjacent to utility line rights-of-ways.

Communication Uses

- Proponents for new communication uses (cellular, FM radio, internet service provider, etc.) should first consider co-location in an existing site that has an approved communication site management plan. Per special uses policy, the Forest Service authorizes use of NFS lands as communication sites by issuing leases to facility owners or managers, who may sublease their facilities to multiple occupants for operation of communications equipment.
- New facilities, which would require new leases, could be authorized after a site-specific environmental analysis pursuant to the NEPA is completed. Communication sites are designated for a specific type or types of communication uses. Broad categories of communication uses include:

- Broadcast. Television, AM/FM radio, cable television, broadcast translator, and low power television and radio.
- Non-broadcast. Intermittent transmitter use, including mobile radio service (two-way radio or paging), cellular phone, microwave.

- At existing communication sites, the senior use at the site establishes the site designation.
- Sometimes a use that is not compatible with the designated use is proposed. In these situations, the proponent must demonstrate that the equipment for the proposed use can be installed and operated in a manner that is compatible with the site designation.
- In addition to the site designation, some sites have specific restrictions, such as Government-entities only.

Benefits to People: Multiple Uses and Ecosystem Services

Livestock Grazing

The general approach to grazing management implements management practices intended to maintain the health and function of rangelands and other resources. Strategies to move towards desired conditions may include the following:

- Using the allotment management plan, annual operating instructions, as tools to implement plan direction, as part of the terms and conditions of permitted grazing.
- Scheduling and completing NEPA allotment management plan (AMP) or AMP revisions, or NEPA sufficiency reviews (FSH 1909.15 Section 18) on a priority basis. Priorities could include, but are not limited to, allotments where monitoring indicates downward trends, allotments where other resource considerations or conflicts exist or arise, or allotments where opportunities develop for improving conditions.
- Reviewing, verifying, updating, and/or modifying allotment management plans or permit terms and conditions is based on information gathered from allotment compliance and long-term trend monitoring.
- Controlling the timing, duration, and intensity of livestock grazing to move toward and achieve desired resource conditions in riparian management zones, woody plant communities, and upland rangeland.
- Considering utilization levels, stubble height, streambank disturbance, and woody stem use, etc. (Allowable use levels), as short-term indicators of grazing effects on meeting long-term upland and riparian desired conditions (vegetation composition, streambank stability, etc.).
- Applying appropriate allowable use levels at the site-specific scale depending on the questions needing to be addressed on rangeland, woody plant communities, or riparian areas.
  - Using upland utilization criteria based on best available science, the dominant habitat type, functional groups, ecological sites (or equivalent) within the allotment pasture and local rangeland conditions (relative to site potential and capability).
  - Implementing riparian utilization, woody browse, stubble height, or streambank alteration criteria from the best available science applicable to the site.
  - Implementing FW-GRAZ-GDL-01 (stubble height annual indicator guideline) could be best achieved by an interdisciplinary approach with aquatics, hydrology, wildlife, and range specialists selecting monitoring sites and establishing initial stubble height on allotments based on criteria established in the guidelines and site-specific issues (i.e. 4” may be appropriate on a functioning properly functioning condition stream reach, where 6” may be needed where trend is

down). The interim stubble height guideline could be used until long-term monitoring and evaluation is available to adapt this numeric range and/or support the use of other indicators.

- Following Northern Region streambank alteration protocol or adopting new methodologies recommended by the Northern Region that demonstrate similar effectiveness and efficiency, for streambank alteration methodology.
- Using methodology for forage use measurements that is efficient to monitor multiple sites per day and can easily be taught to permittees and cooperators. Methodology currently in use on the HLC NF includes grazed/ungrazed paced transects and landscape appearance method. Additional methods found in FSH 2209.14 - Rangeland Vegetation Assessment, Inventory, Monitoring, and Analysis Handbook, or other developed protocols approved by the Northern Region may be used to answer questions regarding resource condition and movement towards or departure from desired conditions.
- Consider prescribing and adjusting specific indicators and indicator values, if needed, in a manner applicable to site conditions. Values can also be adapted over time based on long-term monitoring and evaluation of conditions and trends.
- Annual indicators could be used to provide a measure to reflect the need for management adjustments and the basis for interpreting factors influencing long term trend. However, annual indicators would not be the sole basis for adverse administrative actions on a grazing permit.

- Assessing and updating allotment management plans to ensure suitable acres and sustainable stocking levels are in place, and forage utilization standards, mitigation measures, and appropriate grazing systems are used to manage rangelands to maintain or move towards desired conditions.
- Managing existing grazing allotments in wilderness areas and recommended wilderness in accordance with wilderness values. Applicable grazing direction is found in FSM 2323. Where practical alternatives do not exist, consider authorizing maintenance or other activities through the occasional use of motorized/mechanical equipment.
- Conducting rangeland inspections annually on selected allotments to determine the degree of compliance with NEPA decisions, grazing permits, allotment management plans, or annual operating instructions, and providing monitoring information for initiating changes or improvements as applicable.
- National Forest permittees and cooperators may be encouraged to participate in allotment inspections to help resolve problems on the ground.

Timber, Other Forest Products, and Wood for Fuel

General Strategies

The following management strategies may apply to help meet the desired conditions for timber, other forest products, and wood for fuel:

- Using the full range of applicable stewardship, contracting, and permitting authorities to offer timber, other forest products, and wood for fuel, to meet the needs of the public and contribute to local economies.
- Conducting salvage harvest operations as soon as possible to capture economic value of the wood.
- Determining forest product utilization standards at the project scale as needed to reflect market conditions and site-specific considerations, with Regional approval (FSH 2409.12-2013-1). These standards are regionally determined, and generally minimum standards for sawtimber are 7.0” diameter at breast height, 8’ in length, and 5.6” diameter inside bark at the small end. A diameter at breast height of 6” and diameter inside bark of 4.6” may be used without Regional approval and are

generally used for lodgepole pine. Post and pole material usually consist of material 2 to 6” in diameter, with no minimum height.

Strategies for Specific Plan Components

Timber Volume Offerings

Treatments described in FW-VEGT-OBJ-01 can be used to meet objectives FW-TIM-OBJ-01 and 02. Harvest may be designed to meet timber and other resource objectives, such as forest restoration, fuel reduction, and wildlife habitat improvements. Possible actions and strategies to meet these objectives include:

- Offering timber sales with a variety of sizes and complexities.
- Exploring opportunities to improve biomass utilization.
- Providing opportunities for commercial firewood sales, as well as other forest products such as post and poles.
- Integrating all resource objectives and using timber harvest as a tool where appropriate to achieve desired conditions.
- Utilizing special authorities such as stewardship contracting as appropriate to achieve timber volume offerings and other resource objectives.

Reforestation

Standard FW-TM-STD-02 ensures that forested sites where regeneration harvests occur are reforested in a timely manner to appropriate stocking levels. This applies regardless of whether the harvested area is suitable for timber production. Areas that are being managed as nonforested plant communities are not included in this standard, even though it is possible that timber harvest may occur, for example to remove encroaching conifers. Management approaches for applying this standard include:

- Varying the level of appropriate stocking depending on site conditions and management objectives, but not be lower than the definition of a forested site (ten percent occupied by trees).
- Reforesting sites to lower levels than the original stand, if consistent with the other desired conditions, standards, guidelines, and project objectives applicable to the site.

Maximum Opening Size for Timber Harvest

The NFMA limits clearcutting and other even-aged harvest to 40 acres, with some exceptions. The 2012 Planning Rule provides for development of components that exceed opening size limits, where “larger harvest openings are necessary to help achieve desired ecological conditions” (36 CFR 219.11(d)(4)(i))”. FW-TIM-STD-08 provides a maximum opening size (75 acres) under these provisions. Openings up to 75 acres do not need public review and Regional Forester approval. Exceptions to create openings greater than this size may occur in cases of natural catastrophic conditions, such as fire, insect and disease attack, or windstorm. Exceptions may also be granted as per handbook guidance, with Regional Forester approval and a 60-day public comment period. Management strategies to create appropriate patch sizes across the landscape may include:

- Retaining forest structural components in larger regeneration harvest areas to provide greater short and long-term structural diversity and provide a more visually pleasing landscape. This strategy could include leaving patches of uncut forest or individual/small groups of live trees distributed throughout the harvest openings and may include retaining more snags.
- Considering scenery in project design. To lessen the visual impact, harvest openings can have irregular shapes that are blended to the natural terrain. Retention of individual or patches of trees within the opening may also be more visually pleasing. Consideration for the natural patterns that

might be produced by a mixed severity fire may be incorporated into the shape and size and design of openings. There may be an expectation of short-term visual impacts to achieve long-term benefits.

- Locating new harvest openings adjacent to existing patches of sapling trees. This initially creates a larger patch of early successional forest, where trees are of the same cohort (for example, ages are within 20 years of each other), while lessening potential concerns related to larger openings.
- Considering the location of large units. When determining where a large opening might be created, consider factors such as: wildlife security, visibility from areas with high level of public use, desired conditions related to potential fire behavior and fuel loadings, and watershed conditions related to water yields.
- Considering desired conditions for development of future late successional and old growth forests. Larger patches of young, seedling/sapling forests can eventually develop into larger patches of old growth or late successional forest over time, which is desired.

Special Forest and Botanical Products (FW-OFP-GDL-02)

The intent of the guideline is to ensure that the collection of special forest and botanical material does not adversely impact resources or preclude future opportunities. The methods used to meet this guideline may vary depending on the specific product and resource conditions. For example, when living plants or plant parts are being gathered, consider a requirement to not remove or damage an entire local population.

Connecting People with Nature and History

The following management approaches may apply to support plan components for connecting people with nature and history:

- Creating a forestwide public information and communication plan that reviews and develops public communication measures to ensure communication methods and forums are reaching the appropriate audiences.
- Developing a forestwide education plan that is reviewed and updated to ensure relevancy with area schools and is in sync with national policies for conservation education and stewardship messages.
- Developing a forestwide interpretation plan to coordinate interpretive messages across the Forest and to provide an inventory of interpretive structures and facilities, including the programming being offered at the Lewis and Clark National Historic Trail Interpretive Center.
- Ensuring that visitor information is readily available for pre-visit information gathering in a variety of forums and kept up to date so that the public may be informed and educated through modern technology about current FS related policies, activities, services, and issues.
- Ensuring that the Forest has an organized and consistent approach to working with all youth and young adults and aims to connect with underserved populations.
- Continuing to offer programs already in place, such as the Youth Forest Monitoring Program (YFMP), that have established strong ties to the community.
- Working with partners to identify and widely-publicize grant programs for communities and local schools that connect youth with outdoor recreation. Exploring avenues to match the interest and programming capacity of local partners and the unit's personnel with the resources available in local and national grant programs.
- Working with communities and partners to develop strategies for getting youth outside in nature. Coordinating efforts to ensure compliance with agency policies (e.g., outfitter/guide permits).
- Working with permittees and other partners to identify and remove existing obstacles for diverse and inclusive participation in recreation opportunities on the forest.
- Forging new partnerships with State, local, tribal, private, and non-profit partners to expand access to underserved populations, particularly those in the immediate vicinity of the forest.

- Exploring opportunities to establish programs that preserve and protect the unit's natural and cultural resources, offer training and employment opportunities, develop future stewards of NFS lands, and leverage the unit's capacity to achieve priority work.

Carbon

The desired condition acknowledges the role of forest management in the carbon cycle. The following management strategies may apply to meet this desired condition:

- Maintaining landscapes with native vegetation– not converting them to other uses such as agriculture or urban development.
- Conducting vegetation treatments that increase forest resilience to disturbance.

Energy and Minerals

The following management strategies may apply to help meet the desired conditions for energy and minerals:

- Developing compliance inspections for mineral operations to be commensurate with the complexity of the mineral activity.
- Providing guidance to claimants/operators for planning reclamation and minimizing environmental impacts.
- Ensuring that adequate reclamation requirements and bonds are in place prior to authorizing mineral activities.

Literature

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Appendix D. Vegetation Classifications and Descriptions

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Tables

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Introduction

This appendix defines the vegetation classifications that form the basis for many forest plan components related to vegetation and wildlife habitat.

Data Sources

The vegetation classifications used are consistent with the best available data for the HLC NF, based on the R1 Classification System (Barber, Bush, & Berglund, 2011). This approach ensures that reliable information is available for analysis and monitoring through the life of the 2021 Land Management Plan.

Forest Inventory and Analysis

The sources of data for quantifying vegetation include Forest Inventory and Analysis (FIA) plots and FIA intensified grid plots. FIA is a national inventory of forest ecosystem data derived from field sample locations distributed systematically across the U.S. (Bush, Berglund, Leach, Lundberg, & Zeiler, 2006). Data collection standards are strictly controlled, and the sample design and collection methods are scientifically designed and repeatable. FIA provides a statistically-sound sample to provide unbiased estimates at broad- and mid-levels. Plots have been permanently established and are remeasured on a regular basis. The National FIA grid covers all NFS lands. The FIA grid has been intensified by four times (4x) on the HLC NF, using protocols compatible with the National FIA grid. For GAs where the 4x intensification is completed, these plots are added to the base FIA to create an enhanced analysis dataset. FIA and FIA intensified grid data are summarized in the Region 1 Summary Database, which is an access database that includes statistical reporting functions and derived attributes or classifications consistent with the R1 Classification System (Barber, Berglund, & Bush, 2009; Bush et al., 2006).

Region 1 Vegetation Map

The Region 1 vegetation mapping system (R1 VMap) (Barber et al., 2011) is the data source for classification and spatial mapping of vegetation. R1 VMap is derived from national and regional remote sensing protocols, using a combination of satellite imagery and airborne acquired imagery, with refinement and verification through field sampling. The product is assessed for accuracy. This product allows for an analysis of the spatial distribution of vegetation. It was designed to allow consistent applications of vegetation classification and map products across all land ownerships (Barber et al., 2009; Barber et al., 2011; Berglund, Bush, Barber, & Manning, 2009). R1 VMap represents the best spatial estimate for vegetation attributes including lifeform, dominance type, size class, and density class.

Broad Potential Vegetation Types

Lands across the HLC NF are grouped into broad potential vegetation types (PVTs), based on climate and site conditions. PVTs serve as a basis for description of ecological conditions (potential productivity, natural biodiversity, and processes). PVTs are assemblages of habitat types, which are aggregations of ecological sites of like biophysical environments (such as climate, aspect, and soil characteristics) that produce plant communities of similar composition, structure and function (Mueggler & Stewart, 1980; Pfister, Kovalchik, Amo, & Presby, 1977). Broad PVTs are used because it is not possible to accurately map and model individual habitat types across the forest. The vegetation communities that would develop over time given no major disturbances (the climax plant community) would be similar in a PVT. It is assumed that PVTs generally remain constant. A consistent hierarchy of broad PVT developed for the Northern Region (Milburn, Bollenbacher, Manning, & Bush, 2015) is used, as shown in Table 1.

Table 1. Potential vegetation type classification for habitat types found on the HLC NF

Region 1 broad potential vegetation type	Region 1 habitat type groups	Region 1 MT potential vegetation type	Habitat type codes	General description
Warm dry	Hot dry	pifl	000, 040, 050, 051, 052, 070, 0903, 0913, 0923, 0933, 0943, 0953	The warm dry broad potential vegetation group occupies the warmest and driest sites on the HLC NF that support forests. These sites support ponderosa pine and dry Douglas-fir habitat types. This group occurs at lower elevations, on warm southerly aspects, and/or on droughty soils. Forests are often dominated by Douglas-fir, ponderosa pine, or limber pine. Open forest savannas may occur on this group, where grasses or shrubs are dominant, and trees are widely scattered due to repeated frequent fires.
	Warm dry	pipo	100, 110, 130, 140, 141, 142, 160, 161, 162	
			1034, 1044, 1000325, 1000335, 1000345, 1000355, 1000375, 1054, 1064, 150	
		psme1	200, 210, 220, 230, 2054, 3904	
		psme2	311, 380	
		psme3	321	
		pipo	180, 181, 182	
	Mod warm dry	pipo	170, 171, 172, 190	
		picea	430	
		psme2	2404, 250, 260, 261, 262, 263, 280, 281, 282, 283, 292, 310, 312, 313	
		psme3	360, 320, 322, 323, 324, 330, 350, 370, 340	
	Mod warm Mod dry	psme2	290, 291, 293	
Cool moist	Cool moist	abla2	600, 620, 621, 622, 623, 624, 625, 660, 661, 662670, 671, 673, 740	The cool moist group comprises the most productive forest sites on the HLC NF. Moist Douglas-fir habitat types are in this group, along with lower subalpine fir and spruce habitat types. This setting occurs on mid to high elevation sites across all aspects. Lodgepole pine and Douglas-fir are the most common dominant species, with Engelmann spruce and subalpine fir common as well.
		picea	400, 420, 421, 422, 460, 461, 462, 470, 0046, 4724, 4754	
	Cool wet	abla1	610, 630, 635, 636, 637, 650, 651, 652, 653, 654, 655, 631, 632	
		picea	410, 440, 480	
	Cool mod dry to moist	abla2	663	
		abla3	640, 691, 693, 700, 720, 750, 770, 780, 790, 791, 792, 690, 607, 745	
		picea	450	
		pico	900, 910, 920, 930, 950, 9604	
Cold	Cold	abla3	672, 692, 694, 731, 732, 733,	The cold broad potential vegetation group occupies the highest elevation areas that
		abla4	674, 730, 800, 810, 820, 830, 831, 832	

Region 1 broad potential vegetation type	Region 1 habitat type groups	Region 1 MT potential vegetation type	Habitat type codes	General description
		pico	925, 940	support forests. Some sites are cold, moist subalpine fir habitat types that support moderately dense forest cover. Remaining areas are cold, drier subalpine fir and whitebark pine types where growing conditions are harsher and tree density more open. Subalpine fir, Engelmann spruce, and whitebark pine are the common species.
	Timberline	pial	850, 870, 890	
Xeric grassland	Bluebunch wheatgrass	drygrass	Ref 199: 015, 016, 017, 020, 065; Ref 115: 200, 500, 800; Ref 103: 47130, 47131, 47132, 47140, 47141, 47142, 47143, 47144, 47145, 47146; Ref 114: 100005, 100006, 10010, 100021, 100054, 100055	Xeric grasslands are drought-tolerant, found on dry sites and often at low elevations, containing tall and medium height, cool and warm season grasses such as bluebunch wheatgrass, green/Columbia/western needlegrass; and short grasses such as Sandberg bluegrass.
Mesic grassland	Western wheatgrass	agrsmi	Ref 114: 100001. Ref 115: 100	Mesic grasslands are found on more moist sites, and contain greater amounts of mesic forbs, denser cover, and more species richness than xeric grasslands. The functional plant groups are characterized by long lived, moderately deep rooted cool and warm season grass species (such as rough fescue, Idaho fescue, blue gramma, and tufted hairgrass) with a wide variety of mesic forbs. Shrubs may be present with minor cover.
	Fescue	fesida	Ref 199: 18, 39; Ref 615: GB5917, GB5922; Ref 103: 47003, 47004, 47120, 47121, 47122, 47123, 47124, 47125, 47126, 47127; Ref 114: 100023	
		fessca	Ref 199: 19; Ref 103: 47110, 47111, 47112, 47113, 47114, 47115	
Mesic shrubland	Mesic shrubland	potfru	Ref 199: 34; Ref 103: 46620, 46621, 46622, 46623	Mesic shrublands are often associated with conifer forests and occur as large patches on moist sites or small patches in grasslands. These shrublands can be very productive and favored by wildlife. Communities contain species such as mountain big sagebrush, snowberry, ninebark, and serviceberry, with Idaho fescue, mountain brome and mesic forbs in the understory.
		mesic shrub	Ref 199: 030; Ref 110: 030, 031; Ref 112: 156, 157, 158, 159, 160, 161 Ref 115: 2000, 2100; Ref 114: 100052, 100056; Ref 615: SM19	
Xeric shrubland/ woodland	Low shrubland	sage1	Ref 199: 031; Ref 103: 46600, 46601, 46602, 46603	Xeric shrubland communities occur on dry sites, and support shrub species such as Wyoming big sagebrush, basin big sagebrush, low sagebrush and black
	Mountain shrubland	sage4	Ref 199: 033; Ref 103: 46611, 46612, 46613	

Region 1 broad potential vegetation type	Region 1 habitat type groups	Region 1 MT potential vegetation type	Habitat type codes	General description
	Xeric sagebrush	sage3	Ref 199: 032	sagebrush. Low sagebrush tends to occupy the lower, drier and hotter sites with shallow soils whereas basin big sagebrush typically dominates sites with deeper soils and more plant available moisture. The understory is typically be dominated by graminoid species such as needle-and-thread, Sandberg bluegrass and bluebunch wheatgrass. Xeric woodlands are typically hot and dry or are steep, with shallow soil. The dominant overstory species include Rocky Mountain juniper and mountain mahogany, with the latter usually found on rocky outcrops.
		sage2	Ref 115: 1100, 1200; Ref 103: 46610, 46614; Ref 114: 100014, 100015	
	Xeric shrubland	dry shrub	Ref 103: 46201, 46301, 46630, 46632, 46633; Ref 114: 100028; Ref 115: 1400; Ref 199: 035; Ref 615: SD49	
		rhus	Ref 199: 036, 037; Ref 103:46640, 46641, 46642; Ref 114: 100046, 100047, 10048	
		sage5	Ref 114: 100013; Ref 115: 1000	
	Salt desert shrub	saltshrub	Ref 199: 038; Ref 115: 1300; Ref 103: 46650, 46651, 46652; Ref 114: 100049, 100050.	
	Juniper woodland	juniper	Ref 102: 151, 152; Ref 114: 100029, 100030; Ref 199: 50	
Riparian/wetland	Aspen woodland	poptre	Ref 102: 351, 356; Ref 112: 117, 118, 119, 120, 121; Ref 114: 100040; Ref 199: 078	Riparian systems occur along creeks and rivers and occupy floodplains, streambanks, islands in rivers, narrow bands in steep channels, and backwater channels. Vegetation is comprised of a mosaic of plants which tolerate periodic flooding and a seasonally high water table. Trees may be present with riparian shrubs and herbaceous species. In wide valley bottoms, the vegetation is a mosaic of all lifeforms with patterns reflecting the meander patterns of the stream/river. Key tree species include aspen, cottonwood, Engelmann spruce and
	Riparian shrub	ripshrub	Ref 112:030, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 150, 151, 152, 153, 154, 155, SW1117, SW5112, SW5113; Ref 199:071, 072, 073, 074	
	Wetland graminoid	ripgrass	Ref 615: MW19; Ref 199: 021, 061, 070; Ref 112: 200, 201, 202, 203, 204, 205, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, MD3111, MM1912, MM2912, MM2914, MM2915, MM2917, MM2920, MS31111, MW3912, MW4911, MW4912. Ref 103: 47100, 47101	

Region 1 broad potential vegetation type	Region 1 habitat type groups	Region 1 MT potential vegetation type	Habitat type codes	General description
	Riparian deciduous tree	ripdecid	Ref 102: 301; Ref 110: 20; Ref 112: 103, 104, 105, 106, 110, 111, 112, 113, 114, 115, 116, 122, 123, 124, 125, 130; Ref 114: 100024; Ref 199: 60, 71, 72, 73, 74, 79	subalpine fir; and Douglas fir, and Rocky Mountain juniper on drier sites. Shrubs may include mountain alder, various species of willows, river birch, dogwood, hawthorn, chokecherry, rose, silver buffaloberry, Rocky Mountain maple and/or snowberry. A wide variety of herbaceous species may be present. Wetlands are characterized by dominant vegetation adapted to saturated soil conditions. The vegetation complex is represented by a mosaic of herbaceous and woody plants. Low willow species, bog birch and bog blueberry are often present. Herbaceous species may be dominated by cattails, sedges, rushes, spikerushes or bulrushes. Bryophytes may occur in fens.
Alpine	Alpine herbaceous	alpine	Ref 113: 001,002, 003,004,005, 006, 009, 010, 012, 013, 015, 016, 018, 019, 022, 023, 024, 025, 026, 027, 028, 029; Ref 199: 080, 081, 084	Alpine ecosystems occupy harsh high elevation sites, resulting in short stature and relatively slow growth for both shrubs and herbaceous species. Wetland communities are present in snowloaded depressions. Alpine ecosystems are mostly treeless, although some conifers may be present, often with a krummholz growth form. The plant communities are dominated by a number of shrubs, forbs and graminoids including: arctic willow (turf community), mountain avens, (cushion plant community), mountain heather and moss-heather (snow bed communities).
	Alpine shrub		Ref 113: 007, 008, 011, 014, 017, 020, 021; Ref 199: 087	
Sparse	Sparse	Sparse	Ref 101: 010	Rocky habitats include rock outcrops and scree. Vegetation is sparse or largely lacking. Bryophytes and lichens often occur in crevices and flourish on open rock surfaces. Rock outcrop and scree habitats may also be found at lower elevations.

Table 2 provides the acres and proportion of each Region 1 broad PVT that occurs on the HLC NF.

Table 2. Percent of broad potential vegetation types on NFS lands on the HLC NF[1]

Broad potential vegetation type	Total HLC NF	Big Belts	Castles	Crazies	Divide	Elkhorn[3]	High-woods	Little Belts	Rocky Mtn	Snowies	Upper Black-foot
Warm dry forest	41%	72%	54%	45%	52%	35%/49 %	68%	46%	17%	45%	37%
Cool moist forest	31%	12%	17%	26%	27%	12%/2%	3%	32%	48%	44%	39%
Cold forest	24%	11%	20%	26%	17%	32%/39 %	3%	18%	32%	5%	23%
Xeric grassland[2]	0	<1%	0%	0%	0%	0%/0%	0%	<1%	0%	0%	0%
Mesic grassland[2]	<1%	3%	2%	0%	2%	16%/0%	3%	1%	<1%	0%	<1%
Mesic shrubland[2]	<1%	0%	0%	0%	0%	0%/0%	6%	<1%	<1%	2%	0%
Xeric shrub/wood-land[2]	<1%	<1%	6%	2%	0%	4%/4%	18%	<1%	0%	0%	0%
Riparian/ wetland[2]	<1%	0%	0%	0%	0%	0%/0%	0%	<1%	0%	0%	0%
Alpine[2]	0%	0%	0%	0%	0%	0%/0%	0%	0%	0%	0%	0%
Sparse	2%	<1%	2%	0%	1%	2%/6%	0%	1%	2%	4%	3%

[1] Data is from the R1 Summary Database, FIA and FIA Intensified Grid plot data. Base FIA ("Hybrid 2011" dataset) is used forestwide and for the Rocky Mountain Range GA. Intensified grid data ("F12F15 Partial IntGrid 4x Hybrid 2016 Combined") is used for all other GAs. Values are rounded to the nearest whole number. Plots that have been impacted by fire and harvest are included, because these events would not change the PVT.
[2] Rare types or those distributed in small patches are not well captured by grid data but are known to occur.
3 The HLC NF portion of the Elkhorns is represented by intensified grid data. The entire Elkhorns (all) is represented by base FIA data ("Hybrid 2011") and includes the portion of the GA on the Beaverhead-Deerlodge NF.

Cover Type

Cover types are assemblages of dominant vegetation, including forested and nonforested plant communities. They are groupings of dominance types that simplify analysis for the broad scale. Dominance types describe the most common species present, giving an indication of their relative abundance. Dominance type and cover type describe assemblages of plant species and are named after the most dominant species present. Information on how dominance types are determined is found in Barber and others (2011). The cover types on the HLC NF are shown in Table 3, based on the work of Milburn and others (2015).

Table 3. Cover type classification for dominance types found on the HLC NF

Cover type	Description and species associations	Region1 vegetation map: DomMid40
Ponderosa pine	This cover type includes sites dominated by ponderosa pine, juniper, and/or limber pine. A minor component of Douglas-fir may be present. Ponderosa pine is found on a narrow elevation band between non-forested types and Douglas-fir forests. This cover type usually grows on the warm dry broad PVT.	MX-PIFL2, MX-PIPO, or MX-JUNIP1

Cover type	Description and species associations	Region1 vegetation map: DomMid40
Douglas-fir	This cover type includes the R1 Dry Douglas-fir and Mixed Mesic Conifer types; on the HLC NF both are dominated by Douglas-fir. The Dry Douglas-fir portion is found on dry sites dominated by Douglas-fir, with potential components of ponderosa pine, limber, or juniper; it occurs primarily on the warm dry broad PVT. The mixed mesic conifer portion encompasses moist sites dominated by Douglas-fir which can be mixed with lodgepole pine, western larch, and/or subalpine fir/spruce. This type is found on sites more moist and productive than the dry Douglas-fir type, on both warm dry and cool moist broad PVTs.	Dry Douglas-fir: (IMIX or MX-PSME) AND (PVT = pifl, pipo, psme1, or psme3) Mixed mesic conifer: TMIX or [(MX-PSME or IMIX) AND (PVT is not pifl, pipo, psme1, or psme3)]
Western larch Mixed conifer	These sites are dominated by western larch, with components of Douglas-fir, lodgepole pine, and/or spruce. This type would commonly be found on the cool moist broad PVT, and is only present on the Upper Blackfoot GA.	MX-LAOC
Lodgepole pine	This type is dominated by lodgepole pine with minor components of other species. This cover type can occur on any forested broad PVT.	MX-PICO
Aspen/ hardwood	This cover type includes areas dominated by aspen or cottonwood, often with shrubs such as willow and alder. This type often occurs in association with riparian and moist upland areas and can be found in any forested broad PVT.	HMIX, MX-POPUL, or MX-POTR5
Spruce/fir	This cover type describes where subalpine fir and/or Engelmann spruce dominate, with minor components of other species. These are often climax forests. This cover type most often occurs on the cool moist or cold broad PVT.	MX-ABLA or MX-PIEN
Whitebark pine	The whitebark pine cover type occurs at the high elevations, most commonly on the cold broad PVT but sometimes in cool moist. Minor components of subalpine fir, spruce, or lodgepole pine may be present.	MX-PIAL
Grass	Grass can dominate the xeric and mesic grassland broad PVTs, and some dry forest types. Plant communities include forb mixes; rough fescue; Idaho fescue; western wheatgrass; bluebunch wheatgrass, needle-and-thread grass; tufted hairgrass; little bluestem; prairie sandreed; green needle grass; needlegrass; wheatgrass; timothy; crested wheatgrass; blue grama; kentucky bluegrass; buegrass; cool season short grass mix; cool season mid grass mix; warm season mid grass mix; warm season short grass mix; and mixed grass. Common nonnative species include timothy, crested wheatgrass, smooth brome, and Kentucky bluegrass.	Grass-dry; Grass-bunch; Grass-singlestem
Dry shrub	The dry shrub cover type occurs on the xeric shrub/woodland broad PVT, as well as some dry forest sites. Dominant shrubs include sagebrush; antelope bitterbrush; shrubby cinquefoil; skunkbush sumac; curl-leaf mountain mahogany; rabbitbrush; low shrub; saltbush, soapweed yucca sagebrush, and rabbitbrush.	Shrub-Xeric; MX-CELE3 MX-JUNIP, JUNIP
Riparian grass/shrub	This cover type occurs typically in the riparian/wetland broad PVT, but also potentially in cool and wet forest habitat types. Common species include willow, alder, mountain brome, smooth brome, dry sedge, wet sede/spikerush/juncus, and annual brome.	Grass-wet
Mesic shrub	Mesic shrubs most commonly dominate the mesic shrubland broad PVT. Species may include chokecherry, plum; rose; snowberry; huckleberry; mallow ninebark; white spirea, and buffaloberry.	Shrub-mesic
Sparse or non-vegetated	In addition to the vegetated cover types, some areas on the Forest are categorized as “sparse” (containing little vegetation cover, such scree slopes) or non-vegetated (such as lakes or urban areas). These areas are excluded from the composition analysis	URBAN, WATER, SPARSE

Individual Tree Species Presence

Tree species presence indicates the proportion of an area where there is at least one live tree per acre of a given species, of any size. This measure gives an indication of how widely distributed the species is across the landscape, although not necessarily dominant or even common in all the places it occurs. Most forest stands are composed or more than one tree species. As shown above, cover types are named for the dominant tree species representing the group (i.e., the ponderosa pine cover type). However, ponderosa pine as an individual species may also be found in other cover types. Therefore, the estimates for a given cover type are not the same as the distribution of the tree species for which it is named. There are eleven native tree species found on the HLC NF, although not all occur on every GA: Rocky mountain juniper, limber pine, ponderosa pine, Douglas-fir, lodgepole pine, western larch, aspen, cottonwood, Engelmann spruce, subalpine fir, and whitebark pine.

Size Class

Tree size is an indicator of the structure and age of forests across the landscape. Forest size classes are defined based on the predominant tree diameter in the stand (basal area weighted average diameter). The five size classes are shown in Table 4. Details on how forests are classified into size class can be found in Barber and others (2011).

Table 4. Forest size classes on the HLC NF

Size Class	Diameter range	Description
Seedling/sapling	0 to 5 inches	The seedling/sapling size class represents the early successional stage of development. Forests are dominated by seedlings (less than 4 ½ feet tall) and saplings (less than 5 inches diameter). There may be low numbers of overstory larger trees present. Most trees are less than 40 years old and less than 40 feet tall. On sites of lower productivity (higher elevation, poor soils) or in dense stands, trees in in this class may be older because of their slower diameter growth rates.
Small tree	5 to 8.9 inches	Small size class forests are in the mid-successional stage of development, composed mostly of immature trees 5 to 8.9 inches diameter. Typical tree ages range from 40 to 75 years old. They often have a single canopy layer, but two or more layers are not uncommon, depending on disturbance history and site conditions.
Medium tree	9 to 14.9 inches	Medium size class forests are also in the mid-successional stage of development, where trees 9 to 14.9 inches diameter dominate. Vertical structures vary considerably. Tree age varies depending on species composition, site conditions, and stand density, but is typically 75 to 110 years old. On sites with harsher growing conditions or in stands of very high densities and low growth rates, trees in this medium size class might be substantially older.
Large tree	15 to 19.9 inches	Large size class forests are usually older than those in the medium class. Trees 15 to 19.9 inches diameter dominate. Most trees are over 90 years old, and most stands are in the mid or late successional stage of development. There are sites where trees of large tree size classes are substantially younger or much older.
Very large tree	20+ inches	Very large size class forests represent the oldest stands, where trees >=20 inches diameter dominate. The larger trees are typically over 130 years old, and some may be several centuries in age. Forests are in the late successional stage of development, and some correlate to old growth forest. These forests typically have a more complex structure than other successional stages.

Large-Tree Structure

Large trees are greater than or equal to 15” diameter, and very large trees are greater than or equal to 20” diameter. The large and very large forest size classes described in the previous section reflect areas where large and very large trees occur in relative abundance. However, scattered individuals, groups, and clumps of large and very large trees occur in forests classified into smaller size classes. The large-tree structure attribute is developed to more fully describe these components (Milburn et al 2019). The minimum densities of large- and very large-trees used to define large-tree structure reflect, to the best of our ability, quantities at sufficient amounts to contribute substantially to ecosystem functions (ibid). The label of large or very large is based on minimum tree density values (trees per acre) using diameter at breast-height thresholds by broad PVTs (Milburn et al. 2015), as shown in Table 5. A plot or stand may be classified as meeting the large subclass, the very large subclass, or both. For the desired condition in the 2021 Land Management Plan, the large subclass does not include areas that also meet the very large subclass definition. However, the very large subclass may include areas that also meet the large subclass definition.

Table 5. Large-tree structure definitions for the HLC NF by broad potential vegetation group

Broad potential vegetation type	Large	Very large
Warm dry	At least 5 trees per acre > or = 15” diameter	At least 4 trees per acre > or = 20” diameter
Cool moist	At least 10 trees per acre > or = 15” diameter	At least10 trees per acre > or = 20” diameter
Cold	At least 8 trees per acre > or = 15” diameter	At least 8 trees per acre > or = 20” diameter

Density Class and Vertical Structure

Forest density is a measure of the area occupied by trees. For the HLC NF, tree canopy cover is used as the measure of density. Canopy cover is the percentage of ground covered by a vertical projection of the outermost perimeter of the tree crowns, considering trees of all heights. Vertical structure is not a key indicator; however, it is described in conjunction with density. Vertical structure is categorized as single-storied (one canopy layer), two-storied (two canopy layers), or multistoried (three or more canopy layers). The four canopy cover classes and associated vertical structures are described in Table 6.

Table 6. Forest density classes and associated vertical structures on the HLC NF

Density class	Canopy cover range	Description
Nonforested	<10%	Areas with less than 10% canopy cover are considered nonforested. This class may include open forest savannas or persistent grass/shrub communities that occur on the warm dry broad PVT. Such sites may have multiple age classes but large, fire resistant and drought tolerant trees such as ponderosa pine are favored. This class also includes areas on any PVT that has been recently de-forested through disturbance and trees have not yet re-established. Finally, true nonforested communities are included (grasslands, shrublands, riparian/wetlands, and alpine communities).
Low to medium	10-39.9%	Low and medium tree canopy cover classes represent relatively open forests with 10 to 39.9% canopy cover. This class is common in young forests. In addition, low densities are found in dry forest types at all stages of succession, where site conditions or disturbances maintain low tree density. Cool moist or cold forests may also be in this condition particularly where impacted by disturbances such as mountain pine beetle.
Medium-high	40-59.9%	The medium to high tree canopy cover class represents a more fully stocked forest, a condition which is common in mature moist forests of shade tolerant species. Examples of forests with this density could include mature single-storied lodgepole pine or spruce/fir multistoried stands. Dry forests may also be in this density class particularly where fire has been excluded and understory layers have developed.
High	60%+	The high canopy cover class includes forests with a relatively closed canopy, most often on productive sites. This density class is common in stands with a spruce/fir component in a multi-storied condition. This condition also arises in single-storied lodgepole pine and sometimes Douglas-fir that regenerate to high densities after fire. This condition may also occur in dry forests that have missed natural fire entries and developed layers in the understory.

Snags

Snag components are developed for the quantity and distribution of snags. The components for snags are classified by snag analysis groups defined by Bollenbacher and others (2008). These snag analysis groups are generally consistent with the broad PVTs (warm dry, cool moist, and cold), except that areas currently dominated by lodgepole pine are addressed separately. Snag quantity is estimated as average snags per acre. Snag distribution reflects the percent of the area that contains one or more snags in the size class indicated. Three size classes are included; the smaller classes contain the snags in the larger classes.

- medium (10” + diameter at breast height);
- large (15” + diameter at breast height); and
- very large (20” + diameter at breast height)

Old Growth

Old growth is a forest structural condition that can exist during the late successional stage of forest development. The components for old growth are related to the estimated abundance (acres or percent of the area) of this condition on the landscape. The HLC NF has adopted definitions of old growth developed by the Regional Old Growth Task Force and documented by Green and others (Green et al., 1992). This work contains measurable criteria to consistently define old growth. The definitions are specific to forest type (dominant tree species) and habitat type group. Minimum thresholds have been established for these attributes. Associated characteristics are also defined, including factors such as

probabilities of downed woody material and number of snags, number of canopy layers, and number of snags over 9 inches diameter at breast height.

Coarse Woody Debris

Downed wood is derived from snags, as well as from live trees or parts of trees that fall due to wind, during fires, and to other factors. Long, larger diameter downed wood is generally more important for wildlife because it can be used by a greater range of species and provides a stable and persistent structure, as well as better protection from weather extremes. Plan components are built to describe coarse woody debris, or downed wood that is 3" in diameter or greater, measured in tons per acre.

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Appendix E. Priority and Conservation Watersheds

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Introduction

One of the original purposes for establishing the National Forest System was to protect our nation's water resources. The 2012 Planning Rule includes a set of requirements associated with maintaining and restoring watersheds and aquatic ecosystems, water resources, and riparian areas in the planning area. The increased focus on watersheds and water resources in the 2012 Planning Rule reflects the importance of this natural resource, and the commitment to stewardship of our waters. As such, the HLC NF has developed an aquatic conservation strategy to address watersheds and water resources on the Forest.

The 2012 Planning Rule requires that land management plans identify watersheds that are a priority for restoration and maintenance. The 2012 Planning Rule requires these plans to include components to maintain or restore the structure, function, composition, and connectivity of aquatic ecosystems and watersheds in the planning area, taking into account potential stressors, including climate change, and how they might affect ecosystem and watershed health and resilience. Plans are required to include components to maintain or restore water quality and water resources, including public water supplies, groundwater, lakes, streams, wetlands, and other bodies of water. In addition, the 2012 Planning Rule requires that the FS establish best management practices for water quality and that land management plans ensure implementation of those practices.

Land management plans are also required to include direction to maintain and restore the ecological integrity of riparian areas. The HLC NF 2021 Land Management Plan would maintain riparian areas through riparian management zones, and related components. This direction will also help protect native fish and further strengthen plan components for the conservation watershed network.

This appendix includes five sections. The first section describes the watershed condition framework. The watershed condition framework is a national protocol used to identify priority watersheds, develop watershed restoration action plans, and implement projects to maintain or restore conditions in those priority watersheds. The second section describes the conservation watershed network (CWN), which is designed to provide long-term protection, connectivity, and survival of native fish.

Additional sections describe the restoration of impaired waterbodies on the state 303(d) list that have completed total maximum daily loads (also referred to as TMDLs), municipal watersheds, and Source Water Protection Act areas.

Watershed Condition Framework

The restoration of watersheds and forest health is a core management objective for national forests and grasslands. The Forest Service is directed to restore degraded watersheds by strategically focusing investments on watershed improvement projects and conservation practices at landscape and watershed scales. The Watershed Condition Framework (WCF) is a comprehensive approach for classifying watershed condition, proactively implementing integrated restoration in priority watersheds on national forests and grasslands and tracking and monitoring outcome-based program accomplishments for performance accountability.

The 2012 Planning Rule requires revised plans identify watershed(s) that are a priority for maintenance or restoration as "other required content" in the land management plan (36 CFR 212.7(f)(1)(ii)) to focus effort on the integrated restoration of watershed conditions in these areas. The HLC NF used the national Watershed Condition Framework (WCF) to identify priority watersheds. As priority areas for restoration activities could change quickly due to natural disturbances (e.g. wildfire), the identification of priority

watersheds is included as other required content rather than as a required plan component. This allows for an administrative change to the plan to be used when necessary to quickly respond to changes in priorities.

In 2011, sixth-level watersheds (typically 10,000 to 40,000 acres) across all NFS lands were classified using the national watershed condition framework. This framework was designed to be a consistent, comparable, and credible process for improving the health of watersheds across all NFS lands. The first step was to rate the watershed condition of each watershed, utilizing existing data, knowledge of the land, and professional judgment. Watersheds were rated using a set of indicators of geomorphic, hydrologic, and biotic integrity relative to potential natural condition. The ratings are entered into a computer database, which generates an overall rating for each watershed. The results are also used to create a watershed condition class map.

Geomorphic functionality or integrity is defined in terms of attributes such as slope stability, soil erosion, channel morphology, and other upslope, riparian, and aquatic habitat characteristics. Hydrologic functionality or integrity relates primarily to flow, sediment, and water-quality attributes. Biological functionality or integrity is defined by the characteristics that influence the diversity and abundance of aquatic species, terrestrial vegetation, and soil productivity.

In each case, integrity is evaluated in the context of the natural disturbance regime, geoclimatic setting, and other important factors within the context of a watershed. The definition encompasses both aquatic and terrestrial components because water quality and aquatic habitat are inseparably related to the integrity and functionality of upland and riparian areas within a watershed. The three watershed condition classes are directly related to the degree or level of watershed functionality or integrity:

- Class 1- functioning properly: watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- Class 2 functioning-at-risk: watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- Class 3 impaired function: watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

In this framework, a watershed is considered in good condition if it is functioning in a manner similar to one found in natural wildland conditions (Karr and Chu 1999, Lackey 2001). This characterization should not be interpreted to mean that managed watersheds cannot be in good condition. A watershed is considered to be functioning properly if the physical attributes are appropriate to maintain or improve biological integrity. This consideration implies that a Class 1 watershed in properly functioning condition has minimal undesirable human impact on natural, physical, or biological processes and is resilient and able to recover to the desired condition when or if disturbed by large natural disturbances or land management activities (Yount and Niemi 1990). By contrast, a class 3 watershed has impaired function because some physical, hydrological, or biological threshold has been exceeded. Substantial changes to the factors that caused the degraded state are commonly needed to set them on a trend or trajectory of improving conditions that sustain physical, hydrological, and biological integrity. Defining specific classes for watershed condition is obviously subjective and, therefore, problematic for several reasons. First, watershed condition is not directly observable (Suter 1993). In nature, no distinct lines separate a watershed that is functioning properly from impaired condition, and every classification scheme is arbitrary to some extent. Second, watershed condition is a mental construct that has numerous definitions and interpretations in the scientific literature (Lackey 2001). Third, the attributes that reflect the state of a watershed are continually changing because of natural disturbances (e.g., wildfire, landslides, floods,

insects, and disease), natural variability of ecological processes (e.g., flows and cycles of energy, nutrients, and water), climate variability and change, and human modifications.

The planning area is located in 296 subwatersheds (HUC 12). The HLC NF completed the watershed condition framework analysis in 2011 and identified the following watershed condition classes: 103 watersheds were rated as functioning properly, 159 watersheds were rated as functioning at risk, and 34 watersheds were rated as impaired. Overall, the biggest sources of impairment were aquatic biota (nonnative species), road and trail issues, and water quality impairment. Table 1 is a summary of watershed condition classes across the Forest by GA.

Table 1. Number of 6th level watersheds rated in each condition class using the watershed condition framework

GA	Class 1	Class 2	Class 3	Total	% Rated as Class 3
Big Belts	3	35	7	45	15
Castles	2	9	1	12	8
Crazies	5	5	0	10	0
Divide	1	13	14	28	50
Elkhorns	1	18	2	21	10
Highwoods	3	4	0	7	0
Little Belts	21	39	4	64	6
Rocky Mountain Range	40	13	1	54	2
Snowies	15	3	0	18	0
Upper Blackfoot	12	20	5	37	14
Totals	103	159	34	296	11

The next step of the watershed condition framework used the watershed condition class data to prioritize watersheds for restoration, develop watershed restoration action plans, and implement projects to maintain or restore conditions in priority watersheds. Currently, four priority watersheds in the planning area have planned or ongoing restoration work occurring. These current forest priority watersheds on the HLC NF are displayed in Table 2. Future priority watersheds will be determined throughout the life of the Plan, usually on a 10-year rotation.

Future priority watersheds will be determined based on presence of bull trout, conservation watershed networks, and total maximum daily load status. Also taken into consideration will be other interested parties (other federal, state, and local entities as well as interest groups) and potential partner funding priorities like Montana Fish, Wildlife, and Parks as well as the Environmental Protection Agency's Comprehensive Environmental Response, Compensation, and Liability Act funded cleanup as examples. Future priority watershed identification will also consider opportunities for alignment with vegetation management needs to improve potential funding opportunities, which in turn would contribute to restoration opportunities.

Benefits from implementing the watershed condition framework are as follows:

- Strengthens the effectiveness of FS watershed restoration.
- Establishes a consistent, comparable, credible process for determining watershed condition class.
- Enables a priority-based approach for the allocation of resources for restoration.

- Improves FS reporting and tracking of watershed condition.
- Enhances coordination with external agencies and partners.

Table 2. Current watershed condition framework priority watersheds on the HLC NF[1]

Sub watershed name (HUC 12)	Geographic area	Current priority level*	Attributes rated at risk in watershed condition framework assessment	Current planning efforts	Overlapping priorities and partnerships	Notes
Headwaters Sheep Creek	Little Belts	High	303(d) listed stream, aquatic habitat, aquatic biota, water quality, riparian/wetland, soil productivity, road density, weeds	Upper Sheep VMP	Montana Fish Wildlife and Parks	Opportunity for riparian/wetland restoration and weed treatments. No in-stream fish habitat restoration needs identified 303(d) listing resulting from historic logging practices and poor road conditions.
Cabin Gulch	Big Belts	High	303(d) listed stream, water quality, riparian, channel morphology, species habitat, soils	Cabin Gulch Vegetation Management, culvert upgrades, road improvements and decommissioning	Broadwater County, Montana Fish Wildlife & Parks, Youth Forest Monitoring Program	Opportunity for riparian/wetland restoration, 2015 Cabin Gulch Fire.
Upper Tenmile	Divide	High	303(d) listed stream, aquatic biota, mining, non-native fish, aquatic habitat, road density, trails, water quality, soil, fire effects/fire regime	Tenmile-South Helena Vegetation Management Project, NFS mine remediation projects, road decommissioning	City of Helena (Municipal Watershed), Montana Fish Wildlife & Parks, Tenmile Watershed Collaborative, US EPA, Upper Tenmile Group, Lake Helena Watershed Group, Baxendale Fire Department, Tri County Fire	Opportunity for riparian/wetland restoration and weed treatments. in-stream fish habitat restoration needs identified 303(d) listing resulting from historic logging practices and poor road conditions, City of Helena Municipal Watershed
Telegraph Creek	Divide	High	303(d) listed stream, aquatic biota, mining, non-native fish, aquatic habitat, road density, trails water quality, soil, fire effects/fire regime	Upper Tenmile hazardous fuels reduction and timber salvage, abandon mine reclamation, road decommissioning	City of Helena (Municipal Watershed), Montana Fish Wildlife & Parks, Lake Helena Watershed Group, US EPA, Montana DEQ	Opportunity for riparian/wetland restoration and weed treatments. Reduce sediment from roads, in-stream fish habitat restoration needs identified 303(d) listing resulting from historic logging and mining practices and poor road conditions,

1 potential future priority watershed condition framework watersheds will be determined throughout the life of the Plan

Conservation Watershed Network

A conservation watershed network is a designated collection of watersheds where management emphasizes habitat conservation and restoration to support native fish and other aquatic species. The conservation watershed network is a specific subset of watersheds (12-digit hydrologic unit codes) where prioritization for long-term conservation and preservation of (1) bull trout, (2) westslope cutthroat trout, and (3) water quality. The primary goal of the network is to sustain the integrity of key aquatic habitats to maintain long-term persistence of native aquatic species. Municipal watersheds and watersheds with 303d listed stream segments have been also been included in the HLC NF conservation watershed network to recognize the need for restoration and maintenance of water quality in these areas.

Designation of conservation watershed networks, which should include watersheds that are already in good condition or could be restored to good condition, are expected to protect native fish and help maintain healthy watersheds and river systems. Selection criteria for inclusion should help identify those watersheds that have the capability to be more resilient to ecological change and disturbance induced by climate change. For example, watersheds containing unaltered riparian vegetation will tend to protect streambank integrity and moderate the effects of high stream flows. Rivers with high connectivity and access to their floodplains will experience moderated floods when compared to channelized and disconnected stream systems. Wetlands with intact natural processes slowly release stored cooler water during summer warm and dry periods, whereas impaired wetlands are likely less effective retaining and releasing water over the season. For all these reasons, conservation watershed networks represent the best long-term conservation strategy for native fish and their habitats.

Many watersheds on the Forest that support the healthiest populations of native trout already have their headwaters protected through NFS lands managed as inventoried roadless areas, Congressionally designated wilderness (Bob Marshall and Scapegoat Wilderness), or as wild and scenic rivers. These special places are the building blocks of a conservation network as naturally functioning headwaters have a large influence on the function of downstream stream reaches.

The best available science indicates the Forest is, and will be, important for conservation of native fish (bull trout and westslope cutthroat trout) across their range. Multiple documents and agreements were reviewed. Uniquely, the planning area is located along both sides of the Continental Divide and is predicted to provide cold water into the future as modeling has demonstrated the predicted effects of climate change being slower in high elevation mountain streams. The climate shield model and temperature model across the HLC NF sub-watersheds (HUC12) look closely at where cold water is predicted to persist into the future in the face of climate change (USDA 1994). The models both identified that cold water is predicted to persist in many of our local bull and westslope cutthroat trout sub-watersheds that were previously identified as priority[1] watersheds under the Inland Native Fish Strategy. Therefore, we carried over these important bull and westslope cutthroat trout watersheds, and those watersheds designated as critical habitat by the USFWS, into our conservation watershed network.

Multi-scale analysis was used to develop the Forest's conservation watershed network, starting with the scale of the Columbia River Basin and ending with HUC12 sub-watersheds within the planning area. Multi-scale analysis is consistent with guidance contained in the Interior Columbia Basin Ecosystem Management Project Memorandum of Understanding approved by senior managers in several of the western federal land management and regulatory agencies (Environmental Protection Agency, National Marine Fisheries Service, USFWS, Bureau of Land Management, and the USFS). The memorandum

[1] "Priority" watershed under the INFS differ from those identified under the current plan's watershed condition framework. Previous INFS priority watersheds are not included in the conservation watershed network.

updated science findings from the original Interior Columbia Basin Ecosystem Management Project effort of the late 1990s and guides inclusion of best available science into land management plan revisions.

At the broadest of scale considerations, information in USFWS's bull trout recovery plan was reviewed to help place habitat and core populations located within the HLC NF in context with recovery needs of the species across its range in the western United States. For recovery units like the Columbia Headwaters, the recovery plan strategy states, "A viable recovery unit should demonstrate that the three primary principles of biodiversity have been met: representation (conserving the breadth of the genetic makeup of the species to conserve its adaptive capabilities); resilience (ensuring that each population is sufficiently large to withstand stochastic events); and redundancy (ensuring a sufficient number of populations to provide a margin of safety for the species to withstand catastrophic events)."

Additional information contained in the *Columbia Headwaters Recovery Unit Implementation Plan,* was also reviewed. Types of information contained in the two USFWS documents included threats directly influencing individual bull trout survival, as well as threats to habitat. Primary threats were broken into different categories: habitat, demographic, and invasive species. Recovery actions for the HLC NF focus on fish management and invasive species removal to help recover bull trout in the Columbia Headwaters recovery unit. In addition to primary threats, the recovery plan also recommends actions should be pursued to help provide resilience to "difficult to-manage-threats such as climate change."

The *U.S. Forest Service Bull Trout Conservation Strategy* was also reviewed to further identify opportunities to increase effectiveness of the network. Prior to the release of the *USFWS Bull Trout Recovery Plan,* the Northern Region of the Forest Service developed the *U.S. Forest Service Bull Trout Conservation Strategy*.

The watersheds that met all the criteria established above where then further prioritized for restoration based on species and water quality status. The CWNs are to help guide management when working, or proposing work, in an area that would include any of the CWNs listed below (Table 3). The CWN alone does not directly authorize any management action but instead guides prioritization of restoration actions within a project area boundary. To focus on the conservation of aquatic species, as well as the individual species with Federal status, CWNs have been separated into three priorities. Watersheds with Federally listed Threatened and Endangered Species habitat are the first priority. The second priority are watersheds with Montana native fish habitat that is degrading through hybridization and availability, and the third priority are watersheds with areas of impacted water quality and quantity potentially influencing degraded habitat conditions (Table 3).

Table 3. Conservation watershed network prioritization

Priority	Reasoning	Number of Sub-watersheds
1	Bull Trout	12
2	Westslope Cutthroat Trout	75
3	DEQ listed streams and Municipal Watersheds	5

Table 4 and Table 5 display the conservation watershed network subwatersheds west and east of the Continental Divide that are included in the 2021 Land Management Plan.

Table 4. Conservation watershed network subwatersheds west of the continental divide on the HLC NF

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC acres	WCF Rating	CWN Priority
Divide	Upper Clark Fork (17010201)	Little Blackfoot River Headwaters (1701020105)	Ontario Creek (170102010501)	12,801	Impaired Function	1
			Little Blackfoot River-Larabee Gulch (170102010502)	18,162	Functioning at Risk	1
			Little Blackfoot River-Hat Creek (170102010507)	13,522	Impaired Function	1
Upper Blackfoot	Blackfoot (17010203)	Blackfoot River Headwaters (1701020302)	Blackfoot River-Anaconda Creek (170102030202)	17,154	Impaired Function	1
			Lower Alice Creek (170102030204)	11,697	Functioning at Risk	1
			Hogum Creek (170102030205)	7,630	Functioning at Risk	2
			Blackfoot River-Hardscrabble Creek (170102030206)	12474	Functioning Properly	1
		Landers Fork (1701020301)	Copper Creek (170102030103)	26,005	Functioning at Risk	1
			Lower Landers Fork (170102030104)	15,662	Functioning at Risk	1
		Blackfoot River-Keep Cool Creek (1701020303)	Poorman Creek (170102030302)	25,783	Impaired Function	1
			Arrastra Creek (170102030309)	15,084	Functioning at Risk	1
			Blackfoot River-Little Moose Creek (170102030310)	20,036	Functioning at Risk	1
		Nevada Creek (1701020304)	Nevada Creek Headwaters (170102030401)	25,255	Functioning at Risk	1
		North Fork Blackfoot (1701020306)	Meadow Creek (170102030601)	11,881	Functioning Properly	2
			Mineral Creek (170102030602)	9,495	Functioning Properly	2
			East Fork North Fork Blackfoot (170102030603)	20,692	Functioning Properly	2

Table 5. Conservation watershed network subwatersheds east of the continental divide on the HLC NF

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC Acres	WCF Rating	CWN Priority
Big Belts	Upper Missouri River (10030101)	Missouri River-Dry River (1003010109)	Greyson Creek (100301010902)	15,517	Functioning at Risk	2
		Missouri River-Upper Canyon Ferry Lake (1003010110)	Ray Creek (100301011003)	15,985	Functioning Properly	2
			Gurnett Creek (100301011005)	14,040	Functioning at Risk	2
		Missouri River-	Duck Creek	20,792	Functioning at	2

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC Acres	WCF Rating	CWN Priority
		Middle Canyon Ferry Lake (1003010111)	(100301011101)		Risk	
			White Creek (100301011106)	20,960	Functioning at Risk	2
		Missouri River-Lower Canyon Ferry Lake (1003010112)	Avalanche Creek (100301011202)	25,745	Impaired Function	2
			Magpie Creek (100301011204)	16,729	Functioning at Risk	2
		Beaver Creek (1003010117)	Upper Beaver Creek (100301011701)	19,583	Functioning at Risk	2
			Lower Beaver Creek (100301011703)	21,043	Functioning at Risk	2
	Smith River (10030103)	Smith River – Newlan Creek (1003010303)	Thompson Gulch (100301030303)	13,642	Functioning at Risk	2
		Smith River – Camas Creek (1003010305)	Upper Camas Creek (100301030501)	21,624	Impaired Function	2
		Rock Creek (1003010306)	Upper Rock Creek (100301030602)	21,740	Functioning at Risk	2
Castles	Smith River (10030103)	North Fork Smith River (1003010301)	Fourmile Creek (100301030104)	16,271	Functioning at Risk	2
			NF Smith River-Trout Creek (100301030105)	31,980	Functioning at Risk	2
		South Fork Smith River (1003010302)	Cottonwood Creek (100301030203)	6,921	Functioning Properly	2
Divide	Upper Missouri River (10030101)	Prickley Pear Creek (1003010113)	Clancy Creek (100301011304)	20,990	Impaired Function	2
		Tenmile Creek (1003010114)	Middle Tenmile Creek (100301011402)	22,975	Impaired Function	3
			Upper Tenmile Creek (100301011401)	6,130	Impaired Function	3
			Greenhorn Creek (100301011403)	12,932	Functioning at Risk	2
			Skelly Gulch (100301011404)	7,885	Functioning at Risk	2
Elkhorns	Boulder River (10020006)	Lower Boulder River (1002000605)	Muskrat Creek (100200060501)	25,541	Functioning Properly	2
	Upper Missouri River (10030101)	Missouri River-Crow Creek (1003010107)	Headwaters Crow Creek (100301010701)	15,293	Functioning at Risk	2
			Upper Crow Creek (100301010702)	16,020	Functioning at Risk	2
			South Fork Crow Creek (100301010703)	10,468	Functioning at Risk	2

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC Acres	WCF Rating	CWN Priority
		Missouri River-Middle Canyon Ferry Lake (1003010111)	Lower Beaver Creek (100301011105)	20,179	Functioning at Risk	2
		Prickley Pear Creek (1003010113)	Headwaters Prickley Pear Creek (100301011301)	19,228	Functioning at Risk	2
			Warm Springs Creek (100301011303)	13,235	Functioning at Risk	2
			Upper Prickley Pear Creek (100301011306)	16,436	Functioning at Risk	2
			McClellan Creek (100301011307)	23,215	Functioning at Risk	2
Highwoods	Upper Missouri-Dearborn (10030102)	Highwood Creek (1003010213)	Headwaters Highwood Creek (100301021301)	16,040	Functioning at Risk	2
	Belt Creek (10030105)	Lower Belt Creek (1003010504)	Little Belt Creek (100301050402)	24,526	Functioning Properly	2
	Arrow Creek (10040102)	Upper Arrow Creek (1004010202)	Cottonwood Creek (100401020207)	32,302	Functioning Properly	2
Little Belts	Belt Creek (10030105)	Upper Belt Creek (1003010501)	Jefferson Creek– Belt Creek (100301050101)	20,793	Functioning at Risk	2
			Carpenter Creek-Belt Creek (100301050102)	26,105	Functioning at Risk	2
			Upper Dry Fork Belt Creek (100301050103)	18,512	Functioning at Risk	2
			Lower Dry Fork Belt Creek (100301050104)	21,274	Functioning at Risk	2
			Hoover Creek-Belt Creek (100301050105)	30,975	Functioning at Risk	2
		Big Otter Creek (1003010502)	Headwaters Big Otter Creek (100301050201)	12,917	Functioning at Risk	2
		Middle Belt Creek (1003010503)	Tillinghast Creek (100301050301)	22,191	Functioning at Risk	2
			Pilgrim Creek (100301050302)	18,259	Functioning Properly	2
			Logging Creek (100301050303)	27,092	Functioning at Risk	2
			Iron Creek – Belt Creek (100301050304)	15,689	Functioning at Risk	2
	Judith River (10040103)	Middle Fork Judith River (1004010303)	Cleveland Creek (100401030301)	32,866	Functioning Properly	2
			Yogo Creek (100401030303)	29,275	Functioning at Risk	2
			Middle Fork Judith River (100401030304)	24,116	Impaired Function	2

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC Acres	WCF Rating	CWN Priority
		South Fork Judith River (1004010304)	Upper South Fork Judith River (100401030401)	35,258	Impaired Function	2
		Dry Wolf Creek (1004010311)	Upper Dry Wolf Creek (100401031101)	28,732	Functioning Properly	2
		Upper Wolf Creek (1004010312)	Running Wolf Creek (100401031201)	23,479	Functioning at Risk	2
	Smith River (10030103)	Sheep Creek (1003010304)	Headwaters Sheep Creek (100301030401)	27,663	Functioning at Risk	2
		Tenderfoot Creek (1003010308)	Upper Tenderfoot Creek (100301030801)	26,105	Functioning Properly	2
		Smith River – Deep Creek (1003010309)	Upper Deep Creek (100301030903)	11,267	Functioning Properly	2
Rocky Mountain Range	Sun River (10030104)	North Fork Sun River (1003010401)	Gates Creek (100301040105)	9,135	Functioning Properly	2
		Willow Creek (1003010403)	Little Willow Creek-Willow Creek (100301040302)	24,034	Functioning at Risk	2
		Sun River-Gibson Reservoir (1003010404)	Gibson Reservoir (100301040401)	23,697	Functioning at Risk	2
		Elk Creek (1003010405)	Ford Creek (100301040501)	15,895	Functioning at Risk	2
			Upper Smith Creek (100301040502)	23,064	Functioning Properly	2
	Two Medicine River (10030201)	Upper Two Medicine River (1003020101)	Upper South Fork Two Medicine River (100302010103)	22,836	Functioning Properly	2
			Lower South Fork Two Medicine River (100302010104)	42,986	Functioning at Risk	2
			Little Badger Creek (100302010105)	24,028	Functioning at Risk	2
		Badger Creek (1003020102)	Headwaters Badger Creek (100302010201)	38,358	Functioning Properly	2
			Lonesome Creek–Badger Creek (100302010202)	20,891	Functioning Properly	2
		Dupuyer Creek (1003020105)	Upper Dupuyer Creek (100302010501)	30,115	Functioning Properly	2
		Birch Creek (1003020106)	South Fork Birch Creek (100302010602)	16,420	Functioning Properly	2
	Teton River (10030205)	Teton River-North Fork Teton River (1003020501)	Upper North Fork Teton River (100302050101)	13,317	Functioning Properly	2
			Middle North Fork Teton River (100302050102)	27,339	Functioning Properly	2
			South Fork Teton River (100302050103)	17,717	Functioning Properly	2

Geographic area	4th code HUC (HUC #)	5th code HUC (HUC #)	6th code HUC (HUC #)	6th code HUC Acres	WCF Rating	CWN Priority
			Lower North Fork Teton River (100302050104)	11,082	Functioning Properly	2
Snowies	Judith River (10040103)	Big Spring Creek (1004010307)	East Fork Big Spring Creek (100401030702)	34,528	Functioning Properly	2
			Middle Fork Big Springs Creek (100401030701)	15,770	Functioning Properly	3
			Cottonwood Creek (100401030709)	37,238	Functioning Properly	2
		Lower Ross Fork Creek (1004010302)	Big Rock Creek (100401030204)	37,639	Functioning Properly	3
	Flatwillow Creek (10040203)	Upper Flatwillow Creek (1004020304)	Upper North Fork Flatwillow Creek (100402030401)	32,587	Functioning at Risk	2
			South Fork Flatwillow Creek (100402030403)	37,327	Functioning Properly	3
Upper Blackfoot	Upper Missouri River (10030101)	Upper Little Prickly Pear Creek (1003010118)	Virginia Creek (100301011804)	19,407	Impaired Function	2
			Upper Canyon Creek (100301011805)	15,169	Functioning Properly	2

Restoration of Impaired 303(d) Listed Waterbodies

In 1972 Congress passed the Water Pollution Control Act, more commonly known as the Clean Water Act. Its goal is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The Clean Water Act requires each state to set water quality standards to protect designated beneficial water uses and to monitor the attainment of those uses. Fish and aquatic life, wildlife, recreation, agriculture, industrial, and drinking water are all types of beneficial uses. Streams and lakes (also referred to as waterbodies) that do not meet the established standards are called "impaired waters." These waters are identified on the 303(d) list, named after Section 303(d) of the Clean Water Act, which mandates the monitoring, assessment, and listing of water quality limited waterbodies.

Both Montana state law (75 MCA § 5-703) and section 303(d) of the federal Clean Water Act require the development of total maximum daily loads for impaired waters where a measurable pollutant (for example: metals, nutrients, e. coli, sediment) is the cause of the impairment. A total maximum daily load is a loading capacity and refers to the maximum amount of a pollutant a stream or lake can receive and still meet water quality standards.

The Montana Water Quality Act requires the Montana Department of Environmental Quality (MTDEQ) to develop total maximum daily loads for streams and lakes that do not meet, or are not expected to meet, Montana water quality standards. The Montana Department of Environmental Quality submits the total maximum daily loads to the United States Environmental Protection Agency for approval. Total maximum daily loads provide an approach to improve water quality so that streams can support and maintain their state-designated beneficial uses.

In Montana, the MTDEQ reports out biannually on their impaired waters across the state. According to the Montana State 303(d) list, in 2018 55 stream segments within the planning area are not meeting water quality standards (Montana Department of Environmental Quality 2016) (Table 6). Of these, 35 are listed for mining related impacts and the remaining 20 are listed for grazing or habitat quality issues. Total

maximum daily load assessments have been prepared and are being implemented for several sub-basins in the planning area, including those in the Divide, Elkhorns, Upper Blackfoot, Castles and the Little Belts GAs.

Table 6. 2018 303(d) listed stream segments by GA

Geographic area	Number of stream segments	Miles	Sources of pollutants	TMDL assessments
Big Belts	7	36	Mostly grazing, road impacts, mining in Confederate Gulch	Deep Creek, Canyon Ferry
Divide	14	54	Primarily mining impacts, road impacts	Little Blackfoot, Lake Helena, Boulder-Elkhorn
Elkhorns	11	40	Abandoned mines, road impacts, water diversions	Boulder-Elkhorn, Lake Helena
Little Belts	8	99	Mining, road impacts and grazing impacts	Missouri-Cascade/Belt Creek, Sheep Creek
Rocky Mountain Range	1	4	Grazing and flow alterations, road impacts	Sun River (completed)
Snowies	1	2	Grazing and road impacts	No
Upper Blackfoot	13	54	Abandoned mines, road impacts	Blackfoot Headwaters, Middle Blackfoot-Nevada Creek

Across the planning area, water quality monitoring, in conjunction with forest project activities, has been occurring since the 1986 Forest Plans were developed for each Forest. Both the Helena and the Lewis and Clark National Forests had extensive watershed monitoring programs.

For more than three decades, data has been collected at 55 water quality monitoring sites on the Helena National Forest to monitor the majority of the timber sales and other major projects. The number of years of data collection at each site has varied based on project needs. In fiscal year 2013, 22 water quality monitoring stations were maintained, 3 rain gauge monitoring sites were installed, 5 roadside hazard tree units were monitored, and 133 decommissioned roads were evaluated for closure effectiveness. In addition, other data collection efforts on the Forest have included various total maximum daily load inventory and monitoring programs, the Helena National Forest Youth Forest Monitoring Program, which included 12 water quality sites, and monitoring done by other governmental agencies (such as, Montana Department of Environmental Quality and United States Environmental Protection Agency).

On the Lewis and Clark National Forest, monitoring was more focused around grazing allotments. Ten exclosures have benchmarked monitoring reaches where monitoring has included: up to 10 cross-sections (both inside and outside exclosures), photo points, sinuosity, pebble counts, and slope measurements. Other monitoring has been focused on road obliteration project monitoring, which includes documentation of vegetative recovery, weeds, stream crossings, and erosion along obliterated roads.

Protection of Municipal Watersheds

The 1986 Forest Plans identified portions of four sixth level watersheds as municipal water supplies: Tenmile Creek, McClellan Creek, Belt Creek-Carpenter Creek, and North Fork Smith River-Trout Creek. Big Spring Creek is the municipal watershed for the city of Lewistown and was not identified in the 1986 Forest Plans. These watersheds provide drinking water to five cities or towns by either a reservoir,

groundwater, or water diversion. See individual GA maps in appendix A for the locations of municipal watersheds. Also see Table 7 for a summary of municipal watersheds on the HLC NF.

Tenmile Creek and its tributaries, located in the Divide GA, is the municipal water source for the City of Helena. Diversions are located on Tenmile Creek above Rimini and near the mouths of Beaver Creek, Minnehaha Creek, Moose Creek, and Walker Creek. Water from all diversions is carried to the Tenmile Water Treatment Plant in a common buried pipeline. In addition, Helena stores water in the upper part of the watershed from several tributaries in Scott and Chessman Reservoirs when stream flow is high. The Red Mountain Flume carries water from some of these tributaries to Chessman reservoir. Vegetation treatment efforts are occurring around the flume and reservoir. Further treatments in the rest of the watershed are in the planning and implementation process for the Tenmile South Helena Project. Streams in the lower portion of the Tenmile watershed do not meet drinking water quality standards, but above the diversions water quality does generally meet standards. The primary objective of this project is to reduce the risk for a high intensity wildfire and associated adverse post-fire watershed effects in the watershed.

The City of East Helena uses McClellan Creek in the Elkhorns GA for one source of municipal water. This source is an infiltration gallery located approximately five miles south of East Helena, in the McClellan Creek drainage, downstream of the planning area. The infiltration gallery draws water into two collection systems installed into alluvium near the creek. Recharge to McClellan Creek occurs in the Elkhorn Mountains on NFS lands.

Source water for the town of White Sulphur Springs municipal watershed is Willow Creek in the Smith River-Trout Creek sixth level watershed. The Willow Creek municipal watershed is in the northwest corner of the Castles GA. The Castle Mountains landscape assessment of 2012 described conditions within the municipal watershed as good. Specifically, the watershed is fenced out and except for a few trespassers, livestock access is nonexistent. Public impacts are very small as access and roads are negligible. It has a healthy riparian area with a great diversity of plants including cottonwood, aspen, dogwood, alder, and willow. Mixed conifers adjacent to the channel provide an excellent source of large woody debris which forms numerous log jams along the profile. A boulder dominated channel bed, less prone to degradation when compared to other project area channels, dissipates the 500 year flood energy efficiently and shows no detrimental effects from natural events. The overall condition of the watershed is excellent but hillslopes surrounding the creek have high fuel loading (dead lodgepole pine). Treatments proposed for the watershed include thinning and prescribed burning.

The town of Neihart uses O'Brien Creek and Shorty Creek; both are located within Belt Creek-Carpenter Creek sixth level watershed in the Little Belts GA. There have been turbidity issues linked to a powerline access road near O'Brien Creek and occasionally not meeting EPA Safe Drinking Water Standards. The city uses Shorty Creek during those times. The city received a state grant through the Treasure State Endowment Program in 2015 and has applied for a project grant to implement this plan to improve their overall system.

Not identified in the 1986 Lewis and Clark Forest Plan is the municipal watershed for the City of Lewiston, which receives its drinking water from Big Spring located in Big Spring Creek subwatershed (HUC 12). The groundwater recharge area for Big Spring Creek is located on NFS lands in roughly the northern two thirds of the Big Snowy Mountains south of Lewistown. See the map in the Snowies GA. This is one of the only municipal drinking water sources in Montana where treatment is not needed.

Table 7. Municipal and source waters of the HLC NF

Community	Geographic area	Hydrologic unit code	Hydrologic unit code name	Municipal and source water
Neihart	Little Belts	100301050102	Carpenter Creek-Belt Creek	Surface diversion; O'Brien and Shorty Creeks
White Sulphur Springs	Castles	100301030105	Trout Creek-North Fork Smith River	Surface diversion; Willow Creek
Helena	Divide	100301011401	Upper and Middle Tenmile Creek	Surface diversion; Tenmile, Banner, Moose, Minnehaha, Beaver and Porcupine Creeks.
East Helena	Elkhorn	100301011307	McClellan Creek	Surface diversion; McClellan Creek
Lewistown	Snowies	100401030901	Cottonwood Creek	Groundwater discharge, spring; all the Big Spring Creek Groundwater recharge area watersheds
		100401030204	Big Rock Creek	
		100401030702	East Fork Big Spring Creek	
		100401030701	Middle Fork Big Spring Creek	
		100402030401	Upper North Fork Flatwillow Creek	
		100402030403	South Fork Flatwillow Creek	

Source Water Protection Areas

Source water protection areas protect public water systems from contamination in accordance with the 1996 amendments to the Safe Drinking Water Act. Public water systems are defined under the Safe Drinking Water Act as entities that provide "water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year." Montana Department of Environmental Quality's Source Water Protection Program provides guidance and approval of source water protection areas within the State of Montana. Source water protection areas in Montana are divided into distinct regions according to the time water takes to reach a public water system intake. The purpose of subdividing source water protection areas in this way is to prioritize source water protection efforts. Montana Department of Environmental Quality has identified management goals within each of these regions, and these management goals are discussed in context of the water systems located within, adjacent, or downstream of the HLC NF. Public water supplies and source water assessments can be found on the Montana Department of Environmental Quality website: http://svc.mt.gov/deq/wmadst/default.aspx?requestor=DST&type=SWP.

Public water system intakes on surface water sources, i.e. streams, are the most susceptible to contamination from land management activities within the HLC NF. The City of Helena is the only public water system diverting surface water from locations within the HLC NF administration boundary, specifically from Beaver Creek, Minnehaha Creek, and Moose Creek in the Tenmile Creek watershed. The source water protection areas of these surface water intakes include a "spill response" area that is buffered along each source stream measuring a maximum of 10 miles in length, 1/2 mile from both streambanks, and 1/2 mile downstream from the surface water intake and is confined to the extent within the contributing watershed. These spill response regions are to be managed to prevent releases of contaminants where they can be drawn directly into a water intake with little lag time. In addition to the

City of Helena's surface water intakes, two other communities have spill response areas that overlap the HLC NF, specifically the Town of Neihart's surface water intake on O'Brien and Shorty Creeks and the City of White Sulphur Springs intake on Willow Creek (Table 8).

Table 8. Surface water public water systems with spill response regions that overlap HLC NF

Public water system number	Public water system primary name	GA	Water source	Class of public water system per the safe drinking water act	Population served by public water system
MT0000360	City of White Sulphur Springs	Castles	Willow Creek	Community	1,000
MT0000241	Helena Water System	Divide	Tenmile Intakes Watershed	Community	31,005
MT0000298	town of Neihart	Little Belts	O'Brien Creek/Shorty Creek	Community	229

In addition to the spill response region, the rest of the contributing watershed upstream of each surface water intake is the "watershed region" part of the source water protection area, in which management is to maintain and improve the long-term quality of surface water used by the public water system. In addition to the three spill response regions that overlap the HLC NF, 12 public water systems located downstream of the forest have watershed regions that extend up into the forest. All 15 of these surface public water systems collectively serve approximately 100,000 people (Table 9).

Table 9. Surface water public water systems with watershed regions that overlap HLC NF

Public water system number	Public water system primary name	GA	Water source	Class of public water system per the safe drinking water act	Population served by public water system
MT0000416	Montana Aviation Research Co	Big Belts, Little Belts, Elkhorns, Divide, Castles, Crazies, Snowies	Missouri River	Community	62
MT0003448	Rock Creek Marina and Campground	Big Belts, Little Belts, Elkhorns, Divide, Castles, Crazies, Snowies	Ft Peck Reservoir	Non-community	50
MT0000415	Glasgow, City of	Big Belts, Little Belts, Elkhorns, Highwoods, Divide, Castles, Crazies, Snowies	Missouri River	Community	3,253
MT0042450	Hell Creek State Park	Big Belts, Little Belts, Elkhorns, Highwoods, Divide, Castles, Crazies, Snowies	Fort Peck Reservoir	Non-Community	50

Public water system number	Public water system primary name	GA	Water source	Class of public water system per the safe drinking water act	Population served by public water system
MT0000218	Fort Peck, Town of	Big Belts	Fort Peck Lake	Community	240
MT0000360	White Sulphur Springs, City of	Castles	Willow Creek	Community	1000
MT0000290	Melstone, Town of	Castles, Crazies, Little Belts, Snowies	Musselshell River	Community	170
MT0000241	Helena Water Department	Divide	Intake 4 Minnehaha Creek, Intake 5 Moose Creek, Intake 2 Ten Mile Creek, Intake 3 Beaver Creek, Intake 6 Walker Creek	Community	31,005
MT0000192	Culbertson, Town of	Divide	Missouri River	Community	1,700
MT0000525	Great Falls, City of	Little Belts	Missouri River	Community	60,000
MT0000298	Neihart, Town of	Little Belts	O'Brien Creek	Community	229
MT0000400	Tiber County Water District	Rocky Mountain Range	Tiber Reservoir	Community	750
MT0002669	Loma County Water District	Rocky Mountain Range	Marias River	Community	200
MT0000173	Chester, Town of	Rocky Mountain Range	Tiber Reservoir	Community	870

Groundwater sources also supply drinking water in and around the HLC NF. There are nine public water systems withdrawing groundwater at 12 locations within HLC NFS lands, coming from nine wells and direct from three springs. Montana's Source Water Protection Program states that areas located within 100 feet of these ground water sources is the "control zone" for each intake, and this area is to be managed to protect sources from damage and to prevent direct introduction of contaminants into sources or the immediate surrounding areas. These nine public water systems withdrawing groundwater at 12 locations on NFS lands are the only control zones that intersect the HLC NF (Table 10).

Table 10. Groundwater public water systems with intakes located within the HLC NF

Public water system number	Public water system primary name	GA	Class of public water system per the safe drinking water act	Population served by the water system
MT0003418	Feathered Pipe Ranch	Divide	Non-Community	58
MT0062321	Park Lake Campground (FS)	Divide	Non-Community	150
MT0000591	Forest Park Water Users Association	Elkhorns	Community	323

Public water system number	Public water system primary name	GA	Class of public water system per the safe drinking water act	Population served by the water system
MT0001526	Showdown Ski Lift Inc (FS SU)	Little Belts	Non-Community	448
MT0000789	Camp Rotary Club Monarch (FS SU)	Little Belts	Non-Community	40
MT0003151	Sun Canyon Lodge (FS SU)	Rocky Mountain Range	Non-Community	35
MT0002076	Teton Pass Ski Area Inc (FS SU)	Rocky Mountain Range	Non-Community	150
MT0062323	Lincoln Ranger Station (FS)	Upper Blackfoot	Non-Transient Non-Community	125
MT0003919	Mountain View Coop Lincoln	Upper Blackfoot	Non-Community	100

Beyond the 100-foot control zones, the areas within one mile of each ground water public water system source are typically designated as "inventory regions" by Montana Department of Environmental Quality that will be managed to minimize susceptibility to contamination (Table 11). The delineation of these inventory regions can also be defined using other methodologies than a simple one-mile buffer depending on the information available and circumstances, and these areas are delineated by Montana Department of Environmental Quality. Management in these inventory regions will be focused on pollution prevention activities where water is likely to flow to a public water system well intake within a specified time-period. These inventory regions have various degrees of delineation on the Forest and management in these inventory regions will be considered at the site-specific project level. Best management practices can be implemented to control non-point sources of contamination in these areas (Montana Department of Natural Resources and Conservation 1999).

Table 11. Public water systems that use ground water and whose well/spring intake is outside the HLC NF, but their source water protection area "Inventory Region" (MT DEQ 2018) overlaps the HLC NF

Public water system number	Public water system primary name	GA	Class of public water system per the safe drinking water act	Population served by public water system
MT0004049	Grassy Mountain Lodge	Big Belts	Non-Community	33
MT0003421	York Bar	Big Belts	Non-Community	50
MT0000243	Canyon Ferry Village System	Big Belts	Community	47
MT0000030	Blue Sky Heights WUA Clancy	Elkhorns	Non-Community	250
MT0000240	City of Harlowton	Little Belts, Castles, Crazies	Community	1050
MT0040745	Giant Springs State Park	Little Belts	Non-Community	1011
MT0043637	Headquarters Building Region	Little Belts	Non-Community	180
MT0000298	Town of Neihart	Little Belts	Community	229
MT0000334	Town of Stanford	Little Belts	Community	540
MT0003704	Source Giant Springs Inc	Little Belts	Non-Community	3007
MT0000788	Theiltges Saint Thomas Camp	Little Belts	Non-Community	74
MT0000175	City of Choteau	Rocky Mountain Range	Community	1691

Public water system number	Public water system primary name	GA	Class of public water system per the safe drinking water act	Population served by public water system
MT0004532	Allens Manix Store	Rocky Mountain Range	Non-Community	33
MT0001378	Firebrand Food and Ale Restaurant	Rocky Mountain Range	Non-Community	30
MT0001429	Augusta School District 45	Rocky Mountain Range	Non-Community	86
MT0001437	Lazy B Bar Augusta	Rocky Mountain Range	Non-Community	50
MT0003134	Summit Mountain Lodge	Rocky Mountain Range	Non-Community	42
MT0001921	Mountain View MB HM PK	Upper Blackfoot	Non-Community	150

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Appendix F. Northern Rockies Lynx Management Direction Record of Decision

Introduction

The 2021 Land Management Plan retains the decision for managing Canada lynx habitat from the 2007 Northern Rockies Lynx Management Direction (NRLMD) Record of Decision. The 2021 Land Management Plan carries forward the objectives, standards, and guidelines that were developed to conserve the Canada lynx. The use of the terms "standards," and "guidelines" in the NRLMD is consistent with the definitions of these terms found in the 2021 Land Management Plan. The definition of "objectives" in the NRLMD is consistent with the definition of "desired conditions" found in the 2021 Land Management Plan. The 2021 Land Management Plan thus defines the NRLMD "objectives" as "desired conditions." The NRLMD in this appendix is incorporated in the 2021 Land Management Plan in its entirety, to include required monitoring both part of the NRLMD and those terms and conditions that were incorporated from the US FWS Biological Opinion on the NRLMD (USDI FWS 2007). Projects and activities must be consistent with the NRLMD ROD and 2021 Land Management Plan.

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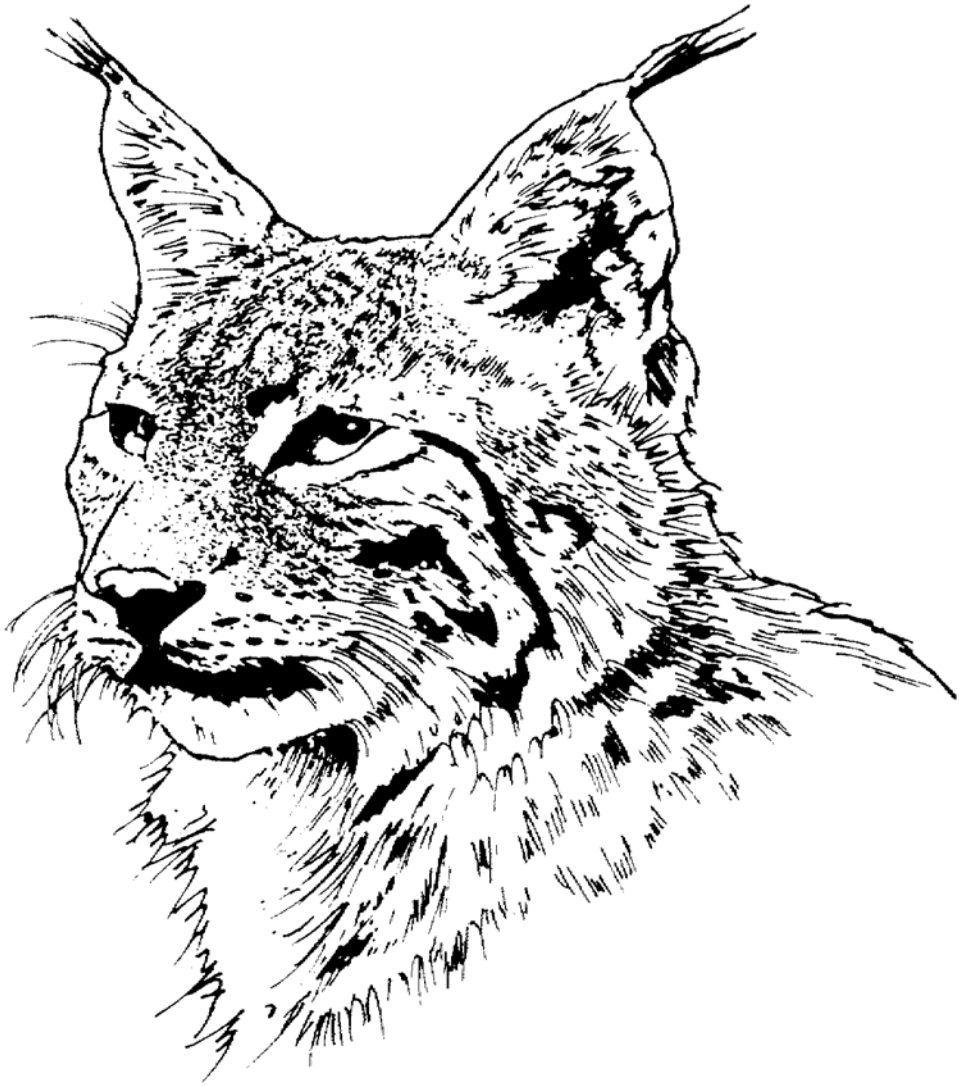
USDA
Forest
Service

National Forests in
Montana, and parts of
Idaho, Wyoming, and
Utah

March 2007

Northern Rockies Lynx Management Direction Record of Decision



Record of Decision

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Summary of the decision

We have selected Alternative F, Scenario 2 as described in the Northern Rockies Lynx Management Direction Final Environmental Impact Statement (FEIS) (pp. 35 to 40), with modifications. We modified Alternative F, Scenario 2 and incorporated the U.S. Fish and Wildlife Service (FWS) Terms and Conditions (USDI FWS 2007), where applicable, into the management direction – see Attachment 1- hereafter called the *selected alternative*. We determined the selected alternative provides direction that contributes to conservation and recovery of Canada lynx in the Northern Rockies ecosystem, meets the Purpose and Need, responds to public concerns, and is consistent with applicable laws and policies. In the FEIS we analyzed six alternatives in detail and two scenarios for Alternative F. Of those, we determined Alternative F Scenario 2 is the best choice. With this decision, we are incorporating the goal, objectives, standards, and guidelines of the selected alternative into the existing plans of all National Forests in the Northern Rockies Lynx Planning Area – see Figure 1-1, FEIS, Vol. 1 Tables 1-1 and 1-2.

The direction applies to mapped lynx habitat on National Forest System land presently **occupied** by Canada lynx, as defined by the *Amended Lynx Conservation Agreement between the Forest Service and the FWS* (USDA FS and USDI FWS 2006). When National Forests are designing management actions in **unoccupied** mapped lynx habitat they should consider the lynx direction, especially the direction regarding linkage habitat. If and when those National Forest System lands become occupied, based upon criteria and evidence described in the Conservation Agreement, the direction shall then be applied to those forests. If a conflict exists between this management direction and an existing plan, the more restrictive direction will apply.

The detailed rationale for our decision, found further in this document, explains how the selected alternative best meets our decision criteria. Those decision criteria are: 1) meeting the Purpose and Need to provide management direction that conserves and promotes the recovery of Canada lynx while preserving the overall multiple use direction in existing plans; 2) responding to the issues; and 3) responding to public concerns.

Background

The FWS listed Canada lynx as a threatened species in March 2000, saying the main threat was "the lack of guidance for conservation of lynx and snowshoe hare habitat in National Forest Land and Resource Plans and BLM Land Use Plans" (USDI FWS 2000a). Following the listing, the Forest Service (FS) signed a Lynx Conservation Agreement with the FWS in 2001 to consider the Lynx Conservation Assessment and Strategy (LCAS) during project analysis, and the FS agreed to not proceed with projects that would be "likely to adversely affect" lynx until the plans were amended. The Conservation Agreement (CA) was renewed in 2005 and added the concept of occupied mapped lynx habitat. In 2006 the CA was amended to define occupied habitat and to

list those National Forests that were occupied. In 2006 it was also extended for 5 years (until 2011), or until all relevant forest plans were revised to provide guidance necessary to conserve lynx (USDA FS and USDI FWS 2000, 2005, 2006a, 2006b). The plan direction in this decision fulfills our agreement to amend the plans. The management direction provided in this decision is based upon the science and recommendations in:

- *Ecology and Conservation of Lynx in the United States* (Ruggiero et al 2000), which summarizes lynx ecology;
- *Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al 2000), which recommends conservation measures for activities that could place lynx at risk by altering their habitat or reducing their prey; and
- Numerous publications cited in the FEIS and found listed in the *References* section of this ROD and in the FEIS, pp. 381 to 396.

Purpose of and Need for action

The Purpose and Need is to incorporate management direction in land management plans that conserves and promotes recovery of Canada lynx, by reducing or eliminating adverse effects from land management activities on National Forest System lands, while preserving the overall multiple-use direction in existing plans (FEIS, Vol. p. 1).

Risks to lynx and lynx habitat

The overall goals of the LCAS were to recommend lynx conservation measures, provide a basis for reviewing the adequacy of Forest Service land and resource management plans with regard to lynx conservation, and to facilitate section 7 conferencing and consultation under ESA. The LCAS identified a variety of possible risks to lynx and lynx habitat.

The LCAS identified *risk factors affecting lynx productivity* (pp. 2-2 to 2-15) as:

- Timber management
- Wildland fire management
- Livestock grazing
- Recreational uses
- Forest backcountry roads and trails
- Other human developments

These are the typical types of activities conducted on federal land administered by the FS, and the FS has the authority to manage and regulate them. As such, the management direction analyzed in the Lynx FEIS and incorporated into the forest plans with this Record of Decision (ROD) focus on these types of activities.

The LCAS identified *risk factors affecting mortality* (pp. 2-15 to 2-17) as:

- Trapping
- Shooting
- Predator control
- Highways
- Predation by other species

These factors can directly cause lynx deaths. Trapping of lynx is no longer permitted in the planning area, although incidental trapping of lynx could still occur. Incidental or illegal shooting can also occur, but trapping and hunting is regulated by state agencies. Predator control activities are conducted by USDA Wildlife Services. Since the factors of trapping shooting and predator control are outside the authority of the FS to manage or regulate, this ROD does not include management direction related to them.

Highways (generally high-speed, two lane) are a known source of direct mortality (LCAS, pp. 2-16 to 2-17). Depending on the situation, this risk factor may fall under the authority of the FS. Therefore, it is addressed in the FEIS, and management direction concerning highways is incorporated into the Forest Plans through this ROD.

Other predators may affect lynx. Lynx have a competitive advantage in places where deep, soft snow tends to exclude predators in mid-winter, the time when prey is most limiting. Certain activities, such as certain types of winter recreation, may provide access to other predators (LCAS, pp. 2-6 to 2-15). The FEIS and ROD addresses this concern.

The LCAS identified *risk factors affecting movement* (pp. 2-17 to 2-19) as:

- Highways and associated development
- Private land development

Lynx are known to disperse over wide areas. Highways and the developments associated with them may affect lynx movement (LCAS, p. 2-17). The FS has only limited authority to address highways, and has no authority to manage activities on private land. Based on the limited authority the FS has in this area, only a few guidelines address these risk factors.

After the LCAS was issued the FWS published a Clarification of Findings in the *Federal Register* (FEIS, Vol. 1, Appendix P), commonly referred to as the Remand Notice. In the Remand Notice the FWS states, "We found no evidence that some activities, such as forest roads, pose a threat to lynx. Some of the activities suggested, such as mining and grazing, were not specifically addressed [in the Remand Notice] because we have no information to indicate they pose threats to lynx" (p. 40083). Further on in the Remand Notice they state, "Because no evidence has been provided that packed snowtrails facilitate competition to a level that negatively affects lynx, we do not consider packed snowtrails to be a threat to lynx at this time" (p. 40098). In regards to timber harvest the FWS states, "Timber harvesting can be beneficial, benign, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the inherent vegetation potential of the site. Forest practices in lynx habitat that result in or retain a dense understory provide good snowshoe hare habitat that in turn provides good foraging habitat for lynx" (p. 40083). These findings by FWS narrow the focus from the concerns first published in the LCAS (discussed above) about what management direction is needed to maintain or improve Canada lynx habitat. We considered this information in the development of the selected alternative, and in our decision.

Public involvement

We involved the public in the development of the plan direction from the very beginning. In order to determine the scope of the public's interest in developing lynx direction the FS and BLM started with a notice published in the *Federal Register* (Vol. 66, No. 176, pp. 47160 to 47163) on September 11, 2001. Originally, the scoping period was scheduled to end on October 26, 2001, but we extended it to December 10, 2001. The FS and BLM gave people more time to comment, both in response to several requests for extensions, and because of the general disruption stemming from the September 11th terrorist attacks. In December 2006, the BLM elected to not be a cooperating agency in this planning effort and to undertake changes to BLM plans through a separate planning process.

We created an official website at www.fs.fed.us/r1/planning/lynx.html. The website continues to provide information, including the information used to develop the Proposed Action, the DEIS, and FEIS.

During scoping we held numerous open-house meetings to provide a better understanding of the lynx proposal and to gain an understanding of public issues and concerns (FEIS, Vol. 1, p. 18). We mailed out more than 6,000 letters about the proposal and upcoming meetings to a mailing list of people interested in land management issues. By December 17, 2001 we had received 1,890 public responses to the scoping notice. We then evaluated and summarized those responses in a report entitled *Summary of Public Comments* (see the *Scoping* section of the Project Record). Responses received after December 17, 2001, but before the release of the Draft Environmental Impact Statement (DEIS) in January 2004 were also considered. A summary of these comments can also be found in the *Scoping* section of the Project Record. In mid-May 2002 we mailed an eight-page update to the more than 2,000 addresses of those who responded to the scoping notice.

We decided to prepare an EIS because of the level of interest expressed during scoping. On August 15, 2002, we published a Notice of Intent to prepare an Environmental Impact Statement in the *Federal Register* (Vol. 67, No. 158, pp. 53334 to 53335). There were five responses to the Notice of Intent, which we also considered.

On January 16, 2004, a Notice of Availability of the DEIS was published in the *Federal Register* (Vol. 69, No. 11, p. 2619). This notice began a 90-day public comment period. At that time, we sent copies of the DEIS (either paper or CD versions), or the summary of the DEIS to a variety of interested parties (FEIS, Vol. 1 p 19). The documents are also available on the web site: www.fs.fed.us/r1/planning/lynx.html.

We hosted open-house meetings in February and March of 2004 to provide the public with a better understanding of the DEIS and its alternatives. Over 380 people attended the open houses which were held in four states and 25 communities. We accepted public comments on the DEIS either sent through the mail or via E-mail. The public comment period ended on April 15, 2004, with the agency receiving well over 5,000

comments. We used those comments, as well as late comments, to help formulate Alternative F, to help clarify and add to the analysis, to correct errors in the DEIS, and to update the FEIS. We responded to all of the comments on the DEIS in the Response to Comments (FEIS, Vol. 2).

Issues

As a result of the public participation process; review by other federal, state, tribal, and local government agencies; and internal reviews, we identified five primary issues, which are described in detail in the FEIS, Vol. 1, Chapter 2. The issues were used as a basis for developing the management direction in the alternatives, and were used to analyze effects. The issues are:

1. Over-the-snow recreation. The effects of limiting the growth of designated over-the-snow routes on opportunities for over-the-snow recreation.

2. Wildland fire risk. The effects of the management direction on the risks to communities from wildland fire.

3. Winter snowshoe hare habitat in multistoried forests. The effect on lynx of allowing projects in winter snowshoe hare habitat in multistoried forests.

4. Precommercial thinning. The effects of limiting precommercial thinning on restoring tree species and forest structures that are declining.

5. FWS Remand decision. The appropriate level of management direction applied to activities that the FWS remand notice found were not a threat to lynx populations.

Alternatives considered in detail

Alternative A, the No Action Alternative. Analyzing a no-action alternative is a requirement of NEPA at 40 CFR 1508.14(d), and of FS planning procedures. The analysis of the effects of Alternative A in the FEIS considers the effects of the forest plans as they currently exist, including any previous amendments. In this case, "no action" means no amendment to the already existing plans, and no additional specific direction to conserve Canada lynx. While the FS has been following the Conservation Agreements signed with the FWS and has considered the LCAS when evaluating projects, the LCAS measures have not been incorporated as plan direction. A decision to adopt Alternative A would not adopt the measures of the LCAS into the plans, but also would not void the existing Conservation Agreements or the consultation requirements of ESA. A decision to not adopt some of the lynx management direction in any of the action alternatives would have been a decision to select a part of Alternative A.

Alternative B, the Proposed Action. The Proposed Action was developed from conservation measures recommended in the LCAS. (See Appendix A in the FEIS, pp. 401 to 438 for a crosswalk from the LCAS, to the proposal as written in the scoping letter; the Proposed Action, Alternative B, found in the Draft and Final EISs; and

Alternative F in the FEIS.) Alternative B addresses activities on National Forest System lands that can affect lynx and their habitat. The exact language of the goal, objectives, standards, and guidelines for Alternative B and all the other action alternatives can be found in the FEIS (Table 2-1, pp. 41 to 69).

Alternative C. Alternative C was designed to respond to issues of over-the-snow recreation management and foraging habitat in multistoried forests, while providing a level of protection to lynx comparable to Alternative B, the Proposed Action. Alternative C would add direction to the plans similar to the LCAS, but would have fewer restrictions on new over-the-snow trails and more restrictions on management actions in winter snowshoe hare habitat in multistoried forests. The exact language of the goal, objectives, standards, and guidelines for Alternative C and all the other action alternatives can be found in the FEIS (Table 2-1, pp. 41 to 69).

Alternative D. Alternative D was designed to address the issues of managing over-the-snow recreation and multistoried forests, similar to Alternative C. Alternative D also allows some precommercial thinning in winter snowshoe hare habitat, while still contributing to lynx conservation. Alternative D would add direction to the plans similar to the LCAS, but having fewer restrictions on new over-the-snow trails and precommercial thinning, and more restrictions than the LCAS (Alternative B) on management actions in winter snowshoe hare habitat in multistoried forests, but less than Alternative C. The exact language of the goal, objectives, standards, and guidelines for Alternative D and all the other action alternatives can be found in the FEIS (Table 2-1, pp. 41 to 69).

Alternative E, the DEIS preferred alternative. Alternative E addresses the issue of wildland fire risk while contributing to lynx conservation. It also responds to statements made in the Remand Notice (USDI FWS, 2003) that FWS has no information to indicate grazing or snow compaction are threats to lynx at this time. This was done by changing the grazing and human uses standards to guidelines. Alternative E would add direction to the plans similar to the LCAS, but has fewer restrictions on new over-the-snow trails and on fuel reduction projects proposed in a collaborative manner, and more restrictions on management actions in winter snowshoe hare habitat in multistoried forests. The exact language of the goal, objectives, standards, and guidelines for Alternative E and all the other action alternatives can be found in FEIS (Table 2-1, pp. 41 to 69).

Alternative F, the FEIS preferred alternative. Alternative F was developed from public comments on the DEIS and by pulling together parts of the other alternatives. Since it was developed from the other alternatives, the effects of Alternative F is within the scope of the effects of the alternatives analyzed in the DEIS.

Alternative F addresses many comments about problems and concerns with Alternatives E, the DEIS preferred alternative. In particular many people and FWS felt Alternative E would not meet the purpose and need because it did not provide the

regulatory mechanisms to adequately address lynx needs. Alternative F was designed to provide adequate regulatory mechanisms for those risk factors found to be a threat to lynx populations – specifically those factors related to the quantity and quality of lynx habitat as discussed in the FEIS, Vol. 1, section *Management direction considered*.

Alternative F addresses comments about where to apply the management direction. Many comments suggested the management direction should only be applied to occupied habitat. Therefore, Alternative F is evaluated under two scenarios: (1) management direction would be incorporated into all forest plans and would *apply to all mapped lynx habitat*, whether or not occupied; and (2) management direction would be incorporated into all forest plans but would only *apply to occupied habitat.* Under Scenario 2, the direction should be "considered" for unoccupied units, but would not have to be followed until such time as lynx occupy the unit. The Nez Perce, Salmon-Challis, Beaverhead-Deerlodge, Bitterroot, Ashley, and Bighorn NFs, and the disjunct mountain ranges on the Custer, Gallatin, Helena, and Lewis and Clark NFs are unoccupied based on the best scientific information available at this time (USDA FS, USDI FWS 2006a).

Other management direction considered

Comments on the DEIS identified a variety of suggestions for management direction. Some of the suggestions were incorporated into the selected alternative, others were not. The FEIS, Vol. 1 pp. 71-102 provides a thorough discussion of these comments and our considerations. The following section includes discussion of some these comments and how they were considered, but not all of the suggestions considered.

The decision

The management direction in Alternative F, Scenario 2 modified (referred from now on as the *selected alternative,* see - Attachment 1) is amended into all Forest Plans in the planning area. The management direction incorporates the terms and conditions FWS issued in their biological opinion (USDI FWS 2007). This management direction includes a goal, objectives, standards, and guidelines related to all activities (ALL), vegetation management (VEG), grazing management (GRAZ), human uses (HU), and linkage (LINK). *Goals* are general descriptions of desired results; *objectives* are descriptions of desired resource conditions; *standards* are management requirements designed to meet the objectives; and *guidelines* are management actions normally taken to meet objectives. Guidelines provide information and guidance for project and activity decision-making (FEIS, Vol. 1 p. 8). The Forest Service and FWS developed the selected alternative in a collaborative manner (Project File/Coordination/with FWS, and Project File/Alternatives/FEIS alternatives).

The selected alternative provides a balance of meeting the purpose and need, and addressing the five primary issues, including other public comments. Alternative B does not provide the management direction necessary for winter snowshoe hare habitat

in multistoried forests. Alternative C, may be best for lynx, but does not address any other issues. Alternative D addresses the need to restore tree species in decline, but we have determined it may allow too much activity in winter snowshoe hare habitat and result in more extensive adverse effects. Alternative E address wildfire risk to communities, but based on our analysis and comments from FWS and the public, may not provide the necessary direction to contribute to conservation and recovery of lynx.

We determined, through our analysis and with concurrence from FWS, the selected alternative contributes to conservation and recovery of lynx, while allowing some activities to occur in lynx habitat that may have some adverse effects on lynx. We determined it was important and acceptable to restore tree species in decline and address wildland fire risks to communities. This decision allows some possible adverse effects on 6.5 percent of lynx habitat (through a combination of fuels treatment in the wildland urban interface (WUI) and precommercial thinning). However, all vegetative standards remain applicable to 93.5 percent of lynx habitat.

The following describes the risk factors, what the LCAS proposed (Alternative B), issues related to the proposed action, what Alternative E (the DEIS preferred alternative) included, comments we received on the DEIS, consideration of new information, and finally what was incorporated into the selected alternative and why.

Management direction related to vegetation

Lynx require certain habitat elements to persist in a given area. Lynx productivity is highly dependent on the quantity and quality of winter snowshoe hare habitat. Winter snowshoe hare habitat may be found in dense young regenerating forests – where the trees protrude above the snowline and in multistoried forests where limbs of the overstory touch the snowline, in addition to shorter understory trees that provide horizontal cover. Certain activities, such as timber harvest, prescribed burning and wildfires, can affect the amount and distribution of these habitat elements, which can in turn affect lynx productivity. Timber harvest can be beneficial, benign, or detrimental depending on the harvest method, the spatial and temporal occurrence on the landscape and the inherent vegetation potential of the site (FEIS, Vol. 1, Appendix P).

Objectives for vegetation management

Objectives define desired conditions for lynx habitat. The LCAS identified four primary objectives which are reflected in Alternative B as *Objectives VEG O1, VEG O2, VEG O3, and VEG O4*. These objectives essentially remain the same among all alternatives. Objectives VEG O1, VEG O2 and VEG O4 were clarified in the selected alternative based on comments on the DEIS, but their intent is the same as the in LCAS.

Standards and guidelines relating to quantity of winter snowshoe hare habitat

Standard VEG S1. In order to provide a distribution of age classes, the LCAS recommended that an lynx analysis unit (LAU) (an area the size of a female lynx home range) not have more than 30 percent of the lynx habitat in an unsuitable condition, and

if an LAU was at 30 percent then vegetation management projects should not create more. Lynx habitat in an unsuitable condition includes those forests in a stand initiation structural stage that are too short to provide winter snowshoe hare habitat. These conditions are created by stand-replacing wildfires, prescribed burns that remove all of the vegetation, or regeneration timber harvest. This recommendation is reflected in Alternative B *Standard VEG S1*.

Some people felt the 30 percent criterion was too high and others said it was too low based on how fires burn in lynx habitat. In addition, some people felt that constraining the 30 percent criterion to a single LAU was too restrictive, as fires burn across vast areas. Fire is the most common disturbance in lynx habitat. Generally, large stand replacing fires burn every 40 to 200 years and smaller low intensity fires burn in the intervals between stand replacing fires (FEIS, Vol. 1, p. 72 and 213-214). The 30 percent criterion was based on a way to maintain lynx habitat over time (Brittel et al. 1989).

None of the alternatives change the 30 percent criterion. However, Alternatives C, D, and E change the area the standard would be considered from an LAU to a larger landscape. Alternatives C and E apply the standard to an LAU or in a combination of immediately adjacent LAUs; Alternative D applies the standard to a subbasin or isolated mountain range. Some people liked the idea of applying the standard to a larger area, others did not. In their comments on the DEIS FWS recommended the standard be applied to a single LAU in order to maintain a good distribution of lynx habitat at the scale of a lynx home range.

The selected alternative applies the management direction to a single LAU to ensure a variety of structural stages are provided within the home range. In addition, the selected alternative was reworded to clarify what "unsuitable habitat" entails and what types of vegetation projects create this condition.

Standard VEG S2. The LCAS also recommended that timber harvest not change more than 15 percent of lynx habitat to an unsuitable condition (stand initiation structural stage that is too short to provide for winter snowshoe hare habitat) over a decade. The purpose of this standard was to limit the rate of management induced change in lynx habitat (FEIS p. 74). This recommendation is reflected in Alternative B *Standard VEG S2.*

In 2003, the effect timber harvest historically had on creating "unsuitable habitat" on Forest Service lands in Region 1 (Hillis et al. 2003) was analyzed. The analysis was based on hydrologic unit codes (HUC) (similar to the size of a lynx home range). This analysis found only 2.5 percent of the HUCs exceeds the 15 percent criterion. Since this criterion was rarely exceeded in the past, and the amount of regeneration harvest the agency does now has been dramatically reduced over the past decade (Project File/Analysis/Vegetation/FEIS/Data), Standard VEG S2 was changed to Guideline VEG G6 in Alternative C, and dropped as a standard or guideline in Alternatives D and E.

FWS comments on the DEIS said that dropping Standard VEG S2 could allow potentially negative effects to lynx to accumulate. Removal of the standard could result in reducing the amount of lynx habitat over a short period of time. Based on these comments, Standard VEG S2 was included in the selected alternative. In addition, the standard was reworded to clarify that it only applies to timber management practices that regenerate a forest (clearcut, seed tree, shelterwood, group selection).

Guideline VEG G1. The LCAS also recommended creating forage (winter snowshoe hare habitat) where it was lacking. *This is reflected as Guideline VEG G1 in Alternative B*. This guideline is retained in the selected alternative. The wording clarifies that the priority areas for creating forage should be in those forests that are in the stem-exclusion, closed canopy structural stage to enhance habitat conditions for lynx and their prey. Basically it says we should focus regeneration efforts in pure lodgepole stands, with little understory, especially where forage is lacking.

Other related comments. Other comments we received on the DEIS relating to the amount or spatial distribution of winter snowshoe hare habitat were in regards to including a standard to limit type conversion, and limiting the size of clearcuts and other regeneration harvest units (FEIS Vol. 1 p. 75-76 and FEIS Vol. 2 27-27, 56-57, 59-60). Neither of these standards were recommended in the LCAS.

Objectives VEG O1, VEG O2, VEG O3 and VEG O4 describe the desired conditions of lynx habitat and all are consistent with the intent to minimize habitat conversions. Projects and activities should be designed to meet or move towards objectives; therefore a standard for type conversion was not necessary.

Openings created by even-aged harvest are normally 40 acres or less. Creating larger openings requires 60-day public review and Regional Forester approval, with some exceptions (R1 Supplement Forest Service Handbook 2400-2001-2; R2 Supplement 2400-99-2). Koehler (1990) speculated that openings created by regeneration harvest, where the distance-to-cover was greater than 325 feet, might restrict lynx movement and use patterns until the forest re-grows. While it is assumed lynx would prefer to travel where there is forested cover, the literature contains many examples of lynx crossing unforested openings (Roe et al. 2000).

Larger openings can often more closely resemble vegetative patterns similar to natural disturbance events (e.g. fire, windthrow, and insect outbreaks) (FEIS, Vol. 1, Appendix P). A disturbance pattern characterized by a few large blocks may be desirable if large areas of forested habitat are a management goal, or if the predation and competition that occur at the edges between vegetation types is a problem (Ruggiero et al. 2000, p. 431). While it is true lynx may not use large openings initially, once they have re-grown and can provide cover, generally after ten to 30 years, such areas may be important to lynx (FEIS, Vol. 1, Appendix P, p. 40092).

The selected alternative already contains direction to consider natural disturbances and maintain habitat connectivity. Based on this management direction and evaluating the information in the *Ecology and Conservation of Lynx in the United States* (Ruggiero et al. 2000) and the LCAS, we decided that a standard limiting the size of openings was unnecessary to improve lynx conservation.

Standards and guidelines relating to quality of winter snowshoe hare habitat

Snowshoe hare are the primary prey for lynx. Winter snowshoe hare habitat is a limiting factor for lynx persistence. Snowshoe hare habitat consists of forests where young trees or shrubs grow densely. In addition to dense young regenerating forests, multistory forests that have trees whose limbs come down to snow level and have an abundance of trees in the understory, also provide winter snowshoe hare habitat. During winter, hare forage is limited to twigs and stems that protrude above the snow and the hares can reach. The LCAS recommended management direction to address winter snowshoe hare habitat in relation to precommercial thinning. Alternative B, the proposed action, splits the management direction to address actions occurring in winter snowshoe hare habitat in young regenerating forests (Standard VEG S5) and actions occurring in winter snowshoe hare habitat found in multistory forests (Standard VEG S6).

Standard VEG S5. The LCAS recommended no precommercial thinning that reduces winter snowshoe hare habitat in the *stand initiation structural stage*. This is reflected in Alternative B *Standard VEG S5.* Precommercial thinning within 200 feet of administrative sites, dwellings, or outbuildings has been allowed under current practices because it was found to have no effect to lynx due to location near structures.

Some people said this standard should apply to all vegetation management projects, not just precommercial thinning. Precommercial thinning is the primary activity that occurs in young regenerating forests. On occasion, other activities such as fuel treatments or prescribe burning, could occur. Alternatives C and D were expanded to apply to all vegetation management projects. Alternative E, the DEIS preferred alternative, only applied it to precommercial thinning projects.

Only a few comments were received on the DEIS saying the standard should apply to all type of projects. FWS did not comment on the more narrow application of the standard.

Standard VEG S5 in the selected alternative only applies to precommercial thinning because it is the predominate activity in young regenerating forests and it is has been identified as the risk factor for reducing winter snowshoe hare habitat (LCAS, Ruggiero et al. 2000, USDA FS and USDI BLM 2000, USDI FWS 2000a, 2000b, USDI FWS 2003).

As noted earlier in the issues section, some people said precommercial thinning should be allowed to restore tree species in decline or to encourage future large trees. Alternative D addresses this issue by allowing precommercial thinning of planted

western white pine, whitebark pine, aspen, and larch, ponderosa pine, and lodgepole pine in certain situations. Alternative E, the DEIS preferred alternative, only allowed precommercial thinning adjacent to structures, for research or genetic tests, or for fuel treatment projects identified in a collaborative manner.

Several comments on the DEIS said the allowances for precommercial thinning in Alternative D should be incorporated into the final alternative. Several comments said that some allowance for adaptive management should be incorporated and that thinning should be allowed where it could be done to promote or prolong winter snowshoe hare habitat.

FWS comments on the DEIS said thinning adjacent to administrative sites, dwellings, or outbuildings and for research and genetic tests would have little effect on lynx or their habitat. In addition, they said the following thinning activities would have cumulatively little effect upon lynx habitat and, in some cases, advance natural ecological conditions. These include: (1) daylight thinning of planted rust-resistant western white pine where 80 percent of winter snowshoe hare habitat is maintained; (2) thinning within whitebark pine stands; (3) western white pine pruning; and (4) thinning for Christmas trees.

We evaluated the comments and incorporated the following elements into the selected alternative:

- Since Standard VEG S5 is concerned with reduction of winter snowshoe hare habitat, western white pine pruning and thinning for Christmas trees can occur if winter snowshoe hare habitat is not reduced. Generally these activities are done on an individual tree basis and do not change the characteristics of the habitat.
- Precommercial thinning can be done adjacent to administrative sites, dwellings, or outbuildings and for research and genetic tests since these would have benign effects on lynx.
- Precommercial thinning can be done for planted rust-resistant western white pine, whitebark pine, and aspen. Thinning to enhance whitebark pine and aspen would benefit other wildlife species and effects only limited acres in lynx habitat (FEIS, Vol. 1 Lynx section). Daylight thinning will be allowed around individual planted rust-resistant western white pine where 80 percent of the winter snowshoe hare habitat is retained. This may reduce some habitat effectiveness, but since this tree species has declined 95 percent across its range, we determined it was important to allow a limited amount of thinning to retain the species on the landscape.

Under these exceptions, about 64,000 acres could be precommercial thinned in occupied lynx habitat over the next decade – assuming full funding. This is likely to affect less than 2 percent of winter snowshoe hare habitat (FEIS Vol. 1 p. 188, USDI FWS 2007).

We also considered allowing precommercial thinning in vast areas of young regenerating forests where precommercial thinning could be done to prolong winter snowshoe hare habitat. We also considered precommercial thinning in young regenerating forests composed primarily of western larch with more than 10,000 trees

per acre – where larch would be removed to favor other species that provide better winter snowshoe hare habitat. In both these situations the general belief is that these activities may be beneficial to lynx in the long term, but information is not available at this time to support that hypothesis. So, the standard was modified to provide an avenue to consider new information that may in the future prove or disprove these hypotheses. The criterion provided in the selected alternative states:

Based on new information that is peer reviewed and accepted by the regional level of the Forest Service and the state level of FWS, where a written determination states:
a. that a project is not likely to adversely affect lynx; or
b. that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat.

This criterion allows incorporation of new peer reviewed information, but requires agreement by FWS before it may be utilized.

Standard VEG S6. The LCAS recommended no precommercial thinning that reduces *winter snowshoe hare habitat in multistory forests*. This is reflected in Alternative B *Standard VEG S6.* Precommercial thinning within 200 feet of administrative sites, dwellings or outbuildings has been allowed under current practices because it was found to have no effect to lynx due to location near structures. The LCAS did not contain a recommendation related to other management actions.

As noted in Issue #3 some people said the management direction should preclude all activities that reduce winter snowshoe hare habitat in multistory forest. Alternatives C, D, and F would apply the management direction to all vegetation management activities in multistory forests that provide winter snowshoe hare habitat. Each alternative has different allowances for vegetation management. Alternative E, the DEIS preferred alternative, changed the management direction from a standard to Guideline VEG G8. The intent of the guideline was to direct vegetation projects to provide winter snowshoe hare habitat through time.

Multistory forest structures can develop from natural processes, such as insects and diseases and fire, or management actions like timber harvest that create small openings where trees and shrubs can grow.

Comments on the DEIS suggested that management direction for multistory forests should be in the form of a standard. FWS suggested the agencies review the latest information or research on lynx use of forests in multistoried structural stages prior to developing a final preferred alternative.

Recent research in northwest Montana demonstrates that mature multistoried forests provide important winter snowshoe hare habitat and are more important than younger stands (FEIS, Vol. 1, p. 22). In fact, the researchers questioned whether or not the LCAS would provide for lynx viability and recovery if only precommercial thinning were precluded.

Based on this new information we retained Standard VEG S6 in the selected alternative, but we preclude *all* vegetation management activities that reduce winter snowshoe hare habitat in multistory forests, not just precommercial thinning as recommended in the LCAS. We would allow minor reductions in winter snowshoe hare habitat for activities within 200 feet of structures, research or genetic tests, and for incidental removal during salvage harvest (associated with skid trails). Fuel treatment projects within the WUI are also exempt from this standard (see fuel treatment discussion further in this decision). We also allow timber harvest in areas that have the potential to improve winter snowshoe hare habitat but presently have poorly developed understories.

We believe and FWS concurred that protecting winter snowshoe hare habitat in multistoried forests will further retain and promote important lynx habitat components.

Standards and guidelines relating to denning habitat

Woody debris – piles of wind-thrown trees, root wads, or large down trees – provides lynx denning sites. Large woody debris gives kittens an escape route from predators, as well as cover from the elements. During the first few months of life, when kittens are left alone while the mother hunts, denning habitat must be available throughout the home range (Bailey 1974). The LCAS recommended two standards and two guidelines related to denning habitat. These are reflected in Alternative B as *Standards VEG S3 and VEG S4 and Guidelines VEG G2 and VEG G3*.

In Alternative B Standard VEG S3 defers vegetation management projects in places with the potential to develop into denning habitat if an LAU contains less than ten percent denning habitat. Standard VEG S4 limits salvage harvest in some situations. Guideline VEG G2 says when more denning habitat is desired to leave standing trees and coarse woody debris. Guideline VEG G3 says to locate denning habitat where there is a low probability of stand-replacing fire.

<u>Development of alternatives for the DEIS</u>

Some people said that den sites can be found in old regenerating forests and the agency should be allowed the flexibility to create denning habitat in regeneration units, especially since denning habitat should be located in or adjacent to forage. In Maine, 17 den sites were located in a variety of stand types, including 10-20 year old clearcuts adjacent to residual stands (FEIS, Vol. 1, Appendix P).

After reviewing the literature, we determined it was reasonable to have an alternative that allows for flexibility to mitigate or create denning habitat, especially when there is less than 10 percent denning habitat. Alternatives D and E modify Standard VEG S3 to say where there is less than 10 percent denning habitat either: 1) defer management, or 2) move towards 10 percent by leaving standing dead trees or piles of coarse woody debris. This combined the guidance in Alternative B, Guideline VEG G2 with the Standard VEG S3.

Some people said salvage harvest should not be singled out because it is not the only management action that removes denning habitat. Standard VEG S4 limits salvage harvest after a disturbance kills trees in areas five acres or smaller – if there is less than 10 percent denning habitat.

We evaluated whether other management actions, such as prescribed burning, chipping, piling and burning, etc. should be precluded. Salvage harvest is the primary management action that removes denning habitat because it removes dead and down timber; therefore we determined other actions did not need to be constrained. However, we determined that Standard VEG S4 should be a guideline in Alternatives D and E because it provides guidance on how to design projects. The guideline says when there is less than 10 percent denning habitat, then units should consider retaining small areas of dead trees. As noted in Alternatives D and E, Standard VEG S3, units can mitigate when there is less than 10 percent denning habitat. It is possible to create denning habitat or retain pockets, but units should be allowed to evaluate denning needs on a site specific basis.

The intent of Alternatives D and E, is where denning habitat is lacking, units should recognize it, retain large and small patches and/or mitigate, especially if it denning habitat can be created in or near new forage areas. In most areas denning habitat is likely not limiting because it is found in such a variety of stand conditions and ages.

Considerations for alternatives in the FEIS

In comments on the DEIS some people said there was no basis for retaining ten percent denning habitat – they wanted the standard dropped altogether. Others wanted more denning habitat required. Some people asked for an alternative to prohibit harvest in old growth or mature timber to protect denning habitat. Others said that all old growth should be protected by management direction because some administrative units do not meet old growth standards.

Some people said allowing salvage logging in disturbed areas smaller than five acres lacked a scientific basis and that all salvage harvest should be deferred. Most comments on the DEIS said that management direction for denning habitat should be in the form of standards.

In their comments on the DEIS FWS supported Standard VEG S3, including conditions 1 and 2 in Alternative E, but was concerned about changing Standard VEG S4 into Guideline VEG G7. FWS recommended development of a standard that: 1) maintains ten percent denning habitat within an individual LAU; 2) is randomly/evenly distributed across the LAU; and 3) ensures recruitment of future denning habitat.

Based on these comments, we reconsidered the management direction for denning habitat. We held discussions with the researchers, lynx biology team and FWS to further explore denning habitat – where it is found, how to measure it, and how to ensure plans provide the appropriate level of management direction.

Where denning habitat is found: Since 1989 researchers have discovered that lynx denning habitat is found in a variety of structural stages from young regenerating forests to old forests. The integral component of lynx den sites appears to be the amount of downed, woody debris, not the age of the forest stand (Mowat, et al. 2000). Research by Squires (pers. com. Oct. 30, 2006) has found that of 40 den sites in northwest Montana most were located under large logs, but "jack-strawed" small diameter wind thrown trees, root wads, slash piles, and rock piles were also used (FEIS, Vol. 1 p. 172-173). These structural components of lynx den sites can often be found in managed (logged) and unmanaged (e.g. insect damaged, wind-throw) stands.

How to measure denning habitat: Retaining ten percent denning habitat is based on maintaining lynx habitat over time (Brittel et al. 1989). Brittel recommended a balance of conditions – 30 percent forage, 30 percent unsuitable that would grow into forage, 30 percent travel, and ten percent denning.

We evaluated how to measure 10 percent denning based on where the habitat can be found. We evaluated using mature and over-mature forests as a first approximation of denning habitat. Generally mature and over-mature forests contain a component of dead and down trees which lynx use. If these two components were used then all units would show much more than ten percent denning habitat as all forests have at least twenty percent of their forest in mature stand structures (Project file/Analysis/Forests/FEIS/Data). In addition, these stand structures do not account for all the stand conditions where denning habitat can be found because denning habitat can be found in young forests with slash piles, lodgepole forests with insect and disease outbreaks, areas recently burned in wildfires, as well as variety of other forest conditions. Based on these discussions, we decided, with agreement from FWS, that using stand structures as a proxy would show an abundance of denning habitat; therefore the requirement to retain ten percent was found not to be a useful measure.

How to provide for denning habitat:

We considered restricting harvest in mature forests and old growth. The important component for all lynx den sites appears to be the amount of down woody debris present, not the age of the forest (Mowat et al. 2000, Appendix P). Old growth and mature forests can provide denning habitat, but based on review of research a variety of forest structures also provide denning habitat. We considered prohibiting timber harvest in old growth but dismissed this from detailed consideration because denning habitat is found in a variety of forest structures (FEIS, Vol. 1 p. 81).

We considered restricting salvage harvest. Standard VEG S4 in Alternatives B and C limits salvage harvest after a disturbance kills trees in areas five acres or smaller – if there is less than 10 percent denning habitat. The standard was changed to a guideline in Alternatives D and F. The guideline says that when there is less than 10 percent denning habitat, then units should consider retaining small areas of dead trees.

Salvage harvest can remove denning habitat. However, den sites are found in areas with large logs, "jack-strawed" small diameter wind thrown trees, root wads, slash piles, and rock piles. These areas need not be extensive – they are generally small areas that provide sufficient cover for lynx den sites.

We reevaluated whether or not denning habitat is a limiting factor for lynx. Based on discussions with research, we reaffirmed that denning habitat is found in a variety of forest conditions, they are found in small pockets scattered across an area and are generally found across the landscape, and lynx denning sites are not believed to be a limiting factor (J. Squires, pers. com. Oct. 30, 2006). In addition, management actions can create denning habitat by strategically leaving piles of woody debris, or leaving residual trees where denning habitat is lacking.

Therefore, we determined that restricting salvage harvest was not necessary, but that projects should consider the abundance and distribution of denning habitat in their project design and leave den site components (piles of down wood, or standing dead trees) where it is lacking.

We considered management direction in the form of standards vs. guidelines. We determined management direction for denning habitat should be incorporated into one set of management direction. Incorporating all the direction into one standard or guideline reduces the potential for conflicts between directions, focusing on the important components of denning habitat.

We determined a guideline would be best suited for this management direction because denning habitat can be found in a variety of forest structures and in small areas, is not a limiting factor for lynx, and the management direction would provide design features for projects. Therefore we developed Guideline VEG G11 in the selected alternative. The guidance is to: 1) have denning habitat distributed across an LAU (in the form of pockets of large woody debris, either down logs or root wads, or large piles of jack-strawed trees); and 2) if denning habitat is lacking, projects should be designed to retain coarse woody debris – by leaving piles or retaining residual trees that can become denning habitat later.

Objectives VEG O1, VEG O2, VEG O3, and VEG O4 and Standards VEG S1, VEG S2, and VEG S6 also indirectly promote the development and retention of the structure needed for denning habitat through vegetation management that promotes a mosaic of forest conditions across the landscape (USDI FWS 2007). Based on the above, FWS determined that projects were unlikely to reduce denning structure to levels that result in adverse effects to lynx (USDI FWS 2007).

In addition, the Lynx Biology Team (the team responsible for the LCAS) is in the process of updating the LCAS denning habitat recommendations based on this new information about where denning habitat is found and its distribution.

Consideration of fuel treatment projects

Most lynx habitat consists of high-elevation spruce/fir and lodgepole pine forests, but some lynx habitat may be found in mixed conifer forests. Generally, forests in lynx habitat are close to historic conditions, meaning the long fire return interval has not been affected to any large degree by more recent fire suppression as is the case in dryer forests with short fire return intervals. However, some stand conditions are conducive to extreme fire behavior because of insect and disease mortality or the amount of tree limbs that provide ladder fuels. Fuel treatments designed to reduce ladder fuels and/or reduce the potential size (Finney 2001) and severity of wildland fires may be proposed in lynx habitat.

After the 2000 wildfire season, which burned a substantial amount of acreage, the Forest Service began to set goals for wildfire management. Several documents serve to provide a national prioritization system for the selection of hazardous fuel treatments on Federal lands with close coordination among the Federal, State, and other agencies, as well as Tribes and communities. The criteria for prioritizing lands for hazardous fuels treatment generally correspond to: (1) closest proximity to communities at risk in the WUI; (2) strategic areas outside the WUI that prevent wildland fire spread into communities or critical infrastructure; (3) areas outside of WUI that are in Condition Classes 2 or 3; and (4) other considerations (FEIS, Vol. 1 p. 215).

The LCAS did not specifically address fuel treatments. During scoping we identified wildland fire risk as an issue, issue # 2 (FEIS, Vol. 1 p. 21-22). We developed a range of alternatives to address this issue.

In Alternative A, there would be no change in existing plan direction on the treatment of fuels.

Alternative B would allow fuel treatments to go forward if they:

- Meet the 10 percent denning standard (Standard VEG S3 and S4)
- Meet 30 percent unsuitable habitat standard (Standard VEG S1) or 15 percent unsuitable habitat created by timber harvest standard (Standard VEG S2)
- Use methods other than precommercial thinning in winter snowshoe hare habitat (Standards VEG S5 and VEG S6)

Alternatives C and D would not allow any type of fuel reduction project that reduced winter snowshoe hare habitat – except within 200 feet of structures.

Alternative E, the DEIS preferred alternative would not apply the vegetation standards (Standards VEG S1, S3, and S5) to fuel treatments developed in a collaborative manner, as described in the *10-Year Comprehensive Strategy Implementation Plan* (USDA FS 2001). This exception was used because a multi-party Memorandum of Understanding was signed in 2003 by the FS, BLM, and FWS (USDA FS et al. 2003) concerning fuel treatments and collaboration.

Many comments were received on the DEIS regarding fuel treatments. Some people suggested there be no exemptions for fuel treatments. Several groups suggested that only fuel treatments within 500 yards of human residences and other structures be allowed because these areas are generally not appropriate to restore lynx anyway. Others felt the exemptions should only apply to the WUI and that the agencies should define the WUI. Others liked the exemptions as they were written in Alternative E.

FWS cautioned against exempting a broad range and unknown number of actions from plan direction. They felt, as currently worded in Alternative E, the exemption was sufficiently vague that it did not allow an adequate analysis of potential effects upon lynx or lynx habitat and it could result in extensive adverse effects to lynx.

FWS suggested Standard VEG S5 be modified to restrict precommercial thinning to within one mile of structures. They did not believe any exemptions were needed for Standards VEG S1 or S2 since so very few LAUs were near the thresholds identified in these standards. They felt very few proposals would be constrained by the standards. They also questioned why Condition Class 1 forests were not specifically excluded from the exemptions. Condition Class 1 forests include areas where fires have burned as often as they did historically; the risk of loosing key ecosystem components is low; and vegetation composition and structure is intact and functioning. The FWS went on to say they recommended that processes, actions, or types that would be exempt be clearly identified.

We reviewed and discussed the comments with FWS and decided to modify the fuel treatment exemption for the selected alternative. We thoroughly discussed the issue of how to allow for fuel treatments to reduce the hazard to communities – while providing for the conservation and recovery of lynx (Project File/Alternatives/FEIS alternatives).

Based on our discussions we decided none of the vegetation standards will apply to fuel treatment projects within the WUI as defined by the Healthy Forests Restoration Act (HFRA), within a certain limit. We constrained the number of acres that do not meet the standards to 6 percent of lynx habitat within a National Forest, and we added the FWS term and condition that fuel treatment projects can cause no more than 3 adjacent LAUs to not meet standard VEG S1.

In addition we added Guideline VEG G10 which says fuel treatment projects within the WUI should be designed *considering* Standards VEG S1, S2, S5, and S6. The intent in adding this guideline is that although these vegetation standards do not apply to fuel treatment projects within the WUI as defined by HFRA, these projects should still consider the standards in the development of the proposal. In many cases projects can be designed to reduce hazardous fuels while providing for lynx needs. This guideline ensures lynx are considered in the project design – but allows for the flexibility of not meeting the standards in situations where meeting the standards would prevent the project from reducing the hazardous fuels in the WUI.

The following describes some of the considerations in the development of this direction.

Application to Standards VEG S1 and S2: Under Standards VEG S1 and S2 it is likely very few projects would exceed the 30 percent and 15 percent criteria because many fuel treatment projects are not regeneration harvest. If regeneration harvest is applied it is likely to be done to create a fuel break adjacent to communities or to break up the continuity of fuels (Finney 2001). Since part of our direction under the Healthy Forests Initiative is to look for ways to expedite fuel reduction projects we determined that we did not want to have to amend forest plans for the few cases where not meeting the standards may be necessary.

Application to Condition Class 1: Many forests in lynx habitat are in Condition Class 1, meaning these forests have not missed a fire cycle because large, stand-replacing fire only occurs every 100 to 200 years. However, some of these Condition Class 1 forests can still be a threat to communities. An example is lodgepole pine forests which are at the age of being susceptible to mountain pine beetle outbreaks. Regenerating lodgepole pine, adjacent to a community, may be needed to reduce the severity and size of a wildland fire. Fire is a natural process in these ecosystems; but there is a need to balance the natural process with the risk of fire destroying homes; therefore we did not limit the standard to particular condition classes.

What locations should be exempted: We evaluated various options regarding where the standards should be applied and we used a variety of criteria to evaluate which option to carry forward for detailed consideration. The criteria included: 1) is there a defined area; 2) can effects be meaningfully evaluated; 3) would it provide for community protection; and 4) does it meet the purpose and need. (For further detail see FEIS, Vol. 1 pp. 85-86 which summarizes the options and considerations and the Project File/Alternatives/FEIS Alternatives/documents July 29, 2004 through February 24, 2005).

Based on comments, national direction regarding fuel treatments, and the effects on lynx, we decided exempting fuel treatment projects within the WUI, within limits would be a reasonable balance. We decided to use the definition established by Congress in the HFRA as it established a national procedure for determining the extent of the WUI (USDI, USDA FS 2006).

What limit(s) should be applied: We elected to put a limit on the amount of fuel treatment projects that could exceed the vegetation standards, since WUI has not been mapped on all units. We evaluated the WUI based on a mile of where people live (FEIS, Vol. 1 p. 217). A one mile buffer from communities was used because HFRA describes WUI as ½ mile or 1 ½ miles depending on certain features. One mile splits this difference and is easy to approximate. Based on this analysis, we found that about 6 percent of lynx habitat is within 1 mile of communities; therefore we limited the amount of acres that can exceed the standards to 6 percent of each National Forest.

In addition, FWS identified two terms and conditions (TC) to minimize impacts of incidental take of lynx due to fuel treatment projects. TC 1 (6 percent limit) was already incorporated as described above; TC 2 says fuel treatment projects shall not result in

more than three adjacent LAUs exceeding the standard. This TC has been incorporated into the management direction – see Attachment 1.

Summary: Exempting fuel treatment projects within the WUI provided a defined area, as requested by FWS; we could evaluate the effects (FEIS, Vol. 1 Lynx section); it provides for community protection by reducing delay; and meets the purpose and need by constraining the area where adverse effects could occur. In addition we compiled information from each forest's 5 year fuel treatment program to evaluate effects – FEIS, Vol. 1, Lynx section and Appendix M, and USDI FWS 2007. This information was not available for the DEIS. We found that although we would limit adverse effects to 6 percent of lynx habitat, it is more likely only 1.4 percent or less of lynx habitat would have adverse effects. This is because the fuel treatment program of work within the WUI only amounts to 1.4 percent of lynx habitat and many projects can be designed to meet the vegetation standards. Regardless, the vegetation standards would apply to fuel treatments on 94 percent of lynx habitat.

In addition, by addressing the exemption and putting a limit on where adverse effects could occur this allowed us to take a cumulative look at the effects planning area wide vs. amending standards project-by-project.

FWS findings related to the vegetation management direction

The vegetation management direction set forth in the selected alternative conserves the most important components of lynx habitat: a mosaic of early, mature, and late successional staged forests, with high levels of horizontal cover and structure. These components ensure the habitat maintains its inherent capability to support both snowshoe hare prey base and adequate lynx foraging habitat (and denning habitat) during all seasons. These standards are required for all vegetation management actions on at least 93.5 percent of lynx habitat in the planning area. Areas within the WUIs (totaling six percent of lynx habitat) are exempt from these standards; however VEG G10 would apply and at least requires some consideration of the standards in designing fuel reduction treatments. Precommercial thinning, allowed under the exceptions, may affect an additional 0.5 percent of lynx habitat. Where these standards are applied to vegetation management projects, we anticipate few, if any, would have adverse effects on lynx. Collectively, application of these standards for vegetation management is expected to avoid adverse effects on lynx and promote the survival and recovery of lynx populations (USDI FWS 2007).

Management direction related to grazing

Livestock grazing may reduce or eliminate foraging habitat in areas that grow quaking aspen and willow in riparian areas (LCAS). These localized changes in habitat may affect individual lynx; however, no information indicates that grazing poses a threat to overall lynx populations (FEIS, Vol. 1, Appendix P, p. 40083). Appropriate grazing management can rejuvenate and increase forage and browse in key habitats such as riparian areas. Grazing was not mentioned in the original listing decision as a threat to

lynx, nor is it discussed in *the Ecology and Conservation of Lynx in the United States* (Ruggiero et al. 2000). In addition, FWS noted that they have found no research that provides evidence of lynx being adversely affected by grazing within the planning area or elsewhere, or of lynx movements within home ranges being impeded by grazing practices (USDI FWS 2007).

The LCAS recommended four standards for grazing management. These are reflected in Alternative B. *Standards GRAZ S1, GRAZ S2, GRAZ S3, and GRAZ S4* provide management direction for grazing in fire and harvest created openings, aspen stands, riparian areas and willow carrs, and shrub-steppe habitat. Alternatives C and D retain the management direction as standards. Alternative E changes the management direction to Guidelines GRAZ G1, GRAZ G2, GRAZ G3, and GRAZ G4 because neither the Remand Notice nor the *Ecology of Conservation of Lynx in the United States* recognized grazing as a threat to lynx.

Many people commented on Alternative E, the preferred alternative in the DEIS, and said the guidelines should be standards in the final alternative. Others said grazing should not be allowed at all, while two said the grazing guidelines should be retained. The FWS did not comment on the level of grazing management direction in Alternative E. We considered these comments in the FEIS Vol. 1 pp. 86-87, as well as Vol. 2, 75-76.

We decided the management direction for grazing in the selected alternative should be in form of guidelines, Guidelines GRAZ G1 through GRAZ G4 because there is no evidence grazing adversely affects lynx. These guidelines provide project design criteria for managing grazing in fire and harvest created openings, aspen, willow, riparian areas, and shrub-steppe habitats. The guidelines are designed to minimize potential adverse effects and improve habitat conditions. FWS found that with the application of these measures in most cases, there would be no effects or discountable effects to lynx (USDI FWS 2007). In addition, the Lynx Biology Team is in the process of updating the LCAS grazing recommendations.

Management direction related to human uses

Over-the-snow winter recreation

Lynx have very large feet in relation to their body mass, providing them a competitive advantage over other carnivores in deep snow. Various reports and observations have documented coyotes using high elevation, deep snow areas (Buskirk et al. 2000). Coyotes use open areas because the snow is more compacted there, according to research conducted in central Alberta (Todd et al. 1981). In another study in Alberta, coyotes selected hard or shallow snow more often than lynx did (Murray et al. 1994).

The LCAS recommended two objectives and two standards relating to winter dispersed recreation. These are reflected in Alternative B, *Objectives HU O1 and HU O3, and Standards HU S1 and HU S3*. In Alternative B, Standard HU S1 would maintain the existing level of groomed and designated routes. All action alternatives contain

Objectives HU O1 and HU O3 that discourage expanding snow-compacting human activities. Alternatives B, C, and D contain Standard HU S1 that would allow existing over-the-snow areas to continue but not expand into new, un-compacted areas. Alternative E, the DEIS preferred alternative, contains Guideline HU G11 that discourages the expansion of designated over-the-snow routes and play areas into uncompacted areas. All alternatives would allow existing special use permits and agreements to continue.

In comments on the DEIS some people asked that no dispersed over-the-snow use be allowed off groomed or designated trails and areas, saying the no net increase in groomed or designated routes did not go far enough. Others said the management direction should be in the form of a standard, not a guideline.

Some people said standards related to over-the-snow use should be removed. They said there is no evidence to show that coyotes and other predators use packed snow trails to compete with lynx for prey, and the amount of compaction created by snowmobiles is insignificant compared to the compaction created naturally by the weather. They were particularly concerned that if such language was introduced into plans, it could be difficult to change, incrementally restricting the places where snowmobiling is allowed. Others wanted an allowance made to increase use. These comments were considered for management direction – see FEIS Vol. 1 pp. 90-93.

In their comments on the DEIS the FWS agreed it is prudent to maintain the status quo and restrict expansion of over-the-snow routes until more information is available because of the possibility that, over time, unregulated expansion could impair further conservation efforts. They also said current, ongoing research in Montana may shed some information on the effects of snow compaction on lynx. They suggested careful consideration of the most recent information and the reality of possible impairment of options for the future. They suggested considering language that could provide more guidance on conditions where the expansion of over-the-snow routes would be warranted and acceptable.

We reviewed the results of research conducted since the DEIS was released. In northwestern Montana (within the northern lynx core area) Kolbe et al. (in press) concluded there was "little evidence that compacted snowmobile trails increased exploitation competition between coyotes and lynx during winter on our study area." Kolbe et al. (in press) suggested that compacted snow routes did not appear to enhance coyotes' access to lynx and hare habitat, and so would not significantly affect competition for snowshoe hare. They found that coyotes used compacted snow routes for less than 8 percent of travel, suggesting normal winter snow conditions allowed access by coyotes, regardless of the presence or absence of compacted snow routes. Kolbe was able to directly measure relationships between coyotes, compacted snow routes and snowshoe hare in an area that also supports a lynx population (USDI FWS 2007). In this study coyotes primarily scavenged ungulate carrion that were readily

available while snowshoe hare kills comprised only three percent of coyote feeding sites (Kolbe et al. in press).

In the Uinta Mountains of northeastern Utah and three comparative study areas (Bear River range in Utah and Idaho, Targhee NF in Idaho, Bighorn NF in Wyoming) Bunnell (2006) found that the presence of snowmobile trails was a highly significant predictor of coyote activity in deep snow areas.

From track surveys it was determined the vast majority of coyotes (90 percent) stayed within 350 meters of a compacted trail and snow depth and prey density estimates (snowshoe hares and red squirrels) were the most significant variable in determining whether a coyote returned to a snowmobile trail (Bunnell 2006). Of the four study areas recent lynx presence has only been documented on the Targhee NF. Bunnell indicated that "circumstantial evidence" suggested the existence of competition.

To date, research has confirmed lynx and coyote populations coexist, despite dietary overlap and competition for snowshoe hare, the primary prey of lynx, and alternate prey species. In some regions and studies, coyotes were found to use supportive snow conditions more than expected, but none confirm a resulting adverse impact on lynx populations in the area. The best scientific information (Kolbe's study) is from an occupied core area within our planning area. Radio-collared lynx and coyotes were monitored in this study, unlike the Bunnell study. This area is occupied by both lynx and coyotes and the study concludes coyotes did not require compacted snow routes to access winter snowshoe hare habitat.

Based on this information, we reevaluated management direction related to over-the-snow activities. An alternative to prohibit all snow-compacting activities or to limit dispersed use was evaluated, but not considered in detail because current research indicates this level of management direction is unwarranted (USDI FWS 2000a; FEIS, Vol. 1, Appendices O and P).

An alternative to drop all direction limiting snow compaction was not developed in detail because there is evidence competing predators use packed trails, suggesting a potential effect on individual lynx. We decided it was prudent to maintain the status quo and not let over-the-snow routes expand. However, we also decided it was reasonable to retain the direction as a guideline in the selected alternative which can be used in project design. The intent is to follow the management direction in guidelines. However, there may be some cases where expansion of over-the-snow routes would be warranted and acceptable, or where research indicates there would be no harm to lynx. Guidelines are better suited to adaptive management.

There is also no basis to establish any particular threshold of allowable increases. However, the selected alternative allows expanding winter recreation in some places where heavy public use existed in 1998, 1999, or 2000 – see Guideline HU G11.

The FWS concluded the Objectives HU O1 and O3, and Guideline HU G11 would be sufficient to maintain habitat effectiveness for lynx by limiting the expansion of

compacted snow routes and this conclusion would be tested through monitoring required in this decision. The best information available has not indicated compacted snow routes increase competition from other species to levels that adversely affect lynx populations, and under the selected alternative the amount of areas affected by snow compacted routes would not substantially increase (USDI FWS 2007).

Developed recreation

The LCAS identified risk factors associated with ski areas, including *short-term effects* on denning, foraging, and diurnal security habitat and *long-term effects* on movement within and between home ranges (LCAS, p. 2-10). Ski areas may eliminate habitat and pose a threat to movements; but most were constructed before lynx became a conservation issue (Hickenbottom et al. 1999, p. 70). Mitigation measures can be developed at the project level to lessen the effects of existing developments.

The LCAS recommended various objectives, standards, and guidelines in relation to developed recreation, specifically ski areas. These are reflected Alternative B*, Objectives ALL O1, HU O2, HU O3, and HU O4; Standards ALL S1 and HU S2; and Guidelines HU G1, HU G2, HU G3, and HU G10.* Objectives and standards *(LINK O1 and LINK S1)* regarding habitat connectivity also address concerns about developed recreation. These objectives, standards, and guidelines provide management direction about ski area development, expansion, and operations to provide for lynx movement, security, and habitat needs.

The alternatives retain similar management direction as Alternative B, except Alternatives C, D, and E changed Standard HU S2 to Guideline HU G10. Standard HU S2 requires diurnal habitat to be maintained, if needed. There is no evidence that diurnal security habitat is required by, or where it occurs on ski areas is used by lynx (USDI FWS 2007). Since the need to provide diurnal habitat is questionable, we determined it was better suited as a guideline.

In commenting on the DEIS some people said ski areas should be removed or at least prevented from expanding. Others recommended the final preferred alternative retain Standard HU S2. There are 24 existing down hill and cross country ski areas in occupied habitat in the planning area, which affect about 17,500 acres out of the 12.5 million acres of occupied habitat. Eight down hill ski areas are planned for expansion. One new ski area is proposed. Most of the ski areas are located on individual mountain ranges, not several together as in other areas in the west (FEIS, Vol. 1 p. 285). There is no indication these ski areas affect lynx travel because these ski areas are spread across the planning area. There is no information that indicates removal of ski areas is warranted, nor is limiting their expansion, as long as lynx needs are considered. The selected alternative includes standards to provide for lynx habitat connectivity, and includes guidelines to be use in the development of ski area expansion. Many adverse effects of developed recreation will be minimized under the selected alternative (USDI FWS 2007).

Minerals and energy

The LCAS said the main risk factors associated with minerals and energy development is related to the potential for plowed roads to provide access for lynx competitors.

These recommendations are reflected in Alternative B, *Objectives ALL O1, HU O1, and HU O5, Standards ALL S1 and HU S3, and Guidelines HU G4, and HU G5* which provide management direction for mineral and energy development. All except standard HU S3 remain essentially the same in all alternatives. Standard HU S3 says to keep mineral and energy development to designated routes. This standard was changed to Guideline HU G12 in Alternative E and in the selected alternative to be consistent with the application of management direction regarding over-the-snow routes discussed above.

In commenting on the DEIS some people said lease stipulations identifying constraints on developing oil and gas, coal, or geothermal resources should be one of the decisions made as a part of the management direction. This comment is addressed in the FEIS, Vol. 1 p. 94-95. FWS did not comment on the management direction related to minerals and energy development.

Forest roads

Lynx are known to have been killed by vehicle-collisions in Colorado (reintroduced population; paved, high-speed highways), in Minnesota (paved, high-speed highways) and in Maine (high-speed, relatively straight gravel roads on flatter terrain). The best information suggests that the types of roads managed by the Forest Service do not adversely affect lynx (USDI FWS 2007). Lynx mortality from vehicle strikes are unlikely, and to date none have been documented on National Forest System lands within the planning area, given the relatively slow speeds at which vehicles travel on these roads (due to topography and road conditions) and generally low traffic volumes.

Roads may reduce lynx habitat by removing forest cover. Along less-traveled roads where the vegetation provides good hare habitat, sometimes lynx use the roadbeds for travel and foraging (Koehler and Brittell 1990; LCAS, p. 2-12). A recent analysis on the Okanogan NF in Washington showed lynx neither preferred nor avoided forest roads, and the existing road density does not appear to affect lynx habitat selection (McKelvey et al. 2000; USDI FWS 2000a, p. 39).

Although many species of wildlife are disturbed when forest roads are used (Ruediger 1996), preliminary information suggests lynx do not avoid roads (Ruggiero et al. 2000) except at high traffic volumes (Apps 2000). In denning habitat, when roads are used during summer, lynx may be affected if they move their kittens to avoid the disturbance (Ruggiero et al. 2000; LCAS, p. 2-12).

The LCAS recommended several guidelines to address potential impacts of forest roads, including upgrading, cutting and brushing, and public use. These guidelines generally discourage improving access for people or reduce the likelihood people would see lynx near roads. These guidelines are reflected in Alternative B, *Guidelines*

HU G6, HU G7, HU G8, and HU G9. All the alternatives, including the selected alternative retain these guidelines.

In commenting on the DEIS some people said more restrictions on roads were needed to conserve lynx. They wanted new road construction halted, road densities identified and existing roads closed or eliminated, or they wanted the roads guidelines turned into standards. Other people said there should be no road-related standards or guidelines, saying no evidence exists that roads harm lynx. Some people said Guideline HU G9 should be deleted because there are no compelling reasons to close roads. The FEIS, Vol. 1, pp. 95 to 96 describes how these were considered in the development of the management direction. FWS had no comments related to these guidelines.

Based on our review we found no information indicating road building should be banned or that further restrictions were needed. The guidelines adequately address the known risks associated with roads. We determined guidelines were the appropriate level of management direction because guidelines provide information and guidance for project design and decision-making. Some guidance on how to design projects is warranted because roads may affect individual lynx.

Management direction related to linkage areas

Highways and connectivity

Highways impact lynx by fragmenting habitat and impeding movement. As traffic lanes, volumes, speeds, and rights-of-way increase, the effects on lynx are increased. As human demographics change, highways tend to increase in size and traffic density.

The LCAS recommended one objective, two standards, and a guideline directly or indirectly related to highways and connectivity. These are reflected in Alternative B, *Objective ALL O1*, *Standards ALL S1* and *LINK S1,* and *Guideline ALL G1*. Objective ALL O1 and Standard ALL S1 are intended to maintain connectivity. Standard LINK S1 is intended to provide a process for identifying wildlife crossings across highways.

Alternatives C, D, E and the selected alternative have the same objective and standards.

In comments on the DEIS some people said more should be done than just identifying highway crossings. FWS did not comment on management direction related to highways.

The LCAS recommended project standards for highways. It says to "Identify, map and prioritize site-specific locations, using topographic and vegetation features, to determine where highway crossings are needed to reduce highway impacts on lynx and other wildlife". Alternatives B, C, D, E and the selected alternative include Standard LINK S1 which reflects the intent of the LCAS recommendations. In addition, Guideline ALL G1 says "Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses or overpasses."

As noted in Chapter 3, Transportation Section, portions of three highways are likely to be reconstructed in linkage areas in the next ten years. State agencies in Wyoming, Idaho, and Montana are incorporating wildlife crossings into their highway design packages (Wyoming Department of Transportation, 2005; Idaho Transportation Department 2004; Montana DOT, FHWA, Confederated Kootenai and Salish Tribes 2006). Therefore no further management direction regarding wildlife crossings in the form of standards was found to be warranted.

Other considerations in linkage areas

Coordination among different land management agencies is important to the recovery of lynx because lynx have large home ranges and may move long distances. The LCAS recommended guidance for working with landowners to pursue solutions to reduce potential adverse effects. This recommendation is reflected in Alternative B, *Objective LINK O1*. This objective is the same among all alternatives, including the selected alternative.

In addition, it is important to mention the Forest Service is a lead member in the interagency Lynx Steering Committee and the Lynx Biology Team (FEIS, Vol. 1 Chapter 4), and played a key coordination role for the Lynx Science Team. These efforts facilitate relationships with other Federal and non-Federal landowners, including the States and provide a source for non-Federal land management guidance, through products such as the LCAS and Forest Plans. The Steering Committee would also provide a forum to build and sustain cooperative efforts with Canada to maintain lynx connectivity across the international border, if and when the need arises (USDI FWS 2007). The Forest Service also led the interagency effort to identify linkage areas.

Use of standards and guidelines

The selected alternative incorporates standards for those risk factors found to threaten lynx populations. Standards are management requirements used to meet desired conditions. Standards were used in those situations where we wanted to provide sideboards for project activities. Guidelines were used for those risk factors that may have possible adverse affects on individual lynx. Guidelines are management actions normally taken to meet objectives. They provide design criteria to meet lynx objectives. We expect guidelines to be followed in most cases, however based on site-specific conditions there may be reason not to follow a guideline.

FWS found guidelines would be implemented in most cases and adverse effects would not always occur where guidelines are not implemented. Effects would be based on site-specific conditions, with compliance with Section 7 consultation for each project. The FWS does not expect adverse effects as a result of changes of LCAS standards to guidelines to reach levels that impact lynx populations. Changes from standards to guidelines occurred when the best available information indicated the action was not likely to adversely affect lynx, or not likely to adversely affect lynx in most cases (i.e. where no conclusive or reliable information supported the standard in the LCAS).

Application of the standards, and for the most part guidelines, in core and occupied secondary areas substantively reduce the potential for adverse effects on lynx over the existing plans (USDI FWS 2007).

In addition, we will monitor the application of guidelines to see if our assumption they are normally applied is correct. Annually we will review the monitoring results to determine if further consideration is warranted.

Where to apply the decision

The selected alternative is incorporated into all forest plans in the planning area (FEIS, Vol. 1, Table 1-1 p. 5 and Figure 1-1). However, the management direction only applies to occupied lynx habitat. Those National Forests (the Beaverhead-Deerlodge, Bitterroot, Nez Perce in Region 1; the Bighorn in Region 2; and the Ashley, and Salmon-Challis in Region 4), or isolated portions of National Forests (the Custer, Gallatin, Helena and Lewis and Clark in Region 1), that presently are unoccupied by Canada lynx should consider the management direction that is now incorporated into their Forest Plans when developing projects, but are not required to follow the management direction until such time as they are occupied by Canada lynx.

According to the Conservation Agreement (USDA FS, USDI FWS 2006a), an area is considered occupied when: (1) there are at least 2 verified lynx observations or records since 1999 on the national forest, unless they are verified to be transient individuals; or (2) there is evidence of reproduction on the national forest.

This direction is in keeping with the current Conservation Agreement which only applies to projects and activities in occupied habitat. The FWS species lists on those forests and portions of forests that are unoccupied do not show lynx as a species for consideration. However, as noted in the Biological Opinion, the FWS said, and we agree that lynx detection is needed to assess whether further management direction is warranted (USDI FWS 2007). Therefore, we agree to work with the FWS to develop and complete an acceptable protocol to survey currently unoccupied lynx habitat in secondary areas as described in the Biological Opinion, Term and Condition #4.

Incorporation of terms and conditions

On March 16, the FWS issued its Biological Opinion on the Northern Rockies Lynx Management Direction (USDI FWS 2007). In the opinion the FWS concluded that the management direction would overall be beneficial, but that some adverse effects to lynx would still be anticipated. It determined the management direction would not jeopardize the continued existence of lynx. The opinion also provides an incidental take statement which specifies the impact of any incidental taking of lynx. It also provides reasonable and prudent measures that are necessary to minimize the impacts of the take and sets forth terms and conditions which must be complied with in order to implement the reasonable and prudent measures.

The opinion identified three reasonable and prudent measures (RPM) with four associated terms and conditions (TC). We incorporated TC 1 through 3 into the management direction. The TCs are shown in italics in Attachment 1. TC #4 is agreed to as described below.

RPM #1: Minimize harm from fuels management by ensuring the acres impacted are not concentrated in a geographic area or several adjacent LAUs

Ensure fuels management projects conducted under the exemptions from Standards VEG S1, S2, S5 and S6 in occupied habitat:

TC 1. do not occur in greater than 6 percent of lynx habitat on any forest; and

TC 2. do not result in more than 3 adjacent LAUs not meeting the VEG S1 standard.

TC 1 was already part of the management direction. TC 2 has been added to Standard VEG S1.

RPM #2: Minimize harm from precommercial thinning and vegetation management by ensuring that LAUs either retain sufficient foraging habitat, or do not substantially reduce foraging habitat.

TC 3. In occupied habitat, precommercial thinning and vegetation management projects allowed per the exceptions listed under VEG S5 and S6, shall not occur in any LAU exceeding VEG S1, except for projection of structures. This requirement has been added to Standards VEG S5 and VEG S6.

RPM #3: On those Forests with currently unoccupied lynx habitat, lynx detection is needed to assess whether further management direction is warranted, including application of the management direction.

TC 4. Within 18 months of the date of the Biological Opinion, the Forest Service shall work with the Service to develop and complete an acceptable protocol to survey currently unoccupied lynx habitat in secondary areas. We agree to work with the FWS to develop and complete the protocol in unoccupied secondary areas.

The FWS also identified several monitoring and reporting requirements related to the above terms and conditions. We have incorporated these elements in the selected alternative – see Attachment 1, page 9.

Consideration of conservation recommendations

The FWS also identified three conservation recommendations which are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop information.

Recommendation 1. The FS should ensure to the extent possible, that unoccupied habitat continues to facilitate and allow dispersal of lynx into the future. Therefore the

FWS recommends the management direction regarding linkage areas and connectivity by applied in the unoccupied areas (ALL O1, ALL S1, ALL G1; LINK O1, LINK S1 and LINK G1). The Forest Service already considers and applies this management direction in our current program of work; therefore we have decided to not apply the direction in unoccupied areas until such time the areas are occupied.

Habitat connectivity is considered in the design of permanent developments and vegetation management. Few, if any, vegetation projects affect habitat connectivity. Most, if not all units, have some level of riparian area protection requirements in their existing plans. This direction facilitates movement of lynx through riparian areas.

The greatest risk to impeding connectivity is in relation to roads and highways. The Forest Service already works with the State and Federal Highway agencies and is part of the steering team that produced the document *Eco-logical: An Ecosystem Approach to Developing Infrastructure Projects* (USDOT, 2006), FEIS Transportation Section. Also noted in this section is the highway work planned and projected in all lynx habitat and how the states have incorporated wildlife crossings into the design of those future projects. The FEIS p. 198 evaluated the effects of not applying the management direction to unoccupied areas and discloses that there would be minimal effects, especially to linkage areas because similar management direction or the intent of the direction already exists.

Recommendation 2. The Forest Service should coordinate with the Service to develop, within 18 months a method to monitor the amount and condition of lynx habitat in unoccupied secondary habitat. The Forest Service agrees to this recommendation.

Recommendation 3. The Forest Service should continue to be a leader in lynx conservation and understanding. The Forest Service agrees to this recommendation.

Canada Lynx Recovery Outline

On September 12, 2005 the FWS issued a Recovery Outline for Canada lynx (USDI FWS 2005). The outline is to serve as an interim strategy to guide and encourage recovery efforts until a recovery plan is completed. In the Recovery Outline, FWS categorized lynx habitat as: 1) core areas; 2) secondary areas; and 3) peripheral areas. The areas with the strongest long-term evidence of the persistence of lynx populations within the contiguous United States are defined as "**core areas**." As we discuss below and illustrated on the enclosed map (Figure 1-1), we have two core areas in the analysis area. Core areas have both persistent verified records of lynx occurrence over time and recent evidence of reproduction. According to FWS, focusing lynx conservation efforts on these core areas will ensure the continued persistence of lynx in the contiguous United States by addressing fundamental principles of conservation biology (USDI FWS 2007). The Recovery Outline says "Recovery of lynx will be achieved when conditions have been attained that will allow lynx populations to persist long-term within each of the identified core areas." (USDI FWS 2005).

At this time, the role of areas outside of these core areas in sustaining lynx populations is unclear. The fluctuating nature of lynx population dynamics and the ability of lynx to disperse long distances have resulted in many individual occurrence records outside of core areas, without accompanying evidence of historic or current presence of lynx populations. Areas classified as "**secondary areas**" are those with historical records of lynx presence with no record of reproduction; or areas with historical records and no recent surveys that document the presence of lynx and/or reproduction. We have one area of secondary habitat in the analysis area (Figure 1-1). Much of the secondary habitat is unoccupied. FWS hypothesizes that secondary areas may contribute to lynx persistence by providing habitat to support lynx during dispersal movements or other periods, allowing animals to then return to "core areas."

In "**peripheral areas**" the majority of historical lynx records are sporadic and generally corresponds to periods following cyclic lynx population highs in Canada. There is no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx. However, some of these peripheral areas may provide habitat enabling the successful dispersal of lynx between populations or subpopulations. We have four areas of peripheral habitat in the analysis area (Figure 1-1). At this time, FWS does not have enough information to clearly define the relative importance of secondary or peripheral areas to the persistence of lynx in the contiguous United States (USDI FWS 2005, USDI FWS 2007).

In the Recovery Outline, FWS presented four preliminary recovery objectives. Below, we summarize FWS findings (USDI FWS 2007) of how the selected alternative meets the recovery objectives.

Preliminary recovery objective 1: *Retain adequate habitat of sufficient quality to support the long-term persistence of lynx populations within each of the identified core areas.*

FWS concludes the selected alternative fulfills this objective and adequately manages the two core areas within the planning area to support lynx recovery. The selected alternative supports the long-term persistence of lynx populations within the Northwestern Montana/Northeastern Idaho and Greater Yellowstone core areas, which constitutes one third of the core areas nationwide (USDI FWS 2007).

Preliminary recovery objective 2: *Ensure that sufficient habitat is available to accommodate the long-term persistence of immigration and emigration between each core area and adjacent populations in Canada or secondary areas in the United States.*

FWS concludes the selected alternative contributes to this recovery objective in part.

Lynx have the ability to move great distances, through varied terrain and habitat. Dispersing lynx use a variety of habitats and prey resources compared to lynx attempting to establish a home range and territory (USDI FWS 2007).

Connectivity between the United States and Canada appears intact thus far, as the Northwestern Montana/Northeastern Idaho core area is directly adjacent to Canada

and includes Glacier Park along its northeastern edge. The selected alternative provides and conserves core area lynx habitat directly adjacent to and contiguous with lynx habitat in Canada. Such habitat should accommodate both immigration of lynx from Canada and emigration from core areas to secondary areas or Canada.

The selected alternative applies to all core areas and occupied secondary areas. The direction includes objectives, standards, and guidelines to actively maintain or restore lynx habitat connectivity in and between linkage areas and LAUs (lynx home ranges). Because these measures apply in both core and occupied secondary areas, the selected alternative clearly meets the recovery objective of accommodated long-term connectivity across these broad areas.

The selected alternative is less clear in its effects in unoccupied secondary areas between the Northwestern Montana/Northeastern Idaho and Greater Yellowstone core areas. The management direction will not be applied to these areas until they become occupied. In the meantime existing plan direction will be followed.

Information indicates the likely impact of projected vegetation management on connectivity in this area may not be excessive. Fuel treatment projects in unoccupied habitat would likely occur in no more than two to three percent of all lynx habitat on any forest in secondary areas (FEIS Vol. 1, p. 195, USDI FWS 2007). In unoccupied areas precommercial thinning could occur on about 67,000 acres (about 1 percent) with full funding and 23,000 acres (0.4 percent) or less with projected funding. Timber harvest in unoccupied areas could result in creating stand initiation openings in more than 30 percent of an LAU. However, very few LAUs exceed this amount now and those that were in excess were in that condition due to past wildfires (FEIS, Vol. p. 155). Information regarding projected timber harvest was not available, but based on the past harvest history (Project File/Forests/FEIS/Data) it is unlikely regeneration harvest will occur to the same levels it did historically (1970s and 1980s). Based on this, FWS found vegetation management, under existing plan direction, would not preclude connectivity or opportunistic foraging conditions (USDI FWS 2007).

Development is another factor that may impede lynx movement. Four ski areas, affecting about 3,800 acres occur on National Forest System lands, in unoccupied secondary habitat; two of the four are planning expansions. None of these ski areas impede connectivity of lynx habitat at this time (USDI FWS 2007).

Connectivity for lynx could be more impacted by development such as highway expansions. Under existing plans and national efforts, methods to provide for safe wildlife crossings are currently being researched by all state highway departments and are being incorporated into highway improvements (FEIS, Vol. 1 p. 294-295).

In secondary unoccupied habitat, units should consider the management direction until such time the area becomes occupied. Given the estimates of projected impacts and the best information available regarding lynx dispersal movements, FWS concluded that under existing plan direction, these unoccupied secondary areas would reasonably be

expected to provide adequate connectivity and opportunistic foraging habitat for lynx to allow dispersal (USDI FWS 2007).

Preliminary recovery objective 3: *Ensure habitat in secondary areas remain available for continued occupancy by lynx.*

FWS found the selected alternative contributes to this recovery objective in part.

The recovery outline discusses the relative importance of core and secondary areas to lynx recovery. The selected alternative will fully provide management direction in occupied lynx habitat – both core and secondary. This measure ensures habitat in currently occupied secondary habitat remains available for continued occupancy by lynx.

The forests should consider the management direction in currently unoccupied secondary habitat. As noted in Objective 3, management actions could adversely affect unoccupied secondary lynx habitat. If and when lynx attempt to establish home ranges in secondary areas, individual lynx could be affected. It is also important to note that about 70 percent of unoccupied secondary lynx habitat in the planning area is in roadless or wilderness status where forest management actions are minimal and natural processes predominate.

Occupancy could occur if lynx populations in core areas were to expand, as periodically happens in lynx populations in Canada. However, given the projected impacts described in Objective 3, non-developmental areas, and existing habitat conditions, FWS believes it is reasonable to expect some lynx would occupy these secondary areas despite lack of mandatory direction in plans, but at a lower density than core. Further, if detected, once lynx occupy a previously unoccupied area, the management direction will apply. In the meantime, our vegetation management actions may degrade lynx habitat, but resulting conditions are typically temporary, not permanent. The risks of most vegetation management actions, such as timber harvest, precommercial thinning and other modifications of habitat, are reversible since typically forests regenerate overtime, with or without active restoration. Based on this FWS found lynx habitat on National Forests System lands in secondary areas will likely remain available for recovery of lynx over time (USDI FWS 2007).

The Opinion goes on to say the selected alternative does not fulfill Objective 3 entirely, as it lacks requirements for further or continued monitoring or surveying of unoccupied secondary areas for the amount and condition of lynx habitat and lynx presence, as recommended in the recovery outline.

However, through this decision we agree to work with the FWS to develop and complete a protocol to survey and to develop a method to monitor the amount and condition of lynx habitat in unoccupied secondary habitat. Our agreement to these items will aid in fulfilling Objective 3.

Preliminary recovery objective 4: *Ensure threats have been addressed so that lynx populations will persist in the contiguous United State for at least the next 100 years.*

FWS found that although plans do not apply for 100 years and thus cannot directly fulfill this objective, the selected alternative will allow lynx populations to persist on lands within core areas in the planning area within the foreseeable future. The selected alternative addresses the threat to the distinct population segment (DPS), inadequate regulatory measures, within core areas in the planning area by limiting, reducing or avoiding major adverse impacts of federal land management on lynx, as well as several other impacts or influences that do not rise to the level of a threat to the DPS. Further, a large portion of lynx habitat within the planning area (67 percent) remains in non-developmental status, where natural processes predominate. Finally, unoccupied lynx habitat within secondary and peripheral lynx areas is likely to retain habitat that provides opportunistic foraging habitat and connectivity adequate for dispersal of lynx, despite the lack of specific direction for lynx habitat management (USDI FWS 2007).

Findings Required by Laws, Regulation, and Policies

National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires analysis of decisions to ensure the anticipated effects on the environment within the analysis area are considered prior to implementation (40 CFR 1502.16). The analysis for the Northern Rockies Lynx Management Direction followed the NEPA guidelines as provided by the Council on Environmental Quality. Alternatives were developed based on the Purpose and Need, the primary issues, public comments, lynx needs as identified by the LCAS, research, and other publications. A total of six alternatives were considered in detail, including the No Action Alternative as required by NEPA (FEIS, pp. 26 to 69 and 107 to 134). Additional management direction was considered but eliminated from detailed study (FEIS, pp. 71 to 106). The range of alternatives is appropriate given the scope of the proposal, the public issues expressed, and the Purpose and Need for action (FEIS, Chapter 1).

Unavoidable adverse effects

The selected alternative does not represent an irreversible or irretrievable commitment of resources. Any disturbance to resources cannot occur without further site-specific analyses, section 7a consultation required under ESA and decision documents. For a detailed discussion of effects of this decision, see Chapter 3 of the FEIS (pp. 135 to 350).

Environmentally preferable alternative(s)

Regulations implementing NEPA require agencies to specify "the alternative or alternatives which are considered to be environmentally preferable" (40 CFR 1505.2(b)). The environmentally preferable alternative causes the least damage to the biological and physical environments and best protects, preserves, and enhances historical,

cultural, and natural resources. Based on the description of the alternatives considered in detail in the FEIS and in this ROD, we determined the selected alternative best meets the goals of Section 101 of the NEPA, and is therefore the environmentally preferable alternative for this proposed federal action.

FWS found timber harvest can be beneficial, benign, or detrimental depending on harvest method, and the spatial and temporal occurrence on the landscape (FEIS, Vol. 1, Appendix P). The vegetation standards in the selected alternative ensure the timber management program is beneficial to lynx. Standard VEG S1 limits the amount of lynx habitat that is in the stand initiation stage to 30 percent of each LAU at any time, ensuring a continuous rotation of all forest stages through time that supply lynx habitat in each LAU (FEIS, Vol. 2, p. 60). Standard VEG S2 allows no more the 15 percent of the lynx habitat to change to the stand initiation stage through timber harvest in a 10-year period. This limits the rate of change within an LAU to ensure sufficient habitat for lynx through time.

Precommercial thinning can impact lynx habitat. Standard VEG S5 precludes precommercial thinning except in certain situations that FWS has determined would have little effect upon lynx or their habitat, but would advance natural ecological conditions (FWS comment letter on the DEIS, pp. 8 and 9). While these exceptions have little effect on lynx (0.5 percent of lynx habitat) they have important positive impacts on other resources and situations such as maintaining aspen, western white pine, and whitebark pine, and fuel reduction near buildings.

Since the LCAS was published it has become clear that multistory mature stands with dense horizontal cover are important to lynx. In the selected alternative, Standard VEG S6 is instrumental in maintaining winter snowshoe hare habitat in multistoried forests which will aid in lynx persistence.

The selected alternative allows for management of fuels in the WUI under Guideline VEG G10, rather than standards. Under VEG G10 fuel reduction projects in the WUI should consider the VEG standards, but may deviate from them, up to a cap of 6 percent of the lynx habitat on each National Forest. Lynx habitat is still considered; however, if the fuel reduction needs are such that any of the four VEG standards cannot be met while at the same time meeting fuel treatment objective, the project may proceed under Guideline VEG G10. Fuel treatment actions in 94 percent of the lynx habitat must follow the VEG standards, while at the same time fuel treatment projects in the WUI can protect other valuable resources.

The selected alternative contains guidelines for the various activities on National Forest System land that may have possible adverse affects on individual lynx. Standards were changed to guidelines when the best available information indicated the action was not likely to adversely affect lynx, or not likely to adversely affect lynx in most cases (i.e. where no conclusive or reliable information supported the standard in the LCAS).

The selected alternative contributes to lynx conservation and recovery on National Forest System lands, but allows for management of other resources. Considering all this, the selected alternative is the environmentally preferred alternative because it causes the least damage to the biological and physical environments and best protects, preserves, and enhances natural resources.

National Forest Management Act

Significance determination: The purpose of this proposal is to incorporate management direction into plans for the conservation and recovery of Canada lynx.

In January 2005, the Forest Service removed the November 9, 2000 National Forest System Land and Resource Management Planning Regulations at 36 CFR 219, subpart A and replaced them with newly adopted regulations. The new regulations set forth a process for land management planning, including the process for developing, amending, and revising land management plans (36 CFR 219.1). These regulations also incorporate effective dates and transition periods. Section 219.4(e) says "Plan development, plan amendments or plan revision initiated before the transition period (starting January 5, 2005) may continue to use the provisions of the planning regulations in effect before November 9, 2000" – in this case the 1982 regulations. This proposal was initiated on September 11, 2001, which is before the transition period; therefore it is being completed under the requirements of the 1982 regulations.

The National Forest Management Act (NFMA) provides that forest plans may be amended in any manner, but if the management direction results in a significant change in the plan, the same procedure as that required for development and approval of a plan shall be followed. The 1982 regulations at 36 CFR 219.10(f) requires the agency to determine whether or not a proposed amendment will result in a significant change in the plan. If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, then the agency may implement the amendment following appropriate public notification and satisfactory completion of NEPA procedures.

Forest Service Manual (FSM) 1920, section 1926.5 (Jan. 31, 2006) identifies factors to consider in determining whether an amendment is significant or non-significant for those plans using planning regulations in effect before November 9, 2000.

Changes to the land management plan that are not significant can result from:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis.
3. Minor changes in standards and guidelines.
4. Opportunities for additional projects or activities.

Examples of significant changes include:
1. Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected.
2. Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

The selected alternative will change in plans similar to examples of non-significant changes #1 and #3. The effects of this decision are not similar to either example of significant plan changes. These findings are discussed in further detail below.

Under the selected alternative the management direction will only apply to occupied habitat. At this time the Beaverhead-Deerlodge, Bitterroot, Nez Perce, Salmon-Challis, Ashley and Bighorn NFs are unoccupied; therefore these units should consider the management direction but will not have to apply it. Several mountain ranges on the Custer, Gallatin, Helena, and Lewis and Clark NFs are also unoccupied and the management direction will not have to be applied in these areas until lynx occupy the site. However, since the selected alternative could be applied to all units at some point in time, the following analyzes the effects on the planning area as a whole.

Changes in standards and guidelines are minor

The selected alternative adds one goal to forest plans; conserve Canada lynx. This goal is consistent with other goals in existing plans and other legal requirements to provide for habitat needs for threatened and endangered species. The selected alternative adds several objectives to the plans. These objectives require consideration of natural ecosystem process and functions, and consideration of lynx habitat needs. The additional objectives provide more species-specific guidance but do not alter the overall objectives to provide for habitat needs for threatened and endangered species. The proposal does not change any Management Area (MA) designation.

The selected alternative adds seven standards and twenty-four guidelines. The addition of these new standards and guidelines are minor as discussed below.

Changes would not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected.

The management direction would not substantially alter outputs for grazing, minerals, energy, transportation systems, developed recreation areas, such as ski areas or winter recreation. These activities will not be prohibited by the management direction; however, habitat needs for lynx will need to be considered when managing these resources. The new direction will also not substantially alter timber outputs, even though it may affect growth and yield.

The selected alternative limits precommercial thinning in winter snowshoe hare habitat in young regenerating forests, with some exceptions – see Standard VEG S5. Precommercial thinning is allowed to restore aspen, whitebark pine and planted rust-

resistant western white pine. Precommercial thinning will also be allowed if new research indicates it will benefit or only have short-term adverse effects to lynx. Precommercial thinning is not allowed in young regenerating lodgepole pine forests, unless new research indicates it is beneficial or benign. Limiting precommercial thinning in lodgepole pine forests could affect growth and yield, and the potential to produce some products in the future, because these forests tend to stop growing if not thinned; however overall cubic foot volume would not be affected.

The Beaverhead-Deerlodge and the Bridger-Teton are the only units that have a majority of their precommercial thinning identified over the next ten years in lynx habitat and in lodgepole pine; therefore they are the only units that could see a reduction to growth and yield (FEIS, Vo1. 1, Appendix K-5). Under current programs, the units only have accomplished a portion of their thinning program (approximately 34 percent) due to budgets, so it is difficult to tease out the effects from the management direction in this proposal from effects of budgets. In addition, Standard VEG S5 allows for consideration of new information. Over the next ten to fifteen years information may become available that indicates some precommercial thinning in lodgepole pine forests may be beneficial to snowshoe hare (see DEIS comment letter #505).

Limiting precommercial thinning is unlikely to affect long-term sustained yield (LTSY), as defined by NFMA and FSH 1909.12, Chapter 60.5, because the cubic foot volume on the site does not substantially change. The volume is spread among more, smaller trees without thinning versus fewer, larger diameter trees with thinning. In addition, some precommercial thinning may be allowed in the future if new information becomes available. Timber outputs have never been at the level of LTSY over the life of these plans, so changes in LTSY are unlikely to lead to changes in outputs, especially if outputs are measured in cubic feet, which is the appropriate measure of LTSY.

In addition, the ASQ should not be affected on any units because the management direction does not preclude timber harvest. Standards VEG S1 and S2 may defer regeneration harvest in some areas, but Guideline VEG G1 encourages projects creating winter snowshoe hare habitat where it is lacking. It is likely there would be no change in overall timber outputs, but there may be changes in what material is harvested and where.

Changes would not have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

There are approximately 38.5 million acres within the 18 National Forests in the planning area. Of this, approximately 18 million acres or 48 percent has been mapped as lynx habitat (see table 3.1). Of the 18 million acres of mapped lynx habitat, approximately 8 million acres are in land allocations that allow for management actions. Therefore the management direction only potentially affects about 20 percent of the planning area. The most noticeable effects are likely to be the location and amount of precommercial thinning. The potential acreage that could be affected is between 11,000 to 15,000 acres per year. This is less than one percent of the planning area. It should be

noted that precommercial thinning is not constrained on an additional 18,000 acres per year outside lynx habitat (FEIS, Vol. 1 p 247-248).

Summary: Considering the three factors, we determined this management direction is not a significant change under NFMA to the 18 forest plans because it imposes minor changes over a limited area of these national forests.

While this amendment is not significant, the planning process necessary for significant amendments is ongoing or will begin soon on most units affected by this decision. In particular interest to the precommercial thinning discussion on the previous page, both the Beaverhead-Deerlodge and Bridger-Teton National Forests are being revised. The Beaverhead-Deerlodge should complete the revision process in 2007. Their DEIS for the Forest Plan recognizes the cumulative contribution the Northern Rockies Lynx Amendment may have on reducing growth and yield (DEIS, page 326). The Bridger-Teton should complete its revision in 2008.

Viability determination: This management direction is being adopted in accordance with the 1982 NFMA regulations for amending land and resource management plans. Plan amendments initiated before January 5, 2005 may proceed using the provisions of these regulations. The transition period to regulations implementing the 2005 planning rule ends on a unit's establishment of an Environmental Management System, or no later than January 7, 2008.

According to the 1982 NFMA regulations, fish and wildlife habitat shall be managed to maintain viable populations of Canada lynx in the planning area (36 CFR 219.19, 2000). For the purpose of this decision, the planning area is the range of lynx encompassed by the national forests subject to this decision. This is based on a biological delineation of the Northern Rockies made in the LCAS.

A viable population is, "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well-distributed in the planning area." It is not possible to reliably predict future population demographics for lynx, and continued existence of lynx may be dependent on threats that exist outside of the planning area (health of Canadian populations, or linkage across other ownerships).

The national forests subject to this new direction will provide habitat to maintain a viable population of lynx in the Northern Rockies by maintaining the current distribution of occupied lynx habitat, and maintaining or enhancing the quality of that habitat. Based on the best scientific information available, and for the specific reasons provided below, this management direction will provide habitat to support persistence of lynx in the Northern Rockies in the long-term.

The LCAS was used as the basis for developing the selected alternative. The FWS Remand Notice (FEIS, Vol. 1, Appendix P), and other new information and research were also evaluated, and became the basis for updating standards and guidelines based upon the current state of knowledge regarding threats to lynx since the LCAS was compiled.

The greatest threats to lynx persistence and reproduction are from changes in vegetation structures that provide snowshoe hare habitat during summer and winter. Standards were developed under the selected alternative to provide direction for a variety of vegetation management activities that are most likely to affect lynx habitat (fuel treatments, precommercial thinning, timber harvest, etc.). These include standards for connectivity (ALL S1), habitat mapping (LAU S1), regeneration harvesting (VEG S2), precommercial thinning (VEG S5), and management of multistory mature and late successional forests (VEG S6). These standards are equal to or more protective than similar recommendations provided in the LCAS. In the Seeley Lake area of Montana, mature, spruce-fir forests with high horizontal cover are particularly important as winter foraging habitat and are more important than younger stands (Squires pers. com., Oct. 30, 2006) and the LCAS provides no specific management recommendations for these vegetative conditions within lynx habitat.

All of the core and secondary lynx habitat (100%) as defined in the *Recovery Outline* (USDI FWS 2005) that is occupied by lynx as defined in the *Occupied Mapped Lynx Habitat Amendment to the Canada Lynx Conservation Agreement* (USDA FS and USDI FWS 2006a) will be managed to conserve lynx.

The value of secondary habitat is unclear. The *Recovery Outline* (UDSI FWS 2005) states "Compared to core areas, secondary areas have fewer and more sporadic current and historical records of lynx and, as a result, historical abundance has been relatively low. Reproduction has not been documented." There currently is no evidence that suggest that unoccupied secondary habitat is considered necessary for a viable population of lynx. Secondary, unoccupied lynx habitat will have management direction implemented to conserve lynx if and when those administrative units become occupied. These National Forests (Beaverhead-Deerlodge, Bitterroot, Salmon-Challis and Nez Perce) which have secondary, unoccupied lynx habitat account for only about 30 percent of the total acres of core and secondary lynx habitat.

Even though the 6 percent limit (reflected in the vegetation standards) does not currently apply to unoccupied lynx habitat, those unoccupied forests would treat an average of 3.2 percent of lynx habitat within the WUI for fuel reduction over the next ten years (FEIS, Vol. 1, Lynx Section, and Appendix M). This is well below the 6 percent cap provided in the Biological Opinion (USDI FWS 2007). Overall fuel treatments, in and outside the WUI, in lynx habitat, average 5 percent within lynx habitat on these Forests.

In addition, The FWS Biological Opinion (2007) concluded that the proposed action is not likely to jeopardize the continued existence of lynx within the contiguous United States DPS. It also found the selected alternative will allow lynx populations to persist on lands in occupied core and secondary areas within the foreseeable future, and unoccupied secondary and peripheral habitat is likely to retain habitat that provides opportunistic foraging habitat and connectivity adequate for dispersal of lynx, despite the lack of specific direction for lynx management. The opinion goes on to say the

incorporation of the management direction over the large geographic area occupied by lynx within 12 of the 18 National Forests (12,150,000 acres) contributes to the landscape level direction necessary for the survival and recovery of lynx in the northern Rockies ecosystem.

Endangered Species Act

The Endangered Species Act creates an affirmative obligation ". . . that all federal departments and agencies shall seek to conserve endangered and threatened species" of fish, wildlife, and plants. This obligation is further clarified in a National Interagency Memorandum of Agreement (August, 2000) which states our shared mission is to ". . . enhance conservation of imperiled species while delivering appropriate goods and services provided by the lands and resources."

We completed biological assessments (BAs) for all listed species; one for wildlife and fish, and one for plants. For all listed species, except for Canada lynx, we determined the preferred alternative would have "no effect" or would be "not likely to adversely affect" them. The determination for Canada lynx was that, while the management direction in selected alternative would improve lynx conservation, the plans amended by selected alternative would still be "likely to adversely affect" lynx because individuals could be adversely affected as a result of the exemptions and exceptions to the vegetation standards for fuel treatments projects and precommercial thinning. The BAs were submitted to the FWS. The FS consulted with the FWS on the determinations and they concurred with the "no effect" and "not likely to adversely affect" determinations. The FWS provided written review as required by Section 7 of the ESA (USDI FWS 2007).

FWS issued a Biological Opinion on the "likely to adversely affect" determination on lynx (USDI FWS 2007). The opinion acknowledges the beneficial and adverse effects of the selected alternative. The opinion states that given the large number of acres covered by the proposed action, the existing plan language, and the beneficial effects of the management direction in the balance of these acres, the selected alternative is likely to have overall beneficial effects to lynx by addressing the primary threat identified at the time of listing: the inadequacy of existing regulatory mechanisms. Even acknowledging some adverse effects could still occur, primarily due to the allowance for fuel treatment projects and precommercial thinning, the opinion found the selected alternative is not likely to jeopardize the continued existence of Canada lynx. The Opinion identifies incidental take and reasonable and prudent measure, with associated terms and conditions to reduce take. These measures have either been incorporated into the management direction (TC 1, 2, and 3) or agreed to in this decision (TC 4).

Further section 7a consultation will occur on future site-specific projects and activities if they result in adverse affects to lynx. Future consultation will reference back to the BO issued on this decision to ensure the effects of the specific projects are commensurate with the effects anticipated in the opinion issued on this decision (USDI FWS 2007).

Critical habitat

On November 9, 2006, FWS published the final rule for the designation of Canada lynx critical habitat (Federal Register, Vol. 71, No. 217, pp. 66008 to 66061). National Forest System lands were not included in the critical habitat designation. There is no adverse modification to designated critical habitat from implementation of selected alternative.

National Historic Preservation Act

This decision is a programmatic action and does not authorize site-specific activities. Projects undertaken following the management direction will comply fully with the laws and regulations that ensure protection of cultural resources. It is our determination this plan direction complies with the National Historic Preservation Act and other statutes that pertain to the protection of cultural resources.

Clean Air Act

This decision is a programmatic action and does not authorize site-specific activities. Projects undertaken following the management direction will comply fully with the laws and regulations that ensure protection of air quality. It is our determination this plan direction complies with the Clean Air Act and other statutes that pertain to the protection of air quality.

Clean Water Act

This decision is a programmatic action and does not authorize site-specific activities. Projects undertaken following the management direction will comply fully with the laws and regulations that ensure protection of water quality. It is our determination this plan direction complies with the Clean Water Act and other statutes that pertain to the protection of water quality.

Invasive Species (Executive Order 13112)

Executive Order 13112 directs federal agencies not to authorize any activities that would increase the spread of invasive species. This decision is a programmatic action and does not authorize site-specific activities. We determined this plan direction complies with Executive Order 13112.

Environmental Justice (Executive Order 12898)

Executive Order 12898 directs federal agencies to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. We determined from the analyses disclosed in the FEIS that this plan direction complies with Executive Order 12898.

Prime Farmland, Rangeland, and Forest Land

We determined from the analyses disclosed in the FEIS that prime farmland, rangeland, and forest land will not be affected by this decision because the selected alternative is a programmatic action and does not authorize site-specific activities.

Equal Employment Opportunity, Effects on Minorities, Women

The FEIS describes the impacts to social and economic factors in Chapter 3. The selected alternative will not have a disproportionate impact on any minority or low-income communities. We determined the selected alternative will not differentially affect the civil rights of any citizens, including women and minorities.

Wetlands and Floodplains (Executive Orders 11988 and 11990)

The selected alternative is a programmatic action and does not authorize site-specific activities. We determined the selected alternative will not have adverse impacts on wetlands and floodplains and will comply with Executive Orders 11988 and 11990.

Other policies

The existing body of national direction for managing National Forest System lands remains in effect.

Implementation and appeal provisions

The management direction will become effective 30 days after publication of the notice of availability of the FEIS in the Federal Register. Requests to stay implementation of the amended plans shall not be granted pursuant to 36 CFR 217.10.

This decision is subject to review pursuant to 36 CFR 217.3 (available at http://www.fs.fed.us/r1/planning/lynx.html). Any appeals must be postmarked or received by the Appeal Reviewing Officer within 45 days of the date the legal notices are published in the The Missoulian, the newspaper of record.

Appeals sent through the US Postal Service must be sent to:

USDA Forest Service
Attn: EMC Appeals
Mail Stop 1104
1400 Independence Ave., SW
Washington, DC 20250-1104

Appeals sent through FedEx, UPS, or a courier service must be sent to:

USDA Forest Service
Ecosystem Management Coordination
Attn: Appeals
Yates Bldg., 3CEN
201 14th Street, SW
Washington, DC 20250

Appeals may be hand-delivered to the above address during regular business hours, 8:00 AM to 4:30 PM Monday through Friday, excluding holidays; or sent by fax to (202) 205-1012; or by email to appeals-chief@fs.fed.us. Emailed appeals must be submitted in rich text format (.rtf) or Word (.doc) and must include the decision name in the subject line. Any notice of appeal must be fully consistent with 36 CFR 217.9 and include at a minimum:

- A statement that the document is a Notice of Appeal filed pursuant to 36 CFR Part 217;
- The name, address, and telephone number of the appellant;
- Identify the decision to which the objection is being made;
- Identify the document in which the decision is contained, by title and subject, date of the decision, and name and title of the Deciding Officer;
- Specifically identify the portion(s) of the decision or decision document to which objection is made;
- The reasons for the appeal, including issues of fact, law, regulation, or policy and, if applicable, specifically how the decision violates law, regulation, or policy; and
- Identification of the specific change(s) in the decision that the appellant seeks.

Further information and contact person

The Northern Rockies Lynx Management Direction FEIS, the Summary, this ROD and the FWS Biological Opinion, as well as other background documents are available on the Web at http://www.fs.fed.us/r1/planning/lynx.html.

For further information regarding the FEIS, ROD, or the plan direction for Canada lynx contact:

Timothy Bertram, Lynx Coordinator
USDA Forest Service, Northern Region
P.O. Box 7669
Missoula, MT 59807
Telephone: (406) 329-3611

I am the Responsible Official for incorporating the Northern Rockies Lynx Management Direction into the Land and Resource Management Plans for the Bighorn and Shoshone National Forests in the Rocky Mountain Region of the Forest Service.

Rick D. Cables — March 21, 2007

Rick D. Cables
Regional Forester, Rocky Mountain Region

Date

I am the Responsible Official for incorporating the Northern Rockies Lynx Management Direction into the Land and Resource Management Plans for the Ashley, Bridger-Teton, Targhee, and Salmon-Challis National Forests in the Intermountain Region of the Forest Service.

Jack G. Troyer
Regional Forester, Intermountain Region

March 23, 2007
Date

I am the Responsible Official for incorporating the Northern Rockies Lynx Management Direction into the Land and Resource Management Plans for the Beaverhead-Deerlodge, Bitterroot, Clearwater, Custer, Flathead, Gallatin, Helena, Idaho Panhandle, Kootenai, Lewis & Clark, Lolo, and Nez Perce National Forests in the Northern Region of the Forest Service.

Kathleen A. McAllister — March 23, 2007

Kathleen A. McAllister
Acting Regional Forester, Northern Region

Date

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ATTACHMENT 1

Northern Rockies Lynx Management Direction

The following management direction applies to all National Forest System lands that are known to be **occupied** by Canada lynx. At the time of this decision the following National Forests in the Northern Rockies lynx planning area are known to be occupied: Bridger-Teton, Clearwater, Custer, Flathead, Idaho Panhandle, Kootenai, Lolo, Shoshone, Targhee. Portions of the Custer, Gallatin, Helena, and Lewis & Clark are also occupied.

The following National Forests in the Northern Rockies lynx planning area are **not occupied** by Canada lynx: Ashley, Beaverhead-Deerlodge, Bighorn, Bitterroot, Nez Perce, Salmon-Challis. In addition, isolated mountain ranges on the Custer, Gallatin, Helena and Lewis and Clark are unoccupied – see Figure 1-1. Until such time as these National Forest System lands become occupied they should consider the following management direction, but are not required to follow it.

GOAL[14]

Conserve the Canada lynx.

ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL). The following objectives, standards, and guidelines apply to all management projects in lynx habitat in lynx analysis units (LAUs) in occupied habitat and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use.

Objective[30] ALL O1

Maintain[26] or restore[40] lynx habitat[23] connectivity[16] in and between LAUs[21], and in linkage areas[22].

Standard[44] ALL S1

New or expanded permanent development[33] and vegetation management[49] projects[36] must maintain[26] habitat connectivity[16] in an LAU[21] and/or linkage area[22].

Guideline[15] ALL G1

Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways[18] or forest highways[12] across federal land. Methods could include fencing, underpasses, or overpasses.

Standard[44] LAU S1

Changes in LAU[21] boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.

VEGETATION MANAGEMENT ACTIVITIES AND PRACTICES (VEG). The following objectives, standards, and guidelines apply to vegetation management projects[36] in lynx habitat within lynx analysis units (LAUs) in occupied habitat. With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads, and the like. None of the objectives, standards, or guidelines apply to linkage areas.

Objective[30] VEG O1

Manage vegetation[49] to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.

Objective VEG O2

Provide a mosaic of habitat conditions through time that support dense horizontal cover[19], and high densities of snowshoe hare. Provide winter snowshoe hare habitat[51] in both the stand initiation structural stage and in mature, multi-story conifer vegetation.

Objective VEG O3

Conduct fire use[11] activities to restore[40] ecological processes and maintain or improve lynx habitat.

Objective VEG O4

Focus vegetation management[49] in areas that have potential to improve winter snowshoe hare habitat[51] but presently have poorly developed understories that lack dense horizontal cover.

Standard[44] VEG S1

Where and to what this applies: Standard VEG S1 applies to all vegetation management[49] projects[36] that regenerate[38] forests, except for fuel treatment[13] projects[36] within the wildland urban interface[50] (WUI) as defined by HFRA[17], subject to the following limitation:

Fuel treatment projects[36] within the WUI[50] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). *In addition, fuel treatment projects may not result in more than three adjacent LAUs exceeding the standard.*

For fuel treatment projects[36] within the WUI[50] see guideline VEG G10.

The standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages[45] limit disturbance in each LAU as follows:

If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects[36].

Standard VEG S2

Where and to what this applies: Standard VEG S2 applies to all timber management[47] projects[36] that regenerate[38] forests, except for fuel treatment[13] projects[36] within the wildland urban interface[50] (WUI) as defined by HFRA[17], subject to the following limitation:

Fuel treatment projects[36] within the WUI[50] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects[36] within the WUI[50] see guideline VEG G10.

The standard: Timber management[47] projects[36] shall not regenerate[38] more than 15 percent of lynx habitat on NFS lands within an LAU in a ten-year period.

Standard VEG S5

Where and to what this applies: Standard VEG S5 applies to all precommercial thinning[35] projects[36], except for fuel treatment[13] projects[36] that use precommercial thinning as a tool within the wildland urban interface[50] (WUI) as defined by HFRA[17], subject to the following limitation:

Fuel treatment projects[36] within the WUI[50] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects[36] within the WUI[50] see guideline VEG G10.

The Standard: Precommercial thinning projects[36] that reduce snowshoe hare habitat may occur from the stand initiation structural stage[45] until the stands no longer provide winter snowshoe hare habitat only:

1. Within 200 feet of administrative sites, dwellings, or outbuildings; or
2. For research studies[39] or genetic tree tests evaluating genetically improved reforestation stock; or
3. Based on new information that is peer reviewed and accepted by the regional level of the Forest Service, and state level of FWS, where a written determination states:
   a. that a project[36] is not likely to adversely affect lynx; or
   b. that a project[36] is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or
4. For conifer removal in aspen, or daylight thinning[5] around individual aspen trees, where aspen is in decline; or

5. For daylight thinning of planted rust-resistant white pine where 80 % of the winter snowshoe hare habitat[51] is retained; or
6. To restore whitebark pine.

Exceptions 2 through 6 shall only be utilized in LAUs where Standard VEG S1 is met.

Standard VEG S6

Where and to what this applies: Standard VEG S6 applies to all vegetation management[49] projects[36] except for fuel treatment[13] projects[36] within the wildland urban interface[50] (WUI) as defined by HFRA[17], subject to the following limitation:

Fuel treatment projects[36] within the WUI[50] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest).

For fuel treatment projects[36] within the WUI[50] see guideline VEG G10.

The Standard: Vegetation management projects[36] that reduce snowshoe hare habitat in multi-story mature or late successional forests[29] may occur only:

1. Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or
2. For research studies[39] or genetic tree tests evaluating genetically improved reforestation stock; or
3. For incidental removal during salvage harvest[42] (e.g. removal due to location of skid trails).

Exceptions 2 and 3 shall only be utilized in LAUs where Standard VEG S1 is met.
(NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow]).

Guideline VEG G1

Vegetation management[49] projects[36] should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority for treatment should be given to stem-exclusion, closed-canopy structural stage[46] stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat[51] should be near denning habitat[6].

Guideline VEG G4

Prescribed fire[34] activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.

Guideline VEG G5

Habitat for alternate prey species, primarily red squirrel[37], should be provided in each LAU.

Guideline VEG G10

Fuel treatment projects[36] within the WUI[50] as defined by HFRA[17] should be designed considering Standards VEG S1, S2, S5, and S6 to promote lynx conservation.

Guideline VEG G11

Denning habitat[6] should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects[36] should be designed to retain some coarse woody debris[4], piles, or residual trees to provide denning habitat[6] in the future.

LIVESTOCK MANAGEMENT (GRAZ): The following objectives and guidelines apply to grazing projects in lynx habitat in lynx analysis units (LAUs) in occupied habitat. They do not apply to linkage areas.

Objective[30] GRAZ O1

Manage livestock grazing to be compatible with improving or maintaining[26] lynx habitat[23].

Guideline[15] GRAZ G1

In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.

Guideline GRAZ G2

In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.

Guideline GRAZ G3

In riparian areas[41] and willow carrs[3], livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages[28], similar to conditions that would have occurred under historic disturbance regimes.

Guideline GRAZ G4

In shrub-steppe habitats[43], livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs[21], to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.

HUMAN USE PROJETS (HU): The following objectives and guidelines apply to human use projects, such as special uses (other than grazing), recreation management, roads, highways, and mineral and energy development, in lynx habitat in lynx analysis units (LAUs) in occupied habitat, subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.

Objective[30] HU O1

Maintain[26] the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat[23].

Objective HU O2

Manage recreational activities to maintain lynx habitat and connectivity[16].

Objective HU O3

Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.

Objective HU O4

Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation[9] sites or ski areas.

Objective HU O5

Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.

Objective HU O6

Reduce adverse highway[18] effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity[16], and to reduce the potential of lynx mortality.

Guideline[15] HU G1

When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris[4], so winter snowshoe hare habitat[51] is maintained.

Guideline HU G2

When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.

Guideline HU G3

Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat[23].

Guideline HU G4

For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.

Guideline HU G5

For mineral and energy development sites and facilities that are closed, a reclamation plan that restores[40] lynx habitat should be developed.

Guideline HU G6

Methods to avoid or reduce effects on lynx should be used in lynx habitat[23] when upgrading unpaved roads to maintenance levels 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases in human activity or development.

Guideline HU G7

New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity[16]. New permanent roads and trails should be situated away from forested stringers.

Guideline HU G8

Cutting brush along low-speed[25], low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.

Guideline HU G9

On new roads built for projects[36], public motorized use should be restricted. Effective closures should be provided in road designs. When the project[36] is over, these roads should be reclaimed or decommissioned, if not needed for other management objectives.

Guideline HU G10

When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat[10], if it has been identified as a need.

Guideline HU G11

Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction[1], unless designation serves to consolidate use and improve lynx habitat. This may be calculated on an LAU basis, or on a combination of immediately adjacent LAUs.

This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12.

Use the same analysis boundaries for all actions subject to this guideline.

Guideline HU G12

Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes[8] or designated over-the-snow routes[7].

LINKAGE AREAS (LINK): The following objective, standard, and guidelines apply to all projects within linkage areas in occupied habitat, subject to valid existing rights.

Objective[30] LINK O1

In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.

Standard[44] LINK S1

When highway[18] or forest highway[12] construction or reconstruction is proposed in linkage areas[22], identify potential highway crossings.

Guideline[15] LINK G1

NFS lands should be retained in public ownership.

Guideline LINK G2

Livestock grazing in shrub-steppe habitats[43] should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages[28], similar to conditions that would have occurred under historic disturbance regimes.

REQUIRED MONITORING

Map the location and intensity of snow compacting activities and designated and groomed routes that occurred inside LAUs during the period of 1998 to 2000. The mapping is to be completed within one year of this decision, and changes in activities and routes are to be monitored every five years after the decision.

When project decisions are signed report the following:

1. Fuel treatments:
    a. Acres of fuel treatment in lynx habitat by forest and LAU, and whether the treatment is within *or outside* the WUI as defined by HFRA.
    b. Whether or not the fuel treatment met the vegetation standards or guidelines. If standard(s) are not met, report which standard(s) are not met, why they were not met, and how many acres were affected.
    c. Whether or not 2 adjacent LAUs exceed standard VEG S1 (30% in a stand initiation structural stage that is too short to provide winter snowshoe hare habitat), and what event(s) or action(s) caused the standard to be exceeded.
2. *Application of exception in Standard VEG S5*
    a. For areas where any of the exemptions 1 through 6 listed in Standard VEG S5 were applied: Report the type of activity, the number of acres, and the location (by unit, and LAU) and whether or not Standard VEG S1 was within the allowance.
3. *Application of exceptions in Standard VEG S6*
    a. *For areas where any of the exemptions 1 through 3 listed in Standard VEG S6 were applied: Report the type of activity, the number of acres, and the location (by unit, and LAU) and whether or not Standard VEG S1 was within the allowance.*
4. *Application of guidelines*
    a. Document the rationale for deviations to guidelines. Summarize what guideline(s) was not followed and why.

Directions in italics were terms and conditions that were incorporated from the FWS Biological Opinion (USDI FWS 2007).

GLOSSARY

[1] *Area of consistent snow compaction* – An area of consistent snow compaction is an area of land or water that during winter is generally covered with snow and gets enough human use that individual tracks are indistinguishable. In such places, compacted snow is evident most of the time, except immediately after (within 48 hours) snowfall. These can be areas or linear routes, and are generally found in or near snowmobile or cross-country ski routes, in adjacent openings, parks and meadows, near ski huts or plowed roads, or in winter parking areas. Areas of consistent snow compaction will be determined based on the acreage or miles used during the period 1998 to 2000.

[2] *Broad scale assessment* – A broad scale assessment is 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. (LCAS)

[3] *Carr* – Deciduous woodland or shrub land occurring on permanently wet, organic soil. (LCAS)

[4] *Course woody debris* – Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses on the ground or in streams. (LCAS)

[5] *Daylight thinning* – Daylight thinning is a form of precommercial thinning that removes the trees and brush inside a given radius around a tree.

[6] *Denning habitat (lynx)* – Denning habitat is 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.

[7] *Designated over-the-snow routes* – Designated over-the-snow routes are routes 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. The determination of baseline snow compaction will be based on the miles of designated over-the-snow routes authorized, promoted or encouraged during the period 1998 to 2000.

[8] *Designated route* – A designated route is a road or trail that has been identified as open for specified travel use.

[9] *Developed recreation* – Developed recreation requires facilities that result in concentrated use. For example, skiing requires lifts, parking lots, buildings, and roads; campgrounds require roads, picnic tables, and toilet facilities.

[10] *Security habitat (lynx)* – Security habitat amounts to places in lynx habitat that provide secure winter bedding sites for lynx in highly disturbed landscapes like ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Forest structures that make human access difficult generally discourage human activity in security habitats. Security habitats are most effective if big enough to provide visual and acoustic insulation and to let lynx easily move away from any intrusion. They must be close to winter snowshoe hare habitat. (LCAS)

[11] *Fire use* – Fire use is the combination of wildland fire use and using prescribed fire to meet resource objectives. (NIFC) Wildland fire use is the management of naturally ignited wildland fires to accomplish resource management objectives in areas that have a fire management plan. The use of the term wildland fire use replaces the term prescribed natural fire. (Wildland and Prescribed Fire Management Policy, August 1998)

[12] *Forest highway* – A forest highway is a forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (USC: Title 23, Section 101(a)), designated by an agreement with the FS, state transportation agency, and Federal Highway Administration.

[13] *Fuel treatment* – A fuel treatment is a type of vegetation management action that reduces the threat of ignition, fire intensity, or rate of spread, or is used to restore fire-adapted ecosystems.

[14] *Goal* – A goal is a broad description of what an agency is trying to achieve, found in a land management plan. (LCAS)

[15] *Guideline* – A guideline is a particular management action that should be used to meet an objective found in a land management plan. The rationale for deviations may be documented, but amending the plan is not required. (LCAS modified)

[16] *Habitat connectivity (lynx)* – Habitat connectivity consists of an adequate amount of vegetation cover arranged in a way that allows lynx to move around. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian areas may provide travel cover across open valley floors. (LCAS)

[17] *HFRA (Healthy Forests Restoration Act)* - Public Law 108-148, passed in December 2003. The HFRA provides statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System and Bureau of Land Management lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. (Modified from Forest Service HFRA web site.)

[18] *Highway* – The word highway includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

[19] *Horizontal cover* – Horizontal cover is 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.

[20] *Isolated mountain range* – Isolated mountain ranges are small mountains cut off from other mountains and surrounded by flatlands. On the east side of the Rockies, they are used for analysis instead of sub-basins. Examples are the Little Belts in Montana and the Bighorns in Wyoming.

[21] *LAU (Lynx Analysis Unit)* – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (LCAS). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

[22] *Linkage area* – A linkage area provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys, or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks. (LCAS updated definition approved by the Steering Committee 10/23/01)

[23] *Lynx habitat* – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (LCAS)

[24] *Lynx habitat in an unsuitable condition* –Lynx habitat in an unsuitable condition consists of lynx habitat in the stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown tall enough to protrude above the snow during winter. Stand replacing fire or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. (LCAS)

[25] *Low-speed, low-traffic-volume road* – Low speed is less than 20 miles per hour; low volume is a seasonal average daily traffic load of less than 100 vehicles per day.

[26] *Maintain* – In the context of this decision, maintain means to provide enough lynx habitat to conserve lynx. It does not mean to keep the status quo.

[27] *Maintenance level* – Maintenance levels define the level of service provided by and maintenance required for a road. (FSH 7709.58, Sec 12.3) Maintenance level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most level 4 roads have double lanes and an aggregate surface. Some may be single lane; some may be paved or have dust abated. Maintenance level 5 is assigned to roads that provide a high degree of user comfort and convenience.

Normally, level 5 roads are have double lanes and are paved, but some may be aggregate surfaced with the dust abated.

[28] *Mid-seral or later* – Mid-seral is the successional stage in a plant community that is the midpoint as it moves from bare ground to climax. For riparian areas, it means willows or other shrubs have become established. For shrub-steppe areas, it means shrubs associated with climax are present and increasing in density.

[29] *Multi-story mature or late successional forest* – This stage is similar to the *old multistory structural* stage (see below). However, trees are generally not as old, and decaying trees may be somewhat less abundant.

[30] *Objective* – An objective is a statement in a land management plan describing desired resource conditions and intended to promote achieving programmatic goals. (LCAS)

[31] *Old multistory structural stage* – Many age classes and vegetation layers mark the old forest, multistoried stage. It usually contains large old trees. Decaying fallen trees may be present that leave a discontinuous overstory canopy. On cold or moist sites without frequent fires or other disturbance, multi-layer stands with large trees in the uppermost layer develop. (Oliver and Larson, 1996)

[32] *Old growth* – Old growth forests generally contain trees that are large for their species and the site, and are sometimes decadent with broken tops. Old growth often contains a variety of tree sizes, large snags, and logs, and a developed and often patchy understory.

[33] *Permanent development* – A permanent development is any development that results in a loss of lynx habitat for at least 15 years. Ski trails, parking lots, new permanent roads, structures, campgrounds, and many special use developments would be considered permanent developments.

[34] *Prescribed fire* – A prescribed fire is any fire ignited as a management action to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements met, before ignition. The term prescribed fire replaces the term management ignited prescribed fire. (NWCG)

[35] *Precommercial thinning* – Precommercial thinning is mechanically removing trees to reduce stocking and concentrate growth on the remaining trees, and not resulting in immediate financial return. (Dictionary of Forestry)

[36] *Project* - All, or any part or number of the various activities analyzed in an Environmental Impact Statement, Environmental Analysis, or Decision Memo. For example, the vegetation management in some units or stands analyzed in an EIS could be for fuel reduction, and therefore those units or stands would fall within the term *fuel treatment project* even if the remainder of the activities in the EIS are being conducted for other purposes, and the remainder of those units or stands have other activities prescribed in them. All units in an analysis do not necessarily need to be for fuel reduction purposes for certain units to be considered a *fuel reduction project*.

[37] *Red squirrel habitat* – Red squirrel habitat consists of coniferous forests of seed and cone-producing age that usually contain snags and downed woody debris, generally associated with mature or older forests.

[38] *Regeneration harvest* – The cutting of trees and creating an entire new age class; an even-age harvest. The major methods are clearcutting, seed tree, shelterwood, and group selective cuts. (Helms, 1998)

[39] *Research* – Research consists of studies conducted to increase scientific knowledge or technology. For the purposes of Standards VEG S5 and VEG S6, research applies to studies financed from the forest research budget (FSM 4040) and administrative studies financed from the NF budget.

[40] *Restore, restoration* – To restore is to return or re-establish ecosystems or habitats to their original structure and species composition. (Dictionary of Forestry)

[41] *Riparian area* – An area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. (LCAS)

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

[43] *Shrub steppe habitat* – Shrub steppe habitat consists of dry sites with shrubs and grasslands intermingled.

[44] *Standard* – A standard is a required action in a land management plan specifying how to achieve an objective or under what circumstances to refrain from taking action. A plan must be amended to deviate from a standard.

[45] *Stand initiation structural stage* – The stand initiation stage generally develops after a stand-replacing disturbance by fire 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. (Oliver and Larson, 1996)

[46] *Stem exclusion structural stage (Closed canopy structural stage)* – In the stem exclusion stage, trees initially grow fast and quickly occupy all of 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)

[47] *Timber management* – Timber management consists of growing, tending, commercially harvesting, and regenerating crops of trees.

[48] *Understory re-initiation structural stage* – In the understory re-initiation stage, a new age class of trees gets established after overstory trees begin to die, are removed, or no longer fully occupy their growing space after tall trees abrade each other in the wind. Understory seedlings then re-grow and the trees begin to stratify into vertical layers. A

low to moderately dense uneven-aged overstory develops, with some small shade-tolerant trees in the understory. (Oliver and Larson, 1996)

[49] *Vegetation management* – Vegetation management 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.

[50] *Wildland urban interface (WUI)* – Use the definition of WUI found in the Healthy Forests Restoration Act. The full text can be found at HFRA § 101. Basically, the wildland urban interface is the area adjacent to an at-risk community that is identified in the community wildfire protection plan. If there is no community wildfire protection plan in place, the WUI is the area 0.5 mile from the boundary of an at-risk community; or within 1.5 miles of the boundary of an at-risk community if the terrain is steep, or there is a nearby road or ridgetop that could be incorporated into a fuel break, or the land is in condition class 3, or the area contains an emergency exit route needed for safe evacuations. (Condensed from HFRA. For full text see HFRA § 101.)

[51] *Winter snowshoe hare habitat* – Winter snowshoe hare habitat consists of places where young trees or shrubs grow densely – thousands of woody stems per acre – and tall enough to protrude above the snow during winter, so snowshoe hare can browse on the bark and small twigs (LCAS). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stages.

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G. Scenery Management

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Introduction

The planning area covers a broad variety of ecological regions. This area is further divided into a series of distinctive "island" mountain ranges. These individual mountain ranges were identified and labeled as geographic areas (GAs).

Scenery is important to visitors' overall experience when visiting the forest. Research has shown (Ryan, 2005) that people prefer natural settings when visiting public lands. Statistics from the National Visitor Use Monitoring (NVUM) project show that the second highest activity visitors participate in nationally is viewing scenery, with 25 percent of visitors participating in this activity. This high percentage emphasizes the importance of maintaining natural appearing landscapes so the expectations of these visitors can be met.

The Scenery Management System is a systematic approach to inventory, analyze, and monitor the scenic resources. This system recognizes natural disturbance processes such as fire, insects, and disease to be part of the natural landscape that is dynamic and also important to maintaining healthy, sustainable, and scenic landscapes. This system for managing scenery is used in the context of ecosystem management to determine the relative value, stability, resiliency and importance of scenery; to assist in establishing overall resource objectives; and to ensure high-quality scenery for future generations.

Scenic Character

Scenic character is defined as a combination of the physical, biological, and cultural images that give an area its scenic identity and contribute to its sense of place. It provides a frame of reference from which to determine the scenic attractiveness of a landscape and to measure changes to the scenic integrity of the scenery described. Scenic character for the planning area was assessed by individual GAs and includes the encompassing view sheds of both NFS forested and nonforested lands. Ecoregion descriptions describe the biophysical aspects of the scenic character of the forest landscape. These ecoregion descriptions serve as the frame of reference for assessing scenic character and the scenery attributes within these landscapes.

The scenic character for each individual GA is described below. Maps of the desired scenic integrity objectives for each GA can be found in appendix A.

Landscape Visibility

Landscape visibility addresses the relative importance and sensitivity of what is seen and/or perceived in a given landscape. It is measured from what is seen from main travelways and use areas and from the distance the viewer is from the landscape being viewed.

- Travelways represent linear concentrations of public-viewing, including freeways, highways, roads, railroads, trails, commercial flight paths, rivers, canals, and other waterways.
- Use areas are spots that receive concentrated public-viewing use. They include visitor centers, vista points, trailheads, campgrounds, picnic grounds, swim beaches, marinas, resorts, ski areas, and other recreation sites. Use areas also include urban and suburban areas, towns, subdivisions, parks, or other public lands within or adjacent to the national forest.

Concern levels are a measure of the degree of public importance placed on landscapes viewed from travelways and use areas. Level 1 indicates a high concern, and level 2 is moderate.

Landscape visibility is mapped with GIS and is determined by distance zones, or the distance at which the landscape is being viewed. In addition to the features found on the GAs, there are also travelways on non-NFS lands, within 20 miles of the HLC NF.

Each GA description includes a table that provides a detailed list of all viewpoints currently found within that GA.

Big Belts Geographic Area

Location

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. This 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. Many other smaller communities also have relationships with the GA such as Lakeside, Canyon Ferry, Townsend, Toston, and White Sulphur Springs. The range is located between the predominantly treeless Smith and Missouri river valleys.

Scenic Character

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. Many of their structures have long disappeared but remnants still exist on the landscape. Thompson Guard Station and Meriwether Guard Station stand as reminders of the USFS history.

The Mann Gulch Smokejumper Memorial commemorates the tragedy of the Mann Gulch Fire, a sacred landscape for wildland firefighters. Many make pilgrimages here to pay their respects, strengthen internal relationships, and revisit lessons learned.

The Big Belt Mountains make up a long arc, approximately 75 miles long, on a northwest to southeast axis. Proportionally, it is narrow west to east, bulging wider in the north. The Missouri River clips the northwest boundary. This section of the river was named the Gates of the Mountains by the Lewis and Clark expedition because here the river is constricted through tall, picturesque limestone cliffs. An area of canyons adjacent to this stretch of river shares similar geology and has been designated wilderness. The tallest mountains are found in the south-central part of the range, Mount Baldy at 9,472 and Mount Edith 9,507, just north of Deep Creek River Canyon. The lowest elevations are along the Missouri River and are around 3,600 feet. Many other mountains are also landmarks, such as Cap, Willow, Hogback, Hedges, and Grassy. 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 the mountains to the west, with over 140 named. A few are very narrow at the entrance to the mountains and then open up into broader bottoms once within, such as Hellgate, Little Hellgate, and Avalanche gulches. Other prominent gulches are Magpie, Cave, White, Confederate, Duck Creek, Cabin, and Dry Creek. Other prominent local landform features are bars, which are depositions of material by a stream body over time. They are similar to sand bars or point bars in a stream, but on a larger scale. Many 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 Mountains and is included in the Big Belts GA because of its close proximity. This landform can be described as foothills to low mountains with elevations ranging between 4,500-6,500 feet. Ellis Canyon is a prominent, branching drainage network that runs south to north through the range.

The geology of this GA is predominantly sedimentary limestone. There are some pockets of rock from metamorphic and volcanic activity in the Big Belt Mountains that are rich with minerals.

Most of the outlying Dry Range, northeast Big Belts, and area of the Big Belts along the Missouri River can be characterized as partially forested foothills with large grassland openings. The area of the Dry Range that borders the Smith River is more heavily forested.

The forest in the Big Belt Mountains is predominantly Douglas-fir and ponderosa pine with some limber pine at lower elevations, and lodgepole pine and subalpine fir are found at higher elevations. Whitebark pine is also encountered at the highest elevations. Valley bottoms alongside drainages have narrow riparian areas with dogwood, willow, patches of cottonwood, Engelmann spruce, and other wet-loving plants. South and southwest aspects grow dry grassland. Fire is the primary sculptor of plant communities and occurs frequently. The majority of the Gates of the Mountains Wilderness burned in 2007 and the famous Mann Gulch fire, in the same vicinity, burned in 1949.

Both the Big Belts and the Dry Range are characteristically dry. 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. Most of the west-facing gulches and canyons have small constrained streams associated with them, such as Beaver Creek, Trout Creek, and Deep Creek. High elevation lakes are in basins east of Mount Baldy and Boulder Baldy. Discharge from these lakes flows east into the Smith River via Camas and Big Birch Creek. Rock Creek also flows into the Smith and connects with Ellis Canyon in the Dry Range. Gipsy Lake, a manmade reservoir, is also on the east side.

Figure 2. High elevation ridge between Mount Baldy and Mount Edith *(photo by USDA FS)*

Figure 3. Meriwether Canyon in Gates of the Mountains Wilderness *(photo by USDA FS)*

Landscape Visibility

Table 1. Viewpoints in the Big Belts GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Atlanta Mule (FSR #575)		X
	Avalanche (FSR #359)		X
	Beaver CK.-Indian CK. (FSR #138)		X
	Blacktail (FSR #4171)		X
	Cabin Gulch-North Fork (FSR #423)		X
	Camas (FSR #383)		X
	Cave Gulch (FSR #4156)		X
	Confederate (FSR #287)		X
	Duck Creek – Birch Creek (FSR #139)	X	
	Gipsy Basin (FSR #8961)		X
	Granger-North Fork (FSR #423-F1)		X
	Grassy Mountain (FSR #583)		X
	Hellgate Road (FSR #693)		X
	Magpie Road (FSR #425)		X
	Grassy Microwave (FSR #583-B1)		X
	Pickfoot Spur #3 F1 (FSR #575-F1)		X
	Sulphur Bar (FSR #147)		X
	US Highway 12	X	
	Wagner Gulch (FSR #259)		X
	York Road (FSR #280)	X	
Travelways (trails)	Hanging Valley (Tr. #247)	X	
	Refrigerator Canyon (Tr.#259)		X
	Trout Creek Canyon (Tr.#270)	X	
Lakes	Canyon Ferry Lake	X	
	Edith Lake	X	
	Grace Lake	X	
	Gipsy Lake	X	
	Hauser Lake	X	
	Hidden Lake	X	
	Holter Lake	X	
	Upper Baldy Lake	X	
	Upper Holter Lake	X	
Rivers	Missouri River	X	
	Smith River	X	
Campgrounds	Coulter	X	
	Deep Creek	X	

Category	Name	Concern level 1	Concern level 2
	Gipsy		X
	Pike Gulch	X	
	Skidway	X	
	Vigilante	X	
Lookout/cabin	Bar Gulch Cabin		X
	Indian Flats Cabin		X
	Rillway Cabin	X	
	Thompson Station		X
Picnic sites	Gipsy Lake Day Use		X
	Meriwether	X	
Trailheads	Big Log	X	
	Birch Creek		X
	Blacktail		X
	Boulder Lake		X
	Camas Lake		X
	Cave Gulch		X
	Edith Lake		X
	Hanging Valley	X	
	Hellgate		X
	Hidden Lake		X
	Hunters Gulch	X	
	Kentucky Gulch		X
	Magpie Meadows		X
	Nary Time		X
	Never Sweat		X
	Refrigerator Canyon	X	
	Spring Gulch	X	
	Stove Camp		X
	Thompson Creek		X
	Trout Creek Canyon	X	
	Wagner Gulch		X
	Willow Creek	X	

Castles Geographic Area

Figure 4. View of Whetstone Ridge from the south *(photo by USDA FS)*

Location

The Castles GA is an island mountain range east of White Sulphur Springs in Meagher County. The Castle's treed higher elevations are surrounded by lower elevations that are predominantly treeless, instilling an island appearance. The range has its own geologic story- unique from the other island ranges.

Scenic Character

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.

The Castles are a combination of landforms that appear as one. Western slopes culminate in a gentle rising, flat-topped dome of volcanic origin that is comprised of a group of mountains, of which the forested slopes of Beartrap Peak, Woodchuck Mountain, and Willow Peak are punctuated by castle-like outcrops of granite. Elk Peak is the highest point in the GA at 8,566 feet. Wapiti and Castle mountains are also prominent features. The eastern section is characterized by plateaus of sedimentary origin, such as the Limestone and Whetstone Ridges. Here, the lowest elevations are down to 5,100. 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 dominated by lodgepole pine, and Douglas-fir. At higher elevations and on sun exposed aspects, forest intergrades with grassland meadows, or *parks* such as Manger Park, Smith Meadows, and Elk Park. Aspen stands grow in moist areas. On the drier, eastern sections plant communities are dominated by grassy parks interspersed with patches of Douglas-fir, Engelmann spruce, lodgepole, limber, and, ponderosa pine. The entire GA is surrounded by sagebrush grasslands. 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. Major drainages are Warm Springs, Checkerboard, Flagstaff, Beartrap, Fourmile, Richardson, Grasshopper, Bonanza, and Cottonwood creeks. Willow Creek is the municipal water source for White Sulphur Springs. The western slopes are wetter than the porous eastern limestone slopes.

Figure 5. View of the granite, castle-like outcrops that extend above a coniferous canopy, looking southeast towards Woodchuck Mountain *(photo by USDA FS)*

Figure 6. Granite outcrop *(photo by USDA FS)*

Landscape Visibility

Table 2. Viewpoints in the Castles GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Bonanza Creek (FSR #585)		X
	Castle Checkerboard (FSR #581)	X	
	Fourmile (FSR #211)	X	
Campgrounds	Grasshopper	X	
	Richardson	X	

Crazies Geographic Area

Figure 7. Looking towards Virginia Peak, elevation 8,769 feet *(photo by USDA FS)*

Location

The Crazies GA encompasses the northern portion of the Crazy Mountains that is administered by the HLC NF. The southern portion 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 with an estimated 970 inhabitants (USCB, 2013).

Scenic Character

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. Chief Many Coups had one of his most prophetic dreams here. Euro- American settlement has lightly affected the area with only a few signs of habitation, such as the Hereim Homestead on Comb Creek. Forest Lake Guard Station still stands as a sentry for FS 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 (Castle, Little Belt, Big Snowy, Beartooth, Absaroka, and Gallatin Mountain 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 area. Glaciation has imparted many of these landforms with sharp, scoured edges. The highest point in the GA is Loco Mountain at 9,242 feet. The summits of Target Rock, Virginia Peak, Mt Elmo, and Lebo Peak are also distinctive landmarks. Lower elevations along stream bottoms are at roughly 6,100 feet.

All of the GA's streams drain into the Musselshell River on their way to the Gulf of Mexico via the Missouri River. The most prominent drainages are the American, Bozeman, Musselshell Forks, Cottonwood, and Little and Big Elk Creeks. Riparian forests of aspen, willow, dogwood and cottonwood grow along their courses. Grasslands occupy much of the lower elevations and intergrade with coniferous forests dominated by lodgepole pine, Douglas-fir, and subalpine fir at higher elevations. Small patches of deciduous trees punctuate the dense canopy of evergreen trees. At the highest elevations, conifer forests give way to alpine habitats. Fire was a major influence on plant communities.

Figure 8. Patterns of vegetation on a long ridge ascending to Loco Mountain *(photo by USDA FS)*

Figure 9. Foreground view showing encroachment of Douglas-fir into sagebrush grassland *(photo by USDA FS)*

Landscape Visibility

Table 3. Viewpoints in the Crazies GA

Category	Name	Concern level 1	Concern level 2
Travelway (road)	Forest Lake (FSR #66)		X
Campground	Forest Lake Campground		X

Divide Geographic Area

Figure 10. Chessman Reservoir from the summit of Red Mountain *(photo by USDA FS)*

Location

This GA is the scenic backdrop and primary recreational resource for Montana's capitol city, Helena, with a population of 29,596 (USCB, 2013). It also includes the smaller communities of Austin, Rimini, and Unionville. Portions of the GA are in the political geographies of Lewis and Clark, Powell, and Jefferson Counties. For ease of comprehension, the area has been broken out into four smaller subareas: northwest, southwest, northeast, and southeast. U.S. Highway 12 divides the subareas south to north and the Continental Divide separates them east to west. The spine of the divide is higher, cooler, wetter, and more exposed, imbuing it with a unique microclimate. The Continental Divide National Scenic Trail follows the crest of the divide.

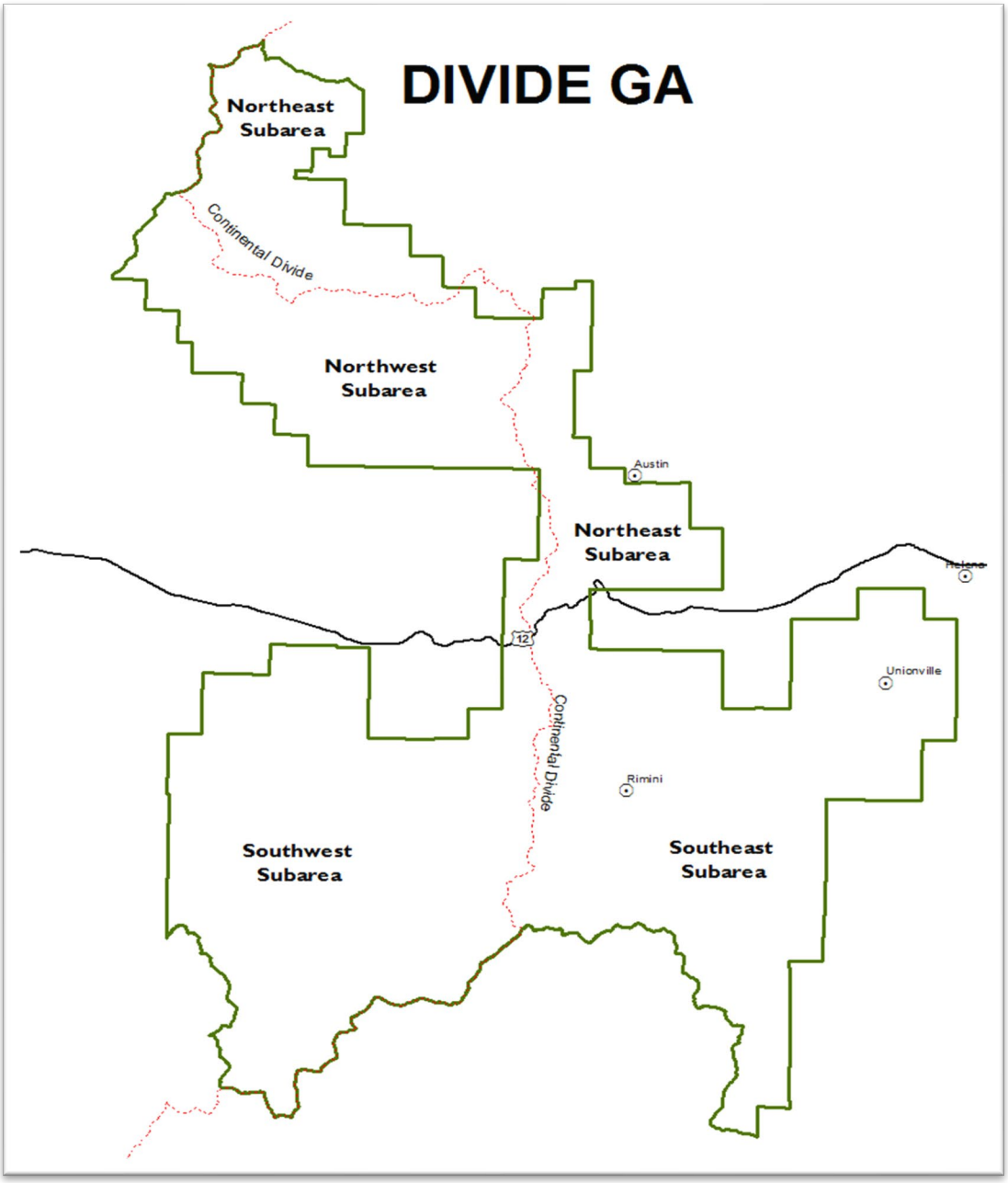

Figure 11. Divide GA and subarea context map

Scenic Character

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 clues of their heyday. 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. Historically, fire was the primary disturbance throughout the GA and would determine composition and patterns of vegetation. Parks are distributed throughout, such as Bullion Parks, Blackfoot Meadows, and Thompson Flats.

Divide Northwest

This subarea is a combination of ecoregions and displays a diversity of characteristics. Mountains are mostly non-glaciated and therefore rounded in form, lacking jagged edges. Most ridges and peaks are heavily forested, obscuring high points. This subarea's highest peak is Black Mountain at 8,297 feet. Lower elevations go down to roughly 5,500 feet. Its geology is mainly composed of carbonate rich sedimentary rock.

Forests are characterized by Douglas-fir and ponderosa pine. Open grasslands occupy south and southwesterly aspects, especially at sun-exposed elevations. The ecoregion to the west is predominantly devoid of trees, creating a stark contrast. Water is scarce here, with only small drainages, Dog Creek being the largest.

Figure 12. Wet bog along the Continental Divide *(photo by USDA FS)*

Figure 13. Granite boulder outcrop and fall color along the Continental Divide *(photo by USDA FS)*

Divide Southwest

This subarea is exclusively in the Elkhorn Mountain-Boulder Batholith ecoregion. The landform is partially glaciated so there is some evidence of glacial activity (terrain features and soil). The geology is of volcanic origin and rich in mineral deposits. Locally, boulder strewn areas of erosion-prone, granitic rocks occur. The highest point is Jack Mountain at 8,727 feet. Lower elevations are approximately 5,350 feet.

Landforms are heavily covered in forests of subalpine fir and Douglas-fir habitat types, mostly dominated by seral lodgepole at higher elevations. Talus slopes create openings in the closed canopy of coniferous trees. The most prominent drainage, the Little Blackfoot River, is the largest in the entire GA. It has carved a broad valley bottom and is buffered by robust willow complexes.

Figure 14. Pasture in the Little Blackfoot Valley, southwest subarea *(photo by USDA FS)*

Figure 15. Aspen and granite boulders create an opening in a closed canopy of conifers, southwest subarea *(photo by USDA FS)*

Divide Northeast

This subarea is a combination of ecoregions and therefore shares attributes of all. Mountains have a rolling form and are heavily forested with grassy openings on sun-exposed ridgelines. Ponderosa pine and Douglas-fir are the dominant tree species. A mostly treeless ecoregion extends directly to the subarea's east, creating contrast.

The geology is composed of rocks of both volcanic and sedimentary origin. Highest points are along the Continental Divide, Meyer's Hill at 7,129 feet and Roundtop Mountain at 6,916 feet. The lowest elevations are roughly 5,160 feet. Water is scarce, and streams are infrequent. Little Prickly Pear Creek's headwaters and canyon begin here.

Figure 16. Historic structure, northeast subarea *(photo by USDA FS)*

Figure 17. Looking at northeast subarea from foothills of Black Mountain in the southeast subarea *(photo by USDA FS)*

Divide Southeast

Divide southeast is a combination of ecoregions and characteristics. It is also the closest subarea to the population center of Helena and therefore most visited. Mountains are rolling and rounded with little evidence of glaciation. The geology is diverse with mineral rich deposits of volcanic origin and sedimentary rocks. Patches of granite boulders and talus slopes are intermittent.

Thick forests of subalpine fir and Douglas-fir climax habitat types, most of which are dominated by seral lodgepole pine, cloak higher elevations. An exception to this is the iconic Red Mountain, at 8,143 feet; its upper slopes are conspicuously barren, exposing red, rocky soil. A stunted forest of wind-swept whitebark pine clings to its round, flat ridge top. Forests are punctuated by wet, boggy habitat, such as Sure Thing Swamp, which harbors unique communities of wet-loving vegetation. Aspen stands are distributed throughout and give contrast to the expanses of conifers. Lower elevations, down to roughly 4,500 feet, have ponderosa pine that intergrade into grassland, mainly on south and southwesterly ridges.

Overall water is scarce, but Helena's primary water source, Tenmile Creek, is found here. Some waterways have been impounded to capture water for utility and recreation, such as Chessman Reservoir and Park Lake. Drainages are characterized as being heavily incised with constrained riparian areas such as Lump Gulch and Orofino Gulch. Some gulches have remnants of historic mining, such as kilns, that recall an era of fine craftsmanship.

Figure 18. Lime kiln remnants in Grizzly Gulch, southeast subarea *(photo by USDA FS)*

Figure 19. Red Mountain from the Continental Divide, southeast subarea *(photo by USDA FS)*

Landscape Visibility

Table 4. Viewpoints in the Divide GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Chessman (FSR #299)		X
	Grizzly Gulch (FSR #723)		X
	Little Blackfoot (FSR #227)		X
	Monarch (FSR #4104)		X
	Mullan (FSR #1805)		X
	Ontario (FSR #123)		X
	Park Lake (FSR #4009)		X
	Priest Pass (FSR #335)		X
	Rimini Road (FSR #695)		X
	Travis Creek (FSR #4000)		X
	Unionville (FSR #454)	X	
	US Highway 12	X	
Travelways (trails)	Continental Divide National Scenic Trail	X	
	Mount Helena (Tr. #373)	X	
Lake	Park Lake	X	
Campground	Cromwell-Dixon	X	
	Kading	X	
	Moose Creek	X	
	Park Lake	X	
Lookout/cabin	Kading Cabin		X
	Moose Creek Cabin	X	
Picnic site	Tenmile Picnic Site	X	
Ski area (Nordic)	Mac Pass Ski Area	X	
Snowpark	Austin Creek		X
	Little Blackfoot		X
	Moose Creek		X
Trailheads	Larabee Gulch		X
	Lava Mountain		X
	Little Blackfoot		X
	Mac Pass CDNST	X	
	Monarch		X
	Mt Helena Ridge	X	

Elkhorns Geographic Area

Figure 20. Crow and Elkhorn Peaks from the Boulder River Valley, looking north *(photo by USDA FS)*

Location

The Elkhorns GA encompasses the Elkhorn Mountains in Broadwater and Jefferson Counties and includes the small mining town of Elkhorn. The nearest population center is Helena, Montana. Many smaller communities also have 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. Many other island ranges and Canyon Ferry Reservoir can be viewed from its vantages.

Scenic Character

The Elkhorn GA has been occupied by human inhabitants for thousands of years. Rock art and other subtle clues of their settlement can still be found on the landscape. 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 are living reminders of FS administration. Fire has had a major influence on plant communities.

The form of the Elkhorn Mountains is rounded and furrowed from extensive weathering. From a bird's-eye view, the island range is oval shaped on a southwest-northeast axis. High points are prominent from background northwest, west, and southwest perspectives but cryptic from other vantages. Drainages have carved steep gulches and canyons.

The Elkhorn Mountains 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, an igneous bulge that formed when magma upwelled from deep within the earth's crust and then cooled. This geologic history has left the area rich in minerals. Evidence of glaciation is localized as boulder strewn areas of granitic rocks. The GA's highest points are Crow Peak at 9,415 feet and Elkhorn Peak at 9,410 feet. Other prominent landmarks are High Peak, Casey Peak, and Strawberry Butte. The lowest elevations in the GA are roughly 4,500 feet in the northwest corner. 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. Prominent landforms are Glendale Butte and Giant Hill.

The plant communities on the batholith portion are mostly forested with ponderosa pine, subalpine fir, Douglas-fir, lodgepole pine, and whitebark pine at higher 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. Its effects are still evident. 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. Douglas-fir is the predominant forest tree species.

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, such as Elkhorn and Dry Creeks. Other major creeks are McClellan, Prickly Pear, Warm Springs, Crow Indian, and Beaver. The basins around Elkhorn and Crow Peaks harbor high elevation lakes such as Hidden Lake, Tizer Lakes, Leslie Lake, and Glenwood Lake. The Crow Lakes are found in the upper headwaters of Crow Creek. Crow Creek plummets over an impressive falls. Springs are important water features in the more arid eastern sections.

Figure 21. Looking north down Weasel Creek towards Canyon Ferry Reservoir and Big Belt Mountains *(photo by USDA FS)*

Figure 22. Looking towards Crow and Elkhorn Peaks from the southeast *(photo by USDA FS)*

Landscape Visibility

Table 5. Viewpoints in the Elkhorns GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Bullock Hill Loop (FSR #4032)		X
	Crystal Creek (FRS #4017)		X
	Elkhorn (FSR #258)		X
	Indian Creek (FSR # 360)		X
	McClellan Creek (FSR # 294)		X
	Prickly Pear (FSR #164)		X
	South Fork Crow Creek (FSR # 277)		X
	Tizer lakes (FSR #4011)		X
	Warm Springs (FSR #226)		X
	Weasel Creek (FSR #405)		X
	Willard creek (FSR #4014)		X
Travelway (trail)	Crow Creek (Tr. #109)		X
Lakes	Glenwood Lake	X	
	Hidden Lake	X	
	Tizer Lakes	X	
Lookout/cabin	Eagle Guard Station		X
Picnic site	Elkhorn Picnic Area		X
Trailheads	Crow Creek North		X
	Crystal Creek		X
	Eagle Basin		X
	Hall Creek		X
	Jump Off		X
	Longfellow		X
	Poe Park		X
	Swamp Creek		X
	Willard Creek		X

Highwoods Geographic Area

Figure 23. Looking west from ridge on Windy Mountain, view of North Peak (left) and Highwood Baldy (right) *(photo by USDA FS)*

Location

The Highwoods GA is the smallest of all the GAs within the planning 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, population, 59,351 (USCB, 2013). 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.

Scenic Character

The Highwoods have a long history of grazing. This GA provides an abundance of grass and reliable sources of water. Historic Highwood and Shonkin Cow Camps are reminders of this heritage. Highwood Guard Station continues to greet visitors as they enter the forest at the North Fork of Highwood Creek.

Although small, the GA is diverse and robust in content. The 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 high point and centerpiece of the range is Highwood Baldy at 7,657 feet. The mountains are bisected by Highwood Creek. Highwood Baldy, Pinewood, North, South and Middle Peaks are found to its west. Mount Kennon, Windy Mountain, East, Lava, Prospect, and Arrow Peaks are located to its east. Slopes are moderately steep.

North facing aspects are considerably wetter than less vegetated and rocky south facing aspects. Lowest elevations go down to 4300 feet.

Here, a characterizing landform is the coulee, which is from the French word meaning “to flow”. It is used interchangeably for various terrain features but all have a drainage element in common. Some are predominantly grassy and others harbor woody plants. Some are intermittent and others have perennial flows. Some examples in the Highwood GA are Grouse and Big Coulees.

A dense stream network has dissected the mountains, creating numerous folds in the topography. The most prominent drainages are Arrow, Shonkin, Highwood, and the North Fork of Little Belt Creeks. Riparian areas are rich with willow, dogwood, water birch, cottonwood, and other water-loving plants. Some headwaters provide for pure and geographically unique populations of west slope cutthroat trout.

The land cover of this GA is a mosaic of conifers, deciduous trees, grass, and rock. Large aspen stands intergrade with rich prairie and dense pine forest. Orderly stands of mature lodgepole pine contrast with more diverse plant assemblages. Open grown Douglas-fir and windswept limber pines add to the diverse character. Woodland, forest, and prairie ebb and flow into one another. Fire was historically the main determinant of vegetative cover.

Figure 24. Lodgepole pine stand *(photo by USDA FS)*

Figure 25. Aspen intergrading with grass *(photo by USDA FS)*

Landscape Visibility

Table 6. Viewpoints in the Highwoods GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Highwood Baldy (FSR #8830)		X
	N Fork Highwood Creek (FSR #8840)	X	
	South Fork Highwood (FSR #121)	X	
	Thain Creek (FSR #8841)	X	
Travelways (trails)	Briggs Creek (Tr.#431)	X	
	Center Ridge (Tr. #415)		X
	Marie Springs (Tr. #412)		X
	North Fork Highwood Creek (Tr.#423)		X
	Thain Creek (Tr. #411)	X	
	White Wolf (Tr. #413)		X
	Windy Mountain (Tr. #454)	X	
Campground	Thain Creek Campground	X	
Trailhead	North Fork Highwood	X	

Little Belts Geographic Area

Figure 26. Pierce Park as seen from the slopes of Daisy Mountain with Big Baldy in the background *(photo by Steve Wyatt)*

Location

Portions of this sprawling range are located in the political geographies of 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 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.

Scenic Character

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. Their signature is light on the land but can still be found.

The Little Belts GA was quickly inhabited by Euro-Americans after Missouri river travel was established and rich deposits of minerals were discovered. Approximately 144 named mines have been constructed within the area. Mining infrastructure and tools are frequently encountered throughout. Many communities also sprang up quickly and then disappeared. Some remnants of civic buildings and dwellings stand witnesses to their story. A few former community names are Galena, Summit, Silver Dyke, Carbonate, and

Hughesville. Homesteading also occurred in the GA, mostly along the lower elevation fringes. A 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 remain in various locations and conditions.

This is Charlie Russell country. The cowboy artist lived at times in these mountains and worked the neighboring ranches. Many spots were visited by him and became inspirations for his art. It is not uncommon for local families to recall first-hand accounts of the charismatic man.

The adjective "little" to describe this GA is misleading, as this range is the largest of the isolated island ranges in central Montana. It measures approximately 60 miles southeast to northeast and is 30 miles across. The landmass of the Little Belts Mountains generally has a rolling curvature that lacks much sharpness. Evidence of glaciation is infrequent and patchy, such as on the upper slopes of Big Baldy Mountain. The mountain range's form and its fairly uniform cover of trees create geographic confusion. Visitors seldom realize the range's immensity and spectrum of elevation. The highest points are Big Baldy at 9,175 feet and Yogo Peak at 8,812 feet. Elevations range as low as 4,000 feet in the Smith River Canyon. A few other prominent landmarks are Kings Hill pass, with nearby Porphyry Peak and Showdown ski area, Old Baldy Mountain, Black Butte, Monument Ridge and Peak, Wolf Butte, Granite Mountain, Peterson Mountain, Bandbox Mountain, Sand Point Mountain, Mount High, Lost Fork Ridge, Smoky Mountain, Daisy Peak, and Coxcombe Butte.

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 exposed escarpments and palisades, such as on the Smith River, Tenderfoot Creek, Belt Creek, Haymaker Narrows Creek, Antelope Creek, and the Middle Fork of the Judith River.

The many streams of the Little Belts are picturesque and ecologically rich. Drainages typically flow outward, radially from the center of the range. Those in the west drain to the Smith River, such as the North Fork of the Smith, Newlan Creek, Sheep Creek, and Ming Coulee. Those to the south and southeast drain into the Musselshell River, such as the North Fork of the Musselshell, Haymaker Creek, both forks of Hopley Creek, and Roberts Creek. Those to the east drain to the Judith River, such as Lone Tree Creek, Willow Creek, Dry Wolf Creek, Running Wolf Creek, Surprise Creek, and Sage Creek. Those to the north drain into the Missouri, such as Sand Coulee Creek, Belt Creek, and Big Otter Creek.

The Little Belt's vegetation reflects the gradient of moisture and elevation. Grasslands, sagebrush steppe and open woodland circle the outer fringes with trees clinging to drainage bottoms. Ponderosa pine stands are more common on the drier east side. Thick stands of Douglas-fir and lodgepole pine cloak the interior. Whitebark pine and subalpine fir are found in the higher elevations. Engelmann spruce and aspen occupy wet sites. Some mountain summits lack vegetation, revealing gentle sloping, broad ridges that appear to be composed of mostly dark loose rock. The GA is also characterized by its many parks that punctuate the forests. They are rich assemblages of predominantly herbaceous plants. Onion, Harley, O'Brien, Pierce, and Lucy parks are a select few.

Figure 27. Evidence of glaciation on the east side of Big Baldy Mountain *(photo by USDA FS)*

Figure 28. Smith River Canyon on the northwest boundary *(photo by USDA FS)*

Landscape Visibility

Table 7. Viewpoints in the Little Belts GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Belt Park Connector (FSR #6511)	X	
	Divide Road (FSR #839)	X	
	Dry Fork Belt Creek (FSR #120)	X	
	Dry Wolf (FSR #251)	X	
	Ettien Ridge Road (FSR #821)		X
	Fawn Creek (FSR #6393)		X
	Haymaker Canyon (FSR #8809)		X
	High mountain (FSR #382)	X	
	Hughesville (FSR #6403)		X
	US Highway 89	X	
	Jefferson Creek (FSR #267)	X	
	Lick Creek (FSR #67)	X	
	Lion creek (FSR #829)		X
	Lonetree (FSR #262)		X
	Memorial way (FSR #487)	X	
	Middle Fork Judith river (FSR #825)	X	
	Monument (FSR #3497)		X
	Monument Ridge (FSR #268-A1)		X
	Moose Creek (FSR #204)		X
	Ruby-Henn (FSR #613)		X
	Sheep Creek (FSR #119)		X
	Spring Creek (FSR #274)	X	
	West Fork Trombone (FSR #8804)		X
	Williams Park (FSR #586)		X
	Yogo Creek (FSR #266)	X	
Travelways (trails)	Daisy Peak Jeep Trail (Tr.#J6520)		X
	Ettien Trail Jeep Trail (Tr. #J821)		X
	Middle Fork Judith River (Tr. #437)		X
River	Smith River	X	
Fishing site	Sheep Creek Fishing Access	X	
Ski area (downhill)	Showdown Ski Area	X	
Ski area (Nordic)	Kings Hill Winter Recreation	X	
Snowpark	Balsinger Creek		X
Campgrounds	Aspen	X	
	Basin Creek		X
	Dry Pole Canyon		X
	Dry Wolf	X	
	Hay Canyon	X	
	Indian Hill	X	
	Jellison Place	X	

Category	Name	Concern level 1	Concern level 2
	Judith Station	X	
	Jumping Creek	X	
	Kings Hill	X	
	Logging Creek	X	
	Lower Lion Creek		X
	Many Pines	X	
	Moose Creek	X	
	Russian Flat		X
	Spring Creek	X	
	Upper Lion Creek		X
	Whitetail		X
Lookout/cabins	Calf Creek Cabin		X
	Dry Wolf Cabin	X	
	Hunters Spring Cabin		X
	Judith Guard Station	X	
	Kings Hill Cabin	X	
	Monument Peak Lookout		X
Trailheads	Daisy Dean		X
	Deep Creek	X	
	Holiday Camp		X
	Middle Fork Judith		X
	Memorial Falls	X	
	North Fork Hoover		X
	South Pilgrim		X
	Taylor Hills		x

Rocky Mountain Range Geographic Area

Figure 29. Looking north; west to east: North Fork of the Sun River valley, Gibson Reservoir and the Sun River *(photo from wikipedia.com)*

Location

The Rocky Mountain Range GA is in portions of Teton, Pondera, Glacier, and Lewis and Clark Counties. The closest communities are Augusta, Choteau, Bynum, Dupuyer, and Heart Butte. Great Falls is the nearest 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 Blackfeet 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 Flathead National Forest are to the west. A large portion of the Rocky Mountain Range GA is designated wilderness and includes parts of the Scapegoat and Bob Marshall Wilderness Areas. These two wilderness areas are components of a greater wilderness complex that totals over 1.5 million acres, the 5th largest wilderness area in the lower 48 states. The GA's proximity to this wilderness complex, Glacier National Park, and adjacent wild areas of Canada make it a critical component of the North Continental Divide Ecosystem.

Scenic Character

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. It is an area of stark contrast- the collision of the Northwest Glaciated Plains and the Canadian Rockies ecoregions, where the prairie meets the mountains.

The Northwest Glaciated Plains are characterized by large open expanses of what was historically short grass prairie. It has been predominantly converted to wheat and barley production or ranchland. Limber pine, woodland, and prairie occupy rocky and hilly areas that have not already been converted to agriculture. Kettle ponds seasonally dot the rolling foothills.

Here, the Canadian Rockies are represented by the Sawtooth and Lewis & Clark Ranges. The Sawtooth Range is the eastern edge that abuts the prairie. Large bands of exposed limestone are the essence of their visual character. An icon of this phenomenon is the Chinese Wall, a limestone escarpment that averages 1,000 feet high and extends for approximately 22 miles. The distinct ridges are locally known as reefs, recalling the geologic processes that created them. However, it was the mountain building processes that gave them their current up thrust form. The range is the first north-south running chain of mountains in a series of parallel chains. The highest elevations are approximately in the 9,000 feet zone, a difference of over 5,000 feet from the eastward plains. The highest point in the Sawtooth Range is Rocky Mountain at 9,392 feet. The highest points in the Lewis & Clark Range inside the GA are Scapegoat Mountain at 9,202 feet and Flint Mountain at 9,079 feet (note: this mountain range spans multiple GAs).

Water drains from the mountains eastward cutting perpendicular 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, such as Badger Creek, Birch Creek, North and South Forks of the Sun River, Straight Creek, and the Dearborn River. While topographically constrained, their riparian areas are robust and their water is cold and clear. Upon exiting the forest boundary, most of the 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.

Vegetation is influenced by relatively natural processes. Recently, fire has been allowed to burn inside the wilderness areas for ecological benefits. Prairie, limber pine woodland, and aspens cover lower foothills. Prairie vegetation extends into the front ridges and gives way to western forests. Douglas-fir and lodgepole pine are the major tree species in montane areas. Engelmann spruce grow in wetter soils. Whitebark pine and subalpine fir occupy higher elevations. Much exposed rock, aspen stands, and open grassland break up forest.

The Rocky Mountain Range 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 few remaining wild places in the lower 48 states. Grizzly bears and the complete suite of native fauna, excluding free range bison, still roam here. Many intact large ranches occupy the foothill prairie to the east and function as vital parts of the GA's ecosystem. The region is a last true vestige of the American West and old Montana. Many lodges, resorts, camps, cabins, and ranches have intimate relationships with the area. Guard stations, work centers, and lookouts help the Forest Service steward the vast country.

The GA is a distant backdrop for many locations. The inaccessibility of its western reaches dictates that the majority of visitors approach from the east through the ranches, limber pine woodland, and intact remnants of prairie. In places, it seems to undergo a magnification effect due to the mountain's location on the horizon.

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 religious importance such as a place for dream quests. The Badger-Two Medicine area is a Traditional Cultural District due to its cultural and spiritual resources. Archeological sites, such as pictographs, dot the entire GA.

Figure 30. Looking east; Over thrust of carbonate rocks (reef) Sawtooth Range in Blackleaf Canyon *(photo by USDA FS)*

Figure 31. Looking west; Vegetative patterns (prairie, woodland, forest), Ear Mountain area *(photo by USDA FS)*

Landscape Visibility

Table 8. Viewpoints in the Rocky Mountain Range GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Beaver - Willow Creek (FSR #233)		X
	Benchmark (FSR #235)	X	
	Blackleaf Canyon (FSR #145)	X	
	County Road #3334		X
	Elk Creek (FSR #196)	X	
	Mowitch Basin (FSR #9204)		X
	North Fork Dupuyer (FSR #9193)	X	
	Pike Creek (FSR #8958)		X
	Sawmill Creek Spur (FSR #3329)		X
	Smith Creek (FSR #215)	X	
	South Fork Teton River (FSR #109)	X	
	Sun River (FSR #108)	X	
	US Highway 2	X	
	White Rock (FSR #9218)		X
Travelways (trails)	Arsenic Creek (Tr. #208)	X	
	Blackleaf (Tr. #106)	X	
	Continental Divide National Scenic Trail	X	
	Dearborn River (Tr.#206)	X	
	Elk Pass (Tr. #205)	X	
	Falls Creek (TR. #229)	X	
	Headquarters Creek (Tr. #165)	X	
	High Water 101 (Tr. #101)	X	
	Jakie Creek (Tr. #214)	X	
	North Fork Sun (Tr. #201)	X	
	North Fork Badger (Tr. #103)	X	
	North Fork Birch Creek (Tr. #121)	X	
	North Fork Teton (Tr. #107)	X	
	Route Creek Pass (Tr. #108)	X	
	South Fork Sun Low Water (Tr. #265)	X	
	South Fork Dupuyer (Tr. #112)		X
	Straight Creek (Tr. #212)	X	
	Summit Campground Cutoff (Tr.#133)	X	
	Two Med-Heart Butte (Tr. #101)	X	
Ski area (downhill/Nordic)	Teton Pass Ski Area	X	
Boating sites	Gibson Boat Launch	X	
	Home Gulch Boat Launch	X	
Campgrounds	Benchmark Campground	X	
	Cave Mountain Campground	X	
	Double Falls Campground	X	

Category	Name	Concern level 1	Concern level 2
	Elko Campground	X	
	Home Gulch Campground	X	
	Mill Falls Campground	X	
	Mortimer Gulch Campground	X	
	South Fork Sun Campground	X	
	Summit Campground	X	
	Van Dereit Memorial Pilots Campground	X	
	West Fork Teton Campground	X	
	Wood Lake Campground	X	
Horse camps	Benchmark Packer Corrals	X	
	Straight Creek Packer Corrals	X	
Lookout/cabins	Kenck Cabin	X	
	West Fork Cabin	X	
Observation site	Marias Pass Historic Site	X	
Trailheads	Beaver	X	
	Blackleaf	X	
	Clary Coulee		X
	Elk Creek		X
	Green Gulch	X	
	Jones Creek		X
	Little Willow		X
	Middle Fork Teton	X	
	Mortimer Gulch	X	
	Ron Janikula	X	
	South Fork Sun	X	
	South Fork Teton	X	
	Straight Creek	X	
	Summit		X
	West Fork Teton	X	

Snowies Geographic Area

Figure 32. Steep-walled, amphitheater-like basin *(photo by Drew Sovilla and Bailey Campbell)*

Location

The Snowies is the farthest east GA within the HLC NFs planning area. It is primarily in the political geography of Fergus County with smaller portions in Golden Valley County. Lewistown is the largest nearby population center, with approximately 5,900 inhabitants (USCB, 2013). The GA includes both the Big and Little Snowy Mountain ranges. Both are mountain islands near one another but are slightly different in character. The Little Snowies are directly east of the Big Snowies. Along with the Judith and Moccasin Mountains, the Snowies display prominent changes in elevation accentuated by surrounding grassland, high plains, and foothill savanna.

Scenic Character

Big Snowy Mountains

The Big Snowy Mountains have long been a unique and revered destination. Early first people visited its basins and summits for various reasons. 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. Crystal Lake Guard station still actively facilitates Forest Service stewardship, whereas other structures are fading or completely disappeared, such as the Bercail School and Blake Creek Forest Station.

The Big Snowies are higher in elevation and larger in size than the Little Snowies range. The spine of the dominant landform runs east-west for approximately 25 miles, and 10 miles north-south. This orientation is unique for Montana mountain ranges east of the continental divide. The lowest elevations range to approximately 5,200 feet. Middle elevations are clad with coniferous trees, with Engelmann spruce and Douglas-fir being the dominant species. 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 tops of Mt Harlow, Tepee Point, and Lost Peak are connected by a flat-topped ridge that culminates with the summit of Greathouse Peak at 8,655 feet and Old Baldy at 8,678 feet, which are separated by Half Moon Pass. In sections, the ridge constricts to a narrow edge, such as Knife Blade Ridge at 8,590 feet.

Streams flowing out of the north side of the Big Snowies, such as Ross Fork Creek, Big Rock Creek, Cottonwood Creek, and the East Fork of Big Spring Creek, flow into the Judith River. Those flowing out of the south side, such as Galloway Creek, Half Moon Creek, and Merrills Spring Creek, flow into the Musselshell River. Many streams, such as Careless Creek and Swimming Woman Creek, originate in steep-walled, amphitheater-like basins and emerge out through canyons. Most of the precipitation falls during winter in the form of snow, so streams are heavily dependent on snowmelt. The climate and porous limestone imbues a dry character to the range.

Crystal Lake is one of the Big Snowies' crown jewels. It is a shallow lake of natural origin, roughly 15 feet at its deepest and underlain by a bed of limestone. The GA's karst topography conceals many caves. Floristically, the Big Snowies are unique with many vegetation types compressed into the same area. Greathouse Peak and Old Baldy Research Natural Areas are recognized exemplary examples of dry, alpine plant communities that have been shaped without glaciation but through frost patterning. Fire was the historic driver of plant communities.

Figure 33. Looking west from the ridge of West Peak *(photo by USDA FS)*

Figure 34. Upper slopes approaching ridgeline *(photo by USDA FS)*

Little Snowy Mountains

This smaller island range also 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 entirely located in one ecoregion, which is characterized by foothills that are partially forested with mostly ponderosa pine. In general, the country is semi-arid and dominated by grassy vegetation. Landforms are rolling with slopes that are gentle to flat, except where creeks have dissected them. The area lacks prominent high points and is entirely vegetated. The highest elevation is 5,624 feet at Bold Butte.

Creeks within the Little Snowies are small and often run dry during the summer months. The major drainages are Willow Creek and the North Fork of Pole Creek, both of which drain south to the Musselshell River.

Figure 35. Fossil *(photo by Drew Sovilla and Bailey Campbell)*

Figure 36. Ponderosa pine and aspen *(photo by USDA FS)*

Landscape Visibility

Table 9. Viewpoints in the Snowies GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Careless Canyon (FSR #15869)		X
	Crystal Lake (FSR #275)	X	
	Little Snowies (FSR #271)		X
	Niel Creek (FSR #8935)		X
	Red Hill Road (FSR #238)	X	
	Snowy Ridge(FSR #8954)		X
	Timber Creek (FSR #270)		X
Travelways (trails)	Crystal Cascades Connector (TR.#445-A)	X	
	Crystal Cascades (Tr. #445)	X	
	Crystal Lake Loop (Tr. #404)	X	
	Grand View (Tr. #403)		X
	West Peak (Tr. #490)		X
	Ulhorn (Tr. #493)		X
Campground	Crystal Lake Campground Complex	X	
	Timber Creek Campground		X
Lookout/cabin	Crystal Lake Cabin	X	
Trailheads	Crystal Cascades	X	
	Ice Cave	X	

Upper Blackfoot Geographic Area

Figure 37. Upper Blackfoot River *(photo by USDA FS)*

Location

The Upper Blackfoot GA spans Lewis and Clark and Powell Counties. The towns of Lincoln and Helmville are the nearest communities. Most of the area is west of the continental divide. The Rocky Mountain Range GA and Flathead NF are directly north and the Divide GA is to the south. To the east, mountains become grassy foothills with isolated buttes. The city of Great Falls is approximately 70 miles away. MT 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. The northwest corner of the GA is 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 and greater Northern Continental Divide Ecosystem.

Scenic Character

Evidence of prehistoric settlement is present on the landscape but inconspicuous. Artifacts, such as tepee rings, can be encountered but are infrequent. Culturally modified trees, such as scars on ponderosa pine from the collection of inner bark, are to be expected. Many western Montana tribes used the Blackfoot GA as a corridor as they traveled over to the plains area to the east to hunt for buffalo. Faint travois tracks, all which remain of this prehistoric trail, can still be seen in some location in the Landers Fork and Alice Creek drainages.

Euro-American settlement is more apparent, but many elements are also fading to time. Portions of the Lewis and 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 and Granite Butte Lookout, stand testament to the Forest Service's administration. Other sites, such as Alice Creek Ranger Station, have succumbed to time.

The Blackfoot River finds its headwaters here in the GA. The highly valued recreational and scenic river clips other portions of the GA, as well. The Continental Divide National Scenic Trail transects the GA, north to south.

The GA is predominantly in two ecoregions separated by the continental divide. The first, 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, such as glacial terrain features and soil types. The second is characterized by rounded mountains that are underlain by volcanic rocks and sedimentary rocks that have changed through geologic processes. Summits lack much exposed rock. The effects of glaciation are absent. The highest point in the GA and the Lewis & Clark Range is Red Mountain at 9,411 feet. The lowest points are at approximately 4,300 feet along the Blackfoot River. Some other prominent mountains are Ogden, Dalton, Stonewall, Olson, Crater, Nevada, Greer, and Lone Mountains.

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, Windy, and Flesher.

Most of the area is heavily forested with conifers. Ponderosa pine and Douglas-fir are the prominent components, with subalpine fir at higher elevations. Engelmann spruce grow in wet areas. Whitebark pine occurs at high elevations. Aspen stands are intermittent. Grasslands are frequent, especially along valley bottoms and sun exposed aspects, turning from verdant green to khaki brown throughout the growing season. Wetland complexes, fens, and other groundwater dependent ecosystems harbor rich assemblages of plants, such as Indian Meadows. Western and subalpine larches are found sporadically. These species are absent in other GAs. Fire is a major driver in the structure and composition of plant communities including lodgepole pine.

This GA has many important headwater streams emanating from the high country's snowmelt. Some prominent streams north of the Blackfoot River are Stonewall Creek, Arrastra Creek, Snowbank Creek, Cadotte Creek, Alice Creek, and the Landers Fork. Some prominent streams to the south of the river are Poorman Creek, Washington Creek, Hogum Creek, and Nevada Creek. 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, flowing towards the Missouri River, are the Middle and South Forks of the Dearborn River and Canyon Creek. Cottonwoods and other riparian species mark the stream courses. Many natural lakes occur throughout. The quality and number of lakes help to differentiate this GA from others.

Figure 38. Looking north into the Scapegoat Wilderness from the slopes of Red Mountain *(photo by USDA FS)*

Figure 39. Red Mountain*(photo by USDA FS)*

Landscape Visibility

Table 10. Viewpoints in the Upper Blackfoot GA

Category	Name	Concern level 1	Concern level 2
Travelways (roads)	Alice Creek (FSR #293)		X
	Beaver Creek-Dry Creek (FSR#4106)		X
	Copper Creek (FSR #330)		X
	Dalton (FSR #329)		X
	Flesher (FSR #279)	X	
	US Highway 200	X	
	Hogum Creek (FSR #1841)		X
	Indian Meadows (FSR #1842)		X
	Keep Cool (FSR #1821)		X
	Lincoln Gulch (FSR #626)		X
	Lower Hogum (FSR #1841-A1)		X
	Marsh Creek (FSR #485)		X
	Nevada Creek (FSR #296)		X
	Nevada Ogden (FSR #1163)		X
	Sauerkraut (FSR #1892)		X
	South Fork Poorman (FSR #4134)		X
	Stemple Pass Road (FSR #601)		X
	Sucker-Keep Cool (FSR #1800)		X
Travelways (trails)	Continental Divide National Scenic Trail	X	
	Lewis and Clark Pass (Tr. #493)	X	
Lake	Snowbank Lake	X	
Campgrounds	Aspen Grove Campground	X	
	Copper Creek Campground	X	
Horse camp	Indian Meadows	X	
Lookout/cabin	Cummings Cabin	X	
Trailheads	Alice Creek		X
	Arrastra Creek 482		X
	Dalton Mountain 404		X
	Dalton Mountain 467		X
	Dry Creek 483		X
	Flesher Pass 440		X
	Indian Meadows 481		X
	Marsh Creek 440 & 467		X
	Nevada Creek 466		X
	Sauerkraut Creek 401		X
	Snowbank Creek 418		X
	Stemple Pass 440		X
	Stonewall Mountain 417		X
	Sucker Creek 418		X

Literature

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USCB. (2013). American Community Survey (ACS): 2013 five-year tables. Retrieved from https://www.census.gov/programs-surveys/acs/

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Appendix H. 2021 Land Management Plan Reader's Guide

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Introduction

Plan components are integrated across sections due to the interrelated nature of resources. This appendix provides an index that cross-references plan components related to resource topics that are commonly of interest, or those that are found in many sections. It is intended to assist the reader in locating plan components that relate to a specific topic of interest; it does not necessarily provide an all-inclusive list of the components that may have an indirect bearing on each topic. The index is sorted alphabetically by topic area, and plan components are listed in order of page number.

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FW-RECWILD-SUIT-05	78
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FW-REC-DC-04	70
FW-WILD-DC-03	75
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PCA-NCDE-STD-10, 11	61
PCA-NCDE-GDL-09, 10	63
FW-REC-SUIT-04	71
FW-WILD-GDL-01; FW-WILD-SUIT-01	76
FW-RECWILD-SUIT-08	78
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FW-VEGF-GDL-02	42
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FW-RECWILD-SUIT-01, 03	78
FW-WSA-SUIT-04, 08	79
FW-IRA-SUIT-02	82
FW-WSR-GDL-01	88
FW-CDNST-GDL-04	94
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FW-VEGF-DC-02, 03	38
FW-VEGF-DC-08	41
FW-WL-DC-06, 07	50
FW-WL-GDL-05, 06, 14	51-52
FW-REC-DC-04	70
FW-WILD-DC-03	75
FW-IRA-DC-01	82
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